ENERGY

PART 1 OF 1

WITH COMMENTS

Proposed Code Modifications

This document created by the Florida Department of Business and Professional Regulation - 850-487-1824

Total Mods for **Energy** in **Approved as Submitted: 7**

Total Mods for report: 22

Sub Code: Energy Conservation

EN6006

Date Submitted	8/2/2012	**Section**	100	**Proponent**	Ann Stanton
Chapter	7	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments Yes   **Alternate Language** Yes

Related Modifications

Summary of Modification

Add Appendix A from 2010 FBC Energy Conservation code.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

6006-A1

Proponent Ann Stanton **Submitted** 12/3/2012 **Attachments** Yes

Rationale

Responding to general comment that seven college names have been changed and need to be reflected in Appendix A.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

None.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Corrects names of colleges.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Corrects names of colleges.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Corrects names of colleges.

Does not degrade the effectiveness of the code

No. Corrects names of colleges.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Corrects proper names of Florida colleges referenced in Appendix A.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

EN6006-G2

Proponent Jon Hamrick **Submitted** 11/1/2012 **Attachments** No

Comment:

Community colleges have been changing from two-year programs to four-year programs. As a result the names of community colleges have been changing. These name changes have been approved by the Florida legislature and the governor. The following college names need to be changed in Appendix A, Jurisdictional Data, to stay up to date with current college names:

Bay County, Jurisdiction 131900, change Gulf Coast Community College to Gulf Coast State College.

Columbia County, Jurisdiction 221400, change Lake City Community College to Florida Gateway College.

Escambia County, Jurisdiction 271300, change Pensacola Junior College to Pensacola State College.

Highlands County, Jurisdiction 381500, change South Florida Community College to South Florida State College.

Marion County, Jurisdiction 521600, change Central Florida Community College to College of Central Florida.

Orange County, Jurisdiction 582700, change Valencia Community College to Valencia College.

St. Johns County, Jurisdiction 651500, change St. Johns River Community College to St. Johns River State College.

EN6006-G1

Proponent	Jon Hamrick	**Submitted**	9/21/2012	**Attachments**	No

Comment:

Resent legislation has changed some the the state colleges names. The following college names should be changed: Gulf Coast Community College to Gulf Coast State College, Lake City Community College to Florida Gateway College, Pensacola Junior College to Pensacola State College, South Florida Community College to South Florida State College, Central Florida Community College to College of Central Florida, Valencia Community College to Valencia College, St. Johns River Community College to St. Johns River State College,

APPENDIX A

JURISDICTIONAL DATA

PERMITTING OFFICE	JURISDICTION NUMBER	REPORTING GROUP
ALACHUA COUNTY	111000	III
ALACHUA DISTRICT SCHOOLS	111100	III
UNIVERSITY OF FLORIDA	111200	III
GAINESVILLE	111300	III
HIGH SPRINGS	111500	III
NEWBERRY	111800	III
WALDO	111900	III
SANTA FE COLLEGE	112000	III
BAKER COUNTY	121000	III
MACCLENNY	121100	III
BAKER DISTRICT SCHOOLS	121200	III
BAY COUNTY	131000	III
CALLAWAY	131100	III
LYNN HAVEN	131300	III
MEXICO BEACH	131400	III
PANAMA CITY	131500	III
PANAMA CITY BEACH	131600	III
BAY DISTRICT SCHOOLS	131700	III
SPRINGFIELD	131800	III
GULF COAST COMMUNITY COLLEGE	131900	III
BRADFORD COUNTY	141000	III

BRADFORD DISTRICT SCHOOLS	141100	III
BREVARD COUNTY	151000	II
CAPE CANAVERAL	151100	II
COCOA	151200	II
COCOA BEACH	151300	II
INDIATLANTIC	151400	II
INDIAN HARBOR BEACH	151500	II
MALABAR	151600	II
MELBOURNE	151700	II
MELBOURNE BEACH	151800	II
MELBOURNE VILLAGE	151900	II
PALM BAY	152000	II
PALM SHORES	152100	II
ROCKLEDGE	152200	II
SATELLITE BEACH	152300	II
TITUSVILLE	152400	II
WEST MELBOURNE	152500	II
BREVARD DISTRICT SCHOOLS	152600	II
BREVARD COMMUNITY COLLEGE	152700	II
BROWARD COUNTY	161000	II
COCONUT CREEK	161100	II
COOPER CITY	161200	II
CORAL SPRINGS	161300	II
DANIA	161400	II
DAVIE	161500	II
DEERFIELD BEACH	161600	II
FORT LAUDERDALE	161700	II

HALLANDALE	161900	II
HOLLYWOOD	162100	II
LAUDERDALE BY THE SEA	162200	II
LAUDERDALE LAKES	162300	II
LAUDERHILL	162400	II
LIGHTHOUSE POINT	162600	II
MARGATE	162700	II
MIRAMAR	162800	II
NORTH LAUDERDALE	162900	II
OAKLAND PARK	163000	II
PARKLAND	163100	II
PEMBROKE PARK	163200	II
PEMBROKE PINES	163300	II
PLANTATION	163400	II
POMPANO BEACH	163500	II
SEA RANCH LAKES	163600	II
SUNRISE	163700	II
TAMARAC	163800	II
WESTON	163850	II
WILTON MANORS	163900	II
BROWARD DISTRICT SCHOOLS	164000	II
BROWARD COLLEGE	164100	II
CALHOUN COUNTY	171000	III
CALHOUN DISTRICT SCHOOLS	171100	III
BLOUNTSTOWN	171200	III
CHARLOTTE COUNTY	181000	III
PUNTA GORDA	181100	III

CHARLOTTE DISTRICT SCHOOLS	181200	III
CITRUS COUNTY	191000	III
CRYSTAL RIVER	191100	III
INVERNESS	191200	III
CITRUS DISTRICT SCHOOLS	191300	III
CLAY COUNTY	201000	III
GREEN COVE SPRINGS	201100	III
ORANGE PARK	201300	III
PENNEY FARMS	201400	III
CLAY DISTRICT SCHOOLS	201500	III
COLLIER COUNTY	211000	III
EVERGLADES CITY	211100	III
MARCO ISLAND	211300	III
NAPLES	211200	III
COLLIER DISTRICT SCHOOLS	211400	III
COLUMBIA COUNTY	221000	III
LAKE CITY	221200	III
COLUMBIA DISTRICT SCHOOLS	221300	III
LAKE CITY COMMUNITY COLLEGE	221400	III
DESOTO COUNTY	241000	III
DESOTO DISTRICT SCHOOLS	241100	III
DIXIE COUNTY	251000	III
DIXIE DISTRICT SCHOOLS	251100	III
DUVAL COUNTY	261000	III
ATLANTIC BEACH	261100	III
BALDWIN	261200	III
JACKSONVILLE	261300	III

JACKSONVILLE BEACH	261400	III
NEPTUNE BEACH	261500	III
DUVAL DISTRICT SCHOOLS	261600	III
FLORIDA STATE COLLEGE		
AT JACKSONVILLE	261700	III
UNIVERSITY OF NORTH FLORIDA	261800	III
ESCAMBIA COUNTY	271000	III
PENSACOLA	271100	III
ESCAMBIA DISTRICT SCHOOLS	271200	III
PENSACOLA JUNIOR COLLEGE	271300	III
UNIVERSITY OF WEST FLORIDA	271400	III
FLAGLER COUNTY	281000	III
BEVERLY BEACH	281100	III
BUNNELL	281200	III
FLAGLER BEACH	281300	III
FLAGLER DISTRICT SCHOOLS	281400	III
PALM COAST	281500	III
FRANKLIN COUNTY	291000	III
CARRABELLE	291200	III
FRANKLIN DISTRICT SCHOOLS	291300	III
GADSDEN COUNTY	301000	III
CHATTAHOOCHEE	301100	III
GRETNA	301300	III
HAVANA	301400	III
QUINCY	301500	III
GADSDEN DISTRICT SCHOOLS	301600	III
GILCHRIST COUNTY	311000	III

GILCHRIST DISTRICT SCHOOLS	311100	III
TRENTON	311300	III
GLADES COUNTY	321000	III
MOORE HAVEN	321100	III
GLADES DISTRICT SCHOOLS	321200	III
GULF COUNTY	331000	III
PORT ST. JOE	331100	III
GULF DISTRICT SCHOOLS	331200	III
HAMILTON COUNTY	341000	III
HAMILTON DISTRICT SCHOOLS	341100	III
HARDEE COUNTY	351000	III
BOWLING GREEN	351100	III
ZOLFO SPRINGS	351300	III
HARDEE DISTRICT SCHOOLS	351400	III
HENDRY COUNTY	361000	III
CLEWISTON	361100	III
HENDRY DISTRICT SCHOOLS	361200	III
HERNANDO COUNTY	371000	III
BROOKSVILLE	371100	III
HERNANCO DISTRICT SCHOOLS	371200	III
HIGHLANDS COUNTY	381000	III
AVON PARK	381100	III
LAKE PLACID	381200	III
SEBRING	381300	III
HIGHLANDS DISTRICT SCHOOLS	381400	III
SOUTH FLORIDA COMM. COLLEGE	381500	III
HILLSBOROUGH COUNTY	391000	II

PLANT CITY	391100	II
TAMPA	391200	II
TEMPLE TERRACE	391300	II
HILLSBOROUGH DISTRICT SCHOOLS	391400	II
HILLSBOROUGH COMM. COL.	391500	II
UNIVERSITY OF SOUTH FLORIDA	391600	II
HOLMES COUNTY	401000	III
HOLMES DISTRICT SCHOOLS	401100	III
INDIAN RIVER COUNTY	411000	III
FELLSMERE	411100	III
ORCHID	411300	III
SEBASTIAN	411400	III
INDIAN RIVER DISTRICT SCHOOLS	411500	III
INDIAN RIVER STATE COLLEGE	411600	III
JACKSON COUNTY	421000	III
JACKSON DISTRICT SCHOOLS	421100	III
CHIPOLA COLLEGE	421200	III
GREENWOOD	421700	III
JEFFERSON COUNTY	431000	III
JEFFERSON DISTRICT SCHOOLS	431100	III
LAFAYETTE COUNTY	441000	III
MAYO	441100	III
LAFAYETTE DISTRICT SCHOOLS	441200	III
LAKE COUNTY	451000	III
CLERMONT	451200	III
EUSTIS	451300	III
FRUITLAND PARK	451400	III

GROVELAND	451500	III
HOWEY IN THE HILLS	451600	III
LADY LAKE	451700	III
LEESBURG	451800	III
MASCOTTE	451900	III
MINNEOLA	452000	III
MONTVERDE	452100	III
MOUNT DORA	452200	III
TAVARES	452300	III
UMATILLA	452400	III
LAKE DISTRICT SCHOOLS	452500	III
LAKE-SUMTER COMM. COL.	452600	III
LEE COUNTY	461000	III
CAPE CORAL	461100	III
FORT MYERS	461200	III
SANIBEL	461300	III
LEE DISTRICT SCHOOLS	461400	III
EDISON STATE COLLEGE	461500	III
GULF COAST UNIVERSITY	461600	III
LEON COUNTY	471000	III
TALLAHASSEE	471100	III
FLORIDA STATE UNIVERSITY	471200	III
TALLAHASSEE COMMUNITY COLLEGE	471300	III
LEON DISTRICT SCHOOLS	471300	III
FLORIDA A&M UNIVERSITY	471400	III
LEVY COUNTY	481000	III
CEDAR KEY	481200	III

CHIEFLAND	481300	III
INGLIS	481400	III
OTTER CREEK	481500	III
WILLISTON	481600	III
LEVY DISTRICT SCHOOLS	481700	III
LIBERTY COUNTY	491000	III
LIBERTY DISTRICT SCHOOLS	491100	III
MADISON COUNTY	501000	III
MADISON DISTRICT SCHOOLS	501100	III
LEE	501200	III
NORTH FLORIDA COMM. COL.	501300	III
MANATEE COUNTY	511000	II
ANNA MARIA	511100	II
BRADENTON	511200	II
BRADENTON BEACH	511300	II
HOLMES BEACH	511400	II
LONGBOAT KEY	511500	II
PALMETTO	511600	II
MANATEE DISTRICT SCHOOLS	511700	II
STATE COLLEGE OF FLORIDA,		
MANATEE – SARASOTA	511800	II
MARION COUNTY	521000	II
BELLEVIEW	521100	II
DUNNELLON	521200	II
MCINTOSH	521300	II
OCALA	521400	II
MARION DISTRICT SCHOOLS	521500	II

CENTRAL FLORIDA COMM. COLLEGE	521600	II
MARTIN COUNTY	531000	II
JUPITER ISLAND	531100	II
OCEAN BREEZE PARK	531200	II
SEWALLS POINT	531300	II
STUART	531400	II
MARTIN DISTRICT SCHOOLS	531500	II
MIAMI-DADE COUNTY	231000	III
BAL HARBOUR VILLAGE	231100	III
BAY HARBOR ISLANDS	231200	III
BISCAYNE PARK	231300	III
CORAL GABLES	231400	III
DORAL	231410	III
EL PORTAL	231500	III
FLORIDA CITY	231600	III
GOLDEN BEACH	231700	III
HIALEAH	231800	III
HIALEAH GARDENS	231900	III
HOMESTEAD	232000	III
INDIAN CREEK VILLAGE	232100	III
ISLANDIA	232200	III
KEY BISCAYNE	233700	III
MEDLEY	232300	III
MIAMI	232400	III
MIAMI BEACH	232500	III
MIAMI GARDENS	232510	III
MIAMI SHORES VILLAGE	232600	III

MIAMI SPRINGS	232700	III
NORTH BAY VILLAGE	232800	III
NORTH MIAMI	233000	III
NORTH MIAMI BEACH	232900	III
OPA LOCKA	233100	III
PALMETTO BAY	233110	III
PENNSUCO	233200	III
PINECREST	233250	III
SOUTH MIAMI	233300	III
SUNNY ISLES BEACH	233700	III
SURFSIDE	233400	III
SWEETWATER	233500	III
VIRGINIA GARDENS	233600	III
MIAMI-DADE DISTRICT SCHOOLS	233800	III
MIAMI-DADE COLLEGE	233900	III
FLORIDA INTERNATIONAL UNIVERSITY	234000	III
MONROE COUNTY	541000	III
KEY COLONY BEACH	541100	III
KEY WEST	541200	III
LAYTON	541300	III
MARATON	541400	III
MONROE DISTRICT SCHOOLS	541500	III
FLORIDA KEYS COMM. COLLEGE	541600	III
NASSAU COUNTY	551000	III
CALLAHAN	551100	III
FERNANDINA BEACH	551200	III
HILLIARD	551300	III

NASSAU DISTRICT SCHOOLS	551400	III
OKALOOSA COUNTY	561000	II
CRESTVIEW	561400	II
DESTIN	561200	II
FORT WALTON BEACH	561300	II
MARY ESTHER	561500	II
NICEVILLE	561600	II
VALPARAISO	561800	II
OKALOOSA DISTRICT SCHOOLS	561900	II
NORTHWEST FLORIDA STATE COLLEGE	562000	II
OKEECHOBEE COUNTY	571000	III
OKEECHOBEE	571100	III
OKEECHOBEE DISTRICT SCHOOLS	571200	III
ORANGE COUNTY	581000	II
APOPKA	581100	II
BAY LAKE	581200	II
EATONVILLE	581400	II
EDGEWOOD	581500	II
LAKE BUENA VISTA	581600	II
MAITLAND	581800	II
OAKLAND	581900	II
OCOEE	582000	II
ORLANDO	582100	II
WINTER GARDEN	582300	II
WINTER PARK	582400	II
ORANGE DISTRICT SCHOOLS	582500	II
UNIVERSITY OF CENTRAL FLORIDA	582600	II

VALENCIA COMMUNITY COLLEGE	582700	II
OSCEOLA COUNTY	591000	II
KISSIMMEE	591100	II
ST CLOUD	591200	II
OSCEOLA DISTRICT SCHOOLS	591300	II
PALM BEACH COUNTY	601000	I
ATLANTIS	601100	I
BELLE GLADE	601200	I
BOCA RATON	601300	I
BOYNTON BEACH	601400	I
BRINY BREEZES	601500	I
CLOUD LAKE	601600	I
DELRAY BEACH	601700	I
GLEN RIDGE	601800	I
GOLF	601900	I
GOLFVIEW	602000	I
HAVERHILL	602300	I
HIGHLAND BEACH	602400	I
HYPOLUXO	602500	I
JUPITER	602700	I
LAKE CLARKE SHORE	602900	I
LAKE PARK	603000	I
LAKE WORTH	603100	I
LANTANA	603200	I
MANALAPAN	603300	I
MANGONIA PARK	603400	I
NORTH PALM BEACH	603500	I

OCEAN RIDGE	603600	I
PAHOKEE	603700	I
PALM BEACH	603800	I
PALM BEACH GARDENS	603900	I
PALM BEACH SHORES	604000	I
PALM SPRINGS	604100	I
RIVIERA BEACH	604200	I
ROYAL PALM BEACH	604300	I
SOUTH PALM BEACH	604500	I
TEQUESTA	604600	I
WELLINGTON	604650	I
WEST PALM BEACH	604700	I
PALM BEACH DISTRICT SCHOOLS	604800	I
PALM BEACH STATE COLLEGE	604900	I
FLORIDA ATLANTIC UNIVERSITY	605100	I
PASCO COUNTY	611000	I
DADE CITY	611100	I
NEW PORT RICHEY	611200	I
PORT RICHEY	611300	I
ST. LEO	611400	I
ZEPHYRHILLS	611600	I
PASCO DISTRICT SCHOOLS	611700	I
PASCO-HERNANDO COMM. COLLEGE	611800	I
PINELLAS COUNTY	621000	I
BELLEAIR	621100	I
BELLEAIR BEACH	621200	I
CLEARWATER	621500	I

DUNEDIN	621600	I
GULFPORT	621700	I
INDIAN ROCK BEACH	621800	I
INDIAN SHORES	621900	I
KENNETH CITY	622000	I
LARGO	622100	I
MADEIRA BEACH	622200	I
NORTH REDINGTON BEACH	622300	I
OLDSMAR	622400	I
PINELLAS PARK	622500	I
REDINGTON BEACH	622600	I
REDINGTON SHORES	622700	I
SAFETY HARBOR	622800	I
ST PETERSBURG	622900	I
ST PETERSBURG BEACH	623000	I
SEMINOLE	623100	I
SOUTH PASADENA	623200	I
TARPON SPRINGS	623300	I
TREASURE ISLAND	623400	I
PINELLAS DISTRICT SCHOOLS	623500	I
ST PETERSBURG COLLEGE	623600	I
POLK COUNTY	631000	I
AUBURNDALE	631100	I
BARTOW	631200	I
DAVENPORT	631300	I
DUNDEE	631400	I
EAGLE LAKE	631500	I

FORT MEADE	631600	I
FROSTPROOF	631700	I
HAINES CITY	631800	I
LAKE ALFRED	632100	I
LAKE HAMILTON	632200	I
LAKELAND	632300	I
LAKE WALES	632400	I
MULBERRY	632500	I
POLK CITY	632600	I
WINTER HAVEN	632700	I
POLK DISTRICT SCHOOLS	632800	I
POLK STATE_COLLEGE	632900	I
PUTNAM COUNTY	641000	III
PALATKA	641300	III
PUTNAM DISTRICT SCHOOLS	641400	III
ST JOHNS COUNTY	651000	I
ST AUGUSTINE	651200	I
ST AUGUSTINE BEACH	651300	I
ST JOHNS DISTRICT SCHOOLS	651400	I
ST JOHNS RIVER COMMUNITY COLLEGE	651500	I
ST LUCIE COUNTY	661000	II
FORT PIERCE	661100	II
PORT ST LUCIE	661200	II
ST LUCIE VILLAGE	661300	II
ST LUCIE DISTRICT SCHOOLS	661400	II
SANTA ROSA COUNTY	671000	II
GULF BREEZE	671100	II

JAY	671200	II
MILTON	671300	II
SANTA ROSA DISTRICT SCHOOLS	671400	II
SARASOTA COUNTY	681000	II
NORTH PORT	681100	II
SARASOTA	681200	II
VENICE	681300	II
SARASOTA DISTRICT SCHOOLS	681400	II
SEMINOLE COUNTY	691000	I
ALTAMONTE SPRINGS	691100	I
CASSELBERRY	691200	I
LONGWOOD	691300	I
OVIEDO	691400	I
SANFORD	691500	I
WINTER SPRINGS	691600	I
LAKE MARY	691700	I
SEMINOLE DISTRICT SCHOOLS	691800	I
SEMINOLE STATE COLLEGE OF FLORIDA	691900	I
SEMINOLE INDIAN TRIBE	692000	III
SUMTER COUNTY	701000	II
BUSHNELL	701100	II
CENTER HILL	701200	II
COLEMAN	701300	II
WILDWOOD	701400	II
SUMTER DISTRICT SCHOOLS	701500	II
SUWANNEE COUNTY	711000	III
BRANFORD	711100	III

LIVE OAK	711200	III
SUWANNEE DISTRICT SCHOOLS	711300	III
TAYLOR COUNTY	721000	II
PERRY	721100	II
TAYLOR DISTRICT SCHOOLS	721200	II
UNION COUNTY	731000	II
UNION DISTRICT SCHOOLS	731100	II
VOLUSIA COUNTY	741000	I
DAYTONA BEACH	741100	I
DAYTONA BEACH SHORES	741200	I
DELAND	741300	I
EDGEWATER	741400	I
HOLLY HILL	741500	I
LAKE HELEN	741600	I
NEW SMYRNA BEACH	741700	I
OAK HILL	741800	I
ORANGE CITY	741900	I
ORMAND BEACH	742000	I
PIERSON	742100	I
PONCE INLET	742200	I
PORT ORANGE	742300	I
SOUTH DAYTONA	742400	I
VOLUSIA DISTRICT SCHOOLS	742500	I
DAYTONA STATE COLLEGE	742600	I
WAKULLA COUNTY	751000	II
WAKULLA DISTRICT SCHOOLS	751100	II
WALTON COUNTY	761000	II

DEFUNIAK SPRINGS	761100	II
WALTON DISTRICT SCHOOLS	761200	II
WASHINGTON COUNTY	771000	II
WASHINGTON DISTRICT SCHOOLS	771100	II

APPENDIX A

JURISDICTIONAL DATA

PERMITTING OFFICE	JURISDICTION NUMBER	REPORTING GROUP
ALACHUA COUNTY	111000	III
ALACHUA DISTRICT SCHOOLS	111100	III
UNIVERSITY OF FLORIDA	111200	III
GAINESVILLE	111300	III
HIGH SPRINGS	111500	III
NEWBERRY	111800	III
WALDO	111900	III
SANTA FE COLLEGE	112000	III
BAKER COUNTY	121000	III
MACCLENNY	121100	III
BAKER DISTRICT SCHOOLS	121200	III
BAY COUNTY	131000	III
CALLAWAY	131100	III
LYNN HAVEN	131300	III
MEXICO BEACH	131400	III
PANAMA CITY	131500	III
PANAMA CITY BEACH	131600	III
BAY DISTRICT SCHOOLS	131700	III
SPRINGFIELD	131800	III
GULF COAST STATE ~~COMMUNITY~~ COLLEGE	131900	III
BRADFORD COUNTY	141000	III

BRADFORD DISTRICT SCHOOLS	141100	III
BREVARD COUNTY	151000	II
CAPE CANAVERAL	151100	II
COCOA	151200	II
COCOA BEACH	151300	II
INDIATLANTIC	151400	II
INDIAN HARBOR BEACH	151500	II
MALABAR	151600	II
MELBOURNE	151700	II
MELBOURNE BEACH	151800	II
MELBOURNE VILLAGE	151900	II
PALM BAY	152000	II
PALM SHORES	152100	II
ROCKLEDGE	152200	II
SATELLITE BEACH	152300	II
TITUSVILLE	152400	II
WEST MELBOURNE	152500	II
BREVARD DISTRICT SCHOOLS	152600	II
BREVARD COMMUNITY COLLEGE	152700	II
BROWARD COUNTY	161000	II
COCONUT CREEK	161100	II
COOPER CITY	161200	II
CORAL SPRINGS	161300	II
DANIA	161400	II
DAVIE	161500	II
DEERFIELD BEACH	161600	II
FORT LAUDERDALE	161700	II

HALLANDALE	161900	II
HOLLYWOOD	162100	II
LAUDERDALE BY THE SEA	162200	II
LAUDERDALE LAKES	162300	II
LAUDERHILL	162400	II
LIGHTHOUSE POINT	162600	II
MARGATE	162700	II
MIRAMAR	162800	II
NORTH LAUDERDALE	162900	II
OAKLAND PARK	163000	II
PARKLAND	163100	II
PEMBROKE PARK	163200	II
PEMBROKE PINES	163300	II
PLANTATION	163400	II
POMPANO BEACH	163500	II
SEA RANCH LAKES	163600	II
SUNRISE	163700	II
TAMARAC	163800	II
WESTON	163850	II
WILTON MANORS	163900	II
BROWARD DISTRICT SCHOOLS	164000	II
BROWARD COLLEGE	164100	II
CALHOUN COUNTY	171000	III
CALHOUN DISTRICT SCHOOLS	171100	III
BLOUNTSTOWN	171200	III
CHARLOTTE COUNTY	181000	III
PUNTA GORDA	181100	III

CHARLOTTE DISTRICT SCHOOLS	181200	III
CITRUS COUNTY	191000	III
CRYSTAL RIVER	191100	III
INVERNESS	191200	III
CITRUS DISTRICT SCHOOLS	191300	III
CLAY COUNTY	201000	III
GREEN COVE SPRINGS	201100	III
ORANGE PARK	201300	III
PENNEY FARMS	201400	III
CLAY DISTRICT SCHOOLS	201500	III
COLLIER COUNTY	211000	III
EVERGLADES CITY	211100	III
MARCO ISLAND	211300	III
NAPLES	211200	III
COLLIER DISTRICT SCHOOLS	211400	III
COLUMBIA COUNTY	221000	III
LAKE CITY	221200	III
COLUMBIA DISTRICT SCHOOLS	221300	III
FLORIDA GATEWAY ~~LAKE CITY COMMUNITY~~ COLLEGE	221400	III
DESOTO COUNTY	241000	III
DESOTO DISTRICT SCHOOLS	241100	III
DIXIE COUNTY	251000	III
DIXIE DISTRICT SCHOOLS	251100	III
DUVAL COUNTY	261000	III
ATLANTIC BEACH	261100	III
BALDWIN	261200	III
JACKSONVILLE	261300	III

JACKSONVILLE BEACH	261400	III
NEPTUNE BEACH	261500	III
DUVAL DISTRICT SCHOOLS	261600	III
FLORIDA STATE COLLEGE AT JACKSONVILLE	261700	III
UNIVERSITY OF NORTH FLORIDA	261800	III
ESCAMBIA COUNTY	271000	III
PENSACOLA	271100	III
ESCAMBIA DISTRICT SCHOOLS	271200	III
PENSACOLA STATE ~~JUNIOR~~ COLLEGE	271300	III
UNIVERSITY OF WEST FLORIDA	271400	III
FLAGLER COUNTY	281000	III
BEVERLY BEACH	281100	III
BUNNELL	281200	III
FLAGLER BEACH	281300	III
FLAGLER DISTRICT SCHOOLS	281400	III
PALM COAST	281500	III
FRANKLIN COUNTY	291000	III
CARRABELLE	291200	III
FRANKLIN DISTRICT SCHOOLS	291300	III
GADSDEN COUNTY	301000	III
CHATTAHOOCHEE	301100	III
GRETNA	301300	III
HAVANA	301400	III
QUINCY	301500	III
GADSDEN DISTRICT SCHOOLS	301600	III
GILCHRIST COUNTY	311000	III

GILCHRIST DISTRICT SCHOOLS	311100	III
TRENTON	311300	III
GLADES COUNTY	321000	III
MOORE HAVEN	321100	III
GLADES DISTRICT SCHOOLS	321200	III
GULF COUNTY	331000	III
PORT ST. JOE	331100	III
GULF DISTRICT SCHOOLS	331200	III
HAMILTON COUNTY	341000	III
HAMILTON DISTRICT SCHOOLS	341100	III
HARDEE COUNTY	351000	III
BOWLING GREEN	351100	III
ZOLFO SPRINGS	351300	III
HARDEE DISTRICT SCHOOLS	351400	III
HENDRY COUNTY	361000	III
CLEWISTON	361100	III
HENDRY DISTRICT SCHOOLS	361200	III
HERNANDO COUNTY	371000	III
BROOKSVILLE	371100	III
HERNANCO DISTRICT SCHOOLS	371200	III
HIGHLANDS COUNTY	381000	III
AVON PARK	381100	III
LAKE PLACID	381200	III
SEBRING	381300	III
HIGHLANDS DISTRICT SCHOOLS	381400	III
SOUTH FLORIDA STATE ~~COMM.~~ COLLEGE	381500	III
HILLSBOROUGH COUNTY	391000	II

PLANT CITY	391100	II
TAMPA	391200	II
TEMPLE TERRACE	391300	II
HILLSBOROUGH DISTRICT SCHOOLS	391400	II
HILLSBOROUGH COMM. COL.	391500	II
UNIVERSITY OF SOUTH FLORIDA	391600	II
HOLMES COUNTY	401000	III
HOLMES DISTRICT SCHOOLS	401100	III
INDIAN RIVER COUNTY	411000	III
FELLSMERE	411100	III
ORCHID	411300	III
SEBASTIAN	411400	III
INDIAN RIVER DISTRICT SCHOOLS	411500	III
INDIAN RIVER STATE COLLEGE	411600	III
JACKSON COUNTY	421000	III
JACKSON DISTRICT SCHOOLS	421100	III
CHIPOLA COLLEGE	421200	III
GREENWOOD	421700	III
JEFFERSON COUNTY	431000	III
JEFFERSON DISTRICT SCHOOLS	431100	III
LAFAYETTE COUNTY	441000	III
MAYO	441100	III
LAFAYETTE DISTRICT SCHOOLS	441200	III
LAKE COUNTY	451000	III
CLERMONT	451200	III
EUSTIS	451300	III
FRUITLAND PARK	451400	III

GROVELAND	451500	III
HOWEY IN THE HILLS	451600	III
LADY LAKE	451700	III
LEESBURG	451800	III
MASCOTTE	451900	III
MINNEOLA	452000	III
MONTVERDE	452100	III
MOUNT DORA	452200	III
TAVARES	452300	III
UMATILLA	452400	III
LAKE DISTRICT SCHOOLS	452500	III
LAKE-SUMTER COMM. COL.	452600	III
LEE COUNTY	461000	III
CAPE CORAL	461100	III
FORT MYERS	461200	III
SANIBEL	461300	III
LEE DISTRICT SCHOOLS	461400	III
EDISON STATE COLLEGE	461500	III
GULF COAST UNIVERSITY	461600	III
LEON COUNTY	471000	III
TALLAHASSEE	471100	III
FLORIDA STATE UNIVERSITY	471200	III
TALLAHASSEE COMMUNITY COLLEGE	471300	III
LEON DISTRICT SCHOOLS	471300	III
FLORIDA A&M UNIVERSITY	471400	III
LEVY COUNTY	481000	III
CEDAR KEY	481200	III

CHIEFLAND	481300	III
INGLIS	481400	III
OTTER CREEK	481500	III
WILLISTON	481600	III
LEVY DISTRICT SCHOOLS	481700	III
LIBERTY COUNTY	491000	III
LIBERTY DISTRICT SCHOOLS	491100	III
MADISON COUNTY	501000	III
MADISON DISTRICT SCHOOLS	501100	III
LEE	501200	III
NORTH FLORIDA COMM. COL.	501300	III
MANATEE COUNTY	511000	II
ANNA MARIA	511100	II
BRADENTON	511200	II
BRADENTON BEACH	511300	II
HOLMES BEACH	511400	II
LONGBOAT KEY	511500	II
PALMETTO	511600	II
MANATEE DISTRICT SCHOOLS	511700	II
STATE COLLEGE OF FLORIDA,		
MANATEE – SARASOTA	511800	II
MARION COUNTY	521000	II
BELLEVIEW	521100	II
DUNNELLON	521200	II
MCINTOSH	521300	II
OCALA	521400	II
MARION DISTRICT SCHOOLS	521500	II

COLLEGE OFCENTRAL FLORIDA ~~COMM. COLLEGE~~	521600	II
MARTIN COUNTY	531000	II
JUPITER ISLAND	531100	II
OCEAN BREEZE PARK	531200	II
SEWALLS POINT	531300	II
STUART	531400	II
MARTIN DISTRICT SCHOOLS	531500	II
MIAMI-DADE COUNTY	231000	III
BAL HARBOUR VILLAGE	231100	III
BAY HARBOR ISLANDS	231200	III
BISCAYNE PARK	231300	III
CORAL GABLES	231400	III
DORAL	231410	III
EL PORTAL	231500	III
FLORIDA CITY	231600	III
GOLDEN BEACH	231700	III
HIALEAH	231800	III
HIALEAH GARDENS	231900	III
HOMESTEAD	232000	III
INDIAN CREEK VILLAGE	232100	III
ISLANDIA	232200	III
KEY BISCAYNE	233700	III
MEDLEY	232300	III
MIAMI	232400	III
MIAMI BEACH	232500	III
MIAMI GARDENS	232510	III
MIAMI SHORES VILLAGE	232600	III

MIAMI SPRINGS	232700	III
NORTH BAY VILLAGE	232800	III
NORTH MIAMI	233000	III
NORTH MIAMI BEACH	232900	III
OPA LOCKA	233100	III
PALMETTO BAY	233110	III
PENNSUCO	233200	III
PINECREST	233250	III
SOUTH MIAMI	233300	III
SUNNY ISLES BEACH	233700	III
SURFSIDE	233400	III
SWEETWATER	233500	III
VIRGINIA GARDENS	233600	III
MIAMI-DADE DISTRICT SCHOOLS	233800	III
MIAMI-DADE COLLEGE	233900	III
FLORIDA INTERNATIONAL UNIVERSITY	234000	III
MONROE COUNTY	541000	III
KEY COLONY BEACH	541100	III
KEY WEST	541200	III
LAYTON	541300	III
MARATON	541400	III
MONROE DISTRICT SCHOOLS	541500	III
FLORIDA KEYS COMM. COLLEGE	541600	III
NASSAU COUNTY	551000	III
CALLAHAN	551100	III
FERNANDINA BEACH	551200	III
HILLIARD	551300	III

NASSAU DISTRICT SCHOOLS	551400	III
OKALOOSA COUNTY	561000	II
CRESTVIEW	561400	II
DESTIN	561200	II
FORT WALTON BEACH	561300	II
MARY ESTHER	561500	II
NICEVILLE	561600	II
VALPARAISO	561800	II
OKALOOSA DISTRICT SCHOOLS	561900	II
NORTHWEST FLORIDA STATE COLLEGE	562000	II
OKEECHOBEE COUNTY	571000	III
OKEECHOBEE	571100	III
OKEECHOBEE DISTRICT SCHOOLS	571200	III
ORANGE COUNTY	581000	II
APOPKA	581100	II
BAY LAKE	581200	II
EATONVILLE	581400	II
EDGEWOOD	581500	II
LAKE BUENA VISTA	581600	II
MAITLAND	581800	II
OAKLAND	581900	II
OCOEE	582000	II
ORLANDO	582100	II
WINTER GARDEN	582300	II
WINTER PARK	582400	II
ORANGE DISTRICT SCHOOLS	582500	II
UNIVERSITY OF CENTRAL FLORIDA	582600	II

VALENCIA ~~COMMUNITY~~ COLLEGE	582700	II
OSCEOLA COUNTY	591000	II
KISSIMMEE	591100	II
ST CLOUD	591200	II
OSCEOLA DISTRICT SCHOOLS	591300	II
PALM BEACH COUNTY	601000	I
ATLANTIS	601100	I
BELLE GLADE	601200	I
BOCA RATON	601300	I
BOYNTON BEACH	601400	I
BRINY BREEZES	601500	I
CLOUD LAKE	601600	I
DELRAY BEACH	601700	I
GLEN RIDGE	601800	I
GOLF	601900	I
GOLFVIEW	602000	I
HAVERHILL	602300	I
HIGHLAND BEACH	602400	I
HYPOLUXO	602500	I
JUPITER	602700	I
LAKE CLARKE SHORE	602900	I
LAKE PARK	603000	I
LAKE WORTH	603100	I
LANTANA	603200	I
MANALAPAN	603300	I
MANGONIA PARK	603400	I
NORTH PALM BEACH	603500	I

OCEAN RIDGE	603600	I
PAHOKEE	603700	I
PALM BEACH	603800	I
PALM BEACH GARDENS	603900	I
PALM BEACH SHORES	604000	I
PALM SPRINGS	604100	I
RIVIERA BEACH	604200	I
ROYAL PALM BEACH	604300	I
SOUTH PALM BEACH	604500	I
TEQUESTA	604600	I
WELLINGTON	604650	I
WEST PALM BEACH	604700	I
PALM BEACH DISTRICT SCHOOLS	604800	I
PALM BEACH STATE COLLEGE	604900	I
FLORIDA ATLANTIC UNIVERSITY	605100	I
PASCO COUNTY	611000	I
DADE CITY	611100	I
NEW PORT RICHEY	611200	I
PORT RICHEY	611300	I
ST. LEO	611400	I
ZEPHYRHILLS	611600	I
PASCO DISTRICT SCHOOLS	611700	I
PASCO-HERNANDO COMM. COLLEGE	611800	I
PINELLAS COUNTY	621000	I
BELLEAIR	621100	I
BELLEAIR BEACH	621200	I
CLEARWATER	621500	I

DUNEDIN	621600	I
GULFPORT	621700	I
INDIAN ROCK BEACH	621800	I
INDIAN SHORES	621900	I
KENNETH CITY	622000	I
LARGO	622100	I
MADEIRA BEACH	622200	I
NORTH REDINGTON BEACH	622300	I
OLDSMAR	622400	I
PINELLAS PARK	622500	I
REDINGTON BEACH	622600	I
REDINGTON SHORES	622700	I
SAFETY HARBOR	622800	I
ST PETERSBURG	622900	I
ST PETERSBURG BEACH	623000	I
SEMINOLE	623100	I
SOUTH PASADENA	623200	I
TARPON SPRINGS	623300	I
TREASURE ISLAND	623400	I
PINELLAS DISTRICT SCHOOLS	623500	I
ST PETERSBURG COLLEGE	623600	I
POLK COUNTY	631000	I
AUBURNDALE	631100	I
BARTOW	631200	I
DAVENPORT	631300	I
DUNDEE	631400	I
EAGLE LAKE	631500	I

FORT MEADE	631600	I
FROSTPROOF	631700	I
HAINES CITY	631800	I
LAKE ALFRED	632100	I
LAKE HAMILTON	632200	I
LAKELAND	632300	I
LAKE WALES	632400	I
MULBERRY	632500	I
POLK CITY	632600	I
WINTER HAVEN	632700	I
POLK DISTRICT SCHOOLS	632800	I
POLK STATECOLLEGE	632900	I
PUTNAM COUNTY	641000	III
PALATKA	641300	III
PUTNAM DISTRICT SCHOOLS	641400	III
ST JOHNS COUNTY	651000	I
ST AUGUSTINE	651200	I
ST AUGUSTINE BEACH	651300	I
ST JOHNS DISTRICT SCHOOLS	651400	I
ST JOHNS RIVER STATE ~~COMMUNITY~~ COLLEGE	651500	I
ST LUCIE COUNTY	661000	II
FORT PIERCE	661100	II
PORT ST LUCIE	661200	II
ST LUCIE VILLAGE	661300	II
ST LUCIE DISTRICT SCHOOLS	661400	II
SANTA ROSA COUNTY	671000	II
GULF BREEZE	671100	II

JAY	671200	II
MILTON	671300	II
SANTA ROSA DISTRICT SCHOOLS	671400	II
SARASOTA COUNTY	681000	II
NORTH PORT	681100	II
SARASOTA	681200	II
VENICE	681300	II
SARASOTA DISTRICT SCHOOLS	681400	II
SEMINOLE COUNTY	691000	I
ALTAMONTE SPRINGS	691100	I
CASSELBERRY	691200	I
LONGWOOD	691300	I
OVIEDO	691400	I
SANFORD	691500	I
WINTER SPRINGS	691600	I
LAKE MARY	691700	I
SEMINOLE DISTRICT SCHOOLS	691800	I
SEMINOLE STATE COLLEGE OF FLORIDA	691900	I
SEMINOLE INDIAN TRIBE	692000	III
SUMTER COUNTY	701000	II
BUSHNELL	701100	II
CENTER HILL	701200	II
COLEMAN	701300	II
WILDWOOD	701400	II
SUMTER DISTRICT SCHOOLS	701500	II
SUWANNEE COUNTY	711000	III
BRANFORD	711100	III

LIVE OAK	711200	III
SUWANNEE DISTRICT SCHOOLS	711300	III
TAYLOR COUNTY	721000	II
PERRY	721100	II
TAYLOR DISTRICT SCHOOLS	721200	II
UNION COUNTY	731000	II
UNION DISTRICT SCHOOLS	731100	II
VOLUSIA COUNTY	741000	I
DAYTONA BEACH	741100	I
DAYTONA BEACH SHORES	741200	I
DELAND	741300	I
EDGEWATER	741400	I
HOLLY HILL	741500	I
LAKE HELEN	741600	I
NEW SMYRNA BEACH	741700	I
OAK HILL	741800	I
ORANGE CITY	741900	I
ORMAND BEACH	742000	I
PIERSON	742100	I
PONCE INLET	742200	I
PORT ORANGE	742300	I
SOUTH DAYTONA	742400	I
VOLUSIA DISTRICT SCHOOLS	742500	I
DAYTONA STATE COLLEGE	742600	I
WAKULLA COUNTY	751000	II
WAKULLA DISTRICT SCHOOLS	751100	II
WALTON COUNTY	761000	II

DEFUNIAK SPRINGS	761100	II
WALTON DISTRICT SCHOOLS	761200	II
WASHINGTON COUNTY	771000	II
WASHINGTON DISTRICT SCHOOLS	771100	II

EN4995

Date Submitted 7/6/2012
Chapter 3
Section R301
Affects HVHZ Yes
Proponent Michael Nau
Attachments Yes
TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

This proposal increases Climate Zone 1 by the inclusion of Palm Beach, Hendry, Collier and Lee Counties

Rationale

This proposal consolidates several countioes with similar climate characteristics into one climate zone (Climate Zone 1).

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal should not impact enforcement of the code.

Impact to building and property owners relative to cost of compliance with code

This provides a more economical use of effective products in areas with equal CDD (cooling degree days) and virtually the same HDD (heating degree days). Incremental cost of heating by adding these counties is negligible.

Impact to industry relative to the cost of compliance with code

This should have no impact on cost of compliance, thus the most populous counties neighboring current zone 1 will be required to meet the same energy criteria.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal turns this section and table into a Florida specific code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal provides a broader array of energy efficient products for counties with neglegable heating degree days (HDD).

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal provides a more neutral ground for all common fenestration materials.

Does not degrade the effectiveness of the code

NO, this methodology provides true energy efficiency for the Florida specific climates.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

EN4995-G4

Proponent	Ann Stanton	**Submitted**	12/11/2012	**Attachments**	No

Comment:

This mod applies only to the residential provisions of the code. If enacted, it should also apply to the commercial building provisions of the code.

1st Comment Period History 08/09/2012 - 09/23/2012

EN4995-G1

Proponent	Michael Nau	**Submitted**	8/21/2012	**Attachments**	No

Comment:

For consistancy sake it would be appropriate to include the extension of zone 1 into the Commercial Code as well.

1st Comment Period History 08/09/2012 - 09/23/2012

EN4995-G2

Proponent	Michael Nau	**Submitted**	8/21/2012	**Attachments**	No

Comment:

The exclusion of all counties and zones not contained in Florida was strictly editorial. PGT takes no position on whether these unrelated counties, states and zones are included in the Florida Energy Conservation Code or not.

1st Comment Period History 08/09/2012 - 09/23/2012

EN4995-G3

Proponent	BOAF CDC	**Submitted**	9/15/2012	**Attachments**	No

Comment:

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

This code requirement should not be removed per the Commission' 2013 FBC update process. "IBC requirements not applicable to Florida (i.e.; snow and seismic requirements) remain in the Code for purposes of formatting consistency with the Foundation Codes."

R301.1 General.

~~Climate zones from Figure R301.1 or~~ Table R301.1 shall be used in determining the applicable requirements from Chapter 4. Locations are ~~not in Table R301.1 (outside the United States) shall be~~ assigned a climate zone based on Section R301.3.

~~FIGURE R301.1 CLIMATE ZONES~~

TABLE R301.1 CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY ~~STATE~~, COUNTY ~~AND TERRITORY~~

Key: A – Moist, ~~B – Dry, C – Marine. Absence of moisture designation indicates moisture regime is irrelevant.~~
Asterisk (*) indicates a warm-humid location.

~~US STATES~~

~~ALABAMA~~	~~3A Lee~~	~~7 Kodiak Island~~	~~3A Calhoun~~	~~3A Monroe~~
~~3A Autauga*~~	~~3A Limestone~~	~~7 Lake and Peninsula~~	~~4A Carroll~~	~~3A Montgomery~~
~~2A Baldwin*~~	~~3A Lowndes*~~	~~7 Matanuska-Susitna~~	~~3A Chicot~~	~~3A Nevada~~
~~3A Barbour*~~	~~3A Macon*~~	~~8 Nome~~	~~3A Clark~~	~~4A Newton~~
~~3A Bibb~~	~~3A Madison~~	~~8 North Slope~~	~~3A Clay~~	~~3A Ouachita~~
~~3A Blount~~	~~3A Marengo*~~	~~8 Northwest Arctic~~	~~3A Cleburne~~	~~3A Perry~~
~~3A Bullock*~~	~~3A Marion~~	~~7 Prince of Wales~~	~~3A Cleveland~~	~~3A Phillips~~
~~3A Butler*~~	~~3A Marshall~~	~~Outer Ketchikan~~	~~3A Columbia*~~	~~3A Pike~~
~~3A Calhoun~~	~~2A Mobile*~~	~~7 Sitka~~	~~3A Conway~~	~~3A Poinsett~~
~~3A Chambers~~	~~3A Monroe*~~	~~7 Skagway-Hoonah-Angoon~~	~~3A Craighead~~	~~3A Polk~~
~~3A Cherokee~~	~~3A Montgomery*~~	~~8 Southeast Fairbanks~~	~~3A Crawford~~	~~3A Pope~~
~~3A Chilton~~	~~3A Morgan~~	~~7 Valdez-Cordova~~	~~3A Crittenden~~	~~3A Prairie~~
~~3A Choctaw*~~	~~3A Perry*~~	~~8 Wade Hampton~~	~~3A Cross~~	~~3A Pulaski~~
~~3A Clarke*~~	~~3A Pickens~~	~~7 Wrangell-Petersburg~~	~~3A Dallas~~	~~3A Randolph~~
~~3A Clay~~	~~3A Pike*~~	~~7 Yakutat~~	~~3A Desha~~	~~3A Saline~~
~~3A Cleburne~~	~~3A Randolph~~	~~8 Yukon-Koyukuk~~	~~3A Drew~~	~~3A Scott~~
~~3A Coffee*~~	~~3A Russell*~~	**~~ARIZONA~~**	~~3A Faulkner~~	~~4A Searcy~~
~~3A Colbert~~	~~3A Shelby~~		~~3A Franklin~~	~~3A Sebastian~~
~~3A Conecuh*~~	~~3A St. Clair~~	~~5B Apache~~	~~4A Fulton~~	~~3A Sevier*~~
~~3A Coosa~~	~~3A Sumter~~	~~3B Cochise~~	~~3A Garland~~	~~3A Sharp~~
~~3A Covington*~~	~~3A Talladega~~	~~5B Coconino~~	~~3A Grant~~	~~3A St. Francis~~
~~3A Crenshaw*~~	~~3A Tallapoosa~~	~~4B Gila~~	~~3A Greene~~	~~4A Stone~~
~~3A Cullman~~	~~3A Tuscaloosa~~	~~3B Graham~~	~~3A Hempstead*~~	~~3A Union*~~
~~3A Dale*~~	~~3A Walker~~	~~3B Greenlee~~	~~3A Hot Spring~~	~~3A Van Buren~~
~~3A Dallas*~~	~~3A Washington*~~	~~2B La Paz~~	~~3A Howard~~	~~4A Washington~~
~~3A DeKalb~~	~~3A Wilcox*~~	~~2B Maricopa~~	~~3A Independence~~	~~3A White~~
~~3A Elmore*~~	~~3A Winston~~	~~3B Mohave~~	~~4A Izard~~	~~3A Woodruff~~
~~3A Escambia*~~	**~~ALASKA~~**	~~5B Navajo~~	~~3A Jackson~~	~~3A Yell~~
~~3A Etowah~~		~~2B Pima~~	~~3A Jefferson~~	**~~CALIFORNIA~~**
~~3A Fayette~~	~~7 Aleutians East~~	~~2B Pinal~~	~~3A Johnson~~	
~~3A Franklin~~	~~7 Aleutians West~~	~~3B Santa Cruz~~	~~3A Lafayette*~~	~~3C Alameda~~
~~3A Geneva*~~	~~7 Anchorage~~	~~4B Yavapai~~	~~3A Lawrence~~	~~6B Alpine~~
~~3A Greene~~	~~8 Bethel~~	~~2B Yuma~~	~~3A Lee~~	~~4B Amador~~

~~3A Hale~~
~~3A Henry*~~
~~3A Houston*~~
~~3A Jackson~~
~~3A Jefferson~~
~~3A Lamar~~
~~3A Lauderdale~~
~~3A Lawrence~~

~~7 Bristol Bay~~
~~7 Denali~~
~~8 Dillingham~~
~~8 Fairbanks North Star~~
~~7 Haines~~
~~7 Juneau~~
~~7 Kenai Peninsula~~
~~7 Ketchikan Gateway~~

~~**ARKANSAS**~~

~~3A Arkansas~~
~~3A Ashley~~
~~4A Baxter~~
~~4A Benton~~
~~4A Boone~~
~~3A Bradley~~

~~3A Lincoln~~
~~3A Little River*~~
~~3A Logan~~
~~3A Lonoke~~
~~4A Madison~~
~~4A Marion~~
~~3A Miller*~~
~~3A Mississippi~~

~~3B Butte~~
~~4B Calaveras~~
~~3B Colusa~~
~~3B Contra Costa~~
~~4C Del Norte~~
~~4B El Dorado~~
~~3B Fresno~~
~~3B Glenn~~

(continued)

~~**TABLE R301.1 continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY**~~

~~4C Humboldt~~
~~2B Imperial~~
~~4B Inyo~~
~~3B Kern~~
~~3B Kings~~
~~4B Lake~~
~~5B Lassen~~
~~3B Los Angeles~~
~~3B Madera~~
~~3C Marin~~
~~4B Mariposa~~
~~3C Mendocino~~
~~3B Merced~~
~~5B Modoc~~
~~6B Mono~~
~~3C Monterey~~
~~3C Napa~~
~~5B Nevada~~
~~3B Orange~~
~~3B Placer~~
~~5B Plumas~~
~~3B Riverside~~
~~3B Sacramento~~
~~3C San Benito~~
~~3B San Bernardino~~
~~3B San Diego~~
~~3C San Francisco~~
~~3B San Joaquin~~
~~3C San Luis Obispo~~
~~3C San Mateo~~
~~3C Santa Barbara~~
~~3C Santa Clara~~
~~3C Santa Cruz~~
~~3B Shasta~~

~~3B Yuba~~

~~**COLORADO**~~

~~5B Adams~~
~~6B Alamosa~~
~~5B Arapahoe~~
~~6B Archuleta~~
~~4B Baca~~
~~5B Bent~~
~~5B Boulder~~
~~6B Chaffee~~
~~5B Cheyenn~~
~~7 Clear Creek~~
~~6B Conejos~~
~~6B Costilla~~
~~5B Crowley~~
~~6B Custer~~
~~5B Delta~~
~~5B Denver~~
~~6B Dolores~~
~~5B Douglas~~
~~6B Eagle~~
~~5B Elbert~~
~~5B El Paso~~
~~5B Fremont~~
~~5B Garfield~~
~~5B Gilpin~~
~~7 Grand~~
~~7 Gunnison~~
~~7 Hinsdale~~
~~5B Huerfano~~
~~7 Jackson~~
~~5B Jefferson~~
~~5B Kiowa~~

~~5B Morgan~~
~~4B Otero~~
~~6B Ouray~~
~~7 Park~~
~~5B Phillips~~
~~7 Pitkin~~
~~5B Prowers~~
~~5B Pueblo~~
~~6B Rio Blanco~~
~~7 Rio Grande~~
~~7 Routt~~
~~6B Saguache~~
~~7 San Juan~~
~~6B San Miguel~~
~~5B Sedgwick~~
~~7 Summit~~
~~5B Teller~~
~~5B Washington~~
~~5B Weld~~
~~5B Yuma~~

~~**CONNECTICUT**~~

~~5A (all)~~

~~**DELAWARE**~~

~~4A (all)~~

~~**DISTRICT OF COLUMBIA**~~

~~4A (all)~~

FLORIDA

2A Alachua*
2A Baker*
2A Bay*
2A Escambia*
2A Flagler*
2A Franklin*
2A Gadsden*
2A Gilchrist*
2A Glades*
2A Gulf*
2A Hamilton*
2A Hardee*
1~~2~~A Hendry*
2A Hernando*
2A Highlands*
2A Hillsborough*
2A Holmes*
2A Indian River*
2A Jackson*
2A Jefferson*
2A Lafayette*
2A Lake*
1~~2~~A Lee*
2A Leon*
2A Levy*
2A Liberty*
2A Madison*
2A Manatee*
2A Marion*
2A Martin*
1A Miami-Dade*
1A Monroe*
2A Nassau*
2A Okaloosa*
2A Okeechobee*
2A Orange*
2A Osceola*
2A Taylor*
2A Union*
2A Volusia*
2A Wakulla*
2A Walton*
2A Washington*

~~**GEORGIA**~~

~~2A Appling*~~
~~2A Atkinson*~~
~~2A Bacon*~~
~~2A Baker*~~
~~3A Baldwin~~
~~4A Banks~~
~~3A Barrow~~
~~3A Bartow~~
~~3A Ben Hill*~~
~~2A Berrien*~~
~~3A Bibb~~
~~3A Bleckley*~~
~~2A Brantley*~~
~~2A Brooks*~~
~~2A Bryan*~~
~~3A Bulloch*~~
~~3A Burke~~
~~3A Butts~~
~~3A Calhoun*~~
~~2A Camden*~~
~~3A Candler*~~
~~3A Carroll~~
~~4A Catoosa~~
~~2A Charlton*~~
~~2A Chatham*~~
~~3A Chattahoochee*~~

~~5B Sierra~~	~~5B Kit Carson~~	2A Bradford*	1~~2~~A Palm Beach*	~~4A Chattooga~~
~~5B Siskiyou~~	~~7 Lake~~	2A Brevard*	2A Pasco*	~~3A Cherokee~~
~~3B Solano~~	~~5B La Plata~~	1A Broward*	2A Pinellas*	~~3A Clarke~~
~~3C Sonoma~~	~~5B Larimer~~	2A Calhoun*	2A Polk*	~~3A Clay*~~
~~3B Stanislaus~~	~~4B Las Animas~~	2A Charlotte*	2A Putnam*	~~3A Clayton~~
~~3B Sutter~~	~~5B Lincoln~~	2A Citrus*	2A Santa Rosa*	~~2A Clinch*~~
~~3B Tehama~~	~~5B Logan~~	2A Clay*	2A Sarasota*	~~3A Cobb~~
~~4B Trinity~~	~~5B Mesa~~	1~~2~~A Collier*	2A Seminole*	~~3A Coffee*~~
~~3B Tulare~~	~~7 Mineral~~	2A Columbia*	2A St. Johns*	~~2A Colquitt*~~
~~4B Tuolumne~~	~~6B Moffat~~	2A DeSoto*	2A St. Lucie*	~~3A Columbia~~
~~3C Ventura~~	~~5B Montezuma~~	2A Dixie*	2A Sumter*	~~2A Cook*~~
~~3B Yolo~~	~~5B Montrose~~	2A Duval*	2A Suwannee*	~~3A Coweta~~

(continued)

~~TABLE R301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~

~~3A Crawford~~	~~2A Lanier*~~	~~3A Taylor*~~	~~5B Cassia~~	~~4A Crawford~~
~~3A Crisp*~~	~~3A Laurens*~~	~~3A Telfair*~~	~~6B Clark~~	~~5A Cumberland~~
~~4A Dade~~	~~3A Lee*~~	~~3A Terrell*~~	~~5B Clearwater~~	~~5A DeKalb~~
~~4A Dawson~~	~~2A Liberty*~~	~~2A Thomas*~~	~~6B Custer~~	~~5A De Witt~~
~~2A Decatur*~~	~~3A Lincoln~~	~~3A Tift*~~	~~5B Elmore~~	~~5A Douglas~~
~~3A DeKalb~~	~~2A Long*~~	~~2A Toombs*~~	~~6B Franklin~~	~~5A DuPage~~
~~3A Dodge*~~	~~2A Lowndes*~~	~~4A Towns~~	~~6B Fremont~~	~~5A Edgar~~
~~3A Dooly*~~	~~4A Lumpkin~~	~~3A Treutlen*~~	~~5B Gem~~	~~4A Edwards~~
~~3A Dougherty*~~	~~3A Macon*~~	~~3A Troup~~	~~5B Gooding~~	~~4A Effingham~~
~~3A Douglas~~	~~3A Madison~~	~~3A Turner*~~	~~5B Idaho~~	~~4A Fayette~~
~~3A Early*~~	~~3A Marion*~~	~~3A Twiggs*~~	~~6B Jefferson~~	~~5A Ford~~
~~2A Echols*~~	~~3A McDuffie~~	~~4A Union~~	~~5B Jerome~~	~~4A Franklin~~
~~2A Effingham*~~	~~2A McIntosh*~~	~~3A Upson~~	~~5B Kootenai~~	~~5A Fulton~~
~~3A Elbert~~	~~3A Meriwether~~	~~4A Walker~~	~~5B Latah~~	~~4A Gallatin~~
~~3A Emanuel*~~	~~2A Miller*~~	~~3A Walton~~	~~6B Lemhi~~	~~5A Greene~~
~~2A Evans*~~	~~2A Mitchell*~~	~~2A Ware*~~	~~5B Lewis~~	~~5A Grundy~~
~~4A Fannin~~	~~3A Monroe~~	~~3A Warren~~	~~5B Lincoln~~	~~4A Hamilton~~
~~3A Fayette~~	~~3A Montgomery*~~	~~3A Washington~~	~~6B Madison~~	~~5A Hancock~~
~~4A Floyd~~	~~3A Morgan~~	~~2A Wayne*~~	~~5B Minidoka~~	~~4A Hardin~~
~~3A Forsyth~~	~~4A Murray~~	~~3A Webster*~~	~~5B Nez Perce~~	~~5A Henderson~~
~~4A Franklin~~	~~3A Muscogee~~	~~3A Wheeler*~~	~~6B Oneida~~	~~5A Henry~~
~~3A Fulton~~	~~3A Newton~~	~~4A White~~	~~5B Owyhee~~	~~5A Iroquois~~
~~4A Gilmer~~	~~3A Oconee~~	~~4A Whitfield~~	~~5B Payette~~	~~4A Jackson~~
~~3A Glascock~~	~~3A Oglethorpe~~	~~3A Wilcox*~~	~~5B Power~~	~~4A Jasper~~
~~2A Glynn*~~	~~3A Paulding~~	~~3A Wilkes~~	~~5B Shoshone~~	~~4A Jefferson~~
~~4A Gordon~~	~~3A Peach*~~	~~3A Wilkinson~~	~~6B Teton~~	~~5A Jersey~~
~~2A Grady*~~	~~4A Pickens~~	~~3A Worth*~~	~~5B Twin Falls~~	~~5A Jo Daviess~~
~~3A Greene~~	~~2A Pierce*~~		~~6B Valley~~	~~4A Johnson~~
~~3A Gwinnett~~	~~3A Pike~~	~~**HAWAII**~~	~~5B Washington~~	~~5A Kane~~
~~4A Habersham~~	~~3A Polk~~	~~1A (all)*~~		~~5A Kankakee~~
~~4A Hall~~	~~3A Pulaski*~~	~~**IDAHO**~~	~~**ILLINOIS**~~	~~5A Kendall~~
~~3A Hancock~~	~~3A Putnam~~		~~5A Adams~~	~~5A Knox~~
~~3A Haralson~~	~~3A Quitman*~~	~~5B Ada~~	~~4A Alexander~~	~~5A Lake~~

~~3A Harris~~	~~4A Rabun~~	~~6B Adams~~	~~4A Bond~~	~~5A La Salle~~
~~3A Hart~~	~~3A Randolph*~~	~~6B Bannock~~	~~5A Boone~~	~~4A Lawrence~~
~~3A Heard~~	~~3A Richmond~~	~~6B Bear Lake~~	~~5A Brown~~	~~5A Lee~~
~~3A Henry~~	~~3A Rockdale~~	~~5B Benewah~~	~~5A Bureau~~	~~5A Livingston~~
~~3A Houston*~~	~~3A Schley*~~	~~6B Bingham~~	~~5A Calhoun~~	~~5A Logan~~
~~3A Irwin*~~	~~3A Screven*~~	~~6B Blaine~~	~~5A Carroll~~	~~5A Macon~~
~~3A Jackson~~	~~2A Seminole*~~	~~6B Boise~~	~~5A Cass~~	~~4A Macoupin~~
~~3A Jasper~~	~~3A Spalding~~	~~6B Bonner~~	~~5A Champaign~~	~~4A Madison~~
~~2A Jeff Davis*~~	~~4A Stephens~~	~~6B Bonneville~~	~~4A Christian~~	~~4A Marion~~
~~3A Jefferson~~	~~3A Stewart*~~	~~6B Boundary~~	~~5A Clark~~	~~5A Marshall~~
~~3A Jenkins*~~	~~3A Sumter*~~	~~6B Butte~~	~~4A Clay~~	~~5A Mason~~
~~3A Johnson*~~	~~3A Talbot~~	~~6B Camas~~	~~4A Clinton~~	~~4A Massac~~
~~3A Jones~~	~~3A Taliaferro~~	~~5B Canyon~~	~~5A Coles~~	~~5A McDonough~~
~~3A Lamar~~	~~2A Tattnall*~~	~~6B Caribou~~	~~5A Cook~~	~~5A McHenry~~

~~(continued)~~

~~TABLE R301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~

~~5A McLean~~	~~5A Boone~~	~~5A Miami~~	~~5A Appanoose~~	~~5A Jasper~~
~~5A Menard~~	~~4A Brown~~	~~4A Monroe~~	~~5A Audubon~~	~~5A Jefferson~~
~~5A Mercer~~	~~5A Carroll~~	~~5A Montgomery~~	~~5A Benton~~	~~5A Johnson~~
~~4A Monroe~~	~~5A Cass~~	~~5A Morgan~~	~~6A Black Hawk~~	~~5A Jones~~
~~4A Montgomery~~	~~4A Clark~~	~~5A Newton~~	~~5A Boone~~	~~5A Keokuk~~
~~5A Morgan~~	~~5A Clay~~	~~5A Noble~~	~~6A Bremer~~	~~6A Kossuth~~
~~5A Moultrie~~	~~5A Clinton~~	~~4A Ohio~~	~~6A Buchanan~~	~~5A Lee~~
~~5A Ogle~~	~~4A Crawford~~	~~4A Orange~~	~~6A Buena Vista~~	~~5A Linn~~
~~5A Peoria~~	~~4A Daviess~~	~~5A Owen~~	~~6A Butler~~	~~5A Louisa~~
~~4A Perry~~	~~4A Dearborn~~	~~5A Parke~~	~~6A Calhoun~~	~~5A Lucas~~
~~5A Piatt~~	~~5A Decatur~~	~~4A Perry~~	~~5A Carroll~~	~~6A Lyon~~
~~5A Pike~~	~~5A De Kalb~~	~~4A Pike~~	~~5A Cass~~	~~5A Madison~~
~~4A Pope~~	~~5A Delaware~~	~~5A Porter~~	~~5A Cedar~~	~~5A Mahaska~~
~~4A Pulaski~~	~~4A Dubois~~	~~4A Posey~~	~~6A Cerro Gordo~~	~~5A Marion~~
~~5A Putnam~~	~~5A Elkhart~~	~~5A Pulaski~~	~~6A Cherokee~~	~~5A Marshall~~
~~4A Randolph~~	~~5A Fayette~~	~~5A Putnam~~	~~6A Chickasaw~~	~~5A Mills~~
~~4A Richland~~	~~4A Floyd~~	~~5A Randolph~~	~~5A Clarke~~	~~6A Mitchell~~
~~5A Rock Island~~	~~5A Fountain~~	~~4A Ripley~~	~~6A Clay~~	~~5A Monona~~
~~4A Saline~~	~~5A Franklin~~	~~5A Rush~~	~~6A Clayton~~	~~5A Monroe~~
~~5A Sangamon~~	~~5A Fulton~~	~~4A Scott~~	~~5A Clinton~~	~~5A Montgomery~~
~~5A Schuyler~~	~~4A Gibson~~	~~5A Shelby~~	~~5A Crawford~~	~~5A Muscatine~~
~~5A Scott~~	~~5A Grant~~	~~4A Spencer~~	~~5A Dallas~~	~~6A O'Brien~~
~~4A Shelby~~	~~4A Greene~~	~~5A Starke~~	~~5A Davis~~	~~6A Osceola~~
~~5A Stark~~	~~5A Hamilton~~	~~5A Steuben~~	~~5A Decatur~~	~~5A Page~~
~~4A St. Clair~~	~~5A Hancock~~	~~5A St. Joseph~~	~~6A Delaware~~	~~6A Palo Alto~~
~~5A Stephenson~~	~~4A Harrison~~	~~4A Sullivan~~	~~5A Des Moines~~	~~6A Plymouth~~
~~5A Tazewell~~	~~5A Hendricks~~	~~4A Switzerland~~	~~6A Dickinson~~	~~6A Pocahontas~~
~~4A Union~~	~~5A Henry~~	~~5A Tippecanoe~~	~~5A Dubuque~~	~~5A Polk~~
~~5A Vermilion~~	~~5A Howard~~	~~5A Tipton~~	~~6A Emmet~~	~~5A Pottawattamie~~
~~4A Wabash~~	~~5A Huntington~~	~~5A Union~~	~~6A Fayette~~	~~5A Poweshiek~~

~~5A Warren~~	~~4A Jackson~~	~~4A Vanderburgh~~	~~6A Floyd~~	~~5A Ringgold~~
~~4A Washington~~	~~5A Jasper~~	~~5A Vermillion~~	~~6A Franklin~~	~~6A Sac~~
~~4A Wayne~~	~~5A Jay~~	~~5A Vigo~~	~~5A Fremont~~	~~5A Scott~~
~~4A White~~	~~4A Jefferson~~	~~5A Wabash~~	~~5A Greene~~	~~5A Shelby~~
~~5A Whiteside~~	~~4A Jennings~~	~~5A Warren~~	~~6A Grundy~~	~~6A Sioux~~
~~5A Will~~	~~5A Johnson~~	~~4A Warrick~~	~~5A Guthrie~~	~~5A Story~~
~~4A Williamson~~	~~4A Knox~~	~~4A Washington~~	~~6A Hamilton~~	~~5A Tama~~
~~5A Winnebago~~	~~5A Kosciusko~~	~~5A Wayne~~	~~6A Hancock~~	~~5A Taylor~~
~~5A Woodford~~	~~5A Lagrange~~	~~5A Wells~~	~~6A Hardin~~	~~5A Union~~
~~**INDIANA**~~	~~5A Lake~~	~~5A White~~	~~5A Harrison~~	~~5A Van Buren~~
	~~5A La Porte~~	~~5A Whitley~~	~~5A Henry~~	~~5A Wapello~~
~~5A Adams~~	~~4A Lawrence~~	~~**IOWA**~~	~~6A Howard~~	~~5A Warren~~
~~5A Allen~~	~~5A Madison~~		~~6A Humboldt~~	~~5A Washington~~
~~5A Bartholomew~~	~~5A Marion~~	~~5A Adair~~	~~6A Ida~~	~~5A Wayne~~
~~5A Benton~~	~~5A Marshall~~	~~5A Adams~~	~~5A Iowa~~	~~6A Webster~~
~~5A Blackford~~	~~4A Martin~~	~~6A Allamakee~~	~~5A Jackson~~	~~6A Winnebago~~

~~(continued)~~

~~TABLE R301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~

~~6A Winneshiek~~	~~4A Haskell~~	~~4A Sedgwick~~	~~2A Iberville*~~	~~6A Cumberland~~
~~5A Woodbury~~	~~4A Hodgeman~~	~~4A Seward~~	~~3A Jackson*~~	~~6A Franklin~~
~~6A Worth~~	~~4A Jackson~~	~~4A Shawnee~~	~~2A Jefferson*~~	~~6A Hancock~~
~~6A Wright~~	~~4A Jefferson~~	~~5A Sheridan~~	~~2A Jefferson Davis*~~	~~6A Kennebec~~
~~**KANSAS**~~	~~5A Jewell~~	~~5A Sherman~~	~~2A Lafayette*~~	~~6A Knox~~
	~~4A Johnson~~	~~5A Smith~~	~~2A Lafourche*~~	~~6A Lincoln~~
~~4A Allen~~	~~4A Kearny~~	~~4A Stafford~~	~~3A La Salle*~~	~~6A Oxford~~
~~4A Anderson~~	~~4A Kingman~~	~~4A Stanton~~	~~3A Lincoln*~~	~~6A Penobscot~~
~~4A Atchison~~	~~4A Kiowa~~	~~4A Stevens~~	~~2A Livingston*~~	~~6A Piscataquis~~
~~4A Barber~~	~~4A Labette~~	~~4A Sumner~~	~~3A Madison*~~	~~6A Sagadahoc~~
~~4A Barton~~	~~5A Lane~~	~~5A Thomas~~	~~3A Morehouse~~	~~6A Somerset~~
~~4A Bourbon~~	~~4A Leavenworth~~	~~5A Trego~~	~~3A Natchitoches*~~	~~6A Waldo~~
~~4A Brown~~	~~4A Lincoln~~	~~4A Wabaunsee~~	~~2A Orleans*~~	~~6A Washington~~
~~4A Butler~~	~~4A Linn~~	~~5A Wallace~~	~~3A Ouachita*~~	~~6A York~~
~~4A Chase~~	~~5A Logan~~	~~4A Washington~~	~~2A Plaquemines*~~	~~**MARYLAND**~~
~~4A Chautauqua~~	~~4A Lyon~~	~~5A Wichita~~	~~2A Pointe Coupee*~~	
~~4A Cherokee~~	~~4A Marion~~	~~4A Wilson~~	~~2A Rapides*~~	~~4A Allegany~~
~~5A Cheyenne~~	~~4A Marshall~~	~~4A Woodson~~	~~3A Red River*~~	~~4A Anne Arundel~~
~~4A Clark~~	~~4A McPherson~~	~~4A Wyandotte~~	~~3A Richland*~~	~~4A Baltimore~~
~~4A Clay~~	~~4A Meade~~	~~**KENTUCKY**~~	~~3A Sabine*~~	~~4A Baltimore (city)~~
~~5A Cloud~~	~~4A Miami~~		~~2A St. Bernard*~~	~~4A Calvert~~
~~4A Coffey~~	~~5A Mitchell~~	~~4A (all)~~	~~2A St. Charles*~~	~~4A Caroline~~
~~4A Comanche~~	~~4A Montgomery~~	~~**LOUISIANA**~~	~~2A St. Helena*~~	~~4A Carroll~~
~~4A Cowley~~	~~4A Morris~~		~~2A St. James*~~	~~4A Cecil~~
~~4A Crawford~~	~~4A Morton~~	~~2A Acadia*~~	~~2A St. John~~	~~4A Charles~~
~~5A Decatur~~	~~4A Nemaha~~	~~2A Allen*~~	~~the Baptist*~~	~~4A Dorchester~~
~~4A Dickinson~~	~~4A Neosho~~	~~2A Ascension*~~	~~2A St. Landry*~~	~~4A Frederick~~

4A Doniphan	5A Ness	2A Assumption*	2A St. Martin*	5A Garrett
4A Douglas	5A Norton	2A Avoyelles*	2A St. Mary*	4A Harford
4A Edwards	4A Osage	2A Beauregard*	2A St. Tammany*	4A Howard
4A Elk	5A Osborne	3A Bienville*	2A Tangipahoa*	4A Kent
5A Ellis	4A Ottawa	3A Bossier*	3A Tensas*	4A Montgomery
4A Ellsworth	4A Pawnee	3A Caddo*	2A Terrebonne*	4A Prince George's
4A Finney	5A Phillips	2A Calcasieu*	3A Union*	4A Queen Anne's
4A Ford	4A Pottawatomie	3A Caldwell*	2A Vermilion*	4A Somerset
4A Franklin	4A Pratt	2A Cameron*	3A Vernon*	4A St. Mary's
4A Geary	5A Rawlins	3A Catahoula*	2A Washington*	4A Talbot
5A Gove	4A Reno	3A Claiborne*	3A Webster*	4A Washington
5A Graham	5A Republic	3A Concordia*	2A West Baton Rouge*	4A Wicomico
4A Grant	4A Rice	3A De Soto*		4A Worcester
4A Gray	4A Riley	2A East Baton Rouge*	3A West Carroll	MASSACHSETTS
5A Greeley	5A Rooks	3A East Carroll	2A West Feliciana	
4A Greenwood	4A Rush	2A East Feliciana*	3A Winn*	5A (all)
5A Hamilton	4A Russell	2A Evangeline		
4A Harper	4A Saline	3A Franklin*	MAINE	MICHIGAN
4A Harvey	5A Scott	3A Grant*	6A Androscoggin	6A Alcona
2A Iberia*	7 Aroostook	6A Alger		

(continued)

TABLE R301.1 —continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY

5A Allegan	7 Mackinac	6A Carver	7 Otter Tail	3A Clarke
6A Alpena	5A Macomb	7 Cass	7 Pennington	3A Clay
6A Antrim	6A Manistee	6A Chippewa	7 Pine	3A Coahoma
6A Arenac	6A Marquette	6A Chisago	6A Pipestone	3A Copiah*
7 Baraga	6A Mason	7 Clay	7 Polk	3A Covington*
5A Barry	6A Mecosta	7 Clearwater	6A Pope	3A DeSoto
5A Bay	6A Menominee	7 Cook	6A Ramsey	3A Forrest*
6A Benzie	5A Midland	6A Cottonwood	7 Red Lake	3A Franklin*
5A Berrien	6A Missaukee	7 Crow Wing	6A Redwood	3A George*
5A Branch	5A Monroe	6A Dakota	6A Renville	3A Greene*
5A Calhoun	5A Montcalm	6A Dodge	6A Rice	3A Grenada
5A Cass	6A Montmorency	6A Douglas	6A Rock	2A Hancock*
6A Charlevoix	5A Muskegon	6A Faribault	7 Roseau	2A Harrison*
6A Cheboygan	6A Newaygo	6A Fillmore	6A Scott	3A Hinds*
7 Chippewa	5A Oakland	6A Freeborn	6A Sherburne	3A Holmes
6A Clare	6A Oceana	6A Goodhue	6A Sibley	3A Humphreys
5A Clinton	6A Ogemaw	7 Grant	6A Stearns	3A Issaquena
6A Crawford	7 Ontonagon	6A Hennepin	6A Steele	3A Itawamba
6A Delta	6A Osceola	6A Houston	6A Stevens	2A Jackson*
6A Dickinson	6A Oscoda	7 Hubbard	7St. Louis	3A Jasper
5A Eaton	6A Otsego	6A Isanti	6A Swift	3A Jefferson*
6A Emmet	5A Ottawa	7 Itasca	6A Todd	3A Jefferson Davis*

~~5A Genesee~~	~~6A Presque Isle~~	~~6A Jackson~~	~~6A Traverse~~	~~3A Jones*~~
~~6A Gladwin~~	~~6A Roscommon~~	~~7 Kanabec~~	~~6A Wabasha~~	~~3A Kemper~~
~~7 Gogebic~~	~~5A Saginaw~~	~~6A Kandiyohi~~	~~7 Wadena~~	~~3A Lafayette~~
~~6A Grand Traverse~~	~~6A Sanilac~~	~~7 Kittson~~	~~6A Waseca~~	~~3A Lamar*~~
~~5A Gratiot~~	~~7 Schoolcraft~~	~~7 Koochiching~~	~~6A Washington~~	~~3A Lauderdale~~
~~5A Hillsdale~~	~~5A Shiawassee~~	~~6A Lac qui Parle~~	~~6A Watonwan~~	~~3A Lawrence*~~
~~7 Houghton~~	~~5A St. Clair~~	~~7 Lake~~	~~7 Wilkin~~	~~3A Leake~~
~~6A Huron~~	~~5A St. Joseph~~	~~7 Lake of the Woods~~	~~6A Winona~~	~~3A Lee~~
~~5A Ingham~~	~~5A Tuscola~~	~~6A Le Sueur~~	~~6A Wright~~	~~3A Leflore~~
~~5A Ionia~~	~~5A Van Buren~~	~~6A Lincoln~~	~~6A Yellow Medicine~~	~~3A Lincoln*~~
~~6A Iosco~~	~~5A Washtenaw~~	~~6A Lyon~~		~~3A Lowndes~~
~~7 Iron~~	~~5A Wayne~~	~~7 Mahnomen~~	~~**MISSISSIPPI**~~	~~3A Madison~~
~~6A Isabella~~	~~6A Wexford~~	~~7 Marshall~~		~~3A Marion*~~
~~5A Jackson~~	~~**MINNESOTA**~~	~~6A Martin~~	~~3A Adams*~~	~~3A Marshall~~
~~5A Kalamazoo~~		~~6A McLeod~~	~~3A Alcorn~~	~~3A Monroe~~
~~6A Kalkaska~~	~~7 Aitkin~~	~~6A Meeker~~	~~3A Amite*~~	~~3A Montgomery~~
~~5A Kent~~	~~6A Anoka~~	~~7 Mille Lacs~~	~~3A Attala~~	~~3A Neshoba~~
~~7 Keweenaw~~	~~7 Becker~~	~~6A Morrison~~	~~3A Benton~~	~~3A Newton~~
~~6A Lake~~	~~7 Beltrami~~	~~6A Mower~~	~~3A Bolivar~~	~~3A Noxubee~~
~~5A Lapeer~~	~~6A Benton~~	~~6A Murray~~	~~3A Calhoun~~	~~3A Oktibbeha~~
~~6A Leelanau~~	~~6A Big Stone~~	~~6A Nicollet~~	~~3A Carroll~~	~~3A Panola~~
~~5A Lenawee~~	~~6A Blue Earth~~	~~6A Nobles~~	~~3A Chickasaw~~	~~2A Pearl River*~~
~~5A Livingston~~	~~6A Brown~~	~~7 Norman~~	~~3A Choctaw~~	~~3A Perry*~~
~~7 Luce~~	~~7 Carlton~~	~~6A Olmsted~~	~~3A Claiborne*~~	~~3A Pike*~~

~~(continued)~~

~~TABLE R301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~

~~3A Pontotoc~~	~~5A Chariton~~	~~4A Mississippi~~	~~4A Webster~~	~~4A Cumberland~~
~~3A Prentiss~~	~~4A Christian~~	~~4A Moniteau~~	~~5A Worth~~	~~4A Essex~~
~~3A Quitman~~	~~5A Clark~~	~~4A Monroe~~	~~4A Wright~~	~~4A Gloucester~~
~~3A Rankin*~~	~~4A Clay~~	~~4A Montgomery~~	~~**MONTANA**~~	~~4A Hudson~~
~~3A Scott~~	~~5A Clinton~~	~~4A Morgan~~		~~5A Hunterdon~~
~~3A Sharkey~~	~~4A Cole~~	~~4A New Madrid~~	~~6B (all)~~	~~5A Mercer~~
~~3A Simpson*~~	~~4A Cooper~~	~~4A Newton~~	~~**NEBRASKA**~~	~~4A Middlesex~~
~~3A Smith*~~	~~4A Crawford~~	~~5A Nodaway~~		~~4A Monmouth~~
~~2A Stone*~~	~~4A Dade~~	~~4A Oregon~~	~~5A (all)~~	~~5A Morris~~
~~3A Sunflower~~	~~4A Dallas~~	~~4A Osage~~		~~4A Ocean~~
~~3A Tallahatchie~~	~~5A Daviess~~	~~4A Ozark~~	~~**NEVADA**~~	~~5A Passaic~~
~~3A Tate~~	~~5A DeKalb~~	~~4A Pemiscot~~	~~5B Carson City (city)~~	~~4A Salem~~
~~3A Tippah~~	~~4A Dent~~	~~4A Perry~~	~~5B Churchill~~	~~5A Somerset~~
~~3A Tishomingo~~	~~4A Douglas~~	~~4A Pettis~~	~~3B Clark~~	~~5A Sussex~~
~~3A Tunica~~	~~4A Dunklin~~	~~4A Phelps~~	~~5B Douglas~~	~~4A Union~~
~~3A Union~~	~~4A Franklin~~	~~5A Pike~~	~~5B Elko~~	~~5A Warren~~
~~3A Walthall*~~	~~4A Gasconade~~	~~4A Platte~~	~~5B Esmeralda~~	~~**NEW MEXICO**~~

~~3A Warren*~~
~~3A Washington~~
~~3A Wayne*~~
~~3A Webster~~
~~3A Wilkinson*~~
~~3A Winston~~
~~3A Yalobusha~~
~~3A Yazoo~~

~~**MISSOURI**~~

~~5A Adair~~
~~5A Andrew~~
~~5A Atchison~~
~~4A Audrain~~
~~4A Barry~~
~~4A Barton~~
~~4A Bates~~
~~4A Benton~~
~~4A Bollinger~~
~~4A Boone~~
~~5A Buchanan~~
~~4A Butler~~
~~5A Caldwell~~
~~4A Callaway~~
~~4A Camden~~
~~4A Cape Girardeau~~
~~4A Carroll~~
~~4A Carter~~
~~4A Cass~~
~~4A Cedar~~
~~5A Gentry~~
~~4A Greene~~
~~5A Grundy~~
~~5A Harrison~~
~~4A Henry~~
~~4A Hickory~~
~~5A Holt~~
~~4A Howard~~
~~4A Howell~~
~~4A Iron~~
~~4A Jackson~~
~~4A Jasper~~
~~4A Jefferson~~
~~4A Johnson~~
~~5A Knox~~
~~4A Laclede~~
~~4A Lafayette~~
~~4A Lawrence~~
~~5A Lewis~~
~~4A Lincoln~~
~~5A Linn~~
~~5A Livingston~~
~~5A Macon~~
~~4A Madison~~
~~4A Maries~~
~~5A Marion~~
~~4A McDonald~~
~~5A Mercer~~
~~4A Miller~~
~~4A Cape May~~
~~4A Polk~~
~~4A Pulaski~~
~~5A Putnam~~
~~5A Ralls~~
~~4A Randolph~~
~~4A Ray~~
~~4A Reynolds~~
~~4A Ripley~~
~~4A Saline~~
~~5A Schuyler~~
~~5A Scotland~~
~~4A Scott~~
~~4A Shannon~~
~~5A Shelby~~
~~4A St. Charles~~
~~4A St. Clair~~
~~4A Ste. Genevieve~~
~~4A St. Francois~~
~~4A St. Louis~~
~~4A St. Louis (city)~~
~~4A Stoddard~~
~~4A Stone~~
~~5A Sullivan~~
~~4A Taney~~
~~4A Texas~~
~~4A Vernon~~
~~4A Warren~~
~~4A Washington~~
~~4A Wayne~~
~~4B Socorro~~
~~5B Eureka~~
~~5B Humboldt~~
~~5B Lander~~
~~5B Lincoln~~
~~5B Lyon~~
~~5B Mineral~~
~~5B Nye~~
~~5B Pershing~~
~~5B Storey~~
~~5B Washoe~~
~~5B White Pine~~

~~**NEW HAMPSHIRE**~~

~~6A Belknap~~
~~6A Carroll~~
~~5A Cheshire~~
~~6A Coos~~
~~6A Grafton~~
~~5A Hillsborough~~
~~6A Merrimack~~
~~5A Rockingham~~
~~5A Strafford~~
~~6A Sullivan~~

~~**NEW JERSEY**~~

~~4A Atlantic~~
~~5A Bergen~~
~~4A Burlington~~
~~4A Camden~~
~~4B Bernalillo~~
~~5B Catron~~
~~3B Chaves~~
~~4B Cibola~~
~~5B Colfax~~
~~4B Curry~~
~~4B DeBaca~~
~~3B Dona Ana~~
~~3B Eddy~~
~~4B Grant~~
~~4B Guadalupe~~
~~5B Harding~~
~~3B Hidalgo~~
~~3B Lea~~
~~4B Lincoln~~
~~5B Los Alamos~~
~~3B Luna~~
~~5B McKinley~~
~~5B Mora~~
~~3B Otero~~
~~4B Quay~~
~~5B Rio Arriba~~
~~4B Roosevelt~~
~~5B Sandoval~~
~~5B San Juan~~
~~5B San Miguel~~
~~5B Santa Fe~~
~~4B Sierra~~

~~(continued)~~

~~**TABLE R301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY**~~

~~5B Taos~~
~~5B Torrance~~
~~4B Union~~
~~4B Valencia~~

~~**NEW YORK**~~

~~5A Albany~~
~~6A Allegany~~
~~4A Bronx~~
~~6A Broome~~
~~6A Cattaraugus~~
~~5A Cayuga~~
~~5A Chautauqua~~
~~5A Chemung~~
~~4A Queens~~
~~5A Rensselaer~~
~~4A Richmond~~
~~5A Rockland~~
~~5A Saratoga~~
~~5A Schenectady~~
~~6A Schoharie~~
~~6A Schuyler~~
~~5A Seneca~~
~~6A Steuben~~
~~6A St. Lawrence~~
~~4A Suffolk~~
~~6A Sullivan~~
~~5A Tioga~~
~~4A Clay~~
~~4A Cleveland~~
~~3A Columbus*~~
~~3A Craven~~
~~3A Cumberland~~
~~3A Currituck~~
~~3A Dare~~
~~3A Davidson~~
~~4A Davie~~
~~3A Duplin~~
~~4A Durham~~
~~3A Edgecombe~~
~~4A Forsyth~~
~~4A Franklin~~
~~4A Orange~~
~~3A Pamlico~~
~~3A Pasquotank~~
~~3A Pender*~~
~~3A Perquimans~~
~~4A Person~~
~~3A Pitt~~
~~4A Polk~~
~~3A Randolph~~
~~3A Richmond~~
~~3A Robeson~~
~~4A Rockingham~~
~~3A Rowan~~
~~4A Rutherford~~
~~7 Divide~~
~~6A Dunn~~
~~7 Eddy~~
~~6A Emmons~~
~~7 Foster~~
~~6A Golden Valley~~
~~7 Grand Forks~~
~~6A Grant~~
~~7 Griggs~~
~~6A Hettinger~~
~~7 Kidder~~
~~6A LaMoure~~
~~6A Logan~~
~~7 McHenry~~

~~6A Chenango~~	~~6A Tompkins~~	~~3A Gaston~~	~~3A Sampson~~	~~6A McIntosh~~
~~6A Clinton~~	~~6A Ulster~~	~~4A Gates~~	~~3A Scotland~~	~~6A McKenzie~~
~~5A Columbia~~	~~6A Warren~~	~~4A Graham~~	~~3A Stanly~~	~~7 McLean~~
~~5A Cortland~~	~~5A Washington~~	~~4A Granville~~	~~4A Stokes~~	~~6A Mercer~~
~~6A Delaware~~	~~5A Wayne~~	~~3A Greene~~	~~4A Surry~~	~~6A Morton~~
~~5A Dutchess~~	~~4A Westchester~~	~~4A Guilford~~	~~4A Swain~~	~~7 Mountrail~~
~~5A Erie~~	~~6A Wyoming~~	~~4A Halifax~~	~~4A Transylvania~~	~~7 Nelson~~
~~6A Essex~~	~~5A Yates~~	~~4A Harnett~~	~~3A Tyrrell~~	~~6A Oliver~~
~~6A Franklin~~	~~**NORTH CAROLINA**~~	~~4A Haywood~~	~~3A Union~~	~~7 Pembina~~
~~6A Fulton~~		~~4A Henderson~~	~~4A Vance~~	~~7 Pierce~~
~~5A Genesee~~		~~4A Hertford~~	~~4A Wake~~	~~7 Ramsey~~
~~5A Greene~~	~~4A Alamance~~	~~3A Hoke~~	~~4A Warren~~	~~6A Ransom~~
~~6A Hamilton~~	~~4A Alexander~~	~~3A Hyde~~	~~3A Washington~~	~~7 Renville~~
~~6A Herkimer~~	~~5A Alleghany~~	~~4A Iredell~~	~~5A Watauga~~	~~6A Richland~~
~~6A Jefferson~~	~~3A Anson~~	~~4A Jackson~~	~~3A Wayne~~	~~7 Rolette~~
~~4A Kings~~	~~5A Ashe~~	~~3A Johnston~~	~~4A Wilkes~~	~~6A Sargent~~
~~6A Lewis~~	~~5A Avery~~	~~3A Jones~~	~~3A Wilson~~	~~7 Sheridan~~
~~5A Livingston~~	~~3A Beaufort~~	~~4A Lee~~	~~4A Yadkin~~	~~6A Sioux~~
~~6A Madison~~	~~4A Bertie~~	~~3A Lenoir~~	~~5A Yancey~~	~~6A Slope~~
~~5A Monroe~~	~~3A Bladen~~	~~4A Lincoln~~	~~**NORTH DAKOTA**~~	~~6A Stark~~
~~6A Montgomery~~	~~3A Brunswick*~~	~~4A Macon~~		~~7 Steele~~
~~4A Nassau~~	~~4A Buncombe~~	~~4A Madison~~	~~6A Adams~~	~~7 Stutsman~~
~~4A New York~~	~~4A Burke~~	~~3A Martin~~	~~7 Barnes~~	~~7 Towner~~
~~5A Niagara~~	~~3A Cabarrus~~	~~4A McDowell~~	~~7 Benson~~	~~7 Traill~~
~~6A Oneida~~	~~4A Caldwell~~	~~3A Mecklenburg~~	~~6A Billings~~	~~7 Walsh~~
~~5A Onondaga~~	~~3A Camden~~	~~5A Mitchell~~	~~7 Bottineau~~	~~7 Ward~~
~~5A Ontario~~	~~3A Carteret*~~	~~3A Montgomery~~	~~6A Bowman~~	~~7 Wells~~
~~5A Orange~~	~~4A Caswell~~	~~3A Moore~~	~~7 Burke~~	~~7 Williams~~
~~5A Orleans~~	~~4A Catawba~~	~~4A Nash~~	~~6A Burleigh~~	~~**OHIO**~~
~~5A Oswego~~	~~4A Chatham~~	~~3A New Hanover*~~	~~7 Cass~~	
~~6A Otsego~~	~~4A Cherokee~~	~~4A Northampton~~	~~7 Cavalier~~	~~4A Adams~~
~~5A Putnam~~	~~3A Chowan~~	~~3A Onslow*~~	~~6A Dickey~~	~~5A Allen~~

~~(continued)~~

~~**TABLE R301.1 continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY**~~

~~5A Ashland~~	~~5A Mahoning~~	~~3A Bryan~~	~~3A Okfuskee~~	~~4C Linn~~
~~5A Ashtabula~~	~~5A Marion~~	~~3A Caddo~~	~~3A Oklahoma~~	~~5B Malheur~~
~~5A Athens~~	~~5A Medina~~	~~3A Canadian~~	~~3A Okmulgee~~	~~4C Marion~~
~~5A Auglaize~~	~~5A Meigs~~	~~3A Carter~~	~~3A Osage~~	~~5B Morrow~~
~~5A Belmont~~	~~5A Mercer~~	~~3A Cherokee~~	~~3A Ottawa~~	~~4C Multnomah~~
~~4A Brown~~	~~5A Miami~~	~~3A Choctaw~~	~~3A Pawnee~~	~~4C Polk~~
~~5A Butler~~	~~5A Monroe~~	~~4B Cimarron~~	~~3A Payne~~	~~5B Sherman~~
~~5A Carroll~~	~~5A Montgomery~~	~~3A Cleveland~~	~~3A Pittsburg~~	~~4C Tillamook~~
~~5A Champaign~~	~~5A Morgan~~	~~3A Coal~~	~~3A Pontotoc~~	~~5B Umatilla~~
~~5A Clark~~	~~5A Morrow~~	~~3A Comanche~~	~~3A Pottawatomie~~	~~5B Union~~
~~4A Clermont~~	~~5A Muskingum~~	~~3A Cotton~~	~~3A Pushmataha~~	~~5B Wallowa~~
~~5A Clinton~~	~~5A Noble~~	~~3A Craig~~	~~3A Roger Mills~~	~~5B Wasco~~

~~5A Columbiana~~
~~5A Coshocton~~
~~5A Crawford~~
~~5A Cuyahoga~~
~~5A Darke~~
~~5A Defiance~~
~~5A Delaware~~
~~5A Erie~~
~~5A Fairfield~~
~~5A Fayette~~
~~5A Franklin~~
~~5A Fulton~~
~~4A Gallia~~
~~5A Geauga~~
~~5A Greene~~
~~5A Guernsey~~
~~4A Hamilton~~
~~5A Hancock~~
~~5A Hardin~~
~~5A Harrison~~
~~5A Henry~~
~~5A Highland~~
~~5A Hocking~~
~~5A Holmes~~
~~5A Huron~~
~~5A Jackson~~
~~5A Jefferson~~
~~5A Knox~~
~~5A Lake~~
~~4A Lawrence~~
~~5A Licking~~
~~5A Logan~~
~~5A Lorain~~
~~5A Lucas~~
~~5A Madison~~
~~5A Ottawa~~
~~5A Paulding~~
~~5A Perry~~
~~5A Pickaway~~
~~4A Pike~~
~~5A Portage~~
~~5A Preble~~
~~5A Putnam~~
~~5A Richland~~
~~5A Ross~~
~~5A Sandusky~~
~~4A Scioto~~
~~5A Seneca~~
~~5A Shelby~~
~~5A Stark~~
~~5A Summit~~
~~5A Trumbull~~
~~5A Tuscarawas~~
~~5A Union~~
~~5A Van Wert~~
~~5A Vinton~~
~~5A Warren~~
~~4A Washington~~
~~5A Wayne~~
~~5A Williams~~
~~5A Wood~~
~~5A Wyandot~~

~~OKLAHOMA~~

~~3A Adair~~
~~3A Alfalfa~~
~~3A Atoka~~
~~4B Beaver~~
~~3A Beckham~~
~~3A Blaine~~
~~3A Creek~~
~~3A Custer~~
~~3A Delaware~~
~~3A Dewey~~
~~3A Ellis~~
~~3A Garfield~~
~~3A Garvin~~
~~3A Grady~~
~~3A Grant~~
~~3A Greer~~
~~3A Harmon~~
~~3A Harper~~
~~3A Haskell~~
~~3A Hughes~~
~~3A Jackson~~
~~3A Jefferson~~
~~3A Johnston~~
~~3A Kay~~
~~3A Kingfisher~~
~~3A Kiowa~~
~~3A Latimer~~
~~3A Le Flore~~
~~3A Lincoln~~
~~3A Logan~~
~~3A Love~~
~~3A Major~~
~~3A Marshall~~
~~3A Mayes~~
~~3A McClain~~
~~3A McCurtain~~
~~3A McIntosh~~
~~3A Murray~~
~~3A Muskogee~~
~~3A Noble~~
~~3A Nowata~~
~~3A Rogers~~
~~3A Seminole~~
~~3A Sequoyah~~
~~3A Stephens~~
~~4B Texas~~
~~3A Tillman~~
~~3A Tulsa~~
~~3A Wagoner~~
~~3A Washington~~
~~3A Washita~~
~~3A Woods~~
~~3A Woodward~~

~~OREGON~~

~~5B Baker~~
~~4C Benton~~
~~4C Clackamas~~
~~4C Clatsop~~
~~4C Columbia~~
~~4C Coos~~
~~5B Crook~~
~~4C Curry~~
~~5B Deschutes~~
~~4C Douglas~~
~~5B Gilliam~~
~~5B Grant~~
~~5B Harney~~
~~5B Hood River~~
~~4C Jackson~~
~~5B Jefferson~~
~~4C Josephine~~
~~5B Klamath~~
~~5B Lake~~
~~4C Lane~~
~~4C Lincoln~~
~~4C Washington~~
~~5B Wheeler~~
~~4C Yamhill~~

~~PENNSYLVANIA~~

~~5A Adams~~
~~5A Allegheny~~
~~5A Armstrong~~
~~5A Beaver~~
~~5A Bedford~~
~~5A Berks~~
~~5A Blair~~
~~5A Bradford~~
~~4A Bucks~~
~~5A Butler~~
~~5A Cambria~~
~~6A Cameron~~
~~5A Carbon~~
~~5A Centre~~
~~4A Chester~~
~~5A Clarion~~
~~6A Clearfield~~
~~5A Clinton~~
~~5A Columbia~~
~~5A Crawford~~
~~5A Cumberland~~
~~5A Dauphin~~
~~4A Delaware~~
~~6A Elk~~
~~5A Erie~~
~~5A Fayette~~
~~5A Forest~~
~~5A Franklin~~
~~5A Fulton~~
~~5A Greene~~

~~(continued)~~

~~TABLE R301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~

~~5A Huntingdon~~
~~5A Indiana~~
~~5A Jefferson~~
~~5A Juniata~~
~~5A Lackawanna~~
~~5A Lancaster~~
~~5A Lawrence~~
~~5A Lebanon~~
~~5A Lehigh~~
~~5A Luzerne~~
~~3A Bamberg*~~
~~3A Barnwell*~~
~~3A Beaufort*~~
~~3A Berkeley*~~
~~3A Calhoun~~
~~3A Charleston*~~
~~3A Cherokee~~
~~3A Chester~~
~~3A Chesterfield~~
~~3A Clarendon~~
~~5A Bennett~~
~~5A Bon Homme~~
~~6A Brookings~~
~~6A Brown~~
~~6A Brule~~
~~6A Buffalo~~
~~6A Butte~~
~~6A Campbell~~
~~5A Charles Mix~~
~~6A Clark~~
~~6A Minnehaha~~
~~6A Moody~~
~~6A Pennington~~
~~6A Perkins~~
~~6A Potter~~
~~6A Roberts~~
~~6A Sanborn~~
~~6A Shannon~~
~~6A Spink~~
~~6A Stanley~~
~~4A Gibson~~
~~4A Giles~~
~~4A Grainger~~
~~4A Greene~~
~~4A Grundy~~
~~4A Hamblen~~
~~4A Hamilton~~
~~4A Hancock~~
~~3A Hardeman~~
~~3A Hardin~~

~~5A Lycoming~~	~~3A Colleton*~~	~~5A Clay~~	~~6A Sully~~	~~4A Hawkins~~
~~6A McKean~~	~~3A Darlington~~	~~6A Codington~~	~~5A Todd~~	~~3A Haywood~~
~~5A Mercer~~	~~3A Dillon~~	~~6A Corson~~	~~5A Tripp~~	~~3A Henderson~~
~~5A Mifflin~~	~~3A Dorchester*~~	~~6A Custer~~	~~6A Turner~~	~~4A Henry~~
~~5A Monroe~~	~~3A Edgefield~~	~~6A Davison~~	~~5A Union~~	~~4A Hickman~~
~~4A Montgomery~~	~~3A Fairfield~~	~~6A Day~~	~~6A Walworth~~	~~4A Houston~~
~~5A Montour~~	~~3A Florence~~	~~6A Deuel~~	~~5A Yankton~~	~~4A Humphreys~~
~~5A Northampton~~	~~3A Georgetown*~~	~~6A Dewey~~	~~6A Ziebach~~	~~4A Jackson~~
~~5A Northumberland~~	~~3A Greenville~~	~~5A Douglas~~	~~**TENNESSEE**~~	~~4A Jefferson~~
~~5A Perry~~	~~3A Greenwood~~	~~6A Edmunds~~		~~4A Johnson~~
~~4A Philadelphia~~	~~3A Hampton*~~	~~6A Fall River~~	~~4A Anderson~~	~~4A Knox~~
~~5A Pike~~	~~3A Horry*~~	~~6A Faulk~~	~~4A Bedford~~	~~3A Lake~~
~~6A Potter~~	~~3A Jasper*~~	~~6A Grant~~	~~4A Benton~~	~~3A Lauderdale~~
~~5A Schuylkill~~	~~3A Kershaw~~	~~5A Gregory~~	~~4A Bledsoe~~	~~4A Lawrence~~
~~5A Snyder~~	~~3A Lancaster~~	~~6A Haakon~~	~~4A Blount~~	~~4A Lewis~~
~~5A Somerset~~	~~3A Laurens~~	~~6A Hamlin~~	~~4A Bradley~~	~~4A Lincoln~~
~~5A Sullivan~~	~~3A Lee~~	~~6A Hand~~	~~4A Campbell~~	~~4A Loudon~~
~~6A Susquehanna~~	~~3A Lexington~~	~~6A Hanson~~	~~4A Cannon~~	~~4A Macon~~
~~6A Tioga~~	~~3A Marion~~	~~6A Harding~~	~~4A Carroll~~	~~3A Madison~~
~~5A Union~~	~~3A Marlboro~~	~~6A Hughes~~	~~4A Carter~~	~~4A Marion~~
~~5A Venango~~	~~3A McCormick~~	~~5A Hutchinson~~	~~4A Cheatham~~	~~4A Marshall~~
~~5A Warren~~	~~3A Newberry~~	~~6A Hyde~~	~~3A Chester~~	~~4A Maury~~
~~5A Washington~~	~~3A Oconee~~	~~5A Jackson~~	~~4A Claiborne~~	~~4A McMinn~~
~~6A Wayne~~	~~3A Orangeburg~~	~~6A Jerauld~~	~~4A Clay~~	~~3A McNairy~~
~~5A Westmoreland~~	~~3A Pickens~~	~~6A Jones~~	~~4A Cocke~~	~~4A Meigs~~
~~5A Wyoming~~	~~3A Richland~~	~~6A Kingsbury~~	~~4A Coffee~~	~~4A Monroe~~
~~4A York~~	~~3A Saluda~~	~~6A Lake~~	~~3A Crockett~~	~~4A Montgomery~~
~~**RHODE**~~	~~3A Spartanburg~~	~~6A Lawrence~~	~~4A Cumberland~~	~~4A Moore~~
~~**ISLAND**~~	~~3A Sumter~~	~~6A Lincoln~~	~~4A Davidson~~	~~4A Morgan~~
~~5A (all)~~	~~3A Union~~	~~6A Lyman~~	~~4A Decatur~~	~~4A Obion~~
~~**SOUTH**~~	~~3A Williamsburg~~	~~6A Marshall~~	~~4A DeKalb~~	~~4A Overton~~
~~**CAROLINA**~~	~~3A York~~	~~6A McCook~~	~~4A Dickson~~	~~4A Perry~~
~~3A Abbeville~~	~~**SOUTH**~~	~~6A McPherson~~	~~3A Dyer~~	~~4A Pickett~~
~~3A Aiken~~	~~**DAKOTA**~~	~~6A Meade~~	~~3A Fayette~~	~~4A Polk~~
~~3A Allendale*~~	~~6A Aurora~~	~~5A Mellette~~	~~4A Fentress~~	~~4A Putnam~~
~~3A Anderson~~	~~6A Beadle~~	~~6A Miner~~	~~4A Franklin~~	~~4A Rhea~~

~~(continued)~~

~~**TABLE R301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY**~~

~~4A Roane~~	~~3B Brewster~~	~~3B Ector~~	~~3B Howard~~	~~3B McCulloch~~
~~4A Robertson~~	~~4B Briscoe~~	~~2B Edwards*~~	~~3B Hudspeth~~	~~2A McLennan*~~
~~4A Rutherford~~	~~2A Brooks*~~	~~3A Ellis*~~	~~3A Hunt*~~	~~2A McMullen*~~
~~4A Scott~~	~~3A Brown*~~	~~3B El Paso~~	~~4B Hutchinson~~	~~2B Medina*~~

~~4A Sequatchie~~
~~4A Sevier~~
~~3A Shelby~~
~~4A Smith~~
~~4A Stewart~~
~~4A Sullivan~~
~~4A Sumner~~
~~3A Tipton~~
~~4A Trousdale~~
~~4A Unicoi~~
~~4A Union~~
~~4A Van Buren~~
~~4A Warren~~
~~4A Washington~~
~~4A Wayne~~
~~4A Weakley~~
~~4A White~~
~~4A Williamson~~
~~4A Wilson~~

~~**TEXAS**~~

~~2A Anderson*~~
~~3B Andrews~~
~~2A Angelina*~~
~~2A Aransas*~~
~~3A Archer~~
~~4B Armstrong~~
~~2A Atascosa*~~
~~2A Austin*~~
~~4B Bailey~~
~~2B Bandera*~~
~~2A Bastrop*~~
~~3B Baylor~~
~~2A Bee*~~
~~2A Bell*~~
~~2A Bexar*~~
~~3A Blanco*~~
~~3B Borden~~
~~2A Bosque*~~
~~3A Bowie*~~
~~2A Brazoria*~~
~~2A Brazos*~~
~~2A Burleson*~~
~~3A Burnet*~~
~~2A Caldwell*~~
~~2A Calhoun*~~
~~3B Callahan~~
~~2A Cameron*~~
~~3A Camp*~~
~~4B Carson~~
~~3A Cass*~~
~~4B Castro~~
~~2A Chambers*~~
~~2A Cherokee*~~
~~3B Childress~~
~~3A Clay~~
~~4B Cochran~~
~~3B Coke~~
~~3B Coleman~~
~~3A Collin*~~
~~3B Collingsworth~~
~~2A Colorado*~~
~~2A Comal*~~
~~3A Comanche*~~
~~3B Concho~~
~~3A Cooke~~
~~2A Coryell*~~
~~3B Cottle~~
~~3B Crane~~
~~3B Crockett~~
~~3B Crosby~~
~~3B Culberson~~
~~4B Dallam~~
~~3A Dallas*~~
~~3B Dawson~~
~~4B Deaf Smith~~
~~3A Delta~~
~~3A Denton*~~
~~2A DeWitt*~~
~~3B Dickens~~
~~2B Dimmit*~~
~~4B Donley~~
~~2A Duval*~~
~~3A Eastland~~
~~3A Erath*~~
~~2A Falls*~~
~~3A Fannin~~
~~2A Fayette*~~
~~3B Fisher~~
~~4B Floyd~~
~~3B Foard~~
~~2A Fort Bend*~~
~~3A Franklin*~~
~~2A Freestone*~~
~~2B Frio*~~
~~3B Gaines~~
~~2A Galveston*~~
~~3B Garza~~
~~3A Gillespie*~~
~~3B Glasscock~~
~~2A Goliad*~~
~~2A Gonzales*~~
~~4B Gray~~
~~3A Grayson~~
~~3A Gregg*~~
~~2A Grimes*~~
~~2A Guadalupe*~~
~~4B Hale~~
~~3B Hall~~
~~3A Hamilton*~~
~~4B Hansford~~
~~3B Hardeman~~
~~2A Hardin*~~
~~2A Harris*~~
~~3A Harrison*~~
~~4B Hartley~~
~~3B Haskell~~
~~2A Hays*~~
~~3B Hemphill~~
~~3A Henderson*~~
~~2A Hidalgo*~~
~~2A Hill*~~
~~4B Hockley~~
~~3A Hood*~~
~~3A Hopkins*~~
~~2A Houston*~~
~~3B Irion~~
~~3A Jack~~
~~2A Jackson*~~
~~2A Jasper*~~
~~3B Jeff Davis~~
~~2A Jefferson*~~
~~2A Jim Hogg*~~
~~2A Jim Wells*~~
~~3A Johnson*~~
~~3B Jones~~
~~2A Karnes*~~
~~3A Kaufman*~~
~~3A Kendall*~~
~~2A Kenedy*~~
~~3B Kent~~
~~3B Kerr~~
~~3B Kimble~~
~~3B King~~
~~2B Kinney*~~
~~2A Kleberg*~~
~~3B Knox~~
~~3A Lamar*~~
~~4B Lamb~~
~~3A Lampasas*~~
~~2B La Salle*~~
~~2A Lavaca*~~
~~2A Lee*~~
~~2A Leon*~~
~~2A Liberty*~~
~~2A Limestone*~~
~~4B Lipscomb~~
~~2A Live Oak*~~
~~3A Llano*~~
~~3B Loving~~
~~3B Lubbock~~
~~3B Lynn~~
~~2A Madison*~~
~~3A Marion*~~
~~3B Martin~~
~~3B Mason~~
~~2A Matagorda*~~
~~2B Maverick*~~
~~3B Menard~~
~~3B Midland~~
~~2A Milam*~~
~~3A Mills*~~
~~3B Mitchell~~
~~3A Montague~~
~~2A Montgomery*~~
~~4B Moore~~
~~3A Morris*~~
~~3B Motley~~
~~3A Nacogdoches*~~
~~3A Navarro*~~
~~2A Newton*~~
~~3B Nolan~~
~~2A Nueces*~~
~~4B Ochiltree~~
~~4B Oldham~~
~~2A Orange*~~
~~3A Palo Pinto*~~
~~3A Panola*~~
~~3A Parker*~~
~~4B Parmer~~
~~3B Pecos~~
~~2A Polk*~~
~~4B Potter~~
~~3B Presidio~~
~~3A Rains*~~
~~4B Randall~~
~~3B Reagan~~
~~2B Real*~~
~~3A Red River*~~
~~3B Reeves~~
~~2A Refugio*~~
~~4B Roberts~~
~~2A Robertson*~~
~~3A Rockwall*~~
~~3B Runnels~~
~~3A Rusk*~~
~~3A Sabine*~~
~~3A San Augustine*~~
~~2A San Jacinto*~~
~~2A San Patricio*~~

~~(continued)~~

~~**TABLE R301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY**~~

~~3A San Saba*~~
~~3B Schleicher~~
~~3B Scurry~~
~~3A Young~~
~~2B Zapata*~~
~~2B Zavala*~~
~~4C Clark~~
~~5B Columbia~~
~~4C Cowlitz~~
~~4A Gilmer~~
~~5A Grant~~
~~5A Greenbrier~~

~~**WISCONSIN**~~

~~6A Adams~~
~~7 Ashland~~

~~3B Shackelford~~
~~3A Shelby*~~
~~4B Sherman~~
~~3A Smith*~~
~~3A Somervell*~~
~~2A Starr*~~
~~3A Stephens~~
~~3B Sterling~~
~~3B Stonewall~~
~~3B Sutton~~
~~4B Swisher~~
~~3A Tarrant*~~
~~3B Taylor~~
~~3B Terrell~~
~~3B Terry~~
~~3B Throckmorton~~
~~3A Titus*~~
~~3B Tom Green~~
~~2A Travis*~~
~~2A Trinity*~~
~~2A Tyler*~~
~~3A Upshur*~~
~~3B Upton~~
~~2B Uvalde*~~
~~2B Val Verde*~~
~~3A Van Zandt*~~
~~2A Victoria*~~
~~2A Walker*~~
~~2A Waller*~~
~~3B Ward~~
~~2A Washington*~~
~~2B Webb*~~
~~2A Wharton*~~
~~3B Wheeler~~
~~3A Wichita~~
~~3B Wilbarger~~
~~2A Willacy*~~
~~2A Williamson*~~
~~2A Wilson*~~
~~3B Winkler~~
~~3A Wise~~
~~3A Wood*~~
~~4B Yoakum~~
~~4C Clallam~~

~~**UTAH**~~

~~5B Beaver~~
~~6B Box Elder~~
~~6B Cache~~
~~6B Carbon~~
~~6B Daggett~~
~~5B Davis~~
~~6B Duchesne~~
~~5B Emery~~
~~5B Garfield~~
~~5B Grand~~
~~5B Iron~~
~~5B Juab~~
~~5B Kane~~
~~5B Millard~~
~~6B Morgan~~
~~5B Piute~~
~~6B Rich~~
~~5B Salt Lake~~
~~5B San Juan~~
~~5B Sanpete~~
~~5B Sevier~~
~~6B Summit~~
~~5B Tooele~~
~~6B Uintah~~
~~5B Utah~~
~~6B Wasatch~~
~~3B Washington~~
~~5B Wayne~~
~~5B Weber~~

~~**VERMONT**~~

~~6A (all)~~

~~**VIRGINIA**~~

~~4A (all)~~

~~**WASHINGTON**~~

~~5B Adams~~
~~5B Asotin~~
~~5B Benton~~
~~5B Chelan~~
~~5B Douglas~~
~~6B Ferry~~
~~5B Franklin~~
~~5B Garfield~~
~~5B Grant~~
~~4C Grays Harbor~~
~~4C Island~~
~~4C Jefferson~~
~~4C King~~
~~4C Kitsap~~
~~5B Kittitas~~
~~5B Klickitat~~
~~4C Lewis~~
~~5B Lincoln~~
~~4C Mason~~
~~6B Okanogan~~
~~4C Pacific~~
~~6B Pend Oreille~~
~~4C Pierce~~
~~4C San Juan~~
~~4C Skagit~~
~~5B Skamania~~
~~4C Snohomish~~
~~5B Spokane~~
~~6B Stevens~~
~~4C Thurston~~
~~4C Wahkiakum~~
~~5B Walla Walla~~
~~4C Whatcom~~
~~5B Whitman~~
~~5B Yakima~~

~~**WEST VIRGINIA**~~

~~5A Barbour~~
~~4A Berkeley~~
~~4A Boone~~
~~4A Braxton~~
~~5A Brooke~~
~~4A Cabell~~
~~4A Calhoun~~
~~4A Clay~~
~~5A Doddridge~~
~~5A Fayette~~
~~5A Hampshire~~
~~5A Hancock~~
~~5A Hardy~~
~~5A Harrison~~
~~4A Jackson~~
~~4A Jefferson~~
~~4A Kanawha~~
~~5A Lewis~~
~~4A Lincoln~~
~~4A Logan~~
~~5A Marion~~
~~5A Marshall~~
~~4A Mason~~
~~4A McDowell~~
~~4A Mercer~~
~~5A Mineral~~
~~4A Mingo~~
~~5A Monongalia~~
~~4A Monroe~~
~~4A Morgan~~
~~5A Nicholas~~
~~5A Ohio~~
~~5A Pendleton~~
~~4A Pleasants~~
~~5A Pocahontas~~
~~5A Preston~~
~~4A Putnam~~
~~5A Raleigh~~
~~5A Randolph~~
~~4A Ritchie~~
~~4A Roane~~
~~5A Summers~~
~~5A Taylor~~
~~5A Tucker~~
~~4A Tyler~~
~~5A Upshur~~
~~4A Wayne~~
~~5A Webster~~
~~5A Wetzel~~
~~4A Wirt~~
~~4A Wood~~
~~4A Wyoming~~
~~6A Outagamie~~
~~6A Barron~~
~~7 Bayfield~~
~~6A Brown~~
~~6A Buffalo~~
~~7 Burnett~~
~~6A Calumet~~
~~6A Chippewa~~
~~6A Clark~~
~~6A Columbia~~
~~6A Crawford~~
~~6A Dane~~
~~6A Dodge~~
~~6A Door~~
~~7 Douglas~~
~~6A Dunn~~
~~6A Eau Claire~~
~~7 Florence~~
~~6A Fond du Lac~~
~~7Forest~~
~~6A Grant~~
~~6A Green~~
~~6A Green Lake~~
~~6A Iowa~~
~~7 Iron~~
~~6A Jackson~~
~~6A Jefferson~~
~~6A Juneau~~
~~6A Kenosha~~
~~6A Kewaunee~~
~~6A La Crosse~~
~~6A Lafayette~~
~~7 Langlade~~
~~7 Lincoln~~
~~6A Manitowoc~~
~~6A Marathon~~
~~6A Marinette~~
~~6A Marquette~~
~~6A Menominee~~
~~6A Milwaukee~~
~~6A Monroe~~
~~6A Oconto~~
~~7 Oneida~~

~~(continued)~~

~~**TABLE R301.1 —continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY**~~

~~6A Ozaukee~~ ~~7 Taylor~~ ~~6B Big Horn~~ ~~6B Sheridan~~ ~~**NORTHERN**~~

~~6A Pepin~~	~~6A Trempealeau~~	~~6B Campbell~~	~~7 Sublette~~	~~**MARIANA ISLANDS**~~
~~6A Pierce~~	~~6A Vernon~~	~~6B Carbon~~	~~6B Sweetwater~~	~~1A (all)*~~
~~6A Polk~~	~~7 Vilas~~	~~6B Converse~~	~~7 Teton~~	~~**PUERTO RICO**~~
~~6A Portage~~	~~6A Walworth~~	~~6B Crook~~	~~6B Uinta~~	
~~7 Price~~	~~7 Washburn~~	~~6B Fremont~~	~~6B Washakie~~	~~1A (all)*~~
~~6A Racine~~	~~6A Washington~~	~~5B Goshen~~	~~6B Weston~~	~~**VIRGIN ISLANDS**~~
~~6A Richland~~	~~6A Waukesha~~	~~6B Hot Springs~~	~~**US TERRITORIES**~~	
~~6A Rock~~	~~6A Waupaca~~	~~6B Johnson~~		~~1A (all)*~~
~~6A Rusk~~	~~6A Waushara~~	~~6B Laramie~~	~~**AMERICAN SAMOA**~~	
~~6A Sauk~~	~~6A Winnebago~~	~~7 Lincoln~~		
~~7 Sawyer~~	~~6A Wood~~	~~6B Natrona~~	~~1A (all)*~~	
~~6A Shawano~~	~~**WYOMING**~~	~~6B Niobrara~~	~~**GUAM**~~	
~~6A Sheboygan~~		~~6B Park~~		
~~6A St. Croix~~	~~6B Albany~~	~~5B Platte~~	~~1A (all)*~~	

"Annual Energy Summary" RECAP

PGT Industries 7/5/12

City	Current Climate Zone	Cooling	Heating	Summary
Ft. Lauderdale	1	$ 481.00	$ 12.00	$ 493.00
Naples	2	$ 387.00	$ 6.00	$ 393.00
Ft. Myers	2	$ 482.00	$ 8.00	$ 490.00
West Palm	2	$ 466.00	$ 11.00	$ 477.00
Miami	1	$ 540.00	$ 1.00	$ 541.00
Homestead	1	$ 502.00	$ 9.00	$ 511.00
Marathon	1	$ 737.00	$ 1.00	$ 738.00

Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
Fort Lauderdale, FL 33394-

Project Title:
2010_Florida_Code_Fort Lauderdale
Building Type: User
Florida Code Example

TMY_City:FL_FORT_LAUDERDALE
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date: 07/05/2012 12:05:57

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3279 kWh	$393
Cooling Fan	730 kWh	$88
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**4009 kWh**	**$481**
Heating Electric	82 kWh	$10
Heating Fan/Pump	13 kWh	$2
Mechanical Vent Fan	0 kWh	$0
Total Heating		$12
Hot Water	2311 kWh	$277
Hot Water Pump	0 kWh	$0
Total Hot Water		$277
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	13351 kWh	$1603
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1603

Emissions	(Calculated as Total - PV Produced)
SO2	53.02 Lbs
NOX	31.14 Lbs
CO2	9.00 Tons

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Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
Naples, FL 34120-

Project Title:
2010_Florida_Code_Naples
Building Type: User
Florida Code Example

TMY_City:FL_NAPLES_MUNICIPAL
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date: 07/05/2012 12:03:45

End-Use	Energy Consumption	Annual Cost
Cooling Electric	2632 kWh	$316
Cooling Fan	588 kWh	$71
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**3220 kWh**	**$387**
Heating Electric	44 kWh	$5
Heating Fan/Pump	6 kWh	$1
Mechanical Vent Fan	0 kWh	$0
Total Heating		$6
Hot Water	2431 kWh	$292
Hot Water Pump	0 kWh	$0
Total Hot Water		$292
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	12636 kWh	$1518
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1518

Emissions	(Calculated as Total - PV Produced)
SO2	50.18 Lbs
NOX	29.48 Lbs
CO2	8.52 Tons

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Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
Fort Myers, FL 33913-

Project Title:
2010_Florida_Code_Fort Myers
Building Type: User
Florida Code Example

TMY_City:FL_FORT_MYERS_PAGE_F
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date: 07/05/2012 12:05:26

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3285 kWh	$394
Cooling Fan	730 kWh	$88
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**4015 kWh**	**$482**
Heating Electric	57 kWh	$7
Heating Fan/Pump	8 kWh	$1
Mechanical Vent Fan	0 kWh	$0
Total Heating		$8
Hot Water	2340 kWh	$281
Hot Water Pump	0 kWh	$0
Total Hot Water		$281
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	13356 kWh	$1604
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1604

Emissions	(Calculated as Total - PV Produced)
SO2	53.04 Lbs
NOX	31.15 Lbs
CO2	9.00 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
West Palm Beach, FL 33417-

Project Title:
2010_Florida_Code_West_Palm_Beach
Building Type: User
Florida Code Example

TMY_City:FL_WEST_PALM_BEACH_I
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date: 07/05/2012 12:07:08

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3174 kWh	$381
Cooling Fan	708 kWh	$85
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**3882 kWh**	**$466**
Heating Electric	80 kWh	$10
Heating Fan/Pump	11 kWh	$1
Mechanical Vent Fan	0 kWh	$0
Total Heating		$11
Hot Water	2362 kWh	$283
Hot Water Pump	0 kWh	$0
Total Hot Water		$283
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	13271 kWh	$1593
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1593

Emissions	(Calculated as Total - PV Produced)
SO2	52.70 Lbs
NOX	30.95 Lbs
CO2	8.94 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge Anyplace Miami, FL 33142-	Project Title: 2010_Florida_Code_Miami trial Building Type: User Florida Code Example	TMY_City:FL_MIAMI_INTL_AP Elec Util: MyFloridaAverage Gas Util: MyFloridaAverage Run Date: 07/05/2012 12:04:27

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3676 kWh	$441
Cooling Fan	823 kWh	$99
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**4499 kWh**	**$540**
Heating Electric	9 kWh	$1
Heating Fan/Pump	1 kWh	$0
Mechanical Vent Fan	0 kWh	$0
Total Heating		$1
Hot Water	2268 kWh	$272
Hot Water Pump	0 kWh	$0
Total Hot Water		$272
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	13713 kWh	$1646
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1646

Emissions	(Calculated as Total - PV Produced)
SO2	54.46 Lbs
NOX	31.99 Lbs
CO2	9.24 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
Homestead, FL 33030-

Project Title:
2010_Florida_Code_Homestead
Building Type: FLProp2010
Florida Code Example

TMY_City:FL_HOMESTEAD_AFB
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date:

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3413 kWh	$410
Cooling Fan	763 kWh	$92
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**4176 kWh**	**$502**
Heating Electric	65 kWh	$8
Heating Fan/Pump	8 kWh	$1
Mechanical Vent Fan	0 kWh	$0
Total Heating		$9
Hot Water	2323 kWh	$279
Hot Water Pump	0 kWh	$0
Total Hot Water		$279
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	0 kWh	$0
Miscellaneous Electric (including lighting)	6671 kWh	$801
Miscellaneous Therms	20 Therms	$34
Pool Pump	0 kWh	$0
Range	0 kWh	$0
Refrigerator	0 kWh	$0
Total (kWh)	13243 kWh	$1625
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1625

Emissions	(Calculated as Total - PV Produced)
SO_2	52.67 Lbs
NOX	30.94 Lbs
CO_2	8.94 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
Marathon, FL 33050-

Project Title:
2010_Florida_Code_Marathon
Building Type: FLProp2010
Florida Code Example

TMY_City:FL_MARATHON_AIRPORT
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date:

End-Use	Energy Consumption	Annual Cost
Cooling Electric	5021 kWh	$603
Cooling Fan	1113 kWh	$134
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**6134 kWh**	**$737**
Heating Electric	6 kWh	$1
Heating Fan/Pump	1 kWh	$0
Mechanical Vent Fan	0 kWh	$0
Total Heating		$1
Hot Water	2123 kWh	$255
Hot Water Pump	0 kWh	$0
Total Hot Water		$255
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	0 kWh	$0
Miscellaneous Electric (including lighting)	6671 kWh	$801
Miscellaneous Therms	20 Therms	$34
Pool Pump	0 kWh	$0
Range	0 kWh	$0
Refrigerator	0 kWh	$0
Total (kWh)	14935 kWh	$1828
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1828

Emissions	(Calculated as Total - PV Produced)
SO_2	59.39 Lbs
NOX	34.88 Lbs
CO_2	10.08 Tons

EnergyGauge® / USRRPB v3.0

"Annual Energy Summary" RECAP

PGT Industries 7/5/12

City	Current Climate Zone	Cooling	Heating	Summary
Ft. Lauderdale	1	$ 481.00	$ 12.00	$ 493.00
Naples	2	$ 387.00	$ 6.00	$ 393.00
Ft. Myers	2	$ 482.00	$ 8.00	$ 490.00
West Palm	2	$ 466.00	$ 11.00	$ 477.00
Miami	1	$ 540.00	$ 1.00	$ 541.00
Homestead	1	$ 502.00	$ 9.00	$ 511.00
Marathon	1	$ 737.00	$ 1.00	$ 738.00

Annual Energy Summary

Wholehouse Summary

Energy Gauge	Project Title:	TMY_City:FL_FORT_LAUDERDALE
Anyplace	2010_Florida_Code_Fort Lauderdale	Elec Util: MyFloridaAverage
Fort Lauderdale, FL 33394-	Building Type: User	Gas Util: MyFloridaAverage
	Florida Code Example	Run Date: 07/05/2012 12:05:57

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3279 kWh	$393
Cooling Fan	730 kWh	$88
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**4009 kWh**	**$481**
Heating Electric	82 kWh	$10
Heating Fan/Pump	13 kWh	$2
Mechanical Vent Fan	0 kWh	$0
Total Heating		$12
Hot Water	2311 kWh	$277
Hot Water Pump	0 kWh	$0
Total Hot Water		$277
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	13351 kWh	$1603
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1603

Emissions	(Calculated as Total - PV Produced)
SO2	53.02 Lbs
NOX	31.14 Lbs
CO2	9.00 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
Naples, FL 34120-

Project Title:
2010_Florida_Code_Naples
Building Type: User
Florida Code Example

TMY_City:FL_NAPLES_MUNICIPAL
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date: 07/05/2012 12:03:45

End-Use	Energy Consumption	Annual Cost
Cooling Electric	2632 kWh	$316
Cooling Fan	588 kWh	$71
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**3220 kWh**	**$387**
Heating Electric	44 kWh	$5
Heating Fan/Pump	6 kWh	$1
Mechanical Vent Fan	0 kWh	$0
Total Heating		$6
Hot Water	2431 kWh	$292
Hot Water Pump	0 kWh	$0
Total Hot Water		$292
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	12636 kWh	$1518
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1518

Emissions	(Calculated as Total - PV Produced)
SO2	50.18 Lbs
NOX	29.48 Lbs
CO2	8.52 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge	Project Title:	TMY_City:FL_FORT_MYERS_PAGE_F
Anyplace	2010_Florida_Code_Fort Myers	Elec Util: MyFloridaAverage
Fort Myers, FL 33913-	Building Type: User	Gas Util: MyFloridaAverage
	Florida Code Example	Run Date: 07/05/2012 12:05:26

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3285 kWh	$394
Cooling Fan	730 kWh	$88
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**4015 kWh**	**$482**
Heating Electric	57 kWh	$7
Heating Fan/Pump	8 kWh	$1
Mechanical Vent Fan	0 kWh	$0
Total Heating		$8
Hot Water	2340 kWh	$281
Hot Water Pump	0 kWh	$0
Total Hot Water		$281
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	13356 kWh	$1604
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1604

Emissions	(Calculated as Total - PV Produced)
SO2	53.04 Lbs
NOX	31.15 Lbs
CO2	9.00 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
West Palm Beach, FL 33417-

Project Title:
2010_Florida_Code_West_Palm_Beach
Building Type: User
Florida Code Example

TMY_City:FL_WEST_PALM_BEACH_I
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date: 07/05/2012 12:07:08

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3174 kWh	$381
Cooling Fan	708 kWh	$85
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**3882 kWh**	**$466**
Heating Electric	80 kWh	$10
Heating Fan/Pump	11 kWh	$1
Mechanical Vent Fan	0 kWh	$0
Total Heating		$11
Hot Water	2362 kWh	$283
Hot Water Pump	0 kWh	$0
Total Hot Water		$283
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	13271 kWh	$1593
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1593

Emissions	(Calculated as Total - PV Produced)
SO2	52.70 Lbs
NOX	30.95 Lbs
CO2	8.94 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge Anyplace Miami, FL 33142-	Project Title: 2010_Florida_Code_Miami trial Building Type: User Florida Code Example	TMY_City:FL_MIAMI_INTL_AP Elec Util: MyFloridaAverage Gas Util: MyFloridaAverage Run Date: 07/05/2012 12:04:27

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3676 kWh	$441
Cooling Fan	823 kWh	$99
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**4499 kWh**	**$540**
Heating Electric	9 kWh	$1
Heating Fan/Pump	1 kWh	$0
Mechanical Vent Fan	0 kWh	$0
Total Heating		$1
Hot Water	2268 kWh	$272
Hot Water Pump	0 kWh	$0
Total Hot Water		$272
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	891 kWh	$107
Lighting	2055 kWh	$247
Miscellaneous	2768 kWh	$332
Pool Pump	0 kWh	$0
Range	447 kWh	$54
Refrigerator	775 kWh	$93
Total (kWh)	13713 kWh	$1646
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1646

Emissions	(Calculated as Total - PV Produced)
SO2	54.46 Lbs
NOX	31.99 Lbs
CO2	9.24 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
Homestead, FL 33030-

Project Title:
2010_Florida_Code_Homestead
Building Type: FLProp2010
Florida Code Example

TMY_City:FL_HOMESTEAD_AFB
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date:

End-Use	Energy Consumption	Annual Cost
Cooling Electric	3413 kWh	$410
Cooling Fan	763 kWh	$92
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**4176 kWh**	**$502**
Heating Electric	65 kWh	$8
Heating Fan/Pump	8 kWh	$1
Mechanical Vent Fan	0 kWh	$0
Total Heating		$9
Hot Water	2323 kWh	$279
Hot Water Pump	0 kWh	$0
Total Hot Water		$279
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	0 kWh	$0
Miscellaneous Electric (including lighting)	6671 kWh	$801
Miscellaneous Therms	20 Therms	$34
Pool Pump	0 kWh	$0
Range	0 kWh	$0
Refrigerator	0 kWh	$0
Total (kWh)	13243 kWh	$1625
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1625

Emissions	(Calculated as Total - PV Produced)
SO_2	52.67 Lbs
NOX	30.94 Lbs
CO_2	8.94 Tons

EnergyGauge® / USRRPB v3.0

Annual Energy Summary

Wholehouse Summary

Energy Gauge
Anyplace
Marathon, FL 33050-

Project Title:
2010_Florida_Code_Marathon
Building Type: FLProp2010
Florida Code Example

TMY_City:FL_MARATHON_AIRPORT
Elec Util: MyFloridaAverage
Gas Util: MyFloridaAverage
Run Date:

End-Use	Energy Consumption	Annual Cost
Cooling Electric	5021 kWh	$603
Cooling Fan	1113 kWh	$134
Mechanical Vent Fan	0 kWh	$0
Total Cooling	**6134 kWh**	**$737**
Heating Electric	6 kWh	$1
Heating Fan/Pump	1 kWh	$0
Mechanical Vent Fan	0 kWh	$0
Total Heating		$1
Hot Water	2123 kWh	$255
Hot Water Pump	0 kWh	$0
Total Hot Water		$255
Ceiling Fans	0 kWh	$0
Clothes Washer	0 kWh	$0
Dishwasher	0 kWh	$0
Dryer	0 kWh	$0
Miscellaneous Electric (including lighting)	6671 kWh	$801
Miscellaneous Therms	20 Therms	$34
Pool Pump	0 kWh	$0
Range	0 kWh	$0
Refrigerator	0 kWh	$0
Total (kWh)	14935 kWh	$1828
Total (Therms)	0 Therms	$0
Total (Oil Gallons)	0 Gallons	$0
Total (Propane Gallons)	0 Gallons	$0
PV Produced (kWh) Assumes net metering	0 kWh	$0
Total Cost		$1828

Emissions	(Calculated as Total - PV Produced)
SO_2	59.39 Lbs
NOX	34.88 Lbs
CO_2	10.08 Tons

EnergyGauge® / USRRPB v3.0

EN5034

Date Submitted	7/9/2012	**Section**	R303	**Proponent**	Ann Stanton
Chapter	3	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No **Alternate Language** Yes

Related Modifications

Summary of Modification

Provides Florida-specific criteria for insulation installation and calculation.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901, FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

OTHER

Explanation of Choice

Subject is partially covered by the IECC. Florida-specific insulation installation standards are brought forward as well.

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Florida's energy code has long been more detailed than the IECC.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5034-A2

Proponent Ann Stanton **Submitted** 12/10/2012 **Attachments** Yes

Rationale

Replace Section R303.1.2 of Mod 5034 with Alternate language as shown, with no change to the rest of the mod. When Mod 5056 died for lack of a second, it left no standards referenced for heating and cooling equipment, including commercial equipment installed in residences (e.g. PTACs in apartments, chillers in 10,000 s.f. mansions). Mod 5034, however, does provide a general reference for equipment efficiencies. The alternate language proposed for Section R303.1.2 of this mod would expand the general reference for equipment efficiencies from Chapter 4 to Chapter 4 of the commercial provisions of this code, as applicable. This would allow typical residential equipment efficiencies to be ignored but still cover commercial equipment installed in residences that is not directly covered by NAECA.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

None.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

The IECC does not cover equipment efficiencies because they are regulated by the U.S. Department of Energy. However, there are situations where "commercial" equipment is installed in residential occupancies. This Alternate language to one section of the mod would reference such equipment to Chapter 4 of the commercial provisions of the energy code.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1st Comment Period History 08/09/2012 - 09/23/2012

EN5034-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

This code change is unnecessary as the provisions contained in the proposed amendment are adequately addressed in the applicable international code. Per FS 553.73 (7) (g)

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

R303.1 Identification. Materials, systems and equipment shall be identified in a manner that will allow a determination of compliance with the applicable provisions of this code.

R303.1.1 Building thermal envelope insulation. [move text to R303.1.1.2.1]

R303.1.1.14 Insulation product rating. The thermal resistance (R-value) of insulation shall be determined in accordance with the U.S. Federal Trade Commission R-value rule (CFR Title 16, Part 460) in units of h x ft2 x °F/Btu at a mean temperature of 75°F (24°C).

R303.1.1.1.1 R-values referenced in Chapter 4 of this code refer to the R-values of the added insulation only. The R-values of structural building materials such as framing members, concrete blocks or gypsum board shall not be included.

Exception: R402.1.4 Total UA Alternative.

R303.1.1.1.2 When installing two layers of bulk or board insulation, the R-values of each material may be added together for a total R-value. When installing two separate reflective insulation products in layers, the total R-value of the system shall have been achieved by testing under FTC regulations, 16 CFR Part 460.

R303.1.1.2 Building thermal envelope insulation markers. An *R*-value identification mark shall be applied by the manufacturer to each piece of *building thermal envelope* insulation 12 inches (305 mm) or greater in width. Alternately, the insulation installers shall provide a certification listing the type, manufacturer and *R*-value of insulation installed in each element of the *building thermal envelope*. For blown or sprayed insulation (fiberglass and cellulose), the initial installed thickness, settled thickness, settled *R*-value, installed density, coverage area and number of bags installed shall be *listed* on the certification. For sprayed polyurethane foam (SPF) insulation, the installed thickness of the areas covered and *R*-value of installed thickness shall be *listed* on the certification. The insulation installer shall sign, date and post the certification in a conspicuous location on the job site.

R303.1.1.2.1 Blown or sprayed roof/ceiling insulation. The thickness of blown-in or sprayed roof/ceiling insulation (fiberglass or cellulose) shall be written in inches (mm) on markers that are installed at least one for every 300 square feet (28 m^2) throughout the attic space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness with numbers a minimum of 1 inch (25 mm) in height. Each marker shall face the attic access opening. Spray polyurethane foam thickness and installed *R*-value shall be *listed* on certification provided by the insulation installer

303.1.1.2.2 Insulation mark installation. Insulating materials shall be installed such that the manufacturer's *R*-value mark is readily observable upon inspection.

R303.1.2 Equipment efficiency ratings. Minimum equipment efficiency rating identification for heating, cooling, hot water, swimming pool heating and filtration, and lighting shall be in accordance with industry standards and as described in Chapter 4 for such equipment.

R303.1.3 Fenestration product rating. U-factors…..[No change to R303.1.3 or tables]

~~R303.1.4 Insulation product rating.~~[move to Section R303.1.1.1]

R303.2 Installation. All materials, systems and equipment shall be installed in accordance with the manufacturer's installation instructions and the *Florida Building Code, Residential,* or *Florida Building Code, Building*, as applicable.

R303.2.1 Insulation installation. Insulation materials shall comply with the requirements of their respective ASTM standard specification and shall be installed in accordance with their respective ASTM installation practice in Table R303.2.1 in such a manner as to achieve *rated R-value of insulation*. Open-blown or poured loose-fill insulation shall not be used in *attic roof* spaces when the slope of the ceiling is more than three in twelve. When eave vents are installed, baffling of the vent openings shall be provided to deflect the incoming air above the surface of the insulation.

Exception: Where *metal building roof* and *metal building wall* insulation is compressed between the *roof* or *wall* skin and the structure.

TABLE R303.2.1

INSULATION INSTALLATION STANDARDS

Insulation Material	Standard Specification	Installation Practice
Mineral Fiber Batt/Blanket	ASTM C 665	ASTM C 1320
Mineral Fiber Loose Fill	ASTM C 764	ASTM C 1015
Cellulose Loose Fill	ASTM C 739	ASTM C 1015
Polystyrene Foam	ASTM C 578	
Polyisocyanurate Foam	ASTM C 1289	
Reflective	ASTM C 1224	ASTM C 727
Radiant Barrier	ASTM C 1313	ASTM C 1158
Vermiculite	ASTM C 516	
Perlite	ASTM C 549	
Spray-Applied Rigid Cellular Polyurethane Foam	ASTM C 1029	
Interior Radiation Control Coating Systems		ASTM C 1321

R303.2.1.1 Compressed insulation. Insulation that has been compressed to 85-percent or less of the manufacturer's rated thickness for the product shall use the R-values given in Table 303.2.1.1. These values are to be used except where data developed by an independent testing laboratory is provided.

TABLE 303.2.1.1

R-VALUES OF COMPRESSED INSULATION

% of Original Thickness	R-5	R-7	R-11	R-14	R-19	R-30	R-38

90	5	6	10	13	18	28	36
80	4	6	10	12	17	26	33
70	4	5	9	11	15	24	30
60	3	5	8	10	14	22	27
50	3	4	7	9	12	18	24
40	2	4	6	8	10	15	20
30	2	3	4	6	8	12	16
20	2	2	2	3	4	10	10

R**303.2.1.2 Substantial Contact.** Insulation shall be installed in a permanent manner in *substantial contact* with the inside surface in accordance with manufacturer's recommendations for the framing system used. Flexible batt insulation installed in floor cavities shall be supported in a permanent manner by supports no greater than 24 inches (610 mm) on center (o.c.).

Exception: Insulation materials that rely on airspaces adjacent to reflective surfaces for their rated performance.

R303.2.1.3 Insulation protection. Exterior insulation shall be covered with a protective material to prevent damage from sunlight, moisture, landscaping operations, equipment maintenance, and wind. In *attics* and mechanical rooms, a way to access equipment that prevents damaging or compressing the insulation shall be provided. Foundation vents shall not interfere with the insulation. Insulation materials in ground contact shall have a water absorption rate no greater than .3 percent when tested in accordance with ASTM C272, shall cover the exposed exterior insulation and shall extend a minimum of 6 inches (153 mm) below grade.

~~R 303.2.1 Protection of exposed foundation insulation~~. [Duplicates critera in R303.2.1.3. Delete in its entirety]

R303.3 Maintenance information. [no change to IECC text]

R303.1.2 Equipment efficiency ratings. Minimum equipment efficiency rating identification for heating, cooling, hot water, swimming pool heating and filtration, and lighting shall be in accordance with industry standards and as described in Chapter 4 of the Commercial Provisions of this code, as applicable, for such equipment.

EN5666

Date Submitted	7/26/2012	**Section**	R403.1	**Proponent**	Jeff Sonne / FSEC
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language** Yes

Related Modifications

None.

Summary of Modification

Clarify programmable thermostat requirements.

Rationale

Although Section R403.1 Controls, is labeled as Mandatory, it is unclear whether all control requirements are. Table R405.5.2(1) specifies a manual thermostat for Section 405 (performance) compliance. The proposed language would clarify that programmable thermostats are required for prescriptive compliance by Section R402.1 (if the primary heating system is a forced-air furnace), but they are not required for Section R405 (performance) compliance (whether the primary heating system is a forced-air furnace or not).

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None, as this modification only clarifies what is seen as the intention of the code that programmable thermostats are required for prescriptive compliance but are optional for performance compliance. Proposed language is in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Public is benefited since this modification clarifies the intention of the code. Proposed language is in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification improves the code by clarifying what is seen as the intention of the code that a builder has choices by the performance method regarding programmable thermostats. Proposed language is in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed modification does not discriminate against materials, products, methods, or systems of construction; it only provides a clarification. Proposed language is in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

This modification increases the effectiveness of the code by clarifying what is seen as the intention of the code that a builder has choices by the performance method regarding programmable thermostats. Proposed language is in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

OTHER

Explanation of Choice

Modification is to clarify the intent of the international code.

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Modification is to clarify the intent of the code.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5666-A2

Proponent Paul Abernathy **Submitted** 12/13/2012 **Attachments** Yes

Rationale

Section R403.1 is in Section R403, Systems. Yet, when one goes to definitions, System is not defined. So how does a baseboard heater or a thermal storage heater fit into that definition? The requirement is vague because the definition of system is not clear and is open to interpretation. There should be one thermostat per zone; this allows for comfort heating of only the zone that is occupied while other zones are kept at a lower temperature for heating and a higher temperature for cooling. Section 403.1.1 is limiting the requirement to heat pumps with only electric resistance supplementary heat. Why should the requirement not apply to heat pumps with a gas fired or oil fired unit as supplementary heat?

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.? The requirement as previously proposed is vague because the definition of system is not clear and is open to interpretation and eratic enforcement.

Impact to building and property owners relative to cost of compliance with code

None. Programable thermostats are widely available for all forms of temperature control.

Impact to industry relative to the cost of compliance with code

None. The products are already accepted in the market place and used on a daily basis.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. this allows for comfort heating of only the zone that is occupied while other zones are kept at a lower temperature for heating and a higher temperature for cooling.in R403.1.1 -Why should the requirement not apply to heat pumps with a gas fired or oil fired unit as supplementary heat?

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal ensures reliable control and the utmost cost efficiency of heating and cooling systems at a easy and controlled point of control. Electric Resistance Heating also is safer than other methods of heating due to Overcurrent Protection provisions.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

So how does a baseboard heater or a thermal storage heater fit into the original proposal? The original proposal EN-5666 heavily descriminates againsts products what are already proven reliable and very cost effective.

Does not degrade the effectiveness of the code

No. This proposal allows for the continued use of products already proven in the industry.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

NO

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

EN5666-G1

Proponent	BOAF CDC	Submitted	9/15/2012	Attachments	No

Comment:

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

This code change is unnecessary as the provisions contained in the proposed amendment are adequately addressed in the applicable international code. Per FS 553.73 (7) (g)

R403.1 Controls ~~**(Mandatory).** At least one thermostat shall be provided for each separate heating and cooling system.~~

<u>**R403.1.1 Thermostat provision (Mandatory).** At least one thermostat shall be provided for each separate heating and cooling system.</u>

R403.1.~~1~~<u>2</u> Programmable thermostat <u>(Prescriptive)</u>. Where the primary heating system is a forced-air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55°F (13°C) or up to 85°F (29°C). The thermostat shall initially be programmed with a heating temperature set point no higher than 70°F (21°C) and a cooling temperature set point no lower than 78°F (26°C).

R403.1.~~2~~<u>3</u> Heat pump supplementary heat (Mandatory). Heat pumps having supplementary electric-resistance heatshall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressorcan meet the heating load.

R403.1 ~~Controls~~ Thermostat provision (Mandatory). ~~At least~~ one thermostat shall be provided for each ~~separate~~ heating and cooling ~~system~~ zone.

R403.1.1 Programmable thermostat ~~(Mandatory)~~ (Prescriptive). Where the primary heating system is a forced-air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55°F (13°C) or up to 85°F (29°C). The thermostat shall initially be programmed with a heating temperature set point no higher than 70°F (21°C) and a cooling temperature set point no lower than 78°F (26°C).

Date Submitted	7/10/2012	**Section**	R403.5	**Proponent**	Ann Stanton
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Add Florida-specific ventilation air requirements.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901, FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5055-A2

Proponent Mike Moore **Submitted** 12/7/2012 **Attachments** Yes

Rationale

Newport Ventures, on behalf of Broan NuTone, supports EN5055, which provides for energy efficient delivery of whole house mechanical ventilation by meeting but not exceeding ASHRAE 62.2 rates. We also respectfully request modification of the proposal by amending Section R403.5.1 as follows. The intention of this modification is to dramatically improve the energy performance of WHMV system fans while greatly improving the system payback. This proposed modification would save a large amount of energy – up to 300 kWh in fan energy when exhaust fans are used for whole-house mechanical ventilation – enough to offset the annual energy use of a refrigerator. The modification is also designed to be cost-effective, with attractive paybacks. A rationale is presented in the attachment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Need to confirm efficacy based on manufacturer data (i.e., label)

Impact to building and property owners relative to cost of compliance with code

In some cases, additional first costs, but these are recouped quickly through energy savings.

Impact to industry relative to the cost of compliance with code

Minimal.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Results in energy and $ savings as well as provides for improved air quality, which can lead to better health.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improvement in fan efficacy, resulting in energy savings.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Numerous manufacturers who can provide the various products that can be approved through the modification.

Does not degrade the effectiveness of the code

Makes the code more effective.

Is the proposed code modification part of a prior code version? No

1st Comment Period History 08/09/2012 - 09/23/2012

EN5055-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

This code change is unnecessary as the provisions contained in the proposed amendment are adequately addressed in the applicable international code. Per FS 553.73 (7) (g)

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5055-G2

Proponent Mike Moore **Submitted** 9/22/2012 **Attachments** Yes

Comment:

This comment submits proposed alternative language to EN5055. Please see the attachment for details. I was unable to get the alternative language comment form to work.

R403.5 Mechanical ventilation (Mandatory). The building shall be provided with ventilation that meets the requirements of the *Florida Building Code*, ~~*International*~~ *Residential* ,~~*Code*~~ or *Florida Building Code*, ~~*International*~~ *Mechanical* ~~*Code*~~, as applicable, or with other approved means of ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

R403.5.1 Whole-house mechanical ventilation system fan efficacy. Mechanical ventilation system fans shall meet the efficacy requirements of Table R403.5.1. [No Florida-specific change to table]

R403.5.2 Ventilation air. Residential buildings designed to be operated at a positive indoor pressure or for mechanical ventilation shall meet the following criteria:

1. The design air change per hour minimums for residential buildings in ASHRAE 62, *Ventilation for Acceptable Indoor Air Quality*, shall be the maximum rates allowed for residential applications.

2. No ventilation or air-conditioning system make-up air shall be provided to conditioned space from attics, crawlspaces, attached enclosed garages or outdoor spaces adjacent to swimming pools or spas.

3. If ventilation air is drawn from enclosed space(s), then the walls of the space(s) from which air is drawn shall be insulated to a minimum of R-11 and the ceiling shall be insulated to a minimum of R-19, space permitting, or R-10 otherwise.

R403.5.1 Whole-house mechanical ventilation system fan efficacy. ~~Mechanical ventilation system fans shall meet the efficacy requirements of Table R403.5.1.~~ Fans serving as a component of whole-house mechanical ventilation systems shall have a manufacturer's designation for fan performance in accordance with one of the following:

~~Exception:~~

1. Exhaust fans with a minimum fan efficacy of 8 cfm/W.
2. Supply fans with a minimum fan efficacy of 4 cfm/W.
3. Energy recovery ventilators with a minimum total recovery efficiency of 50% at 95°F.
4. Where mechanical ventilation fans are integral to tested and listed HVAC equipment, they shall be powered by an electronically commutated motor.

[Remove table R403.5.1 in its entirety.]

NEWPORT VENTURES

September 21, 2012

Energy Technical Advisory Committee
Florida Building Commission
1940 North Monroe Street
Tallahassee FL 32399

Re: EN5055

Dear FBC Staff and Energy TAC:

Newport Ventures, on behalf of Broan NuTone, supports EN5055, which provides for energy efficient delivery of whole house mechanical ventilation by meeting but not exceeding ASHRAE 62.2 rates. We also respectfully request modification of the proposal by amending Section R403.5.1 as follows. The intention of this modification is to dramatically improve the energy performance of WHMV system fans while greatly improving the system payback. In improving the fan efficacy, it was also necessary to provide an exception for ERVs, which cannot meet the same efficacy levels as other types of WHMV fans, but should still be retained as viable solutions based on other benefits, such as filtration and total recovery efficiency. A rationale is presented after the proposed change.

Amend Section R403.5.1 as Follows:
R403.5.1 Whole-house mechanical ventilation system fan efficacy. Fans serving as a component of a whole-house ~~M~~mechanical ventilation system ~~fans~~ shall ~~meet the~~ have a minimum efficacy of 8.0 cfm/W ~~requirements of Table R403.5.1~~.
Exceptions:

1. Energy recovery ventilators with a minimum total recovery efficiency of 50% based on manufacturer data.
2. Where mechanical ventilation fans are integral to tested and listed HVAC equipment, they shall be powered by an electronically commutated motor, a brushless DC motor, or have a minimum efficacy of 2.5 cfm/W based on manufacturer data.

[Remove table R403.5.1 in its entirety.]

Rationale:
The purpose of this proposal is to move the bar forward for whole house mechanical ventilation (WHMV) fan efficacy. This change is needed in the Florida Energy Conservation Code because these fans operate for long duty cycles and can have a significant impact on the energy use of the home. Requiring higher efficacy WHMV fans is a great opportunity to reduce home energy use cost-effectively. Because whole house mechanical ventilation systems (WHMV) can vary greatly across their type, controls, and function, it is difficult to develop a prescriptive efficacy requirement that is at once:

- Achievable with best-in-class products
- Suited for all systems (no de-facto prohibition of any system types)
- Enforceable
- Equitable, and
- Cost effective.

This proposal strives to accomplish all of those objectives simultaneously while greatly improving the required energy performance of these systems. Following is the justification for the various efficacy

NEWPORT VENTURES

December 6, 2012

Energy Technical Advisory Committee
Florida Building Commission
1940 North Monroe Street
Tallahassee FL 32399

Re: EN5055

Dear FBC Staff and Energy TAC:

Newport Ventures, on behalf of Broan NuTone, supports EN5055, which provides for energy efficient delivery of whole house mechanical ventilation by meeting but not exceeding ASHRAE 62.2 rates. We also respectfully request modification of the proposal by amending Section R403.5.1 as follows. The intention of this modification is to dramatically improve the energy performance of WHMV system fans while greatly improving the system payback. This proposed modification would save a large amount of energy – up to 300 kWh in fan energy when exhaust fans are used for whole-house mechanical ventilation – enough to offset the annual energy use of a refrigerator. The modification is also designed to be cost-effective, with attractive paybacks. A rationale is presented after the proposed change.

Amend Section R403.5.1 as Follows:
R403.5.1 Whole-house mechanical ventilation system fan efficacy. ~~Mechanical ventilation system fans shall meet the efficacy requirements of Table R403.5.1.~~ <u>Fans serving as a component of whole-house mechanical ventilation systems shall have a manufacturer's designation for fan performance in accordance with one of the following:</u>
~~Exception:~~

1. <u>Exhaust fans with a minimum fan efficacy of 8 cfm/W.</u>
2. <u>Supply fans with a minimum fan efficacy of 4 cfm/W.</u>
3. <u>Energy recovery ventilators with a minimum total recovery efficiency of 50% at 95°F.</u>
4. Where mechanical ventilation fans are integral to tested and listed HVAC equipment, they shall be powered by an electronically commutated motor.

[Remove table R403.5.1 in its entirety.]

Rationale:
The purpose of this proposal is to reduce the energy use impact of whole house mechanical ventilation (WHMV) fans. This change is needed in the Florida Energy Conservation Code because these fans operate for long duty cycles and can have a significant impact on the energy use of the home. Requiring higher efficacy WHMV fans is a great opportunity to reduce home energy use cost-effectively. Because whole house mechanical ventilation systems (WHMV) can vary greatly across their type, controls, and function, it is difficult to develop a prescriptive efficacy requirement that is at once:

- Achievable with best-in-class products
- Suited for all systems (no de-facto prohibition of any system types)
- Enforceable
- Equitable, and
- Cost effective.

This proposal strives to accomplish all of those objectives simultaneously while greatly improving the required energy performance of these systems. Following is the justification for the various efficacy requirements by system type. Please note that a similar proposal was unanimously approved by the mechanical subcommittee of ASHRAE 90.2 and continues to move through the committee on the path to approval within the next revision of this standard.

EN5045

Date Submitted	7/10/2012	**Section**	R403.9	**Proponent**	Ann Stanton
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Move swimming pool criteria from 2010 code forward into the 2013 code.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901, FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5045-A1

Proponent Jennifer Hatfield **Submitted** 12/14/2012 **Attachments** Yes

Rationale

The alternate language moves the swimming pool criteria from 2010 code forward into the 2013 code, but does not repeat the pump and motor requirements found in APSP-15, nor does it specify requirements found in APSP-14. To do so is duplicative and could cause inconsistencies between how requirements are stated within the standard versus the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Eliminates redundancy and possible concerns with misinterpretation of what is required within the referenced standards.

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

Eliminates possible misinterpretation.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Provides for State mandated energy savings.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC per the requirements of the FL legislature. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1st Comment Period History 08/09/2012 - 09/23/2012

EN5045-G1

Proponent Ken Cureton **Submitted** 9/21/2012 **Attachments** No

Comment:

The proposal provides for swimming pool criteria as per 553.909 FS.

R403.9 Swimming pools~~, and~~inground ~~permanently installed~~ spas, and portable spas (Mandatory). The energy requirements for residential pools and inground spas shall be as specified in Sections R403.9.1 through R403.9.4 and ANSI/APSP-15. The energy requirements for portable spas shall be in accordance with Section R403.9.5 and ANSI/APSP-14. ~~Pools and inground permanently installed spas shall comply with Sections R403.9.1 through R403.9.3.~~

R403.9.1 Pool and spa heaters. All pool heaters shall be equipped with a readily *accessible* on-off switch that is mounted outside the heater to allow shutting off the heater without adjusting the thermostat setting. [Replace IECC R403.9.1 in its entirety]

R403.9.1.1 Gas and oil-fired pool and spa heaters. All gas- and oil-fired pool and spa heaters shall have a minimum thermal efficiency of 82 percent for heaters manufactured on or after April 16, 2013 when tested in accordance with ANSI Z 21.56. Pool heaters fired by natural or LP gas shall not have continuously burning pilot lights.
R403.9.1.2 Heat pump pool heaters. Heat pump pool heaters shall have a minimum COP of 4.0 when tested in accordance with ARI 1160, Table 2, Standard Rating Conditions-Low Air Temperature. A test report from an independent laboratory is required to verify procedure compliance.

R403.9.2 Time switches. Time switches or other control method that can automatically turn off and on heaters and pumps according to a preset schedule shall be installed on all heaters and pumps. Heaters, pumps and motors that have built in timers shall be deemed in compliance with this requirement

Exceptions:

1. Where public health standards require 24-hour pump operation.

2. Where pumps are required to operate solar- and waste-heat-recovery pool heating systems.

3. Where pumps are powered exclusively from on-site renewable generation.

R403.9.3 Covers. Heated swimming pools and inground permanently installed spas shall be equipped ~~provided~~ with a vapor-retardant cover on or at the water surface or a liquid cover or other means proven to reduce heat loss. -

Exception: Outdoor pools deriving over 70 percent of the energy for heating from site-recovered energy, such as a heat pump or solar energy source computed over an operating season.

R403.9.4 Residential pool pumps and pump motors. Pool filtration pump motors shall meet the following requirements:

1. Pool pump motors shall not be split-phase, shaded-pole or capacitor start-induction run types.

2. Pool pumps and pool pump motors with a total horsepower (HP) of = 1 HP shall have the capability of operating at two or more speeds. The low speed shall have a rotation rate of no more than ½ of the motor's maximum rotation rate.

3. Pool pumps motor controls shall have the capability of operating the pool pump at a minimum of two speeds. The default circulation speed shall be the residential filtration speed, with a higher speed override capability for a temporary period not to exceed one normal cycle or 24 hours, whichever is less.

Exception: Solar pool heating systems shall be permitted to run at higher speeds during periods of usable solar heat gain.

R403.9.5 Portable spa standby power. Portable electric spa standby power shall not be greater than 5(V2/3) watts where V = the total volume, in gallons, when spas are measured in accordance with the spa industry test protocol provided in ANSI/APSP-14.

R403.9 Swimming pools, ~~and~~inground ~~permanently installed~~ spas, and portable spas (Mandatory). The energy requirements for residential pools and inground spas shall be as specified in Sections R403.9.1 through R403.9.3 and in accordance with ANSI/APSP-15. The energy requirements for portable spas shall be in accordance with ANSI/APSP-14. ~~Pools and inground permanently installed spas shall comply with Sections R403.9.1 through R403.9.3.~~

R403.9.1 Pool and spa heaters. All pool heaters shall be equipped with a readily *accessible* on-off switch that is mounted outside the heater to allow shutting off the heater without adjusting the thermostat setting. [Replace IECC R403.9.1 in its entirety]

R403.9.1.1 Gas and oil-fired pool and spa heaters. All gas- and oil-fired pool and spa heaters shall have a minimum thermal efficiency of 82 percent for heaters manufactured on or after April 16, 2013 when tested in accordance with ANSI Z 21.56. Pool heaters fired by natural or LP gas shall not have continuously burning pilot lights.

R403.9.1.2 Heat pump pool heaters. Heat pump pool heaters shall have a minimum COP of 4.0 when tested in accordance with ARI 1160, Table 2, Standard Rating Conditions-Low Air Temperature. A test report from an independent laboratory is required to verify procedure compliance.

R403.9.2 Time switches. Time switches or other control method that can automatically turn off and on heaters and pumps according to a preset schedule shall be installed on all heaters and pumps. Heaters, pumps and motors that have built in timers shall be deemed in compliance with this requirement

Exceptions:

1. Where public health standards require 24-hour pump operation.

2. Where pumps are required to operate solar- and waste-heat-recovery pool heating systems.

3. Where pumps are powered exclusively from on-site renewable generation.

R403.9.3 Covers. Heated swimming pools and inground permanently installed spas shall be equipped ~~provided~~ with a vapor-retardant cover on or at the water surface or a liquid cover or other means proven to reduce heat loss.

Exception: Outdoor pools deriving over 70 percent of the energy for heating from site-recovered energy, such as a heat pump or solar energy source computed over an operating season.

EN6005

Date Submitted	8/2/2012	**Section**	C-All	**Proponent**	Ann Stanton
Chapter	5	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

6004

Summary of Modification

Update standards list to reflect Florida specific references.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

6005-A1

Proponent Ann Stanton **Submitted** 12/11/2012 **Attachments** Yes

Rationale

This document is not referenced from an approved mod.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

This mod was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies. This comment removes a document from the Florida-specific reference documents that will not be in the code.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1st Comment Period History 08/09/2012 - 09/23/2012

EN6005-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

CHAPTER 5

REFERENCED STANDARDS

AABC

Associated Air Balance Council,

1518 K Street, Suite 503,

Washington, DC 20005

Standard referenced number Title Reference in code section number

AABC, 1989 Associated Air Balance Council National Standard . . . . ……………….. . . . . C408.2.2.1

ACCA

Air Conditioning Contractors of America

2800 Shirlington Road, Suite 300

Arlington, VA 22206

Standard referenced number Title Reference in code section number

ACCA Manual D-1995 Residential Duct Systems C403.2.7.5

ACCA Manual N-2005 Commercial Load Calculation C403.2.1

ANSI/ASHRAE/ACCA 183-2007 Peak Cooling and Heating Load Calculations in Buildings Except Low-rise Residential Buildings . .C403.2.1

ADC

Air Diffusion Council

1000 E. Woodfield Rd., Suite 102

Schaumburg, IL 60173-5921

Standard referenced number Title Reference in code section number

ADC 2003 Flexible Duct Performance & Installation Standards, Fourth Edition. C403.2.7.2

ANSI

American National Standards Institute

25 West 43rd Street

Fourth Floor

New York, NY 10036

Standard referenced number Title Reference in code section number

A 112.18.1M-1999 Finished and Rough Brass Plumbing Fixture Fittings C404.8.1

ASHRAE

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

1791 Tullie Circle, NE

Atlanta, GA 30329-2305

Standard referenced number Title Reference in code section number

ANSI/ASHRAE Std. 55-1992 Thermal Environmental Conditions for Human Occupancy. C403.4.8

ANSI/ASHRAE/IESNA Energy Standard for Buildings Except Low-rise Residential Buildings

90.1—2010 . . . .C101.5.1.2.3, C304.1,1, C304.3.1.4, C304.3.2.1, C304.3.2.2

C405.7.1, C407.5.3

ASHRAE—2008 HVAC Systems and Equipment Handbook C403.2.1

ASTM

ASTM International

100 Barr Harbor Drive

West Conshohocken, PA 19428-2959

Standard referenced number Title Reference in code section number

C36/C36M-03 Standard Specification for Gypsum Wallboard 202

C 177-04 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties

by Means of the Guarded-Hot-Plate Apparatus C304.2.1

C236-89 (1993e1) Test Method for Steady State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box C304.2.1

C 516-02 Vermiculite Loose Fill Thermal Insulation Table 303.2

C 518-04 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus. C304.2.1

C1363-05 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means

of a Hot Box Apparatus C304.2.2

D2412-02(2008) Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Pipe Loading Table C403.2.7.2

E 84-09 Test Method for Surface Burning Characteristics of Building Materials C403.2.7.3.7

E 283—04 Test Method for Determining the Rate of Air Leakage Through Exterior Windows,

Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen 402.4.5, 502.34.2, 502. 3.8

E 903-96 Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials

Using Integrating Spheres 405.6.2

E 1918-06 Standard Test Method for Measuring Solar Reflectance of Horizontal and

Low-Sloped Surfaces in the Field 405.6.2

DOE

U.S. Department of Energy

c/o Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402-9325

Standard referenced number	Title	Reference in code section number
EPACT, 92 42 USC 6831, et seq Public Law 102-486	Energy Policy Act of 1992	C405.7.5

Florida Codes

Building Codes and Standards Office

Florida Department of Business and Professional Regulation

140 N Monroe Street

Tallahassee, FL 32399-2100

Standard referenced number	Title	Reference in code section number
FS 2013	Florida Statutes	C103.1.1.2, C103.1.1.2

ESTATAM 2012 Energy Simulation Tool Approval Technical Assistance Manual C407.4

NAIMA

North American Insulation Manufacturers Association

44 Canal Center Plaza, Suite 310,

Alexandria, VA 22314

Standard referenced number	Title	Reference in code section number
NAIMA 2002	Fibrous Glass Duct Construction Standards, Fifth Edition	Table C403.2.7.2

NEBB

National Environmental Balancing Bureau

8575 Grovemont Circle

Gaithersburg, MD 20877-4121

Standard referenced number	Title	Reference in code section number
NEBB, 2005	Procedural Standards For Testing Adjusting Balancing of Environmental Systems, Seventh Edition.	C403.2.2.1

NEMA

National Electrical Manufacturers Association

1300 N 17th Street, Suite 1847

Rosslyn, VA 22209

Standard referenced number Title Reference in code section number

NEMA MG 1-2004 Motors and Generators Table C405.7.5

SMACNA

Sheet Metal and Air Conditioning Contractors National Association, Inc.

4021 Lafayette Center Drive

Chantilly, VA 20151-1209

Standard referenced number Title Reference in code section number

SMACNA—85 HVAC Air Duct Leakage Test Manual. . . . . .Table C403.2.7.2, C403.2.7.3.7.

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SPRI

Single Ply Roofing Industry

411 Waverley Oaks Road, Ste 331

Waltham, MA 02452

Standard referenced number Title Reference in code section number

ANSI/SPRI VF-1 2010 External Fire Design Standard for Vegetative Roofs. C407.5.2.4.1

UL

Underwriters Laboratories Inc.

333 Pfingsten Road

Northbrook, IL 60062-2096

Standard referenced number Title Reference in code section number

181-05 Standard for Factory-Made Air Ducts and Air Connectors with revisions

through December 1998. Table C403.2.7.2

181A-05 Closure Systems for Use With Rigid Air Ducts and Air Connectors,

with revisions through December 1998. C403.2.7.3.7, Table C403.2.7.3.7

181B-05 Closure Systems for Use With Flexible Air Ducts and Air Connectors with revisions through May 2000. C403.2.7.3.7, Table C403.2.7.3.7

723-03 Standard for Test for Surface Burning Characteristics of Building Materials. C403.2.7.3.7

US—FTC

United States - Federal Trade Commission

600 Pennsylvania Avenue NW

Washington, DC 20580

Standard referenced number Title Reference in code section number

CFR Title 16, Part 460 R-value Rule. C202, C303.1.4

Although Mod 6005 was approved As Submitted, the following document is no longer referenced from the code and should be deleted from the list of Florida-specific standards in Chapter 5 of the FBC-Energy Conservation, Commercial Provisions.

Florida Codes

Building Codes and Standards Office

Florida Department of Business and Professional Regulation

1940 N Monroe Street

Tallahassee, FL 32399-2100

Standard referenced number Title
Reference in code section number

FS 2013 Florida Statutes
C103.1.1.2, C103.1.1.2

~~ESTATAM 2012 Energy Simulation Tool Approval Technical Assistance Manual C407.4~~

Total Mods for **Energy** in **No Affirmative Recommendation with a Second: 15**

Total Mods for report: 22

Sub Code: Energy Conservation

EN6009

8

Date Submitted 8/2/2012
Chapter 9
Section Form C402
Affects HVHZ No
Proponent Ann Stanton
Attachments No
TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

Summary of Modification

Need to update energy code form for commercial prescriptive code compliance.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

6009-A1

Proponent Ann Stanton **Submitted** 12/14/2012 **Attachments** Yes

Rationale

The Energy TAC voted this mod NAR in order to have the actual requirements on the form for code compliance. This is an attempt at including relevant information on the form.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

This is Florida specific according to a Commission approved plan.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1st Comment Period History 08/09/2012 - 09/23/2012

EN6009-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

This code change is unnecessary as the provisions contained in the proposed amendment are adequately addressed in the applicable international code. Per FS 553.73 (7) (g)
The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)
The proposed amendment does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

[

[NOTE: This form may change significantly due to changes made during the code revision process.]

FLORIDA ENERGY EFFICIENCY CODE FOR BUILDING CONSTRUCTION CHAPTER C4 – Building Envelope Prescriptive Method	
Form C402-2013 ~~2010~~ **All Climate Zones**	
Project Name:	Buildings that may comply by this form: Shell buildings (preliminary), renovation, change of occupancy type permitted before 1979, limited or special use building, building system changeouts)
Address:	
City, Zip Code:	Building Permit No.:
Builder:	Permitting Office:
Owner:	Jurisdiction No.:

BUILDING ENVELOPE INFORMATION		
ENVELOPE COMPONENT	**Shell building**	**Renovation; Change of occupancy type; Limited/Special Use building;** **Lighting or equipment changeout**
Roof: Absorptance: R-value (U-value):		
Wall: **Above grade wall** **Absorptance:** **R-value (U- value):** Below grade wall		
Floor: **Raised Floor Insulation: R-value (U-value):** Slab-on-grade: No requirement unless heated:		
Fenestration **U- factor** **SHGC (by percent of wall area):** Overhang Projection Factor (PF):		N.A.

Skylights: **SHGC:** **U- factor:** Percent of roof area:		N.A.

SYSTEMS INFORMATION (if applicable)					
SYSTEM	Type (describe system)	Size (capacity)	Sizing calculation	Efficiency Rating	
Air-conditioning system					
Heating system					
Ventilation		Fan Power:		CFM	
Ducts	Location:			R-value	
Piping	Fluid design operating temp:	Size of pipe:	-------	Inches	
Hot water			-------	EF	
Electric power	Drawings	Y N	Operations manual available upon completion: Y N		
Motors	Open or enclosed		Poles & speed:	Horsepower	
Lighting	Space type:		Lighting power density		

PRESCRIPTIVE MEASURES		
Components	**Section**	**Requirements**
Operations Manual	C303.3.1	Operations manual provided to owner.
Air infiltration: Windows & Doors Joints/Cracks Dropped Ceiling Cavity	C402.3	Per C402.4.4: Windows, skylights & sliding glass doors air infiltration = .3 cfm/sq.ft. Swinging doors = 0.5 cfm/sq.ft. To be caulked, gasketted, weatherstripped or otherwise sealed. Recessed lights IC-rated and labeled to ASTM E 283. Vented: seal & insulated ceiling. Unvented seal & insulate roof & side walls.
Dehumidification	C403.4.5	Simultaneous heating/cooling prohibited, Exceptions.
HVAC Efficiency	C403.2.3	Minimum efficiencies: Tables C403.2.3(1)-(8)
HVAC Controls	C403.2.4	Zone controls prevent reheat (exceptions); separate thermostatic control per zone; combined HAC control 5℉ deadband, Exceptions.
Ventilation	C403.2.5	Outdoor air supply & exhaust ducts shall have dampers that automatically shut when systems or spaces served are not in use. Exhaust air energy recovery required for cooling systems (Exceptions).
HVAC Ducts	C403.2.7	Air ducts, fittings, mechanical equipment & plenum chambers shall be mechanically attached, sealed, insulated & installed per Table 503.2.7.2. Fan power limitations.
Balancing	C403.2.9.1	HVAC distribution system(s) tested & balanced. Report in construction documents.
Piping Insulation	C403.2.8	HAC and service hot water. In accordance with Table C403.2.8.
Water Heaters	C404	Performance requirements in accordance with Table C404.2. Heat trap

		required.
Swimming Pools	C404.7	Vapor-retardant or liquid cover or other means proven to reduce heat loss on heated pools; Time switch (exceptions); Readily accessible on/off switch.
Lighting Controls	C405.2, 502.3	Automatic control required for interior lighting in buildings >5,000 s.f.; Space control; Exterior photo sensor; Tandem wiring where 1-3 linear fluorescent lamps >30W.

I hereby certify that the plans and specifications covered by the calculation are in compliance with the Florida Energy Code. PREPARED BY: ______________________________DATE: _________ I hereby certify that this building is in compliance with the Florida Energy Code: OWNER AGENT: ______________________________DATE:________	**Review of plans and specifications covered by this calculation indicates compliance with the Florida Energy Code. Before construction is completed, this building will be inspected for compliance in accordance with Section 553.908, F.S.** **BUILDING OFFICIAL:__________________ DATE: __________**

BUILDING ENVELOPE REQUIREMENTS			
SHELL BUILDINGS		RENOVATIONS; CHANGE OF OCCUPANCY; LIMITED/SPECIAL USE BUILDING; LIGHTING OR EQUIPMENT CHANGEOUT[1]	
BUILDING COMPONENT	REQUIREMENT	BUILDING COMPONENT	REQUIREMENT
Roof: **Absorptance** **R-value (U-value)**	 **= 0.22** **R-40 (U=0.025)**	Roof: **Absorptance** **U-value**	 **= 0.22** **R-38(U=0.033)**
Wall: **Above grade wall** **Absorptance** **R-value (U- value)** **Below grade wall**	 **= 0.30** **R-30 (U= 0.032)** **No requirement**	Wall: **Above grade wall** **Absorptance** **R-value (U- value)** **Below grade wall**	 **= 0.30** **R-19 (U= 0.052)** **No requirement**
Raised Floor Insulation: **R-value (U-value):**	 **R-30 (U = 0.032)**	Raised Floor Insulation: **R-value (U-value):**	 **R-19 (U= 0.052)**

Windows: **U- factor** **SHGC (by window area)[2]** **0-40% WW Ratio** **40-50% WW Ratio** **> 50 % Not allowed**	 **= 0.45** **0.25** **0.19**	Windows: **U- factor** **SHGC (by window area)** **0-40% WW Ratio** **>40% WW Ratio**	 **= 0.45** **0.25** **0.25**
Skylights: **SHGC** **U- factor** **Maximum percent of roof area**	 **= 0.19** **= 1.36** **= 3%**	Skylights: **SHGC** **U- factor**	 **= 0.19** **= 1.36**
Opaque Door U- **value**: **Swinging** **Non-swinging**	 **= 0.70** **= 1.45**	Opaque Door U- **value**: **Swinging** **Non-swinging**	 **= 0.70** **= 1.45**
BUILDING SYSTEM REQUIREMENTS			
SHELL BUILDINGS: Lighting and HVAC must be sufficiently efficient to meet a Section 506 calculation for the entire space at time of build-out.		OTHER BUILDINGS: Replacement systems[3]	
HVAC Equipment			
Air conditioner (0-65KBtuh)	**13.0 SEER**	**Heat pump (0 – 65 KBtuh)**	**13.0 SEER/ 7.7 HSPF**
Air conditioner (>65-135KBtuh)	**11.2 EER**	**Heat pump (>65 – 135 KBtuh)**	**10.8 EER/3.3 COP**
Air conditioner (>135-240 KBtuh)	**11.0 EER, 11.2 IEER**	**Heat pump (>135-240 KBtuh)**	**10.4 EER/3.2 COP**
Air conditioner (>240-760 KBtuh)	**10.0 EER, 10.1 IEER**	**Heat pump (>240 KBtuh)**	**9.3 EER, 9.0 IPLV/3.1 COP**
Air conditioner (> 760 KBtuh)	**9.7 EER, 9.8 IEER**		
		Gas furnace (0-225 KBtuh)	**80% AFUE**
Service Hot Water		**Gas furnace (>225 KBtuh)**	**80% E_c**

Gas storage =75,00 Btu/h, =20 gallons	0.67-0.0019V EF		
Gas storage > 75,000 Btu/h	80% E_t	Lighting	LPD for space type on Table 505.5.3.
Gas instantaneous	80% E_t		
Electric storage =12 kW	0.97 – 0.0032xV EF		
Pipe insulation Diameter = 1.5 inches Diameter > 1.5 inches	 0.5 inch 1.0 inch		

1 See *FBC-EC* Table C101.4.1; meet code for component being changed as applicable.

2 Building with greater than 50% WWR shall comply with Section C406.

3Other types of replacement equipment shall meet the code minimum for that type of equipment in the applicable table of Section C403.2.3 and C404.2.

FLORIDA ENERGY EFFICIENCY CODE FOR BUILDING CONSTRUCTION

CHAPTER C4 – Building Envelope Prescriptive Method

Form C402-2013	**Climate Zone:**
Project Name:	Occupancy type:
Address:	New? Addition? Alteration? Renovation? Repair? Shell?
City, Zip Code:	Building Permit No.:
Builder:	Permitting Office:
Owner:	Jurisdiction No.:

BUILDING ENVELOPE INFORMATION (Use Table C402.1.1 or Table C402.2)

ENVELOPE COMPONENT	**Description**	**Requirement**	**Efficiency Installed**
Roof type			
Roof reflectance/ emittance		From Table C402.2.1.1	
Wall type, above grade			
Wall, below grade			
Floor type			
Floor, slab-on-grade			
Window-to-wall ratio		<40 percent	

SYSTEMS INFORMATION (C403)

SYSTEM	Type (describe system)	Sizing report (Attached)	Efficiency Required	Efficiency Rating (unit)	Installed
Air-conditioning system			From Tables C403.2.3 (1-3, 6-8)*:		
Heating system			From Tables C403.2.3 (4-5)*:		
Ventilation/air handling system		Fan Power (cfm):	From Tables C403.2.10.1(1-2):		
Ducts	Location:			R-value	
Piping	Fluid design operating temp:	Size of pipe:	From Table C403.2.8:	Inches	
Hot water (C404)			From Table C404.2:		
Electric power	Drawings	Y N	Operations manual available upon completion: Y N		
Motors	Open or enclosed		Poles & speed:	HP	
Lighting (C405)	Space types: (append list)		Lighting power density*		

Efficiency package option (C406): C406.2 HVAC ? C406.3 Lighting ? C406.4 Renewable Energy ?

SUMMARY OF MAJOR PRESCRIPTIVE MEASURES

Components	Section	Requirements
Documentation requirements	C303.3 C405.7.4.2 C408.2.5	Maintenance instructions furnished to owner within 90 days of CO. Equipment and systems requiring preventive maintenance; label required. System balancing report. Commissioning report. Lighting systems calibrated, adjusted, programmed, in good working order.
Air infiltration: Windows & Doors Joints/Cracks Dropped Ceiling Cavity	 C402.4.3 C402.4.9	Per Table C402.4.4. To be caulked, gasketed, weatherstripped or otherwise sealed. Recessed lights IC-rated; not more than 0.2 cfm unless tested & labeled to ASTM E 283. Vented: seal & insulated ceiling. Unvented seal & insulate roof & side walls.
Dehumidification	C403.2.4.3.4	Controls provided capable of preventing simultaneous humidification/dehumidification
HVAC Efficiency	C403.2.3	Minimum efficiencies: Tables C403.2.3(1)-(7)
HVAC Controls	C403.2.4	Zone controls prevent reheat (exceptions); separate thermostatic control per zone; combined HVAC control 5°F deadband, Automatic setback/ shutdown capability. Exceptions.
Ventilation	C403.2.5	Outdoor air supply & exhaust ducts shall have dampers that automatically shut whe[n] systems or spaces served are not in use. Demand control provided for spaces >500 s.f., where avg. occupant load 25 people/1000 s.f. Exhaust air energy recovery required for cooling systems.
HVAC Ducts	C403.2.7	Air ducts, fittings, mechanical equipment & plenum chambers shall be mechanicall[y] attached, sealed, insulated & installed per Table C403.2.7.2.
Testing & Balancing	C408.2.2	HVAC distribution system(s) tested & balanced. Report in construction documents.
Piping Insulation	C403.2.8	HVAC & service hot water. In accordance with Table C403.2.8, Sec. C404.5
Fan Power Limitation	C403.2.10.1	HVAC system with total fan system nameplate horsepower > 5 hp to meet provisions of Sections C403.2.10.1 through C403.2.10.2.
Water Heaters	C404	Performance requirements in accordance with Table C404.2. Heat trap required.
Swimming Pools	C404.7	Vapor-retardant or liquid cover or other means proven to reduce heat loss on heated pools. Time switch. Readily accessible on/off switch.
Lighting Controls	C405.2	Automatic control required for interior lighting in buildings >5,000 s.f.. Space control. Occupancy sensors. Daylighting controls. Tandem wiring. Exit signs = 5 watts/side. Exterior building grounds lighting.

I hereby certify that the plans and specifications covered by the calculation are in compliance with the Florida Energy Code. PREPARED BY: ________________________________DATE: _________ I hereby certify that this building is in compliance with the Florida Energy Code: OWNER/AGENT:	Review of plans and specifications covered by this calculation indicates compliance with the Florida Energy Code. Before construction is completed, this building will be inspected for compliance in accordance with Section 553.908, F.S. BUILDING OFFICIAL:_____________ DATE: ____________

DATE:__________

Section C402: BUILDING ENVELOPE REQUIREMENTS

	Climate Zone 1		**Climate Zone 2**	
	All Other	**Group R**	**All Other**	**Group R**
ROOFS				
Insulation entirely above deck	U-0.048	U-0.048	U-0.048	U-0.048
Metal buildings	U-0.044	U-0.0435	U-0.035	U-0.035
Attic and other	U-0.027	U-0.027	U-0.027	U-0.027
WALLS, above grade				
Mass	U-0.142	U-0.142	U-0.142	U-0.123
Metal building	U-0.079	U-0.079	U-0.079	U-0.079
Metal framed	U-0.077	U-0.077	U-0.077	U-0.064
Wood framed & other	U-0.064	U-0.064	U-0.064	U-0.064
WALLS, below grade				
Below-grade wall	C-1.140	C-1.140	C-1.140	C-1.140
FLOORS				
Mass	U-0.322	U-0.322	U-0.107	U-0.107
Joist/framing	U-0.066	U-0.066	U-0.033	U-0.0.33
FLOORS, slab-on-grade				
Unheated slabs	F-0.73	F-0.73	F-0.73	F-0.73
Heated slabs	F-0.70	F-0.70	F-0.70	F-0.70

Section C405: LIGHTING

Total interior lighting power shall meet the cumulative interior lighting power LPD by floor area for the Building Area Method from Table C405.5.2(1) or by the Space-By-Space Method from Table C405.5.2(2).

Section C406: ADDITIONAL EFFICIENCY PACKAGE OPTIONS (Fulfill ONE of these)

Section C406.2 Efficient HVAC Performance	Meet efficiencies of Tables C406.2(1) through C406.2(7) for the equipment type in addition to the prescriptive requirements of Section C403.
Section C406.3 Efficient Lighting System	Total interior lighting power shall meet the cumulative reduced interior lighting power LPD of Table C406.3 by floor area and Building Area Type.

Section C406.4 On-site renewable energy	Total minimum ratings of on-site renewable energy systems shall be either: 1) not less than 1.75 Btu (or 0.50 watts) per square foot of conditioned floor area; or 2) not less than 3% of the regulated energy used in the building for mechanical, service water heating and lighting.

EN6008

Date Submitted	8/2/2012	**Section**	Form R402	**Proponent**	Ann Stanton
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Need to update energy code form for residential prescriptive code compliance.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

6008-A2

Proponent Ann Stanton **Submitted** 12/14/2012 **Attachments** Yes

Rationale

The Energy TAC voted this mod NAR in order to more closely approximate requirements of later mods. The final requirements on the form will depend of which mods are approved by the Florida Building Commission.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

1st Comment Period History 08/09/2012 - 09/23/2012

6008-A1

Proponent Eric Lacey **Submitted** 9/23/2012 **Attachments** Yes

Rationale

We recommend that Table 402A reflect the efficiency values of the 2012 IECC.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There should be no impact on enforcement because this is a correction of the values in Appendix C. The values should be consistent with the 2012 IECC.

Impact to building and property owners relative to cost of compliance with code

No negative impact.

Impact to industry relative to the cost of compliance with code

No negative impact.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal maintains consistency in the code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal maintains consistency in the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

Is the proposed code modification part of a prior code version? No

1st Comment Period History 08/09/2012 - 09/23/2012

EN6008-G1

Proponent	BOAF CDC	**Submitted**	9/15/2012	**Attachments**	No

Comment:

This code change is unnecessary as the provisions contained in the proposed amendment are adequately addressed in the applicable international code. Per FS 553.73 (7) (g)

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

The proposed amendment does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

[

Florida Building Code, Energy Conservation

Residential Building Thermal Envelope Approach

FORM R402-2013 ~~2010~~ **All climate zones**

[NOTE: This form may change significantly due to changes made during the code revision process.]

Scope: Compliance with Section 402 of the ***Florida Building Code, Energy Conservation***, shall be demonstrated by the use of Form R402 for single- and multiple-family residences of three stories or less in height, additions to existing residential buildings, renovations to existing residential buildings, new heating, cooling, and water heating systems in existing buildings, as applicable. To comply, a building must meet or exceed all of the energy efficiency requirements on Table R402A and all applicable mandatory requirements summarized in Table R402B of this form. If a building does not comply with this method or Alternate Form R402, it may still comply under Section R405 of the ***Florida Building Code, Energy Conservation***.

PROJECT NAME: AND ADDRESS:		BUILDER:
		PERMITTING OFFICE:
		JURISDICTION NUMBER:
OWNER:		PERMIT NUMBER:

General Instructions:

1. New construction which incorporates any of the following features cannot comply using this method: glass areas in excess of 20 percent of conditioned floor area, electric resistance heat and air handlers located in attics. Additions = 600 sq.ft., renovations and equipment changeouts may comply by this method with exceptions given.

2. Fill in all the applicable spaces of the "To Be Installed" column on Table 402A with the information requested. All "To Be Installed" values must be equal to or more efficient than the required levels.

3. Complete page 1 based on the "To Be Installed" column information.

4. Read the requirements of Table 402B and check each box to indicate your intent to comply with all applicable items.

5. Read, sign and date the "Prepared By" certification statement at the bottom of page 1. The owner or owner's agent must also sign and date the form.

Check

1. New construction, addition, or existing building
1.________________________ _____

2. Single-family detached or multiple-family attached 2.
________________________ _____

3. If multiple-family, number of units covered by this submission 3. ______________________ ____

4. Is this a worst case? (yes/no) 4. ______________________ ____

5. Conditioned floor area (sq. ft.) 5. ______________________ ____

6. Glass type and area:

a) U-factor: 6a.______________________ ____

b) SHGC: 6b.______________________ ____

c) Glass area 6c.______________________ ____

7. Percentage of glass to floor area 7. ______________________ ____

8. Floor type, area or perimeter, and insulation:

a) Slab-on-grade (R-value) 8a. ______________________ ____

b) Wood, raised (R-value) 8b. ______________________ ____

c) Wood, common (R-value) 8c. ______________________ ____

d) Concrete, raised (R-value) 8d. ______________________ ____

e) Concrete, common (R-value) 8e. ______________________ ____

9. Wall type, area and insulation:

a) Exterior: 1. Wood frame (Insulation R-value) 9a1.______________________ ____

2. Masonry (Insulation R-value) 9a2.______________________ ____

b) Adjacent: 1. Wood frame (Insulation R-value) 9b1.______________________ ____

2. Masonry (Insulation R-value) 9b2.______________________ ____

10. Ceiling type, area and insulation

a) Attic (Insulation R-value) 10a.______________________ ____

b) Single assembly (Insulation R-value) 10b.______________________ ____

11. Air distribution system: Duct insulation, location, Qn

a) Duct location, insulation 11a.______________________ _____

b) AHU location 11b.______________________ _____

c) Q_n, Test report attached (=0.03; yes/no) 11c.______________________ _____

12. Cooling system: a) type b) efficiency
12a.______________________ _____

12b.______________________ _____

13. Heating system: a) type b) efficiency: 13a.______________________ _____

13b. ______________________ _____

14. HVAC sizing calculation: attached 14. ______________________ _____

15. Water heating system: a) type b) efficiency 15a. ______________________ _____
15b. ______________________ _____

I herby certify that the plans and specifications covered by this form are in compliance with the Florida energy code. PREPARED BY:_______________________________ Date___________ I hereby certify that this building is in compliance with the Florida energy code. OWNER/AGENT:_______________________________ Date:___________	Review of plans and specifications covered by this form indicate compliance with the Florida energy code. Before construction is complete, this building will this building will be inspected for compliance in accordance with Section 553.908, *F.S.* CODE OFFICIAL:_______________________________ Date:__________

TABLE 402A CLIMATE ZONES		**ALL**	
BUILDING COMPONENT	**PERFORMANCE CRITERIA[1]**	**INSTALLED VALUES**	
Windows [2]: Skylights	U-Factor = 0.65 SHGC = 0.30 % of CFA = 20 % U-factor = 0.75	U-Factor = SHGC = % of CFA = U-factor =	
Doors: Exterior door U-factor	U-factor = 0.65	U-factor:	
Floors: Slab-on-Grade Over unconditioned spaces[3]	 No requirement R-13	 R-Value =	
Walls – Ext. and Adj. [3] Frame Mass [3] Interior of wall: Exterior of wall	 R-13 R-7.8 R-6 -	 R-Value = R-Value = R-Value =	
Ceilings[3]: Reflectance	R=30 0.25	R-Value = Reflectance=	Test report Attached? Yes/No
Air distribution system[4] Ductwork & air handling unit: Unconditioned space Conditioned space Duct R-value Air leakage Q_n	- Not allowed R-value = R-6 Q_n = 0.03	 Location: R-Value = Q_n =	 Test report Attached? Yes/No
Air conditioning systems[5]	SEER = 13.0	SEER=	
Heating system Heat pump[5] Cooling: Heating:	 SEER = 13.0 HSPF = 7.7 AFUE = 78%	 SEER = HSPF = AFUE =	

Gas furnace Oil furnace Electric resistance: Not allowed[5]	AFUE = 78%	AFUE =	
Water heating system (storage type): Electric[6]: Gas fired[7] Other (describe):	40 gal: EF = 0.92 50 gal: EF = 0.90 40 gal: EF = 0.59 50 gal: EF = 0.58	Gallons = EF = Gallons = EF =	

(1) Each component present in the As Proposed home must meet or exceed each of the applicable performance criteria in order to comply with this code using this method; otherwise Section R405 compliance must be used.

(2) Windows and doors qualifying as glazed fenestration areas must comply with both the maximum U-Factor and the maximum SHGC (solar Heat Gain Coefficient) criteria and have a maximum total window area equal to or less than 20 % of the conditioned floor area (CFA); otherwise Section 405 must be used for compliance.

Exceptions: Additions of 600 square feet (56 m^2) or less may have a maximum glass to CFA of 50 percent

(3) R-values are for insulation material only as applied in accordance with manufacturers' installation instructions. For mass walls, the "interior of wall" requirement must be met except if at least 50% of the R-6 insulation required for the "exterior of wall" is installed exterior of, or integral to, the wall.

(4) Ducts & AHU installed substantially leak free per Section R403.2.2.1. Test by Class 1 BERS rater required.

Exception: Ducts installed onto an existing air distribution system as part of an addition or renovation; duct must be R-6 installed per Sec. C403.2.7.2.

(5) For all conventional units with capacities greater than 30,000 Btu/hr. For other types of equipment, see Tables C403.2.3(1-7).

Exception: Electric resistance heat prohibition does not apply to additions, renovations, and new heating systems installed in existing buildings.

(6) For other electric storage volumes, min. EF = 0.97 - (0.00132 * volume) ;

(7) For other natural gas storage volumes, min. EF = 0.67 - (0.0019 * volume)

TABLE 402B MANDATORY REQUIREMENTS			
Component	**Section**	**Summary of Requirement(s)**	**Check**
Air leakage	R402.4	To be caulked, gasketed, weatherstripped or otherwise sealed. Recessed	

		lighting IC-rated as meeting ASTM E 283. Windows and doors = 0.30 cfm/sq.ft. Testing or visual inspection required. Fireplaces: gasketed doors & outdoor combustion air.	
Ceilings/knee walls	R405.2.1	R-19 space permitting.	
Programmable thermostat	R403.1.1	Where forced-air furnace is primary system, programmable thermostat is required.	
Air distribution system	R403.2	Ducts shall be located in conditioned space, insulated to a minimum of R-6 and tested to a Qn=0.03 by Class 1 BERS rater or a Class A, B or Mechanical air-conditioning contractor.	
Water heaters	R403.4	Heat trap required for vertical pipe risers. Comply with efficiencies in Table R403.4.3.2. Provide switch or clearly marked circuit breaker (electric) or shutoff (gas). Circulating system pipes insulated to = R-2 + accessible manual OFF switch.	
Swimming pools & spas	R403.9	Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency=82%. Heat pump pool heaters minimum COP= 4.0.	
Cooling/heating equipment	R403.6	Sizing calculation performed & attached. Minimum efficiencies per Tables 503.2.3. Equipment efficiency verification required. Special occasion cooling or heating capacity requires separate system or variable capacity system. Electric heat >10kW must be divided into two or more stages.	
Lighting equipment	R404.1	At least 50% of permanently installed lighting fixtures shall be high-efficacy lamps.	

Amend Table 402A as follows:

TABLE 402A		ALL CLIMATE ZONES	
BUILDING COMPONENT	PERFORMANCE CRITERIA[1]	INSTALLED VALUES	
Windows [2]	U-Factor = 0.40 ~~0.65~~	U-Factor =	
	SHGC = 0.25 ~~0.30~~	SHGC =	
	% of CFA = 20%	% of CFA =	
Skylights	U-Factor = 0.65 ~~0.75~~	U-Factor =	
Doors: Exterior door U-Factor	U-Factor = 0.40 ~~0.65~~	U-Factor =	
Floors:			
Slab-on-Grade	No requirement		
Over unconditioned spaces [3]	R-13	R-Value =	
Walls – Ext. and Adj. [3]			
Frame	R-13	R-Value =	
Mass [3]	R-7.8		
Interior of wall:	R-6	R-Value =	
Exterior of wall:		R-Value =	
Ceilings [3]:	R = 38 ~~30~~	R-Value =	Test report
Reflectance		Reflectance =	Attached? Yes/No

This placeholder form was voted NAR in order to incorporate requirements for compliance by Section R402 made at a later time. This mod includes two likely options presented for consideration in Alternatives A-1 and A-3, as well as A-2 and A4 of of Mod 5687.

FLORIDA BUILDING CODE, ENERGY CONSERVATION

Residential Building Thermal Envelope Approach

FORM R402-2013 Climate Zone ?

Scope: Compliance with Section R402 of the Florida Building Code, Energy Conservation, shall be demonstrated by the use of Form R402 for single- and multiple-family residences of three stories or less in height, additions to existing residential buildings, renovations to existing residential buildings, and new heating, cooling, water heating and fenestration systems in existing buildings, as applicable. To comply, a building must meet or exceed all of the energy efficiency requirements on Table R402A and all applicable mandatory requirements summarized in Table R402B of this form. If a building does not comply with this method, or by the UA Alternative method, it may still comply under Section R405 of the Florida Building Code, Energy Conservation.

PROJECT NAME:		**BUILDER:**
		PERMITTING OFFICE:
AND ADDRESS:		**JURISDICTION NUMBER:**
OWNER:		**PERMIT NUMBER:**

General Instructions:

1. New construction which incorporates any of the following features cannot comply using this method: glass areas in excess of 15 percent of conditioned floor area, electric resistance heat and air handlers located in attics. Additions of no greater than 600 sq.ft. in area, renovations and equipment changeouts may comply by this method with exceptions given.

2. Fill in all the applicable spaces of the "To Be Installed" column on Table 402A with the information requested. All "To Be Installed" values must be equal to or more efficient than the required levels.

3. Complete page 1 based on the "To Be Installed" column information.

4. Read the requirements of Table 402B and check each box to indicate your intent to comply with all applicable items.

5. Read, sign and date the "Prepared By" certification statement at the bottom of page 1. The owner or owner's agent must also sign and date the form.

Check

1. New construction, addition, or existing building 1.

2. Single-family detached or multiple-family attached 2.

3. If multiple-family, number of units covered by this submission 3.

4. Is this a worst case? (yes/no) 4.

5. Conditioned floor area (sq. ft.) 5.

6. Glass type and area:

a) U-factor: 6a.

b) SHGC 6b.

c) Glass area 6c.

7. Percentage of glass to floor area 7.

8. Floor type, area or perimeter, and insulation:

a) Slab-on-grade (R-value) 8a.

b) Wood, raised (R-value) 8b.

c) Wood, common (R-value) 8c.

d) Concrete, raised (R-value) 8d.

e) Concrete, common (R-value) 8e.

9. Wall type, area and insulation:

a) Exterior: 1. Wood frame (Insulation R-value) 9a1.

2. Masonry (Insulation R-value) 9a2.

b) Adjacent: 1. Wood frame (Insulation R-value) 9b1.

2. Masonry (Insulation R-value) 9b2.

10. Ceiling type, area and insulation

a) Attic (Insulation R-value) 10a.

b) Single assembly (Insulation R-value) 10b.

11. Air distribution system:

a) Duct location, insulation 11a.

b) AHU location 11b.

c) Total duct leakage. Test report attached. 11c. cfm/100s.f. Yes ? No ?

12. Cooling system: a) type b) efficiency *12a.* ______

______ *12b.* ______

13. Heating system: a) type b) efficiency: *13a.* ______

______ *13b.* ______

14. HVAC sizing calculation: attached *14.* *Yes ? No ?*

15. Water heating system: a) type b) efficiency *15a.* ______

______ *15b.* ______

I hereby certify that the plans and specifications covered by this form are in compliance with the Florida energy code. PREPARED BY:______ Date______ I hereby certify that this building is in compliance with the Florida energy code. OWNER/AGENT:______ Date:______	Review of plans and specifications covered by this form indicate compliance with the Florida energy code. Before construction is complete, this building will be inspected for compliance in accordance with Section 553.908, *F.S.* CODE OFFICIAL:______ Date:______

Alternates A-1 and A-3

TABLE 402A CLIMATE ZONES 1 and 2			
BUILDING COMPONENT	**PERFORMANCE CRITERIA[1]**		**INSTALLED VALUES**
	Climate Zone 1	**Climate Zone 2**	
Windows [2]:	U-Factor = 0.65[3] SHGC = 0.25 % of CFA = 15%	U-Factor = 0.40[3] SHGC = 0.25 % of CFA = 15%	U-Factor = SHGC = % of CFA =
Skylights	U-factor = 0.75	U-factor = 0.65	U-factor =
Doors: Exterior door	U-factor = 0.65	U-factor = 0.40	U-factor=
Floors:			

Slab-on-Grade Over unconditioned spaces[3]	NR R-13	NR R-13	 R-Value =
Walls[4] – Ext. and Adj. Frame Mass Interior of wall: Exterior of wall	 R-13 R-7.8 R-6	 R-13 R-7.8 R-6	 R-Value = R-Value = R-Value =
Ceilings[4]	R=38	R=38	R-Value =
Air distribution system[5] Air handling unit: Duct R-value Air leakage: Duct test required	 Not allowed in unconditioned space R-value = R-8 or = R-6 if in conditioned space Postconstruction test: Total leakage = 4 cfm/100 s.f. Rough-in test (ahu not installed): Total leakage = 3 cfm/100 s.f.		 Location: R-Value = Total leakage = Test report Attached? Yes ? No ?
Air conditioning systems	Minimum federal standard required by NAECA[6] SEER = 13.0		SEER=
Heating system Heat pump Cooling: Heating: Gas furnace, non-weatherized Oil furnace, non-weatherized Electric resistance:	Minimum federal standard required by NAECA[6] SEER = 13.0 HSPF = 7.7 AFUE = 80% AFUE = 83% Not allowed[7]		 SEER = HSPF = AFUE = AFUE =
Water heating system (storage type): Electric[8]	Minimum federal standard required by NAECA[6] 40 gal: EF = 0.92 50 gal: EF = 0.90		 Gallons = EF =

Gas fired[9]	40 gal: EF = 0.59	Gallons =
	50 gal: EF = 0.58	EF =
Other (describe):		

NR = No requirement.

(1) Each component present in the As Proposed home must meet or exceed each of the applicable performance criteria in order to comply with this code using this method; otherwise Section R405 compliance must be used.

(2) Window to conditioned floor area (CFA) shall not exceed 15 percent by this compliance method.

Exception: Additions of 600 square feet (56 m^2) or less may have a maximum glass to CFA of 50 percent.

(3) For impact rated fenestration complying with Section R301.2.1.2 of the Florida Building Code, Residential or Section 1609.1.2 of the Florida Building Code, Building the maximum U-factor shall be 0.75 in Climate Zone 1 and 0.65 in Climate Zone 2. An area-weighted average of U-factor and SHGC shall be accepted to meet the requirements, or up to 15 square feet of glazed fenestration area are exempted from the U-factor and SHGC requirement based on Sections R402.3.1, R402.3.2 and R402.3.3.

(4) R-values are for insulation material only as applied in accordance with manufacturers' installation instructions. For mass walls, the "interior of wall" requirement must be met except if at least 50% of the insulation required for the "exterior of wall" is installed exterior of, or integral to, the wall.

(5) Ducts & AHU installed "substantially leak free" per Section R403.2.2. Test required by Class 1 BERS rater or as authorized by Florida Statutes.

Exception: Ducts installed onto an existing air distribution system as part of an addition or renovation; duct must be R-6 installed per Sec. C403.2.7.2.

(6) Minimum efficiencies are those set by the National Appliance Energy Conservation Act of 1987 for typical residential equipment. For other types of equipment, see Tables C403.2.3(1-7) of the Commercial Provisions of the Florida Building Code, Energy Conservation.

(7) The electric resistance heat prohibition does not apply to additions, renovations, and new heating systems installed in existing buildings.

*(8) For other electric storage volumes, min. EF = 0.97 - (0.00132 * volume) ;*

*(9) For other natural gas storage volumes, min. EF = 0.67 - (0.0019 * volume)*

TABLE 402B MANDATORY REQUIREMENTS

Component	Section	Summary of Requirement(s)	Check
Air leakage	R402.4	To be caulked, gasketed, weatherstripped or otherwise sealed. Recessed lighting: IC-rated as having =2.0 cfm tested to ASTM E 283.	

		Windows and doors: 0.3 cfm/sq.ft (swinging doors: 0.5 cfm/sf) when tested to NFRC 400 or AAMA/WDMA/CSA 101/I.S. 2/A440. Testing: Blower door test is required on the building envelope. Fireplaces: Tight-fitting flue dampers & outdoor combustion air.	
Knee walls on attic space	R405.2.1	R-19, space permitting.	
Programmable thermostat	R403.1.1	Where forced-air furnace is primary system, programmable thermostat is required.	
Air distribution system	R403.2	Ducts shall be tested to Section 803 of the RESNET standards by a Class 1 BERS rater or as authorized by *Florida Statutes.*	
Water heaters	R403.4	Heat trap required for vertical pipe risers. Comply with efficiencies in Table C404.2. Provide switch or clearly marked circuit breaker (electric) or shutoff (gas). Circulating system pipes insulated to = R-2 and have an accessible manual OFF switch.	
Swimming pools & spas	R403.9	Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency is 82%. Heat pump pool heaters minimum COP is 4.0.	
Cooling/heating equipment	R403.6	Sizing calculation performed & attached. Special occasion cooling or heating capacity requires separate system or variable capacity system.	
Lighting equipment	R404.1	At least 75% of permanently installed lighting fixtures shall be high-efficacy lamps.	

Alternates A-2 and A-4

TABLE 402A CLIMATE ZONES 1 and 2

BUILDING COMPONENT	**PERFORMANCE CRITERIA[1]**		**INSTALLED VALUES**
	Climate Zone 1	**Climate Zone 2**	
Windows [2]:	U-Factor = 0.65[3] SHGC = 0.25 % of CFA = 15%	U-Factor = 0.40[3] SHGC = 0.25 % of CFA = 15%	U-Factor = SHGC = % of CFA =
Skylights	U-factor = 0.75	U-factor = 0.65	U-factor =
Doors: Exterior door	U-factor = 0.65	U-factor = 0.40	U-factor=
Floors: Slab-on-Grade Over unconditioned spaces[3]	 NR R-13	 NR R-13	 R-Value =
Walls[4] – Ext. and Adj.			

Frame Mass Interior of wall: Exterior of wall	R-13 R-4 R-3	R-13 R-6 R-4	R-Value = R-Value = R-Value =
Ceilings[4]	R=38	R=38	R-Value =
Air distribution system[5] Air handling unit: Duct R-value Air leakage: Duct test required	Not allowed in unconditioned space R-value = R-8 or = R-6 if in conditioned space Postconstruction test: Total leakage = 4 cfm/100 s.f. Rough-in test (ahu not installed): Total leakage = 3 cfm/100 s.f.		Location: R-Value = Total leakage = Test report Attached? Yes ? No ?
Air conditioning systems	Minimum federal standard required by NAECA[6] SEER = 13.0		SEER=
Heating system Heat pump Cooling: Heating: Gas furnace, non-weatherized Oil furnace, non-weatherized Electric resistance:	Minimum federal standard required by NAECA[6] SEER = 13.0 HSPF = 7.7 AFUE = 80% AFUE = 83% Not allowed[7]		SEER = HSPF = AFUE = AFUE =
Water heating system (storage type): Electric[8] Gas fired[9] Other (describe):	Minimum federal standard required by NAECA[6] 40 gal: EF = 0.92 50 gal: EF = 0.90 40 gal: EF = 0.59 50 gal: EF = 0.58		Gallons = EF = Gallons = EF =

NR = No requirement.

(1) Each component present in the As Proposed home must meet or exceed each of the applicable performance criteria in order to comply with this code using this method; otherwise Section R405 compliance must be used.

(2) Window to conditioned floor area (CFA) shall not exceed 15 percent by this compliance method.

Exception: Additions of 600 square feet (56 m^2) or less may have a maximum glass to CFA of 50 percent.

(3) For impact rated fenestration complying with Section R301.2.1.2 of the Florida Building Code, Residential or Section 1609.1.2 of the Florida Building Code, Building the maximum U-factor shall be 0.75 in Climate Zone 1 and 0.65 in Climate Zone 2. An area-weighted average of U-factor and SHGC shall be accepted to meet the requirements, or up to 15 square feet of glazed fenestration area are exempted from the U-factor and SHGC requirement based on Sections R402.3.1, R402.3.2 and R402.3.3.

(4) R-values are for insulation material only as applied in accordance with manufacturers' installation instructions. For mass walls, the "interior of wall" requirement must be met except if at least 50% of the insulation required for the "exterior of wall" is installed exterior of, or integral to, the wall.

(5) Ducts & AHU installed "substantially leak free" per Section R403.2.2.1. Test required by Class 1 BERS rater or as authorized by Florida Statutes.

Exception: Ducts installed onto an existing air distribution system as part of an addition or renovation; duct must be R-6 installed per Sec. C403.2.7.2.

(6) Minimum efficiencies are those set by the National Appliance Energy Conservation Act of 1987 for typical residential equipment. For other types of equipment, see Tables C403.2.3(1-7) of the Commercial Provisions of the Florida Building Code, Energy Conservation.

(7) The electric resistance heat prohibition does not apply to additions, renovations, and new heating systems installed in existing buildings.

*(8) For other electric storage volumes, min. EF = 0.97 - (0.00132 * volume) ;*

*(9) For other natural gas storage volumes, min. EF = 0.67 - (0.0019 * volume)*

TABLE 402B MANDATORY REQUIREMENTS

Component	**Section**	**Summary of Requirement(s)**	**Check**
Air leakage	R402.4	To be caulked, gasketed, weatherstripped or otherwise sealed. Recessed lighting: IC-rated as having =2.0 cfm tested to ASTM E 283. Windows and doors: 0.3 cfm/sq.ft (swinging doors: 0.5 cfm/sf) when tested to NFRC 400 or AAMA/WDMA/CSA 101/I.S. 2/A440. Testing: Blower door test is required on the building envelope.	

		Fireplaces: Tight-fitting flue dampers & outdoor combustion air.	
Knee walls on attic space	R405.2.1	R-19, space permitting.	
Programmable thermostat	R403.1.1	Where forced-air furnace is primary system, programmable thermostat is required.	
Air distribution system	R403.2	Ducts shall be tested to Section 803 of the RESNET standards by a Class 1 BERS rater or as authorized by *Florida Statutes.*	
Water heaters	R403.4	Heat trap required for vertical pipe risers. Comply with efficiencies in Table C404.2. Provide switch or clearly marked circuit breaker (electric) or shutoff (gas). Circulating system pipes insulated to = R-2 and have an accessible manual OFF switch.	
Swimming pools & spas	R403.9	Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency is 82%. Heat pump pool heaters minimum COP is 4.0.	
Cooling/heating equipment	R403.6	Sizing calculation performed & attached. Special occasion cooling or heating capacity requires separate system or variable capacity system.	
Lighting equipment	R404.1	At least 75% of permanently installed lighting fixtures shall be high-efficacy lamps.	

EN6008

The thermal envelope requirements of the 2012 *IECC* have been substantially improved. We believe that Table 402A in proposal EN6008 is simply a placeholder, and that the final table will reflect the values of the 2012 *IECC* as adopted by Florida. However, if the intent of EN6008 is to weaken the thermal envelope requirements, we oppose EN6008 and recommend that all compliance materials, including Table 402A, reflect the actual requirements of the 2012 *IECC*.

EN5072

Date Submitted	7/10/2012	**Section**	C202 General Definitions	**Proponent**	Ken Cureton
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

4938, 4964, 4968, 4969, 4970, 4971, 4989 and 4990

Summary of Modification

Add and / or modify Chapter 2 definitions of terms included in the proposed modifications listed in Related Modifications item above.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901 and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently adopted by the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently adopted by the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently adopted by the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

It does not. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

It does not. The Proposed language for this Modification is currently included in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

The proposed code change was submitted in accordance with the Commission's update process for the 2013 FBC in order to maintain the current Florida energy efficiency requirements.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5072-A2

Proponent Ann Stanton **Submitted** 12/14/2012 **Attachments** Yes

Rationale

The Energy TAC voted Mod 5072 NAR with direction to staff to ensure that all terms are referenced from approved code. Staff requests that the TAC recommend approval of this mod with the exception of the term Visible Tranmittance which should return to the IECC definition. Public comment was received to use the IECC definition.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

1st Comment Period History 08/09/2012 - 09/23/2012

5072-A1

Proponent Eric Lacey **Submitted** 9/23/2012 **Attachments** Yes

Rationale

Proposals EN5072 and 5660 introduce a definition into the Florida Building Code that creates confusion and a potential conflict with Florida Statutes. The modification proposed above would import the actual language from Florida Statutes and remove that potential conflict.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This alternative imports the actual statutory definition of "Renovated Building" into the code. The code and Florida Statutes should not conflict. Uniform definitions will simplify enforcement.

Impact to building and property owners relative to cost of compliance with code

There should be no negative impact.

Impact to industry relative to the cost of compliance with code

There should be no negative impact.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The alternative language replaces a definition that is not contained in either Florida Statutes or in the IECC with the actual definition of "Renovated Buildings" as contained in Florida Statutes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This maintains the efficiencies of the 2012 IECC and maintains consistency with Florida Statutes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

Is the proposed code modification part of a prior code version? No

1st Comment Period History 08/09/2012 - 09/23/2012

EN5072-G1

Proponent	BOAF CDC	**Submitted**	9/15/2012	**Attachments**	No

Comment:

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

The proposed amendment does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

ADJACENT WALL, CEILING or FLOOR. A wall, ceiling or floor of a structure that separates conditioned space from enclosed but unconditioned space, such as an unconditioned attached garage, storage or utility room.

AEROSOL SEALANT. A closure product for duct and plenum systems, which is delivered internally to leak sites as aerosol particles using a pressurized air stream.

AIR BARRIER. ~~Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material or a combination of materials.~~ Relating to air distribution systems, a material object(s) which impedes or restricts the free movement of air under specified conditions. For fibrous glass duct, the air barrier is its foil cladding; for flexible non-metal duct, the air barrier is the non-porous core; and for sheet metal duct and air handling units, the air barrier is the metal in contact with the air stream. For mechanical closets, the air barrier may be a uniform panelized material such as gypsum wall board which meets ASTM C 36, or it may be a membrane which alone acts as an air barrier which is attached to a panel, such as the foil cladding of fibrous glass duct board. Relating to the building envelope, air barriers comprise the planes of primary resistance to air flow between the interior spaces of a building and the outdoors and the planes of primary air flow resistance between adjacent air zones of a building, including planes between adjacent conditioned and unconditioned air spaces of a building. To be classed as an air barrier, abuilding plane must be substantially leak free; that is, it shall have an air leakage rate not greater than 0.5 cfm/ft2 when subjected to an air pressure gradient of 25 pascal. In general, air barriers are made of durable, non-porous materials and are sealed to adjoining wall, ceiling or floor surfaces with a suitable long-life mastic. House wraps and taped and sealed drywall may constitute an air barrier but dropped acoustical tile ceilings (T-bar ceilings) may not. Batt insulation facings and asphalt-impregnated fiberboard and felt paper are not considered air barriers.

AIR CONDITIONING. The treatment of air so as to control simultaneously the temperature, humidity, cleanness and distribution of the air to meet the requirements of a conditioned space.

AIR DISTRIBUTION SYSTEM. Any system of ducts, plenums and air-handling equipment that circulates air within a space or spaces and includes systems made up of one or more air-handling units.

ATTIC. An enclosed unconditioned space located immediately below an uninsulated roof and immediately above the ceiling of a building.

BTU (British Thermal Unit). The standard unit for measuring heat energy, such as the heat content of fuel. It is the amount of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit. 1 BTU per minute = 17.6 watts.

BUILDING. Any structure used or intended for supporting or sheltering any use or occupancy. ~~including any mechanical systems, service water heating systems and electric power and lighting systems located on the building site and supporting the building.~~ For each purpose of this Code each portion of a building separated from other portions by a firewall shall be considered as a separate building. The term "building" shall be construed as if followed by the words "or part thereof."

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof, and any other building element that enclose conditioned space. This boundary also includes the boundary between conditioned space and any exempt or unconditioned space. See "Adjacent wall, ceiling or floor."

CONDITIONED FLOOR AREA. The horizontal projection of ~~the floors associated with the conditioned space.~~ that portion of space which is conditioned directly or indirectly by an energy-using system.

CONDITIONED SPACE. An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent conditioned space. See "Space."

CONTROL. To regulate the operation of equipment.

CONTROL DEVICE. A specialized device used to regulate the operation of equipment.

EFFICIENCY. Performance at specified rating conditions.

ENERGY. The capacity for doing work. It takes a number of forms that may be transformed from one into another such as thermal (heat), mechanical (work), electrical, and chemical. Customary measurement units are British thermal units (Btu).

EQUIPMENT. Devices for comfort conditioning, electric power, lighting, transportation, or service water heating including, but not limited to, furnaces, boilers, air conditioners, heat pumps, chillers, water heaters, lamps, luminaires, ballasts, elevators, escalators, or other devices or installations.

EXTERIOR WALL. Walls including both above-grade walls and basement walls which form a boundary between a conditioned and an outdoor space.

FENESTRATION AREA. Total area of the fenestration measured using the rough opening and including the glazing, sash, and frame. For doors where the glazed vision area is less than 50% of the door area, the fenestration area is the glazed vision area. For all other doors, the fenestration area is the door area.

GASKETING. A compressible, resilient elastic packing, made of foam rubber or of a synthetic foam polymer. A gasket is distinct from the components being joined and must be capable of closing all air leakage pathways between the air barriers of the joint and of creating an air-tight seal.

HEAT. The form of energy that is transferred by virtue of a temperature difference or a change in the state of a material.

HORSEPOWER (HP). Unit of power; work done at a rate equal to 745.7Watts, 550 foot lb. per second, or 33,000 foot lb.per minute.

HVAC. Heating, ventilating and air conditioning.

HVAC SYSTEM. The equipment, distribution systems, and terminals that provide, either collectively or individually, the processes of heating, ventilating, or air conditioning to a building or portion of a building.

INDIRECTLY CONDITIONED SPACE. See “Space.”

INDOOR. Within the conditioned building envelope.

INFILTRATION. The uncontrolled inward air leakage ~~into a building caused by the pressure effects of wind or the effect of differences in the indoor and outdoor air density or both.~~ through cracks and crevices in any building element and around windows and doors of a building caused by pressure differences across these elements due to factors such as wind, inside and outside temperature differences (stack effect), and imbalance between supply and exhaust air systems.

INSULATION. Material mainly used to retard the flow of heat. See “Home insulation.”

KILOWATT (kW). The basic unit of electric power, equal to KILOWATT (kW). The basic unit of electric power, equal to 1,000 Watts.

LIGHTING SYSTEM. A group of luminaires circuited or controlled to perform a specific function.

MANUFACTURER. The company engaged in the original production and assembly of products or equipment or a company that purchases such products and equipment manufactured in accordance with company specifications.

MECHANICAL CLOSET. For the purposes of this code, a closet used as an air plenum which contains the blower unit or air handler of a central air conditioning or heating unit.

OCCUPANCY. The purpose for which a building, or part thereof, is used or intended to be used. For the purposes of determining changes of occupancy for this Code, the occupancy shall be considered the major occupancy group designations established by Chapter 3 of the Building Code, Building.

OUTDOOR. The environment exterior to the building structure.

OUTDOOR (OUTSIDE) AIR. Air that is outside the building envelope or is taken from outside the building that has not been previously circulated through the building.

OUTSIDE. The environment exterior to the conditioned space of the building and may include attics, garages, crawlspaces, etc., but not return air plenums.

PLENUM. A compartment or chamber to which one or more ducts are connected, that forms a part of the air distribution system, and that is not used for occupancy or storage. A plenum often is formed in part or in total by portions of the building.

POSITIVE INDOOR PRESSURE. A positive pressure condition within a conditioned space caused by bringing in more outside air than the amount of air that is exhausted and/or lost through air leakage.

PRESSURE ENVELOPE. The primary air barrier of a building; that part of the envelope that provides the greatest resistance to air flow to or from the building.

PRESSURE-SENSITIVE TAPE. Tape used for sealing duct system components and air barriers which adheres when pressure is applied and is not heat activated.

PROPOSED DESIGN. A description or computer representation of the proposed building used to estimate annual energy use for determining compliance based on total building performance or design energy cost.

READILY ACCESSIBLE. Capable of being reached quickly for operation, renewal or inspection without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders or access equipment (see "Accessible"). In public facilities, accessibility may be limited to certified personnel through locking covers or by placing equipment in locked rooms.

RENOVATION. Any structural repair, reconstruction or restoration to a structure, the costs of which equals or exceeds, over a 1-year period, a cumulative total of 30 percent of the assessed value of the structure when that value is assessed, either:

1. Before the improvement or repair is started; or

2. Before the damage occurred, if the structure has been damaged.

For the purposes of this Code, renovation occurs when the first alteration of any wall, ceiling, floor, or other structural part or mechanical system of the building commences, whether or not that alteration affects the external dimensions of the structure.

REPLACEMENT. The installation of part or all of an existing mechanical or electrical system in an existing building.

RESIDENTIAL BUILDING. For this code, includes ~~detached one- and two-family dwellings and multiple single-family dwellings (townhouses) as well as Group R-2, R-3 and R-4~~ R-3 buildings, as well as R-2 and R-4 buildings three stories or less in height above grade.

RETROFIT. Modification of existing equipment or systems to incorporate improved performance of operation.

ROOF. The upper portion of the building envelope, including opaque areas and fenestration, that is horizontal or tilted at an angle of less than 60° from horizontal. For the purposes of determining building envelope requirements, the classifications are defined as follows:

1. Attic and other roofs: all other roofs, including roofs with insulation entirely below (inside of) the roof structure (i.e., attics, cathedral ceilings, and single-rafter ceilings), roofs with insulation both above and below the roof structure, and roofs without insulation but excluding metal building roofs.

2. Metal building roof: a roof that is constructed with (a) a metal, structural, weathering surface, (b) has no ventilated cavity, and (c) has the insulation entirely below deck (i.e., does not include composite concrete and metal deck construction nor a roof framing system that is separated from the superstructure by a wood substrate) and whose structure consists of one or more of the following configurations: (1) metal roofing in direct contact with the steel framing members or (2) insulation between the metal roofing and the steel framing members or (3) insulated metal roofing panels installed as described in (1) or (2).

3. Roof with insulation entirely above deck: a roof with all insulation (1) installed above (outside of) the roof structure and (2) continuous (i.e., uninterrupted by framing members).

4. Single-rafter roof: a subcategory of attic roofs where the roof above and the ceiling below are both attached to the same wood rafter and where insulation is located in the space between these wood rafters.

SOLAR HEAT GAIN COEFFICIENT (SHGC). The ratio of the solar heat gain entering the space through the fenestration assembly to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation which is then reradiated, conducted or convected into the space. (See "Fenestration area".)

SPACE. An enclosed space within a building. The classifications of spaces are as follows for the purpose of determining building envelope requirements.

1. Conditioned space: a cooled space, heated space, or indirectly conditioned space or unvented attic assembly defined as follows.

a. Cooled space: an enclosed space within a building that is cooled by a cooling system whose sensible output capacity exceeds 5 Btu/h·ft2 of floor area.

b. Heated space: an enclosed space within a building that is heated by a heating system whose output capacity relative to the floor area is greater than or equal to 5 Btu/h·ft2.

c. Indirectly conditioned space: an enclosed space within a building that is not a heated space or a cooled space, which is heated or cooled indirectly by being connected to adjacent space(s) provided (a) the product of the U-factor(s) and surface area(s) of the space adjacent to connected space(s) exceeds the combined sum of the product of the U-factor(s) and surface area(s) of the space adjoining the outdoors, unconditioned spaces, and to or from semiheated spaces (e.g., corridors) or (b) that air from heated or cooled spaces is intentionally transferred (naturally or mechanically) into the space at a rate exceeding 3 air changes per hour (ACH) (e.g., atria).

d. Unvented attic assembly: as defined in Section R806.4 of the Florida Building Code, Residential. These spaces shall not require supply or return outlets.

2. Semiheated space: an enclosed space within a building that is heated by a heating system whose output capacity is greater than or equal to 3.4 Btu/h·ft2 of floor area but is not a conditioned space.

3. Unconditioned space: an enclosed space within a building that is not a conditioned space or a semiheated space. Crawl spaces, attics, and parking garages with natural or mechanical ventilation are not considered enclosed spaces.

STOREFRONT. A nonresidential system of doors and windows mulled as a composite fenestration structure that has been designed to resist heavy use. Storefront systems include, but are not limited to, exterior fenestration systems that span from the floor level or above to the ceiling of the same story on commercial buildings. ~~with or without mulled windows and doors.~~

STRUCTURE. That which is built or constructed.

SUNROOM. ~~A one-story structure attached to a dwelling with a glazing area in excess of 40 percent of the gross area of the structure's exterior walls and roof.~~ For the purposes of this code, the term "sunroom" as used herein shall be as follows and shall include conservatories, sunspaces, solariums, and porch or patio covers or enclosures.

1. A room with roof panels that includes sloped glazing that is a one-story structure added to an existing dwelling with an open or glazed area in excess of 40 percent of the gross area of the sunroom structure's exterior walls and roof.

2. A one-story structure added to a dwelling with structural roof panels without sloped glazing. The sunroom walls may have any configuration, provided the open area of the longer wall and one additional wall is equal to at least 65 percent of the area below 6 feet 8 inches of each wall, measured from the floor.

SYSTEM. A combination of equipment and auxiliary devices (e.g., controls, accessories, interconnecting means, and terminal elements) by which energy is transformed so it performs a specific function such as HVAC, service water heating, or lighting.

TERMINAL. A device by which energy from a system is finally delivered, e.g., registers, diffusers, lighting fixtures, faucets, etc.

THERMAL ENVELOPE. The primary insulation layer of a building; that part of the envelope that provides the greatest resistance to heat flow to or from the building.

UNCONDITIONED SPACE. See "SPACE."

VISIBLE TRANSMITTANCE (VT).~~The ratio of visible light entering the space through the fenestration product assembly to the incident visible light, Visible Transmittance, includes the effects of glazing material and frame and is expressed as a number between 0 and 1.~~ Transmittance of glazing material over the visible portion of solar spectrum.

WALL. That portion of the building envelope, including opaque area and fenestration, that is vertical or tilted at an angle of 60 degrees from horizontal or greater. This includes above and below-grade walls, between floor spandrels, peripheral edges of floors, and foundation walls. For the purposes of determining building envelope requirements, the classifications are defined as follows:

1. Above-grade wall: a wall that is not a below-grade wall.

2. Below-grade wall: that portion of a wall in the building envelope that is entirely below the finish grade and in contact with the ground.

3. Mass wall: a wall with a heat capacity exceeding (1) 7 Btu/ft2·°F or (2) 5 Btu/ft2·°F provided that the wall has a material unit weight not greater than 120 lb/ft3.

4. Metal building wall: a wall whose structure consists of metal spanning members supported by steel structural members (i.e., does not include spandrel glass or metal panels in curtain wall systems).

5. Steel-framed wall: a wall with a cavity (insulated or otherwise) whose exterior surfaces are separated by steel framing members (i.e., typical steel stud walls and curtain wall systems).

6. Wood-framed and other walls: all other wall types, including wood stud walls.

Amend Chapter 2 as follows:

~~Renovation. Any structural repair, reconstruction or restoration to a structure, the costs of which equals or exceeds, over a 1-year period, a cumulative total of 30 percent of the assessed value of the structure when that value is assessed, either:~~

~~1. Before the improvement or repair is started; or~~

~~2. Before the damage occurred, if the structure has been damaged.~~

~~For the purposes of this Code, renovation occurs when the first alteration of any wall, ceiling, floor, or other structural part or mechanical system of the building commences, whether or not that alteration affects the external dimensions of the structure.~~

Renovated Building. A residential or nonresidential building undergoing alteration that varies or changes insulation, HVAC systems, water heating systems, or exterior envelope conditions, provided the estimated cost of renovation exceeds 30 percent of the assessed value of the structure.

Remove the Florida-specific definition of Visible Transmittance (VT) from Mod 5072, returning it to the IECC definition. All other definitions proposed in Mod 5072 remain as proposed.

VISIBLE TRANSMITTANCE (VT). The ratio of visible light entering the space through the fenestration product assembly to the incident visible light, Visible Transmittance, includes the effects of glazing material and frame and is expressed as a number between 0 and 1. ~~Transmittance of glazing material over the visible portion of solar spectrum.~~

EN5072

Florida's Thermal Efficiency Code (Section 553.901 et seq.) directs the Florida Building Commission to set regulations for new and existing buildings. In existing buildings, if the estimated cost of an alteration exceeds 30 percent of the assessed value of the building, it is deemed a "Renovated Building" under 553.902 Definitions. Under Section 553.906, "Thermal efficiency standards for renovated buildings," a Renovated Building (over the 30% threshold) must meet a specific list of requirements. Thermal designs "shall take into account insulation; windows; infiltration; HVAC, service water heating, energy distribution, lighting, energy managing, and auxiliary systems design and equipment selection and performance. Such buildings shall not be required to meet standards more stringent than the provisions of the Florida Energy Efficiency Code for Building Construction. These standards apply only to those portions of the structure which are actually renovated."

The term "renovation" as used in proposal EN5072 is problematic because it is overbroad. Not all "renovations" qualify as the narrowly-defined "Renovated Building" under the statute. To expand the exemption for "Renovated Buildings" to a broader category of "renovations" stretches the statutory exemption well beyond its intended purpose.

Where the alterations cost 30 percent or less of the assessed value of the structure, these alterations are not automatically exempt from the code. The Florida Building Commission is authorized to set thermal efficiency requirements for specific systems and components under Section 553.903.

> **553.903 Applicability.** – This part shall apply to all new and renovated buildings in the state, except exempted buildings, for which building permits are obtained after March 15, 1979, <u>and to the installation or replacement of building systems and components with new products for which thermal efficiency standards are set by the Florida Energy Efficiency Code for Building Construction</u>. The provisions of this part shall constitute a statewide uniform code.

The Commission set thermal efficiency requirements for a few replacement systems and components in the 2010 FBC-EC, including HVAC systems and replacement fenestration. Likewise, both the 2012 *IECC* and 2012 *IEBC* contain requirements that apply in the context of alterations, including efficiency standards for replacement fenestration. The modification above maintains the narrow scope of the exemption for "Renovated Buildings" as defined by Florida law and avoids a potential conflict.

EN5660

Date Submitted	7/25/2012	**Section**	R202	**Proponent**	Ann Stanton
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Bring forward applicable Florida-specific definitions from the 2010 FBC-Energy Conservation.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

5660-A4

Proponent Ann Stanton **Submitted** 12/11/2012 **Attachments** Yes

Rationale

The Energy TAC found this mod NAR, asking proponent to determine which definitions are needed based on approved text. This alternate language comment deletes some definitions that are not in approved mods.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

1st Comment Period History 08/09/2012 - 09/23/2012

5660-A2

Proponent Eric Lacey **Submitted** 9/23/2012 **Attachments** Yes

Rationale

Proposals EN5072 and 5660 introduce a definition into the Florida Building Code that creates confusion and a potential conflict with Florida Statutes. The modification proposed above would import the actual language from Florida Statutes and remove that potential conflict.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

The alternative language to EN5660 will replace a proposed definition with the actual definition of "Renovated Building" found in Florida Statutes. This will provide more clarity and uniformity for Building Officials.

Impact to building and property owners relative to cost of compliance with code

There should be no negative impact.

Impact to industry relative to the cost of compliance with code

There should be no negative impact.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The Florida Building Code should not conflict with Florida Statutes. This alternative will eliminate one proposed conflict.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This alternative maintains the efficiencies of the 2012 IECC and maintains consistency with Florida Statutes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

Is the proposed code modification part of a prior code version? No

Alternate Language

1st Comment Period History 08/09/2012 - 09/23/2012

5660-A1

Proponent Roger LeBrun **Submitted** 9/20/2012 **Attachments** Yes

Rationale

This term was defined to correspond with the NFRC definition, which is appropriate. The proposed definition seems to refer to what NFRC would call "center-of-glass visible transmittance", and is only one element of a fenestration product assembly VT determination. If there is a need for a Center-of-Glass VT definition, please add it and justify it as a Florida-specific need.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Does not change current practice.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Maintains correlation with referenced standards.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not change current practice.

Does not degrade the effectiveness of the code

Does not change current practice.

Is the proposed code modification part of a prior code version? No

1st Comment Period History 08/09/2012 - 09/23/2012

EN5660-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

The proposed amendment does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

R202, GENERAL DEFINITIONS

Add or change the following definitions:

ADJACENT WALL, CEILING or FLOOR. A wall, ceiling or floor of a structure that separates conditioned space from enclosed but unconditioned space, such as an unconditioned attached garage, storage or utility room.

AIR BARRIER. ~~Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material or a combination of materials.~~ Relating to air distribution systems, a material object(s) which impedes or restricts the free movement of air under specified conditions. For fibrous glass duct, the air barrier is its foil cladding; for flexible non-metal duct, the air barrier is the non-porous core; and for sheet metal duct and air handling units, the air barrier is the metal in contact with the air stream. For mechanical closets, the air barrier may be a uniform panelized material such as gypsum wall board which meets ASTM C 36, or it may be a membrane which alone acts as an air barrier which is attached to a panel, such as the foil cladding of fibrous glass duct board.

Relating to the building envelope, air barriers comprise the planes of primary resistance to air flow between the interior spaces of a building and the outdoors and the planes of primary air flow resistance between adjacent air zones of a building, including planes between adjacent conditioned and unconditioned air spaces of a building. To be classed as an air barrier, abuilding plane must be substantially leak free; that is, it shall have an air leakage rate not greater than 0.5 cfm/ft^2 when subjected to an air pressure gradient of 25 pascal. In general, air barriers are made of durable, non-porous materials and are sealed to adjoining wall, ceiling or floor surfaces with a suitable long-life mastic. House wraps and taped and sealed drywall may constitute an air barrier but dropped acoustical tile ceilings (T-bar ceilings) may not. Batt insulation facings and asphalt-impregnated fiberboard and felt paper are not considered air barriers.

AIR CONDITIONING. The treatment of air so as to control simultaneously the temperature, humidity, cleanness and distribution of the air to meet the requirements of a conditioned space.

AIR DISTRIBUTION SYSTEM. Any system of ducts, plenums and air-handling equipment that circulates air within a space or spaces and includes systems made up of one or more air-handling units.

AIR-HANDLING UNIT. The fan unit of a furnace and the fan-coil unit of a split-system, packaged air conditioner or heat pump.

ATTIC. An enclosed unconditioned space located immediately below an uninsulated roof and immediately above the ceiling of a building. For the roof to be considered insulated, roof insulation shall be at least the R-value required to meet Section R405.2.1.

BUILDING. Any structure used or intended for supporting or sheltering any use or occupancy. ~~including any mechanical systems, service water heating systems and electric power and lighting systems located on the building site and supporting the building.~~ For each purpose of this Code each portion of a building separated from other portions by a firewall shall be considered as a separate building. The term "building" shall be construed as if followed by the words "or part thereof."

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof, and any other

building element that enclose conditioned space. This boundary also includes the boundary between conditioned space and any exempt or unconditioned space. See "Adjacent wall, ceiling or floor."

CONDITIONED FLOOR AREA. The horizontal projection of ~~the floors associated with the conditioned space.~~ that portion of space which is conditioned directly or indirectly by an energy-using system.

CONDITIONED SPACE. An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent conditioned space. See "Space."

EFFICIENCY. Performance at specified rating conditions.

ENERGY. The capacity for doing work. It takes a number of forms that may be transformed from one into another such as thermal (heat), mechanical (work), electrical, and chemical. Customary measurement units are British thermal units (Btu).

EQUIPMENT. Devices for comfort conditioning, electric power, lighting, transportation, or service water heating including, but not limited to, furnaces, boilers, air conditioners, heat pumps, chillers, water heaters, lamps, luminaires, ballasts, elevators, escalators, or other devices or installations.

EXISTING BUILDING. A building or portion thereof that was previously occupied or approved for occupancy by the authority having jurisdiction. (Reference Section R101.4.)

EXTERIOR WALL. Walls including both above-grade walls and basement walls which form a boundary between a conditioned and an outdoor space.

FENESTRATION AREA. Total area of the fenestration measured using the rough opening and including the glazing, sash, and frame. For doors where the glazed vision area is less than 50% of the door area, the fenestration area is the glazed vision area. For all other doors, the fenestration area is the door area.

HEAT. The form of energy that is transferred by virtue of a temperature difference or a change in the state of a material.

HVAC. Heating, ventilating and air conditioning.

HVAC SYSTEM. The equipment, distribution systems, and terminals that provide, either collectively or individually, the processes of heating, ventilating, or air conditioning to a building or portion of a building.

INDIRECTLY CONDITIONED SPACE. See "Space."

INDOOR. Within the conditioned building envelope.

INFILTRATION. The uncontrolled inward air leakage ~~into a building caused by the pressure effects of wind or the effect of differences in the indoor and outdoor air density or both.~~ through cracks and crevices in any building element and around windows and doors of a building caused by pressure differences across these elements due to factors such as wind, inside and outside temperature differences (stack effect), and imbalance between supply and exhaust air systems.

INSULATION. Material mainly used to retard the flow of heat. See Section R303.1.4.

MANUFACTURER. The company engaged in the original production and assembly of products or equipment or a company that purchases such products and equipment manufactured in accordance with company specifications.

OUTDOOR. The environment exterior to the building structure.

OUTDOOR (OUTSIDE) AIR. Air that is outside the building envelope or is taken from outside the building that has not been previously circulated through the building.

OUTSIDE. The environment exterior to the conditioned space of the building and may include attics, garages, crawlspaces, etc., but not return air plenums.

PLENUM. A compartment or chamber to which one or more ducts are connected, that forms a part of the air distribution system, and that is not used for occupancy or storage. A plenum often is formed in part or in total by portions of the building.

POSITIVE INDOOR PRESSURE. A positive pressure condition within a conditioned space caused by bringing in more outside air than the amount of air that is exhausted and/or lost through air leakage.

PRESSURE ENVELOPE. The primary air barrier of a building; that part of the envelope that provides the greatest resistance to air flow to or from the building.

PROPOSED DESIGN. A description or computer representation of the proposed building used to estimate annual energy use for determining compliance based on total building performance or design energy cost.

RENOVATION. Any structural repair, reconstruction or restoration to a structure, the costs of which equals or exceeds, over a 1-year period, a cumulative total of 30 percent of the assessed value of the structure when that value is assessed, either:

1. Before the improvement or repair is started; or

2. Before the damage occurred, if the structure has been damaged.

For the purposes of this Code, renovation occurs when the first alteration of any wall, ceiling, floor, or other structural part or mechanical system of the building commences, whether or not that alteration affects the external dimensions of the structure.

REPLACEMENT. The installation of part or all of an existing mechanical or electrical system in an existing building.

RETROFIT. Modification of existing equipment or systems to incorporate improved performance of operation.

SEAL or SEALING – AIR DUCT. The use of closure products, either welds, mastic, mastic plus embedded fabric, adhesives, caulking, gaskets, pressure sensitive tapes, heat-activated tapes or combinations thereof as allowed by specific sections of this code, to close cracks, joints, seams, and other openings in the air barriers of air duct, air handling units, and plenum chambers for the purpose of preventing air leakage. No joining of opening from which a closure product is absent shall be considered sealed unless considered otherwise in specific cases identified by this code. Closeness of fit between mated parts alone shall not be considered a seal.

SOLAR HEAT GAIN COEFFICIENT (SHGC). The ratio of the solar heat gain entering the space through the fenestration assembly to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation which is then reradiated, conducted or convected into the space. (See "Fenestration area".)

SPACE. An enclosed space within a building. The classifications of spaces are as follows for the purpose of determining building envelope requirements.

1. Conditioned space: a cooled space, heated space, or indirectly conditioned space or unvented attic assembly defined as follows.

a. Cooled space: an enclosed space within a building that is cooled by a cooling system whose sensible output capacity exceeds 5 Btu/h·ft^2 of floor area.

b. Heated space: an enclosed space within a building that is heated by a heating system whose output capacity relative to the floor area is greater than or equal to 5 Btu/h·ft^2.

c. Indirectly conditioned space: an enclosed space within a building that is not a heated space or a cooled space, which is heated or cooled indirectly by being connected to adjacent space(s) provided (a) the product of the U-factor(s) and surface area(s) of the space adjacent to connected space(s) exceeds the combined sum of the product of the U-factor(s) and surface area(s) of the space adjoining the outdoors, unconditioned spaces, and to or from semiheated spaces (e.g., corridors) or (b) that air from heated or cooled spaces is intentionally transferred (naturally or mechanically) into the space at a rate exceeding 3 air changes per hour (ACH) (e.g., atria).

d. Unvented attic assembly: as defined in Section R806.5 of the Florida Building Code, Residential. These spaces shall not require supply or return outlets.

2. Semiheated space: an enclosed space within a building that is heated by a heating system whose output capacity is greater than or equal to 3.4 Btu/h·ft^2 of floor area but is not a conditioned space.

3. Unconditioned space: an enclosed space within a building that is not a conditioned space or a semiheated space. Crawl spaces, attics, and parking garages with natural or mechanical ventilation are not considered enclosed spaces.

STRUCTURE. That which is built or constructed.

SUNROOM. ~~A one-story structure attached to a dwelling with a glazing area in excess of 40 percent of the gross area of the structure's exterior walls and roof.~~ For the purposes of this code, the term "sunroom" as used herein shall be as follows and shall include conservatories, sunspaces, solariums, and porch or patio covers or enclosures.

1. A room with roof panels that includes sloped glazing that is a one-story structure added to an existing dwelling with an open or glazed area in excess of 40 percent of the gross area of the sunroom structure's exterior walls and roof.

2. A one-story structure added to a dwelling with structural roof panels without sloped glazing. The

sunroom walls may have any configuration, provided the open area of the longer wall and one additional wall is equal to at least 65 percent of the area below 6 feet 8 inches of each wall, measured from the floor.

SYSTEM. A combination of equipment and auxiliary devices (e.g., controls, accessories, interconnecting means, and terminal elements) by which energy is transformed so it performs a specific function such as HVAC, service water heating, or lighting.

THERMAL ENVELOPE. The primary insulation layer of a building; that part of the envelope that provides the greatest resistance to heat flow to or from the building.

UNCONDITIONED SPACE. See "SPACE."

VISIBLE TRANSMITTANCE (VT).~~The ratio of visible light entering the space through the fenestration product assembly to the incident visible light, Visible Transmittance, includes the effects of glazing material and frame and is expressed as a number between 0 and 1.~~ Transmittance of glazing material over the visible portion of solar spectrum.

WALL. That portion of the building envelope, including opaque area and fenestration, that is vertical or tilted at an angle of 60 degrees from horizontal or greater. This includes above and below-grade walls, between floor spandrels, peripheral edges of floors, and foundation walls. For the purposes of determining building envelope requirements, the classifications are defined as follows:

1. Above-grade wall: a wall that is not a below-grade wall.

2. Below-grade wall: that portion of a wall in the building envelope that is entirely below the finish grade and in contact with the ground.

3. Mass wall: a wall with a heat capacity exceeding (1) 7 $Btu/ft^2 \cdot °F$ or (2) 5 $Btu/ft^2 \cdot °F$ provided that the wall has a material unit weight not greater than 120 lb/ft^3.

4. Metal building wall: a wall whose structure consists of metal spanning members supported by steel structural members (i.e., does not include spandrel glass or metal panels in curtain wall systems).

5. Steel-framed wall: a wall with a cavity (insulated or otherwise) whose exterior surfaces are separated by steel framing members (i.e., typical steel stud walls and curtain wall systems).

6. Wood-framed and other walls: all other wall types, including wood stud walls.

For the definition of VISIBLE TRANSMITTANCE (VT):

Do not alter the base code definition as proposed.

Amend Chapter 2 as follows:

~~Renovation. Any structural repair, reconstruction or restoration to a structure, the costs of which equals or exceeds, over a 1-year period, a cumulative total of 30 percent of the assessed value of the structure when that value is assessed, either:~~

~~1. Before the improvement or repair is started; or~~

~~2. Before the damage occurred, if the structure has been damaged.~~

~~For the purposes of this Code, renovation occurs when the first alteration of any wall, ceiling, floor, or other structural part or mechanical system of the building commences, whether or not that alteration affects the external dimensions of the structure.~~

Renovated Building. A residential or nonresidential building undergoing alteration that varies or changes insulation, HVAC systems, water heating systems, or exterior envelope conditions, provided the estimated cost of renovation exceeds 30 percent of the assessed value of the structure.

Add or change the following definitions:

ADJACENT WALL, CEILING or FLOOR. A wall, ceiling or floor of a structure that separates conditioned space from enclosed but unconditioned space, such as an unconditioned attached garage, storage or utility room.

AIR BARRIER. ~~Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material or a combination of materials.~~ Relating to air distribution systems, a material object(s) which impedes or restricts the free movement of air under specified conditions. For fibrous glass duct, the air barrier is its foil cladding; for flexible non-metal duct, the air barrier is the non-porous core; and for sheet metal duct and air handling units, the air barrier is the metal in contact with the air stream. For mechanical closets, the air barrier may be a uniform panelized material such as gypsum wall board which meets ASTM C 36, or it may be a membrane which alone acts as an air barrier which is attached to a panel, such as the foil cladding of fibrous glass duct board.

Relating to the building envelope, air barriers comprise the planes of primary resistance to air flow between the interior spaces of a building and the outdoors and the planes of primary air flow resistance between adjacent air zones of a building, including planes between adjacent conditioned and unconditioned air spaces of a building. To be classed as an air barrier, abuilding plane must be substantially leak free; that is, it shall have an air leakage rate not greater than 0.5 cfm/ft^2 when subjected to an air pressure gradient of 25 pascal. In general, air barriers are made of durable, non-porous materials and are sealed to adjoining wall, ceiling or floor surfaces with a suitable long-life mastic. House wraps and taped and sealed drywall may constitute an air barrier but dropped acoustical tile ceilings (T-bar ceilings) may not. Batt insulation facings and asphalt-impregnated fiberboard and felt paper are not considered air barriers.

AIR CONDITIONING. The treatment of air so as to control simultaneously the temperature, humidity, cleanness and distribution of the air to meet the requirements of a conditioned space.

AIR DISTRIBUTION SYSTEM. Any system of ducts, plenums and air-handling equipment that circulates air within a space or spaces and includes systems made up of one or more air-handling units.

AIR-HANDLING UNIT. The fan unit of a furnace and the fan-coil unit of a split-system, packaged air conditioner or heat pump.

ATTIC. An enclosed unconditioned space located immediately below an uninsulated roof and immediately above the ceiling of a building. For the roof to be considered insulated, roof insulation shall be at least the R-value required to meet Section R405.2.1.

BUILDING. Any structure used or intended for supporting or sheltering any use or occupancy. ~~including any mechanical systems, service water heating systems and electric power and lighting systems located on the building site and supporting the building.~~ For each purpose of this Code each portion of a building separated from other portions by a firewall shall be considered as a separate building. The term "building" shall be construed as if followed by the words "or part thereof."

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof, and any other building element that enclose conditioned space. This boundary also includes the boundary between conditioned space and any exempt or unconditioned space. See "Adjacent wall, ceiling or floor."

CONDITIONED FLOOR AREA. The horizontal projection of ~~the floors associated with the conditioned space.~~ that portion of space which is conditioned directly or indirectly by an energy-using system.

CONDITIONED SPACE. An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent conditioned space. See "Space."

DRAWBAND. A fastener which surrounds and fastens a duct fitting with either the inner lining or the outer jacket of flexible ducts. Tension ties, clinch bands, draw ties, and straps are considered drawbands.

EFFICIENCY. Performance at specified rating conditions.

ENERGY. The capacity for doing work. It takes a number of forms that may be transformed from one into another such as thermal (heat), mechanical (work), electrical, and chemical. Customary measurement units are British thermal units (Btu).

EQUIPMENT. Devices for comfort conditioning, electric power, lighting, transportation, or service water heating including, but not limited to, furnaces, boilers, air conditioners, heat pumps, chillers, water heaters, lamps, luminaires, ballasts, elevators, escalators, or other devices or installations.

EXISTING BUILDING. A building or portion thereof that was previously occupied or approved for occupancy by the authority having jurisdiction. (Reference Section 101.4.1 of the *Florida Building Code, Energy Conservation* .)

EXTERIOR WALL. Walls including both above-grade walls and basement walls which form a boundary between a conditioned and an outdoor space.

FENESTRATION AREA. Total area of the fenestration measured using the rough opening and including the glazing, sash, and frame. For doors where the glazed vision area is less than 50% of the door area, the fenestration area is the glazed vision area. For all other doors, the fenestration area is the door area.

HEAT. The form of energy that is transferred by virtue of a temperature difference or a change in the state of a material.

HVAC. Heating, ventilating and air conditioning.

HVAC SYSTEM. The equipment, distribution systems, and terminals that provide, either collectively or individually, the processes of heating, ventilating, or air conditioning to a building or portion of a building.

~~**INDIRECTLY CONDITIONED SPACE.** See "Space."~~

INDOOR. Within the conditioned building envelope.

INFILTRATION. The uncontrolled inward air leakage ~~into a building caused by the pressure effects of wind or the effect of differences in the indoor and outdoor air density or both.~~ through cracks and crevices in any building element and around windows and doors of a building caused by pressure differences across these elements due to factors such as wind, inside and outside temperature differences (stack effect), and imbalance between supply and exhaust air systems.

INSULATION. Material mainly used to retard the flow of heat. See Section R303.1.4.

MANUFACTURER. The company engaged in the original production and assembly of products or equipment or a company that purchases such products and equipment manufactured in accordance with company specifications.

MECHANICAL CLOSET. For the purposes of this code, a closet used as an air plenum which contains the blower unit or air handler of a central air conditioning or heating unit.

OUTDOOR. The environment exterior to the building structure.

OUTDOOR (OUTSIDE) AIR. Air that is outside the building envelope or is taken from outside the building that has not been previously circulated through the building.

OUTSIDE. The environment exterior to the conditioned space of the building and may include attics, garages, crawlspaces, etc., but not return air plenums.

PLENUM. A compartment or chamber to which one or more ducts are connected, that forms a part of the air distribution system, and that is not used for occupancy or storage. A plenum often is formed in part or in total by portions of the building.

POSITIVE INDOOR PRESSURE. A positive pressure condition within a conditioned space caused by bringing in more outside air than the amount of air that is exhausted and/or lost through air leakage.

~~**PRESSURE ENVELOPE.** The primary air barrier of a building; that part of the envelope that provides the greatest resistance to air flow to or from the building.~~

PROPOSED DESIGN. A description or computer representation of the proposed building used to estimate annual energy use for determining compliance based on total building performance or design energy cost.

RENOVATION. Any structural repair, reconstruction or restoration to a structure, the costs of which equals or exceeds, over a 1-year period, a cumulative total of 30 percent of the assessed value of the structure when that value is assessed, either:

1. Before the improvement or repair is started; or

2. Before the damage occurred, if the structure has been damaged.

For the purposes of this Code, renovation occurs when the first alteration of any wall, ceiling, floor, or other structural part or mechanical system of the building commences, whether or not that alteration affects the external dimensions of the structure.

REPLACEMENT. The installation of part or all of an existing mechanical or electrical system in an existing building.

~~**RETROFIT.** Modification of existing equipment or systems to incorporate improved performance of operation.~~

SEAL or SEALING – AIR DUCT. The use of closure products, either welds, mastic, mastic plus embedded fabric, adhesives, caulking, gaskets, pressure sensitive tapes, heat-activated tapes or combinations thereof as allowed by specific sections of this code, to close cracks, joints, seams, and other openings in the air barriers of air duct, air handling units, and plenum chambers for the purpose of preventing air leakage. No joining of opening from which a closure product is absent shall be considered sealed unless considered otherwise in specific cases identified by this code. Closeness of fit between mated parts alone shall not be considered a seal.

SOLAR HEAT GAIN COEFFICIENT (SHGC). The ratio of the solar heat gain entering the space through the fenestration assembly to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation which is then reradiated, conducted or convected into the space. (See "Fenestration area".)

SPACE. An enclosed space within a building. The classifications of spaces are as follows for the purpose of determining building envelope requirements.

1. Conditioned space: a cooled space, heated space, or indirectly conditioned space or unvented attic assembly defined as follows.

a. Cooled space: an enclosed space within a building that is cooled by a cooling system whose sensible output capacity exceeds 5 Btu/h·ft^2 of floor area.

b. Heated space: an enclosed space within a building that is heated by a heating system whose output capacity relative to the floor area is greater than or equal to 5 Btu/h·ft^2.

c. Indirectly conditioned space: an enclosed space within a building that is not a heated space or a cooled space, which is heated or cooled indirectly by being connected to adjacent space(s) provided (a) the product of the U-factor(s) and surface area(s) of the space adjacent to connected space(s) exceeds the combined sum of the product of the U-factor(s) and surface area(s) of the space adjoining the outdoors, unconditioned spaces, and to or from semiheated spaces (e.g., corridors) or (b) that air from heated or cooled spaces is intentionally transferred (naturally or mechanically) into the space at a rate exceeding 3 air changes per hour (ACH) (e.g., atria).

d. Unvented attic assembly: as defined in Section R806.5 of the Florida Building Code, Residential. These spaces shall not require supply or return outlets.

2. Semiheated space: an enclosed space within a building that is heated by a heating system whose output capacity is greater than or equal to 3.4 Btu/h·ft^2 of floor area but is not a conditioned space.

3. Unconditioned space: an enclosed space within a building that is not a conditioned space or a semiheated space. Crawl spaces, attics, and parking garages with natural or mechanical ventilation are not considered enclosed spaces.

STRUCTURE. That which is built or constructed.

SUNROOM. ~~A one-story structure attached to a dwelling with a glazing area in excess of 40 percent of the gross area of the structure's exterior walls and roof.~~ For the purposes of this code, the term "sunroom" as used herein shall be as follows and shall include conservatories, sunspaces, solariums, and porch or patio covers or enclosures.

1. A room with roof panels that includes sloped glazing that is a one-story structure added to an existing dwelling with an open or glazed area in excess of 40 percent of the gross area of the sunroom structure's exterior walls and roof.

2. A one-story structure added to a dwelling with structural roof panels without sloped glazing. The sunroom walls may have any configuration, provided the open area of the longer wall and one additional wall is equal to at least 65 percent of the area below 6 feet 8 inches of each wall, measured from the floor.

SYSTEM. A combination of equipment and auxiliary devices (e.g., controls, accessories, interconnecting means, and terminal elements) by which energy is transformed so it performs a specific function such as HVAC, service water heating, or lighting.

THERMAL ENVELOPE. The primary insulation layer of a building; that part of the envelope that provides the greatest resistance to heat flow to or from the building.

UNCONDITIONED SPACE. See “SPACE.”

VISIBLE TRANSMITTANCE (VT). The ratio of visible light entering the space through the fenestration product assembly to the incident visible light, Visible Transmittance, includes the effects of glazing material and frame and is expressed as a number between 0 and 1. ~~Transmittance of glazing material over the visible portion of solar spectrum.~~ [OK as in IECC]

WALL. That portion of the building envelope, including opaque area and fenestration, that is vertical or tilted at an angle of 60 degrees from horizontal or greater. This includes above and below-grade walls, between floor spandrels, peripheral edges of floors, and foundation walls. For the purposes of determining building envelope requirements, the classifications are defined as follows:

1. Above-grade wall: a wall that is not a below-grade wall.

2. Below-grade wall: that portion of a wall in the building envelope that is entirely below the finish grade and in contact with the ground.

3. Mass wall: a wall with a heat capacity exceeding (1) 7 Btu/ft^2·°F or (2) 5 Btu/ft^2·°F provided that the wall has a material unit weight not greater than 120 lb/ft^3.

4. Metal building wall: a wall whose structure consists of metal spanning members supported by steel structural members (i.e., does not include spandrel glass or metal panels in curtain wall systems).

5. Steel-framed wall: a wall with a cavity (insulated or otherwise) whose exterior surfaces are separated by steel framing members (i.e., typical steel stud walls and curtain wall systems).

6. Wood-framed and other walls: all other wall types, including wood stud walls.

EN5660

Florida's Thermal Efficiency Code (Section 553.901 et seq.) directs the Florida Building Commission to set regulations for new and existing buildings. In existing buildings, if the estimated cost of an alteration exceeds 30 percent of the assessed value of the building, it is deemed a "Renovated Building" under 553.902 Definitions. Under Section 553.906, "Thermal efficiency standards for renovated buildings," a Renovated Building (over the 30% threshold) must meet a specific list of requirements. Thermal designs "shall take into account insulation; windows; infiltration; HVAC, service water heating, energy distribution, lighting, energy managing, and auxiliary systems design and equipment selection and performance. Such buildings shall not be required to meet standards more stringent than the provisions of the Florida Energy Efficiency Code for Building Construction. These standards apply only to those portions of the structure which are actually renovated."

The term "renovation" as used in proposal EN5660 is problematic because it is overbroad. Not all "renovations" qualify as the narrowly-defined "Renovated Building" under the statute. To expand the exemption for "Renovated Buildings" to a broader category of "renovations" stretches the statutory exemption well beyond its intended purpose.

Where the alterations cost 30 percent or less of the assessed value of the structure, these alterations are not automatically exempt from the code. The Florida Building Commission is authorized to set thermal efficiency requirements for specific systems and components under Section 553.903.

> **553.903 Applicability.** – This part shall apply to all new and renovated buildings in the state, except exempted buildings, for which building permits are obtained after March 15, 1979, <u>and to the installation or replacement of building systems and components with new products for which thermal efficiency standards are set by the Florida Energy Efficiency Code for Building Construction</u>. The provisions of this part shall constitute a statewide uniform code.

The Commission set thermal efficiency requirements for a few replacement systems and components in the 2010 FBC-EC, including HVAC systems and replacement fenestration. Likewise, both the 2012 *IECC* and 2012 *IEBC* contain requirements that apply in the context of alterations, including efficiency standards for replacement fenestration. The modification above maintains the narrow scope of the exemption for "Renovated Buildings" as defined by Florida law and avoids a potential conflict.

EN5447

Date Submitted	7/20/2012	**Section**	C402.2	**Proponent**	Mark Nowak
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** Yes

Related Modifications

Summary of Modification

Provides climate-appropriate R-values for metal framing.

Rationale

The IECC process did not consider the unique climates of Florida in setting their prescriptive envelope requirements. The IECC climate zones are far broader than Florida. Further, there was no specific cost impact assessment conducted to support individual entries to this table in the IECC. It was part of a larger proposal to the code that did not address the impact of isolated entries for their economic impact. Some of the table entries were negotiated between different parties to achieve agreement on the larger proposal to update the entire IECC. See the uploaded file for technical and cost justification for this proposal.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

Lowers cost to owners.

Impact to industry relative to the cost of compliance with code

Lowers cost of construction.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Proposal provides requirements appropriate for Florida's climate to insure energy efficient buildings.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Proposal provides more cost effective systems that are less complex to construct than in the foundation code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Proposal removes a bias against metal framing.

Does not degrade the effectiveness of the code

The changes proposed have insignificant impact on energy use while lowering cost of construction.

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

5447-A1

Proponent Mark Nowak **Submitted** 12/10/2012 **Attachments** Yes

Rationale

This modification is in response to comments from various Energy TAC members and public participants during the October meetings. The revised text expands the proposal to include both wood and steel framing. Since the meetings in October, we have looked further into the energy savings and believe that the TAC should also consider the impact of embodied energy associated with adding foam insulation to the exterior of a wall. As efficiencies of other components of the building such as windows and equipment have been tightened up over the years, the embodied energy has grown as a percentage of the potential energy saving associated with a given increase in envelope requirements. Using Extruded Polystyrene (XPS) as an example, the embodied energy is equivalent to approximately 1.87 kWh per square foot of R-5 insulation. This equates to over 9 years of the simulated annual energy savings from adding R-5 continuous insulation to an R-13 wall. From a societal perspective, this pushes the payback out closer to 50 years. Given that continuous insulation is not a good investment and provides little to no energy savings in Florida, we request that the table be modified as proposed. Although one could build a deeper wall and comply with the R-20 for wood construction, the cost to do so is not reasonable. A 2x6 stud wall would significantly increase the amount of framing material for a very small energy savings.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

Lowers cost to comply.

Impact to industry relative to the cost of compliance with code

Lowers cost to comply.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Creates requiremetns specific to Florida's climate.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

provides more cost-effective solutions.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposal is material neutral

Does not degrade the effectiveness of the code

The energy savings at issue are insignificant. The proposed alternative provides a more practical solution.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

It does not strength the flundation code but does addess how the ammendment applies to Florida.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

YES

2nd Comment Period 10/31/2012 - 12/14/2012

EN5447-G3

Proponent Paul Coats **Submitted** 12/14/2012 **Attachments** No

Comment:

I am in support of Mark Nowak's proposed alternate language submittal, EN5447-A1, which corrects some of the incongruity of the original proposal. His research shows that the continuous insulation provisions for the building envelope in commercial construction yield little benefit compared to the initial and life cycle costs.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5447-G1

Proponent	BOAF CDC	**Submitted**	9/15/2012	**Attachments**	No

Comment:

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5447-G2

Proponent	Paul Coats	**Submitted**	9/21/2012	**Attachments**	No

Comment:

The proposed modification is not comprehensive enough. Steel has a greater thermal bridging effect than wood, so it does not make sense to remove the requirement for continuous insulation, which is the single most effective insulation strategy for steel. Continuous insulation provides a thermal block over the studs, whereas batt insulation does not. This proposal retains the continuous insulation requirement for wood and other building systems – where thermal bridging not an issue. As a result of this change, energy losses from the envelope of steel buildings will be greater than for other building systems.

Modify Table C402.2 as follows:

TABLE C402.2 OPAQUE THERMAL ENVELOPE REQUIREMENTS[a]

CLIMATE ZONE	1		2	
	All Other	Group R	All Other	Group R
Metal framed	R-13 ~~+ R-5ci~~	R-13 ~~+ R-5ci~~	R-13 ~~+ R-5ci~~	R-13 ~~+ R-7.5ci~~

All other table entries remain unchanged.

Further Modify Table C402.2 from the original IECC text as follows:

TABLE C402.2 OPAQUE THERMAL ENVELOPE REQUIREMENTS[a]

CLIMATE ZONE	1		2	
	All Other	**Group R**	**All Other**	**Group R**
Metal framed	R-13 ~~+ R-5ci~~	R-13 ~~+ R-5ci~~	R-13 ~~+ R-5ci~~	R-13 ~~+ R-7.5ci~~
Wood framed and other	R-13~~+3.8 or R 20~~	R-13~~+3.8 or R 20~~	R-13~~+3.8 or R 20~~	R R-13~~+3.8 or R 20~~

All other table entries remain unchanged.

The IECC process did not consider the unique climates of Florida in setting their prescriptive envelope requirements. The IECC climate zones are far broader than Florida. Further, there was no specific cost impact assessment conducted to support individual entries to this table in the IECC. It was part of a larger proposal that did not address the impact of isolated entries for their economic impact. Some of the table entries were negotiated between different parties to achieve agreement on the larger proposal to the update the entire IECC.

To support our proposal, we evaluated a four story, 32-unit building that is representative of many hotels, offices, and multi-family buildings in today's market. Using Energy Gauge Summit Version 4, we ran multiple simulations on the building using R-13, R-13+5, and R-13+7.5 wall insulation to assess the difference in energy use and cost savings. The U-factors used in the analysis were based on values in Table A3.3 of ASHRAE 90.1-2010. The Energy Gauge results show the energy savings gained by adding R-5 and R-7.5 continuous insulation in a Florida city (Orlando) in Climate Zone 2 are small. On a per unit basis, the annual cost savings would be in the order of $6.50 to add R-5 and $8.37 to add R-7.5 compared to the base code. The results are similar for Miami (Climate Zone 1). Total building energy use and savings are shown in the following table.

Energy and Cost Savings from Continuous Insulation over Steel Studs in Climate Zone 2 (Orlando)

Steel wall insulation package	Regulated energy use (kWh)	Regulated energy cost (Dollars)	Annual cost savings relative to 2010 Florida code*
R-13	355721	$40,268	-
R-13+5	353867	$40,058	$210
R-13+7.5	353353	$40,000	$268

*Savings are for the entire 32 unit building.

On the building subject to the simulations, the cost for continuous insulation would be between $0.75 and $1.00 per square foot (varies by location, insulation type, and R-value) to meet the 2012 IECC versus the 2010 Florida energy code. This is equivalent to about $7776 to $10, 300 (based on 10368 sf of exterior wall after backing out opening area) for the building or $243 to $322 per unit. Even in the best case scenario, this is a 40+ year payback. The payback is even longer if the cost impact of wider walls is considered for window and door jamb extensions, and the cost of fasteners for the foam insulation.

Given that continuous insulation is not a good investment and provides little to no energy savings in Florida, we request that the table be modified as proposed.

Date Submitted	7/20/2012	**Section**	C402.2	**Proponent**	Larry Williams
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Adds a footnote to Table C402.2 to recognize alternative assemblies for efficient framing methods

Rationale

The addition of continuous insulation in Climate Zones 1 and 2 results in very little energy savings but adds significant cost to a building. This proposal provides equivalent performance while also providing some financial relief to owners or builders by recognizing that many metal stud assemblies are constructed at 24 inch on center spacing.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact.

Impact to building and property owners relative to cost of compliance with code

Proposal will lower costs to owners.

Impact to industry relative to the cost of compliance with code

Proposal will lower costs of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Provides lower cost alternative compliance options.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Provides equivalent performance at lower cost by recognizing alternative compliance options for efficient framing.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposal is material neutral. It offers more alternatives for compliance.

Does not degrade the effectiveness of the code

The alternative compliance options are equivalent to the options in the foundation code.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5452-A1

Proponent Mark Nowak **Submitted** 12/10/2012 **Attachments** Yes

Rationale

This modification is in response to comments from various Energy TAC members and public participants during the October meetings. The revised text expands the proposal to include both wood and steel framing at 24 inch on center stud spacing. See attached support file for a detailed rationale.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

Lowers cost to comply

Impact to industry relative to the cost of compliance with code

lowers cost to comply

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

provides economical solutions for construction

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

provides more practical compliance options

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

proposal is material neutral

Does not degrade the effectiveness of the code

Difference in overall building performance in negligible

Is the proposed code modification part of a prior code version? No

1st Comment Period History 08/09/2012 - 09/23/2012

EN5452-G1

Proponent	BOAF CDC	**Submitted**	9/15/2012	**Attachments**	No

Comment:

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

1st Comment Period History 08/09/2012 - 09/23/2012

EN5452-G2

Proponent	Paul Coats	**Submitted**	9/21/2012	**Attachments**	No

Comment:

The proposed modification is not comprehensive enough. The proposed reduction based on stud spacing would create incongruity in the code for wood-framed and other buildings. For this modification to make sense, similar reductions for wood-framed and other buildings would need to be introduced as appropriate.

Modify Table C402.2 as follows:

TABLE C402.2 OPAQUE THERMAL ENVELOPE REQUIREMENTS[a]

CLIMATE ZONE	1		2	
	All Other	**Group R**	**All Other**	**Group R**
Metal framed [f]	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-7.5ci

f. The insulation for a metal-framed wall shall be permitted to be reduced to R-15+3 or R13+3.7 whenever the stud spacing is 24 inches or greater in Climate Zone 1 for all building types and in Climate Zone 2 for "All Other" building types. For Group R buildings in Climate Zone 2, the insulation shall be permitted to be reduced to R13+6.5 or R-15+6 whenever the stud spacing is 24 inches or greater.

Remaining parts of table unchanged.

Further modify Table C402.2 with a new footnote g as follows:

TABLE C402.2 OPAQUE THERMAL ENVELOPE REQUIREMENTS[a]

CLIMATE ZONE	1		2	
	All Other	**Group R**	**All Other**	**Group R**
Metal framed[f]	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-7.5ci
Wood framed and other[g]	R-13+3.8 or R 20	R-13+3.8 or R 20	R-13+3.8 or R 20	R R-13+3.8 or R 20

All other table entries remain unchanged.

f. The insulation for a metal-framed wall shall be permitted to be reduced to R-15+3 or R13+3.7 whenever the stud spacing is 24 inches or greater in Climate Zone 1 for all building types and in Climate Zone 2 for “All Other” building types. For Group R buildings in Climate Zone 2, the insulation shall be permitted to be reduced to R13+6.5 or R-15+6 whenever the stud spacing is 24 inches or greater.

g. The insulation for a wood-framed wall shall be permitted to be reduced to R13+3.6, R15+2.6, or R-19 whenever the stud spacing is 24 inches or greater in Climate Zone 1 or 2 for all buildings.

Remaining parts of table unchanged.

This modification is in response to comments from various Energy TAC members and public participants during the October meetings. The revised text expands the proposal to include both wood and steel framing at 24 inch on center stud spacing.

The addition of continuous insulation in Climate Zones 1 and 2 results in very little energy savings but adds significant cost to a building. This proposal provides equivalent performance while also providing some financial relief to owners or builders by recognizing that many stud assemblies are constructed at 24 inch on center spacing. Wider stud spacing makes a significant difference in the performance of many stud assemblies, allowing less continuous insulation to achieve the same performance level.

The proposed R-values are taken from 2010 ASHRAE 90.1 Appendix Table A3.3 as illustrated in the following:

ASHRAE 90.1 Table A3.3 shows a U-factor of 0.077 for a metal wall assembly with R-13+5 at 16 inch on center spacing. In the same table, by linear interpolation a U-factor of 0.077 is equivalent to R-13+3.71 at 24 inch spaced studs. By the same process, an R-15+3.1 at 24 inch spaced studs equals a U of 0.077. The R-3.1 was rounded down to R-3 in the proposal to match commonly available product lines. The energy savings due to the rounding is indistinguishable.

For the Group R buildings in Climate Zone 2, R-13 + 7.5 at 16 inches on center is equivalent to a U-factor of 0.064. The ASHRAE Table A3.3 yields R13+6.5 for metal studs at 24 inches on center for this same U-factor. Similarly, R-15+6 at 24 inches (U = 0.063) on center studs is slightly lower than the target U-factor of 0.064.

The same process was used to determine the insulation requirements for a wood framed wall, using a U-factor of 0.064 from the IECC. Note that we rounded R-19+1 down to R-19 for the wood stud walls to match available products. The difference in energy saving due to this rounding is indistinguishable.

Note that the 2012 IECC set a precedent for this approach by recognizing 24 inch spacing for metal framing based on a proposal prepared by the Steel Framing Alliance for residential buildings.

This proposal will allow more economical selection of continuous insulation products and help offset significant cost added between the 2010 Florida Energy Code and the 2012 IECC.

The addition of continuous insulation in Climate Zones 1 and 2 results in very little energy savings but adds significant cost to a building. This proposal provides equivalent performance while also providing some financial relief to owners or builders by recognizing that many metal stud assemblies are constructed at 24 inch on center spacing. Wider stud spacing makes a significant difference in a metal stud assembly performance, allowing less continuous insulation to achieve the same performance level.

The proposed R-values are taken from ASHRAE 90.1 Appendix Table A3.3 as illustrated in the following:

ASHRAE 90.1 Table A3.3 shows a U-factor of 0.077 for a metal wall assembly with R-13+5 at 16 inch on center spacing. In the same table, by linear interpolation a U-factor of 0.077 is equivalent to R-13+3.71 at 24 inch spaced studs. By the same process, an R-15+3.1 at 24 inch spaced studs equals a U of 0.077. The R-3.1 was rounded down to R-3 in the proposal to match commonly available product lines. The energy savings due to the rounding is indistinguishable.

For the Group R buildings in Climate Zone 2, R-13 + 7.5 at 16 inches on center is equivalent to a U-factor of 0.064. The ASHRAE Table A3.3 yields R13+6.5 for studs at 24 inches on center for this same U-factor. Similarly, R-15+6 at 24 inches (U = 0.063) on center studs is slightly lower than the target U-factor of 0.064.

Note that the 2012 IECC set a precedent for this approach by recognizing 24 inch spacing for metal framing based on a proposal prepared by the Steel Framing Alliance for residential buildings.

This proposal will allow more economical selection of continuous insulation products and help offset significant cost added between the 2010 Florida Energy Code and the 2012 IECC.

EN5803

Date Submitted	7/31/2012	**Section**	C403.2.3(1)	**Proponent**	Ann Stanton
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Update Table C403.2.3(1) to federal efficiencies effective 1/1/15.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process. Update to revised federal standards for residential sized equipment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies. Updating to federal standards comes under the Commission's legislative mandate

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1st Comment Period History 08/09/2012 - 09/23/2012

5803-A1

Proponent Ann Stanton **Submitted** 9/19/2012 **Attachments** Yes

Rationale

Comment A1 reflects needed corrections to the table to make it correct after consultation with Karim Amrane of AHRI. Both ASHRAE 90.1 and IECC had listed the SEER for Small duct high velocity at 10.0 SEER, while the US DOE has had it at SEER 13, effective in 2006. Also, DOE has replaced the category "Through-the-wall" units by the term "Space-constrained products".

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

None.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. It represents a national standard for equipment efficiencies.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. It represents a national standard for equipment efficiencies.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. It represents a national standard for equipment efficiencies.

Does not degrade the effectiveness of the code

No. It represents a national standard for equipment efficiencies.

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

EN5803-G3

Proponent Ann Stanton **Submitted** 12/14/2012 **Attachments** No

Comment:

This mod contains important information that will be incorporated on a timeline. It can wait until the Glitch fix cycle to incorporate commercial provisions as well.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5803-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

The proposed amendment does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process. (2015 cycle perhaps)
The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

1st Comment Period History 08/09/2012 - 09/23/2012

EN5803-G2

Proponent Karim Amrane **Submitted** 9/22/2012 **Attachments** Yes

Comment:

See attached comments.

TABLE C403.2.3(1)

MINIMUM EFFICIENCY REQUIREMENTS

ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency[b] Before 1/1/15 ~~6/1/2011~~	Minimum Efficiency[b] As of 1/1/15 ~~6/1/2011~~	Test Procedure[a]
Air Conditioners, Air Cooled	<65,000 Btu/h[b]	All	Split System	13.0 SEER	14.0 SEER	AHRI 210/240
			Single Package	13.0 SEER	14.0 SEER	
Through-the Wall, Air-cooled	=30,000 Btu/h[b]	All	Split System	12.0 SEER	No change	
			Single Package	12.0 SEER	No change	
Small-duct, high-velocity systems	<65,000 Btu/h	All	Split system or Single Package	13.0 SEER	13.0 SEER	
	=65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or none)	Split System and Single Package	11.2 EER 11.4 IEER	No change	
		All other				

Air conditioners, air cooled						AHRI 340/360
	=135,000 Btu/h and <240,000 Btu/h		Split System and Single Package	11.0 EER[c] 11.2 IEER[c]	No change	
	=240,000 Btu/h and <760,000 Btu/h		Split System and Single Package	10.0 EER[c], 10.1 IEER[c]	No change	
	=760,000 Btu/h		Split System and Single Package	9.7 EER[c], 9.8 IEER[c]	No change	
Space constrained products, air conditioners	<65,000 Btu/h		Split system or Single Package	12.0 SEER[e]	12.0 SEER	
Air Conditioners, Water Cooled	<65,000 Btu/h[b]	All	Split System and Single Package	12.1 EER 12.3 IEER	No change	AHRI 210/240
	=65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.1 EER 12.3 IEER	No change	AHRI 340/360
		All other	Split System and Single Package	11.9 EER 12.1 IEER	No change	
	=135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.5 EER 12.7 IEER	No change	
		All other	Split System and	12.3 EER	No change	

			Single Package	12.5 IEER		
	=240,000 Btu/h and <760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.4 EER 12.6 IEER	No change	
		All other	Split System and Single Package	12.2 EER 12.4 IEER	No change	
	=760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.0 EER 12.4 IEER	No change	
		All other	Split System and Single Package	12.0 EER 12.2 IEER	No change	
Air Conditioners, evaporatively cooled	<65,000 Btu/h[b]	All	Split System and Single Package	12.1 EER 12.3 IEER	No change	AHRI 210/240
	=65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.1 EER 12.3 IEER	No change	AHRI 340/360
		All other	Split System and Single Package	11.9 EER 12.1 IEER	No change	
	=135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.0 EER 12.2 IEER	No change	
		All other	Split System and Single Package	11.8 EER 12.0 IEER	No change	
	=240,000	Electric	Split System and	11.9 EER	No change	

	Btu/h and <760,000 Btu/h	Resistance (or None)	Single Package	12.1 IEER		
		All other	Split System and Single Package	12.2 EER 11.9 IEER	No change	
	=760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.7 EER 11.9 IEER	No change	
		All other	Split System and Single Package	11.5 EER 11.7 IEER	No change	
Condensing units, air cooled	=135,000 Btu/h			10.5 EEER 14.0 IEER	No change	AHRI 365
Condensing units, water cooled	=135,000 Btu/h			13.5 EEER 14.0 IEER	No change	
Condensing units, evaporatively cooled	=135,000 Btu/h			13.5 EEER 14.0 IEER	No change	

For SI: 1 British thermal unit per hour = 0.2931 W.

[a] Chapter 6 of the referenced standard contains a complete specification of the reference test procedure, including the reference year version of the test procedure.

[b]Single-phase, air-cooled air-conditioners <65,000 Btu/h are regulated by NAECA. SEER values are those set by NAECA.

NOTE: All efficiencies from “Before 6/1/2011” are deleted and replaced with efficiencies in effect since 6/1/2011.

TABLE C403.2.3(1)

MINIMUM EFFICIENCY REQUIREMENTS

ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency[b] Before 1/1/15 ~~6/1/2011~~	Minimum Efficiency[b] As of 1/1/15 ~~6/1/2011~~	Test Procedure[a]
Air Conditioners, Air Cooled	<65,000 Btu/h[b]	All	Split System	13.0 SEER	14.0 SEER	AHRI 210/240
			Single Package	13.0 SEER	14.0 SEER	
Space-constrained ~~Through-the Wall~~, Air-cooled	=30,000 Btu/h[b]	All	Split System	12.0 SEER	No change	
			Single Package	12.0 SEER	No change	
Small-duct, high-velocity systems	<65,000 Btu/h	All	Split system or Single Package	13.0 SEER[c]	No change[c] ~~13.0 SEER~~	
	=65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or none)	Split System and Single Package	11.2 EER 11.4 IEER	No change	

Air conditioners, air cooled		All other				AHRI 340/360
	=135,000 Btu/h and <240,000 Btu/h		Split System and Single Package	11.0 EER[c] 11.2 IEER[c]	No change	
	=240,000 Btu/h and <760,000 Btu/h		Split System and Single Package	10.0 EER[c], 10.1 IEER[c]	No change	
	=760,000 Btu/h		Split System and Single Package	9.7 EER[c], 9.8 IEER[c]	No change	
~~Space constrained products, air conditioners~~	~~<65,000 Btu/h~~		~~Split system or Single Package~~	~~12.0 SEER[e]~~	~~12.0 SEER~~	
Air Conditioners, Water Cooled	<65,000 Btu/h[b]	All	Split System and Single Package	12.1 EER 12.3 IEER	No change	AHRI 210/240
	=65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.1 EER 12.3 IEER	No change	AHRI 340/360
		All other	Split System and Single Package	11.9 EER 12.1 IEER	No change	
	=135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.5 EER 12.7 IEER	No change	

		All other	Split System and Single Package	12.3 EER 12.5 IEER	No change	
	=240,000 Btu/h and <760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.4 EER 12.6 IEER	No change	
		All other	Split System and Single Package	12.2 EER 12.4 IEER	No change	
	=760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.0 EER 12.4 IEER	No change	
		All other	Split System and Single Package	12.0 EER 12.2 IEER	No change	
Air Conditioners, evaporatively cooled	<65,000 Btu/h[b]	All	Split System and Single Package	12.1 EER 12.3 IEER	No change	AHRI 210/240
	=65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.1 EER 12.3 IEER	No change	AHRI 340/360
		All other	Split System and Single Package	11.9 EER 12.1 IEER	No change	
	=135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.0 EER 12.2 IEER	No change	
		All other	Split System and Single Package	11.8 EER 12.0 IEER	No change	

	=240,000 Btu/h and <760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.9 EER 12.1 IEER	No change	
		All other	Split System and Single Package	12.2 EER 11.9 IEER	No change	
	=760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.7 EER 11.9 IEER	No change	
		All other	Split System and Single Package	11.5 EER 11.7 IEER	No change	
Condensing units, air cooled	=135,000 Btu/h			10.5 EEER 14.0 IEER	No change	AHRI 365
Condensing units, water cooled	=135,000 Btu/h			13.5 EEER 14.0 IEER	No change	
Condensing units, evaporatively cooled	=135,000 Btu/h			13.5 EEER 14.0 IEER	No change	

For SI: 1 British thermal unit per hour = 0.2931 W.

[a] Chapter 6 of the referenced standard contains a complete specification of the reference test procedure, including the reference year version of the test procedure.

[b]Single-phase, air-cooled air-conditioners <65,000 Btu/h are regulated by NAECA. SEER values are those set by NAECA.

[c]As granted by a U.S. Department of Energy letter of exception, specific to individual companies, SDHV products without a letter of exception shall have the same efficiency as air-cooled air-conditioners.

NOTE: All efficiencies from “Before 6/1/2011” are deleted and replaced with efficiencies in effect since 6/1/2011.

Air-Conditioning, Heating, and Refrigeration Institute

September 22, 2012

RE: Comments on Florida Building Code Proposal 5803

These comments are submitted by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). AHRI is a trade association representing manufacturers of heating, air conditioning and refrigeration products.

The proposed amendments to Table C403.2.3(1) are based on a final rule published in the Federal Register by the Department of Energy (DOE) on October 31, 2011. However, the final rule promulgated by DOE amends the federal minimum energy conservation standards for residential central air conditioners less than 65,000 Btu/h as opposed to small commercial packaged air conditioner and heating equipment less than 65,000 Btu/h. As a way of background, the Energy Policy and Conservation Act (EPCA) regulates separately residential and commercial air conditioners. Definitions for residential central air conditioners and heat pumps are contained in 10 CFR 430.2 and minimum energy efficiency standards can be found in 10 CFR 430.32. On the other hand, definitions for small commercial air conditioners and heating equipment can be found in 10 CFR 431.92 and minimum energy efficiency standards are in 10 CFR 431.97.

The new minimum federal standards promulgated by DOE in 2011 apply to residential central air conditioners and as such cannot be required for small commercial packaged air conditioners contained in Table C403.2.3 (1). The current federal minimum efficiency standards for small commercial packaged air conditioners remain unchanged at 13 SEER (as currently listed in ASHRAE standard 90.1-2010). Requiring higher minimum efficiencies for commercial air conditioners as proposed in the amendment would be a violation of federal preemption. Therefore, AHRI strongly recommends that the amendment be rejected to avoid that the Florida Building Code be in violation of Federal law. If the intent was to amend the minimum energy efficiency standards for residential central air conditioners, then a separate amendment should be developed that would clearly state that the proposed efficiencies apply to residential and not commercial products.

Sincerely,

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Therefore, for the reasons given in the interim rule and in this document, we are adopting the interim rule as a final rule without change.

This action also affirms the information contained in the interim rule concerning Executive Order 12866 and the Regulatory Flexibility Act, Executive Orders 12372 and 12988, and the Paperwork Reduction Act.

Further, for this action, the Office of Management and Budget has waived its review under Executive Order 12866.

List of Subjects in 7 CFR Part 301

Agricultural commodities, Plant diseases and pests, Quarantine, Reporting and recordkeeping requirements, Transportation.

PART 301—DOMESTIC QUARANTINE NOTICES

■ Accordingly, we are adopting as a final rule, without change, the interim rule that amended 7 CFR part 301 and that was published at 68 FR 43286–43287 on July 22, 2003.

Authority: 7 U.S.C. 7701–7772; 7 CFR 2.22, 2.80, and 371.3.

Section 301.75–15 also issued under Sec. 204, Title II, Pub. L. 106–113, 113 Stat. 1501A–293; sections 301.75–15 and 301.75–16 also issued under Sec. 203, Title II, Pub. L. 106–224, 114 Stat. 400 (7 U.S.C. 1421 note).

Done in Washington, DC, this 11th day of August 2004.

W. Ron DeHaven,

Administrator, Animal and Plant Health Inspection Service.

[FR Doc. 04–18784 Filed 8–16–04; 8:45 am]

BILLING CODE 3410–34–P

DEPARTMENT OF ENERGY

Office of Energy Efficiency and Renewable Energy

10 CFR Part 430

[Docket Number EE–RM–98–440]

RIN 1904–AB46

Energy Conservation Program for Consumer Products; Central Air Conditioners and Heat Pumps Energy Conservation Standards

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Final rule; technical amendment.

SUMMARY: The Department of Energy (DOE) is revising the Code of Federal Regulations to incorporate certain energy conservation standards that will apply to residential central air conditioners and central air conditioning heat pumps beginning on January 23, 2006. More specifically, this technical amendment replaces standard levels currently in the Code of Federal Regulations, which were established by a final rule published by DOE on May 23, 2002, with standard levels that were set forth in a final rule published by DOE on January 22, 2001. As explained in the Supplementary Information section of this notice, the U.S. Court of Appeals for the Second Circuit has ruled that DOE's withdrawal of the rule published on January 22, 2001, was unlawful, and, therefore, that certain standards promulgated in the May 23, 2002, final rule are invalid. DOE has decided not to seek further review of that ruling. Consequently, DOE is now revising its regulations consistent with the court's ruling.

EFFECTIVE DATE: February 21, 2001.

ADDRESSES: For access to the docket to read background documents or comments received, go to *http://www.eere.energy.gov/buildings/appliance_standards/residential/ac_central.html* and/or visit the U.S. Department of Energy, Forrestal Building, Room 1J–018 (Resource Room of the Building Technologies Program), 1000 Independence Avenue, SW., Washington, DC, (202) 586–9127, between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays. Please call Ms. Brenda Edwards-Jones at the above telephone number for additional information regarding visiting the Resource Room. Please note: The Department's Freedom of Information Reading Room (formerly Room 1E–190 at the Forrestal Building) is no longer housing rulemaking materials.

FOR FURTHER INFORMATION CONTACT: Michael Raymond, Project Manager, Energy Conservation Standards for Central Air Conditioners and Heat Pumps, Docket No. EERM–440, EE–2J/Forrestal Building, U.S. Department of Energy, Office of Building Technologies, EE–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121, (202) 586–9611. E-mail: *michael.raymond@ee.doe.gov*.

SUPPLEMENTARY INFORMATION:

I. Background

The National Appliance Energy Conservation Act of 1987 (NAECA) (Pub. L. 100–12) established energy efficiency standards for various consumer products, including residential central air conditioners, and directed DOE to undertake periodic rulemakings to decide whether to amend those standards. NAECA also amended the Energy Policy and Conservation Act (EPCA) to provide, in section 325(o)(1), that when DOE reviews efficiency standards, it ''may not prescribe any amended standard which increases the maximum allowable energy use * * * or decreases the minimum required energy efficiency'' of a covered product (42 U.S.C. 6295(o)(1)).

On January 22, 2001, DOE published a rule in the **Federal Register** amending the efficiency standard for central air conditioners established by NAECA by increasing the standard from 10 to 13 SEER (''seasonal energy efficiency ratio''), a 30% increase in energy efficiency. 66 FR 7170. The rule stated it would become effective on February 21, 2001, but manufacturers' products would not have to meet the 13 SEER standard until January 23, 2006. On January 24, 2001, the President's Chief of Staff issued a memorandum asking Executive Branch agencies to review ongoing rulemaking proceedings and to postpone the effective dates of any new regulations already published in the **Federal Register** but not yet effective, pending completion of such review. DOE accordingly issued a rule delaying the effective date of the central air conditioner rule published on January 22, 2001, in order to conduct that review. 66 FR 8745. DOE also received a petition from the Air-Conditioning and Refrigeration Institute (ARI), an association of air conditioner manufacturers, asking DOE to reconsider the 13 SEER standard. On May 23, 2002, DOE withdrew the 13 SEER rule and promulgated a new rule establishing a 12 SEER efficiency standard, a 20% increase in energy efficiency. 67 FR 36368.

The Natural Resources Defense Council (NRDC) and various public interest groups, joined by several state Attorneys General, filed suit in federal district court, and alternatively in the U.S. Court of Appeals for the Second Circuit, challenging DOE's withdrawal of the 13 SEER rule and promulgation of the 12 SEER standard. Among other things, they alleged that section 325(o)(1) of EPCA precluded DOE from adopting the 12 SEER rule.

On January 13, 2004, the U.S. Court of Appeals for the Second Circuit decided that once DOE published the 13 SEER rule for central air conditioners in the **Federal Register**, DOE was precluded from subsequently adopting a lower standard for those products. Thus, DOE's actions of withdrawing the 13 SEER standard and promulgating the 12 SEER standard violated section 325(o)(1). *Natural Resources Defense*

Council, et al. v. *Abraham,* 355 F.3d 179 (2nd Cir. 2004). The court's written opinion disclaimed any intent to affect a challenge to the 13 SEER standard that ARI and certain manufacturers had filed in the U.S. Court of Appeals for the Fourth Circuit. Nonetheless, ARI and the manufacturers who joined it in the Fourth Circuit lawsuit subsequently withdrew their challenge to the 13 SEER rule, citing the need for regulatory certainty.

On April 2, 2004, DOE publicly announced that, in the interest of giving all affected persons regulatory certainty, DOE would not appeal or seek further review of the ruling of the U.S. Court of Appeals for the Second Circuit. As a result, the 13 SEER standard will apply to covered conventional central air conditioners and central air conditioning heat pumps manufactured on or after January 23, 2006. Today's technical amendment places those standards in the Code of Federal Regulations.

II. Summary of Today's Action

DOE is revising the energy conservation standards for split system and single package central air conditioners and central air conditioning heat pumps in 10 CFR 430.32(c)(2). The standards currently set forth in the Code of Federal Regulations are 12 SEER for split system and single package air conditioners, and 12 SEER, 7.4 HSPF (''heating system performance factor'') for split system and single package heat pumps. DOE is replacing these standards with the following standards established in the January 22, 2001 final rule: 13 SEER for split system and single package air conditioners, and 13 SEER, 7.7 HSPF for split system and single package heat pumps.

The January 22, 2001, final rule also established a separate product class of ''space constrained products,'' but it did not establish amended standard levels for those products. DOE explained in the preamble to the January 22, 2001, final rule that it was concerned that air conditioners and heat pumps intended to serve applications with severe space constraints would have difficulty in meeting the 13 SEER standard. 66 FR 7196. Therefore, DOE established a separate product class for space constrained products and reserved setting standard levels for that class pending completion of later rulemaking proceedings. Subsequently, in the rulemaking culminating in the May 23, 2002, final rule, DOE determined that 12 SEER was the appropriate standard level for all space constrained products except those with through-the-wall condensers, and the final rule established lower standards for through-the-wall products. 67 FR 36402–03, 36406. The standards established for space constrained products in the May 23, 2002, final rule are unaffected by the January 13, 2004, ruling of the U.S. Court of Appeals for the Second Circuit because the January 22, 2001, final rule set no standards for these products and, thus, section 325(o)(1) of EPCA does not affect the validity of the standards for these products that were published on May 23, 2002.

The May 23, 2002, final rule set forth a compliance date of January 23, 2006, for all of the efficiency standards promulgated in that rule, including the standards for space-constrained products. This is the same compliance date set forth in the January 22, 2001, final rule for the standards promulgated in that rule. The May 23, 2002, rule's preamble discussed why DOE was adopting the January 23, 2006, compliance date. 67 FR 36394. DOE recognized that by adopting that date, the time between publication of the May 23, 2002 rule and the compliance date would be less than the five-year interval provided in the statute (42 U.S.C. 6295(d)(3)(A)). DOE explained that when it cannot meet a statutory deadline to promulgate a rule (as was the case with the products covered by the January 22, 2001, and May 23, 2002, final rules), it generally will adjust the date such rule becomes enforceable to allow for the same amount of lead time as provided in the statute, but that in special circumstances DOE will not follow that practice. DOE stated it would set the effective date for the standards adopted in the May 23, 2002, final rule at less than five years from the date of publication because all of the participants in the rulemaking, including representatives of the manufacturers who would have to comply with the standards and who had expressed a view about the matter, had agreed that five years of lead time was not needed for central air conditioner manufacturers to come into compliance with the standards adopted in the May 23, 2002, final rule. DOE stated, however, that if, as a result of unforeseen circumstances, a particular manufacturer could show hardship, inequity, or unfair distribution of burdens, the effective date would be subject to case-by-case exception pursuant to the authority of the DOE Office of Hearings and Appeals under section 504 of the Department of Energy Organization Act (42 U.S.C. 7194), as implemented at subpart B of 10 CFR part 1003.

DOE is today adding to § 430.2 the definition of ''space constrained product'' that was contained in the January 22, 2001, final rule and adding the following standard levels set in the May 23, 2002, final rule: 12 SEER for space constrained air conditioners, and 12 SEER, 7.4 HSPF for space constrained heat pumps. The standards for through-the-wall air conditioners and heat pumps, which fall within the definition of ''space constrained product,'' were set in the May 23, 2002, final rule, and are: 10.9 SEER, 7.1 HSPF for split systems and 10.6 SEER, 7.0 HSPF for single package systems. The definition of ''through-the-wall air conditioner and heat pump'' in § 430.2 provides that this product class exists only for products manufactured prior to January 23, 2010. After that date, the standards for space constrained products will apply to these through-the-wall air conditioners and heat pumps.

The January 22, 2001, final rule did not establish a separate product class for covered central air conditioners that are small duct, high velocity systems, and the rule did not establish separate standards for them; nor are these products ''space constrained products'' (*see* discussion at 66 FR 7197). Therefore, small duct, high velocity systems are covered by the 13 SEER standard. However, in the May 23, 2002, notice of final rulemaking, DOE explained that information obtained in the rulemaking proceeding indicated that the special characteristics of small duct, high velocity systems made it unlikely such systems could even meet the 12 SEER/7.4 HSPF standard established for conventional products. 67 FR 36396. As a result, DOE included the NAECA-prescribed values for small duct, high velocity systems in the Code of Federal Regulations pending a later rulemaking to establish appropriate standards for that product class. Because the Second Circuit's ruling prevents DOE from adopting a standard lower than 13 SEER for small duct, high velocity systems, despite DOE's later conclusion that it is unlikely such systems can meet even the lower 12 SEER standard, DOE has advised the two manufacturers of these systems of the procedure available to affected persons under section 504 of the Department of Energy Organization Act (42 U.S.C. 7194), which allows them to request relief from hardship or inequity caused by a regulation issued under EPCA.

Lastly, DOE is revising § 430.2 to remove several definitions that were included to implement DOE's interpretation of section 325(o)(1) of EPCA contained in the preamble of the May 23, 2002, final rule. Because its interpretation has been rejected by the U.S. Court of Appeals for the Second Circuit, DOE is removing the definitions of ''effective date,'' ''maximum allowable energy use,'' ''maximum allowable water use,'' and ''minimum required energy efficiency.''

III. Procedural Requirements

A. Public Comment

Section 553 of the Administrative Procedure Act (5 U.S.C. 553) generally requires agencies to provide notice and an opportunity for public comment on substantive rules. The requirement does not apply, however, if the agency determines that notice and opportunity for public comment is ''impracticable, unnecessary, or contrary to the public interest.'' DOE finds that good cause exists for dispensing with notice and opportunity for public comment in issuing today's rule because those procedures are unnecessary where, as here, the agency has no discretion in fashioning its rule. Today's final rule simply conforms the Code of Federal Regulations to the order of the U.S. Court of Appeals for the Second Circuit, and DOE has no discretion to deviate from the court's ruling. For this reason, DOE has characterized today's rule as a ''technical amendment'' in the Action line at the beginning of this notice of final rulemaking.

B. Review Under Executive Order 12866

The Office of Information and Regulatory Affairs of the Office of Management and Budget (OMB) has determined that today's regulatory action is a ''significant regulatory action'' under Executive Order 12866, ''Regulatory Planning and Review,'' 58 FR 51735 (October 4, 1993). Accordingly, DOE submitted today's notice to OMB for clearance under the Executive Order. OMB has completed its review.

C. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, ''Proper Consideration of Small Entities in Agency Rulemaking,'' 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the rulemaking process (68 FR 7990). DOE has made its procedures and policies available on the Office of General Counsel's Web site: *http://www.gc.doe.gov.* DOE today is simply revising the Code of Federal Regulations to comply with the order of the U.S. Court of Appeals for the Second Circuit. Because the energy conservation standards in this rule were established in prior final rules that have taken effect, today's rule does not establish any new requirements for any entity. On this basis, DOE certifies that this final rule will not have a significant economic impact on a substantial number of small entities.

D. Review Under the Paperwork Reduction Act

This rulemaking will impose no new information or recordkeeping requirements. Accordingly, OMB clearance is not required under the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*).

E. Review Under the National Environmental Policy Act

DOE has determined that this rule falls into a class of actions that are categorically excluded from review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*) and the Department's implementing regulations at 10 CFR part 1021. This rule is a technical amendment that reinstates, pursuant to court order, amended energy conservation standards for central air conditioners and heat pumps that were published in the **Federal Register** on January 22, 2001. DOE has therefore determined that this rule is covered by the Categorical Exclusion in paragraph A6 to subpart D, 10 CFR part 1021, which applies to rulemakings that are strictly procedural. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

F. Review Under Executive Order 13132

Executive Order 13132, ''Federalism,'' 64 FR 43255 (August 4, 1999), imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations (65 FR 13735). DOE has examined today's final rule and has determined that it does not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. State regulations that may have existed on the products that are the subject of today's final rule were preempted by the Federal standards established in NAECA. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. No further action is required by Executive Order 13132.

G. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, ''Civil Justice Reform'' (61 FR 4729, February 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) Eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; and (3) provide a clear legal standard for affected conduct rather than a general standard and promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this final rule meets the relevant standards of Executive Order 12988.

H. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and tribal governments and the private sector. With respect to a proposed regulatory action that may result in the expenditure by State, local and tribal governments, in the aggregate, or by the private sector of $100 million or more (adjusted annually for inflation), section 202 of the Act requires a Federal agency to publish estimates of the resulting costs, benefits, and other effects on the national economy (2 U.S.C. 1532(a),(b)). The Act also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and tribal governments on a proposed ''significant intergovernmental mandate,'' and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under the Act (62 FR 12820) (also available at *http://www.gc.doe.gov*). The rule published today does not contain any Federal mandate; it only incorporates into the Code of Federal Regulations standards set forth in rules promulgated in 2001 and 2002.

I. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105–277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

J. Review Under Executive Order 12630

DOE has determined pursuant to Executive Order 12630, ''Governmental Actions and Interference with Constitutionally Protected Property Rights,'' 53 FR 8859 (March 18, 1988), that this regulation would not result in any takings which might require compensation under the Fifth Amendment to the United States Constitution.

K. Review Under the Treasury and General Government Appropriations Act, 2001

The Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516, note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (February 22, 2002), and DOE's guidelines were published at 67 FR 62446 (October 7, 2002). DOE has reviewed today's final rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

L. Review Under Executive Order 13211

Executive Order 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,'' 66 FR 28355 (May 22, 2001) requires Federal agencies to prepare and submit to the Office of Information and Regulatory Affairs (OIRA), Office of Management and Budget, a Statement of Energy Effects for any proposed significant energy action. A ''significant energy action'' is defined as any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that: (1) Is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use. Today's regulatory action would not have a significant adverse effect on the supply, distribution, or use of energy and, therefore, is not a significant energy action. Accordingly, DOE has not prepared a Statement of Energy Effects.

M. Congressional Notification

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of today's rule prior to its effective date. The report will state that it has been determined that the rule is not a ''major rule'' as defined by 5 U.S.C. 804(2).

N. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of today's rule.

List of Subjects in 10 CFR Part 430

Administrative practice and procedure, Energy conservation, Household appliances.

Issued in Washington, DC, on August 4, 2004.

David K. Garman,

Assistant Secretary, Energy Efficiency and Renewable Energy.

■ For the reasons set forth in the preamble, Part 430 of Chapter II of Title 10, Code of Federal Regulations, is amended as set forth below:

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

■ 1. The authority citation for part 430 continues to read as follows:

Authority: 42 U.S.C. 6291–6309; 28 U.S.C. 2461 note.

■ 2. Section 430.2 is amended by:
■ a. Removing the definitions for ''effective date,'' ''maximum allowable energy use,'' ''maximum allowable water use,'' and ''minimum required energy efficiency''; and
■ b. Adding a definition of ''space constrained product'' in alphabetical order to read as follows:

§ 430.2 Definitions.

* * * * *

Space constrained product means a central air conditioner or heat pump:

(1) That has rated cooling capacities no greater than 30,000 BTU/hr;

(2) That has an outdoor or indoor unit having at least two overall exterior dimensions or an overall displacement that:

(i) Is substantially smaller than those of other units that are:

(A) Currently usually installed in site-built single family homes; and

(B) Of a similar cooling, and, if a heat pump, heating capacity; and

(ii) If increased, would certainly result in a considerable increase in the usual cost of installation or would certainly result in a significant loss in the utility of the product to the consumer; and

(3) Of a product type that was available for purchase in the United States as of December 1, 2000.

* * * * *

■ 3. Section 430.32 of subpart C is amended by revising paragraph (c)(2) to read as follows:

§ 430.32 Energy and water conservation standards and effective dates.

* * * * *

(c) * * *

(2) Central air conditioners and central air conditioning heat pumps manufactured on or after January 23,

2006, shall have Seasonal Energy Efficiency Ratio and Heating Seasonal Performance Factor no less than:

Product class	Seasonal energy efficiency ratio (SEER)	Heating seasonal performance factor (HSPF)
(i) Split system air conditioners	13	
(ii) Split system heat pumps	13	7.7
(iii) Single package air conditioners	13	
(iv) Single package heat pumps	13	7.7
(v)(A) Through-the-wall air conditioners and heat pumps-split system [1]	10.9	7.1
(v)(B) Through-the-wall air conditioners and heat pumps-single package [1]	10.6	7.0
(vi) Small duct, high velocity systems	13	7.7
(vii)(A) Space constrained products-air conditioners	12	
(vii)(B) Space constrained products-heat pumps	12	7.4

[1] As defined in § 430.2, this product class applies to products manufactured prior to January 23, 2010.

* * * * *

[FR Doc. 04–18533 Filed 8–16–04; 8:45 am]

BILLING CODE 6450–01–P

FEDERAL RESERVE SYSTEM

12 CFR Part 201

[Regulation A]

Extensions of Credit by Federal Reserve Banks

AGENCY: Board of Governors of the Federal Reserve System.

ACTION: Final rule.

SUMMARY: The Board of Governors of the Federal Reserve System (Board) has adopted final amendments to its Regulation A to reflect the Board's approval of an increase in the primary credit rate at each Federal Reserve Bank. The secondary credit rate at each Reserve Bank automatically increased by formula as a result of the Board's primary credit rate action.

DATES: The amendments to part 201 (Regulation A) are effective August 17, 2004. The rate changes for primary and secondary credit were effective on the dates specified in 12 CFR 201.51, as amended.

FOR FURTHER INFORMATION CONTACT: Jennifer J. Johnson, Secretary of the Board (202/452–3259); for users of Telecommunication Devices for the Deaf (TDD) only, contact 202/263–4869.

SUPPLEMENTARY INFORMATION: The Federal Reserve Banks make primary and secondary credit available to depository institutions as a backup source of funding on a short-term basis, usually overnight. The primary and secondary credit rates are the interest rates that the twelve Federal Reserve Banks charge for extensions of credit under these programs. In accordance with the Federal Reserve Act, the primary and secondary credit rates are established by the boards of directors of the Federal Reserve Banks, subject to the review and determination of the Board.

The Board approved requests by the Reserve Banks to increase by 25 basis points the primary credit rate in effect at each of the twelve Federal Reserve Banks, thereby increasing from 2.25 percent to 2.50 percent the rate that each Reserve Bank charges for extensions of primary credit. As a result of the Board's action on the primary credit rate, the rate that each Reserve Bank charges for extensions of secondary credit automatically increased from 2.75 percent to 3.00 percent under the secondary credit rate formula. The final amendments to Regulation A reflect these rate changes.

The 25-basis-point increase in the primary credit rate was associated with a similar increase in the target for the federal funds rate (from 1.25 percent to 1.50 percent) approved by the Federal Open Market Committee (Committee) and announced at the same time. A press release announcing these actions indicated that:

> The Committee believes that, even after this action, the stance of monetary policy remains accommodative and, coupled with robust underlying growth in productivity, is providing ongoing support to economic activity. In recent months, output growth has moderated and the pace of improvement in labor market conditions has slowed. This softness likely owes importantly to the substantial rise in energy prices. The economy nevertheless appears poised to resume a stronger pace of expansion going forward. Inflation has been somewhat elevated this year, though a portion of the rise in prices seems to reflect transitory factors.
>
> The Committee perceives the upside and downside risks to the attainment of both sustainable growth and price stability for the next few quarters are roughly equal. With underlying inflation still expected to be relatively low, the Committee believes that policy accommodation can be removed at a pace that is likely to be measured. Nonetheless, the Committee will respond to changes in economic prospects as needed to fulfill its obligation to maintain price stability.

Regulatory Flexibility Act Certification

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 605(b)), the Board certifies that the new primary and secondary credit rates will not have a significantly adverse economic impact on a substantial number of small entities because the final rule does not impose any additional requirements on entities affected by the regulation.

Administrative Procedure Act

The Board did not follow the provisions of 5 U.S.C. 553(b) relating to notice and public participation in connection with the adoption of these amendments because the Board for good cause determined that delaying implementation of the new primary and secondary credit rates in order to allow notice and public comment would be unnecessary and contrary to the public interest in fostering price stability and sustainable economic growth. For these same reasons, the Board also has not provided 30 days prior notice of the effective date of the rule under section 553(d).

12 CFR Chapter II

List of Subjects in 12 CFR Part 201

Banks, Banking, Federal Reserve System, Reporting and recordkeeping.

Authority and Issuance

■ For the reasons set forth in the preamble, the Board is amending 12 CFR Chapter II to read as follows:

Rules and Regulations

Federal Register

Vol. 76, No. 210

Monday, October 31, 2011

DEPARTMENT OF ENERGY

10 CFR Part 430

[Docket Number EERE–2011–BT–STD–0011]

RIN 1904–AC06

Energy Conservation Program: Energy Conservation Standards for Residential Furnaces and Residential Central Air Conditioners and Heat Pumps

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Notice of effective date and compliance dates for direct final rule.

SUMMARY: The U.S. Department of Energy (DOE) published a direct final rule to establish amended energy conservation standards for residential furnaces and residential central air conditioners and heat pumps in the **Federal Register** on June 27, 2011. DOE has determined that the adverse comments received in response to the direct final rule do not provide a reasonable basis for withdrawing the direct final rule. Therefore, DOE provides this notice confirming adoption of the energy conservation standards for residential furnaces and residential central air conditioners and heat pumps established in the direct final rule and announcing the effective date of those standards.

DATES: The direct final rule published on June 27, 2011 (76 FR 37408) became effective on October 25, 2011. Compliance with the standards in the direct final rule will be required on May 1, 2013 for non-weatherized furnaces and on January 1, 2015 for weatherized furnaces and central air conditioners and heat pumps.

ADDRESSES: The docket is available for review at *http://www.regulations.gov*, including **Federal Register** notices, framework documents, public meeting attendee lists and transcripts, comments, and other supporting documents/materials. All documents in the docket are listed in the *http://www.regulations.gov* index. Not all documents listed in the index may be publicly available, such as information that is exempt from public disclosure. A link to the docket Web page can be found at *http://www.regulations.gov*.

FOR FURTHER INFORMATION CONTACT:
Mr. Mohammed Khan (furnaces) or Mr. Wesley Anderson (central air conditioners and heat pumps), U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE–2J, 1000 Independence Avenue SW., Washington, DC 20585–0121. Telephone: (202) 586–7892 or (202) 586–7335. E-mail: *Mohammed.Khan@ee.doe.gov* or *Wes.Anderson@ee.doe.gov*.

Mr. Eric Stas or Ms. Jennifer Tiedeman, U.S. Department of Energy, Office of the General Counsel, GC–71, 1000 Independence Avenue SW., Washington, DC 20585–0121. Telephone: (202) 586–9507 or (202) 287–6111. Email: *Eric.Stas@hq.doe.gov* or *Jennifer.Tiedeman@hq.doe.gov*.

For further information on how to submit or review public comments or view hard copies of the docket, contact Ms. Brenda Edwards at (202) 586–2945 or email: *Brenda.Edwards@ee.doe.gov*.

SUPPLEMENTARY INFORMATION:

I. Authority and Rulemaking Background

The Energy Policy and Conservation Act of 1975 (EPCA; 42 U.S.C. 6291–6309, as codified), as amended, authorizes DOE to issue a direct final rule (DFR) establishing an energy conservation standard on receipt of a statement submitted jointly by interested persons that are fairly representative of relevant points of view (including representatives of manufacturers of covered products, States, and efficiency advocates) as determined by the Secretary of Energy (Secretary). EPCA further requires that a statement contain recommendations with respect to an energy conservation standard that are in accordance with the provisions of 42 U.S.C. 6295(o). A notice of proposed rulemaking (NOPR) that proposes an identical energy conservation standard must be published simultaneously with the final rule, and DOE must provide a public comment period of at least 110 days on the direct final rule. 42 U.S.C. 6295(p)(4). Not later than 120 days after issuance of the direct final rule, if one or more adverse comments or an alternative joint recommendation are received relating to the direct final rule, the Secretary must determine whether the comments or alternative recommendation may provide a reasonable basis for withdrawal under 42 U.S.C. 6295(o) or other applicable law. If the Secretary makes such a determination, DOE must withdraw the direct final rule and proceed with the simultaneously published NOPR. DOE must publish in the **Federal Register** the reasons why the direct final rule was withdrawn. *Id.*

During the rulemaking proceeding to consider amending energy conservation standards for residential furnaces and residential central air conditioners and heat pumps, DOE received the "Agreement on Legislative and Regulatory Strategy for Amending Federal Energy Efficiency Standards, Test Procedures, Metrics and Building Code Provisions for Residential Central Air Conditioners, Heat Pumps, Weatherized and Non-Weatherized Furnaces and Related Matters" (the "Joint Petition" or "Consensus Agreement"), a comment submitted by representatives of the American Heating and Refrigeration Institute (AHRI), American Council for an Energy-Efficient Economy (ACEEE), Alliance to Save Energy (ASE), Natural Resources Defense Council (NRDC), Appliance Standard Awareness Project (ASAP), Northeast Energy Efficiency Partnerships (NEEP), Northwest Power and Conservation Council (NPCC), California Energy Commission (CEC), Bard Manufacturing Company Inc., Carrier Residential and Light Commercial Systems, Goodman Global Inc., Lennox Residential, Mitsubishi Electric & Electronics USA, National Comfort Products, Rheem Manufacturing Company, and Trane Residential (collectively, the "Joint Petitioners"). This collective set of comments [1] recommends specific energy conservation standards for residential furnaces, central air conditioners, and

[1] DOE Docket No. EERE–2011–BT–STD–0011, Comment 16.

Federal Register / Vol. 69, No. 158 / Tuesday, August 17, 2004 / Rules and Regulations 50999

interpretation has been rejected by the U.S. Court of Appeals for the Second Circuit, DOE is removing the definitions of "effective date," "maximum allowable energy use," "maximum allowable water use," and "minimum required energy efficiency."

III. Procedural Requirements

A. Public Comment

Section 553 of the Administrative Procedure Act (5 U.S.C. 553) generally requires agencies to provide notice and an opportunity for public comment on substantive rules. The requirement does not apply, however, if the agency determines that notice and opportunity for public comment is "impracticable, unnecessary, or contrary to the public interest." DOE finds that good cause exists for dispensing with notice and opportunity for public comment in issuing today's rule because those procedures are unnecessary where, as here, the agency has no discretion in fashioning its rule. Today's final rule simply conforms the Code of Federal Regulations to the order of the U.S. Court of Appeals for the Second Circuit, and DOE has no discretion to deviate from the court's ruling. For this reason, DOE has characterized today's rule as a "technical amendment" in the Action line at the beginning of this notice of final rulemaking.

B. Review Under Executive Order 12866

The Office of Information and Regulatory Affairs of the Office of Management and Budget (OMB) has determined that today's regulatory action is a "significant regulatory action" under Executive Order 12866, "Regulatory Planning and Review," 58 FR 51735 (October 4, 1993). Accordingly, DOE submitted today's notice to OMB for clearance under the Executive Order. OMB has completed its review.

C. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, "Proper Consideration of Small Entities in Agency Rulemaking," 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the rulemaking process (68 FR 7990). DOE has made its procedures and policies available on the Office of General Counsel's Web site: *http://www.gc.doe.gov.* DOE today is simply revising the Code of Federal Regulations to comply with the order of the U.S. Court of Appeals for the Second Circuit. Because the energy conservation standards in this rule were established in prior final rules that have taken effect, today's rule does not establish any new requirements for any entity. On this basis, DOE certifies that this final rule will not have a significant economic impact on a substantial number of small entities.

D. Review Under the Paperwork Reduction Act

This rulemaking will impose no new information or recordkeeping requirements. Accordingly, OMB clearance is not required under the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*).

E. Review Under the National Environmental Policy Act

DOE has determined that this rule falls into a class of actions that are categorically excluded from review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*) and the Department's implementing regulations at 10 CFR part 1021. This rule is a technical amendment that reinstates, pursuant to court order, amended energy conservation standards for central air conditioners and heat pumps that were published in the **Federal Register** on January 22, 2001. DOE has therefore determined that this rule is covered by the Categorical Exclusion in paragraph A6 to subpart D, 10 CFR part 1021, which applies to rulemakings that are strictly procedural. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

F. Review Under Executive Order 13132

Executive Order 13132, "Federalism," 64 FR 43255 (August 4, 1999), imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations (65 FR 13735). DOE has examined today's final rule and has determined that it does not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. State regulations that may have existed on the products that are the subject of today's final rule were preempted by the Federal standards established in NAECA. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. No further action is required by Executive Order 13132.

G. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, "Civil Justice Reform" (61 FR 4729, February 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) Eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; and (3) provide a clear legal standard for affected conduct rather than a general standard and promote simplification and burden reduction. Section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this final rule meets the relevant standards of Executive Order 12988.

H. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and tribal governments and the private sector. With respect to a proposed regulatory action that may result in the expenditure by State, local and tribal governments, in the aggregate, or by the private sector of $100 million or more (adjusted annually for inflation), section 202 of the Act requires a Federal agency to publish estimates of the resulting costs, benefits, and other effects on the national economy (2 U.S.C. 1532(a),(b)). The Act also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and tribal governments on a proposed "significant intergovernmental mandate," and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under the Act (62 FR 12820) (also available at *http://www.gc.doe.gov*). The rule published today does not contain any Federal mandate; it only incorporates into the Code of Federal Regulations standards set forth in rules promulgated in 2001 and 2002.

I. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105–277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

J. Review Under Executive Order 12630

DOE has determined pursuant to Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights," 53 FR 8859 (March 18, 1988), that this regulation would not result in any takings which might require compensation under the Fifth Amendment to the United States Constitution.

K. Review Under the Treasury and General Government Appropriations Act, 2001

The Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516, note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (February 22, 2002), and DOE's guidelines were published at 67 FR 62446 (October 7, 2002). DOE has reviewed today's final rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

L. Review Under Executive Order 13211

Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," 66 FR 28355 (May 22, 2001) requires Federal agencies to prepare and submit to the Office of Information and Regulatory Affairs (OIRA), Office of Management and Budget, a Statement of Energy Effects for any proposed significant energy action. A "significant energy action" is defined as any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that: (1) Is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use. Today's regulatory action would not have a significant adverse effect on the supply, distribution, or use of energy and, therefore, is not a significant energy action. Accordingly, DOE has not prepared a Statement of Energy Effects.

M. Congressional Notification

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of today's rule prior to its effective date. The report will state that it has been determined that the rule is not a "major rule" as defined by 5 U.S.C. 804(2).

N. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of today's rule.

List of Subjects in 10 CFR Part 430

Administrative practice and procedure, Energy conservation, Household appliances.

Issued in Washington, DC, on August 4, 2004.

David K. Garman,

Assistant Secretary, Energy Efficiency and Renewable Energy.

■ For the reasons set forth in the preamble, Part 430 of Chapter II of Title 10, Code of Federal Regulations, is amended as set forth below:

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

■ 1. The authority citation for part 430 continues to read as follows:

Authority: 42 U.S.C. 6291–6309; 28 U.S.C. 2461 note.

■ 2. Section 430.2 is amended by:
■ a. Removing the definitions for "effective date," "maximum allowable energy use," "maximum allowable water use," and "minimum required energy efficiency"; and
■ b. Adding a definition of "space constrained product" in alphabetical order to read as follows:

§ 430.2 Definitions.

* * * * *

Space constrained product means a central air conditioner or heat pump:

(1) That has rated cooling capacities no greater than 30,000 BTU/hr;

(2) That has an outdoor or indoor unit having at least two overall exterior dimensions or an overall displacement that:

(i) Is substantially smaller than those of other units that are:

(A) Currently usually installed in site-built single family homes; and

(B) Of a similar cooling, and, if a heat pump, heating capacity; and

(ii) If increased, would certainly result in a considerable increase in the usual cost of installation or would certainly result in a significant loss in the utility of the product to the consumer; and

(3) Of a product type that was available for purchase in the United States as of December 1, 2000.

* * * * *

■ 3. Section 430.32 of subpart C is amended by revising paragraph (c)(2) to read as follows:

§ 430.32 Energy and water conservation standards and effective dates.

* * * * *

(c) * * *

(2) Central air conditioners and central air conditioning heat pumps manufactured on or after January 23,

2006, shall have Seasonal Energy Efficiency Ratio and Heating Seasonal Performance Factor no less than:

Product class	Seasonal energy efficiency ratio (SEER)	Heating seasonal performance factor (HSPF)
(i) Split system air conditioners	13	
(ii) Split system heat pumps	13	7.7
(iii) Single package air conditioners	13	
(iv) Single package heat pumps	13	7.7
(v)(A) Through-the-wall air conditioners and heat pumps-split system [1]	10.9	7.1
(v)(B) Through-the-wall air conditioners and heat pumps-single package [1]	10.6	7.0
(vi) Small duct, high velocity systems	13	7.7
(vii)(A) Space constrained products-air conditioners	12	
(vii)(B) Space constrained products-heat pumps	12	7.4

[1] As defined in § 430.2, this product class applies to products manufactured prior to January 23, 2010.

* * * * *

[FR Doc. 04–18533 Filed 8–16–04; 8:45 am]

BILLING CODE 6450–01–P

FEDERAL RESERVE SYSTEM

12 CFR Part 201

[Regulation A]

Extensions of Credit by Federal Reserve Banks

AGENCY: Board of Governors of the Federal Reserve System.

ACTION: Final rule.

SUMMARY: The Board of Governors of the Federal Reserve System (Board) has adopted final amendments to its Regulation A to reflect the Board's approval of an increase in the primary credit rate at each Federal Reserve Bank. The secondary credit rate at each Reserve Bank automatically increased by formula as a result of the Board's primary credit rate action.

DATES: The amendments to part 201 (Regulation A) are effective August 17, 2004. The rate changes for primary and secondary credit were effective on the dates specified in 12 CFR 201.51, as amended.

FOR FURTHER INFORMATION CONTACT: Jennifer J. Johnson, Secretary of the Board (202/452–3259); for users of Telecommunication Devices for the Deaf (TDD) only, contact 202/263–4869.

SUPPLEMENTARY INFORMATION: The Federal Reserve Banks make primary and secondary credit available to depository institutions as a backup source of funding on a short-term basis, usually overnight. The primary and secondary credit rates are the interest rates that the twelve Federal Reserve Banks charge for extensions of credit under these programs. In accordance with the Federal Reserve Act, the primary and secondary credit rates are established by the boards of directors of the Federal Reserve Banks, subject to the review and determination of the Board.

The Board approved requests by the Reserve Banks to increase by 25 basis points the primary credit rate in effect at each of the twelve Federal Reserve Banks, thereby increasing from 2.25 percent to 2.50 percent the rate that each Reserve Bank charges for extensions of primary credit. As a result of the Board's action on the primary credit rate, the rate that each Reserve Bank charges for extensions of secondary credit automatically increased from 2.75 percent to 3.00 percent under the secondary credit rate formula. The final amendments to Regulation A reflect these rate changes.

The 25-basis-point increase in the primary credit rate was associated with a similar increase in the target for the federal funds rate (from 1.25 percent to 1.50 percent) approved by the Federal Open Market Committee (Committee) and announced at the same time. A press release announcing these actions indicated that:

> The Committee believes that, even after this action, the stance of monetary policy remains accommodative and, coupled with robust underlying growth in productivity, is providing ongoing support to economic activity. In recent months, output growth has moderated and the pace of improvement in labor market conditions has slowed. This softness likely owes importantly to the substantial rise in energy prices. The economy nevertheless appears poised to resume a stronger pace of expansion going forward. Inflation has been somewhat elevated this year, though a portion of the rise in prices seems to reflect transitory factors.
>
> The Committee perceives the upside and downside risks to the attainment of both sustainable growth and price stability for the next few quarters are roughly equal. With underlying inflation still expected to be relatively low, the Committee believes that policy accommodation can be removed at a pace that is likely to be measured. Nonetheless, the Committee will respond to changes in economic prospects as needed to fulfill its obligation to maintain price stability.

Regulatory Flexibility Act Certification

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 605(b)), the Board certifies that the new primary and secondary credit rates will not have a significantly adverse economic impact on a substantial number of small entities because the final rule does not impose any additional requirements on entities affected by the regulation.

Administrative Procedure Act

The Board did not follow the provisions of 5 U.S.C. 553(b) relating to notice and public participation in connection with the adoption of these amendments because the Board for good cause determined that delaying implementation of the new primary and secondary credit rates in order to allow notice and public comment would be unnecessary and contrary to the public interest in fostering price stability and sustainable economic growth. For these same reasons, the Board also has not provided 30 days prior notice of the effective date of the rule under section 553(d).

12 CFR Chapter II

List of Subjects in 12 CFR Part 201

Banks, Banking, Federal Reserve System, Reporting and recordkeeping.

Authority and Issuance

■ For the reasons set forth in the preamble, the Board is amending 12 CFR Chapter II to read as follows:

Therefore, for the reasons given in the interim rule and in this document, we are adopting the interim rule as a final rule without change.

This action also affirms the information contained in the interim rule concerning Executive Order 12866 and the Regulatory Flexibility Act, Executive Orders 12372 and 12988, and the Paperwork Reduction Act.

Further, for this action, the Office of Management and Budget has waived its review under Executive Order 12866.

List of Subjects in 7 CFR Part 301

Agricultural commodities, Plant diseases and pests, Quarantine, Reporting and recordkeeping requirements, Transportation.

PART 301—DOMESTIC QUARANTINE NOTICES

■ Accordingly, we are adopting as a final rule, without change, the interim rule that amended 7 CFR part 301 and that was published at 68 FR 43286–43287 on July 22, 2003.

Authority: 7 U.S.C. 7701–7772; 7 CFR 2.22, 2.80, and 371.3.

Section 301.75–15 also issued under Sec. 204, Title II, Pub. L. 106–113, 113 Stat. 1501A–293; sections 301.75–15 and 301.75–16 also issued under Sec. 203, Title II, Pub. L. 106–224, 114 Stat. 400 (7 U.S.C. 1421 note).

Done in Washington, DC, this 11th day of August 2004.

W. Ron DeHaven,

Administrator, Animal and Plant Health Inspection Service.

[FR Doc. 04–18784 Filed 8–16–04; 8:45 am]

BILLING CODE 3410–34–P

DEPARTMENT OF ENERGY

Office of Energy Efficiency and Renewable Energy

10 CFR Part 430

[Docket Number EE–RM–98–440]

RIN 1904–AB46

Energy Conservation Program for Consumer Products; Central Air Conditioners and Heat Pumps Energy Conservation Standards

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Final rule; technical amendment.

SUMMARY: The Department of Energy (DOE) is revising the Code of Federal Regulations to incorporate certain energy conservation standards that will apply to residential central air conditioners and central air conditioning heat pumps beginning on January 23, 2006. More specifically, this technical amendment replaces standard levels currently in the Code of Federal Regulations, which were established by a final rule published by DOE on May 23, 2002, with standard levels that were set forth in a final rule published by DOE on January 22, 2001. As explained in the Supplementary Information section of this notice, the U.S. Court of Appeals for the Second Circuit has ruled that DOE's withdrawal of the rule published on January 22, 2001, was unlawful, and, therefore, that certain standards promulgated in the May 23, 2002, final rule are invalid. DOE has decided not to seek further review of that ruling. Consequently, DOE is now revising its regulations consistent with the court's ruling.

EFFECTIVE DATE: February 21, 2001.

ADDRESSES: For access to the docket to read background documents or comments received, go to *http://www.eere.energy.gov/buildings/appliance_standards/residential/ac_central.html* and/or visit the U.S. Department of Energy, Forrestal Building, Room 1J–018 (Resource Room of the Building Technologies Program), 1000 Independence Avenue, SW., Washington, DC, (202) 586–9127, between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays. Please call Ms. Brenda Edwards-Jones at the above telephone number for additional information regarding visiting the Resource Room. Please note: The Department's Freedom of Information Reading Room (formerly Room 1E–190 at the Forrestal Building) is no longer housing rulemaking materials.

FOR FURTHER INFORMATION CONTACT: Michael Raymond, Project Manager, Energy Conservation Standards for Central Air Conditioners and Heat Pumps, Docket No. EERM–440, EE–2J/ Forrestal Building, U.S. Department of Energy, Office of Building Technologies, EE–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121, (202) 586–9611. E-mail: *michael.raymond@ee.doe.gov.*

SUPPLEMENTARY INFORMATION:

I. Background

The National Appliance Energy Conservation Act of 1987 (NAECA) (Pub. L. 100–12) established energy efficiency standards for various consumer products, including residential central air conditioners, and directed DOE to undertake periodic rulemakings to decide whether to amend those standards. NAECA also amended the Energy Policy and Conservation Act (EPCA) to provide, in section 325(o)(1), that when DOE reviews efficiency standards, it "may not prescribe any amended standard which increases the maximum allowable energy use * * * or decreases the minimum required energy efficiency" of a covered product (42 U.S.C. 6295(o)(1)).

On January 22, 2001, DOE published a rule in the **Federal Register** amending the efficiency standard for central air conditioners established by NAECA by increasing the standard from 10 to 13 SEER ("seasonal energy efficiency ratio"), a 30% increase in energy efficiency. 66 FR 7170. The rule stated it would become effective on February 21, 2001, but manufacturers' products would not have to meet the 13 SEER standard until January 23, 2006. On January 24, 2001, the President's Chief of Staff issued a memorandum asking Executive Branch agencies to review ongoing rulemaking proceedings and to postpone the effective dates of any new regulations already published in the **Federal Register** but not yet effective, pending completion of such review. DOE accordingly issued a rule delaying the effective date of the central air conditioner rule published on January 22, 2001, in order to conduct that review. 66 FR 8745. DOE also received a petition from the Air-Conditioning and Refrigeration Institute (ARI), an association of air conditioner manufacturers, asking DOE to reconsider the 13 SEER standard. On May 23, 2002, DOE withdrew the 13 SEER rule and promulgated a new rule establishing a 12 SEER efficiency standard, a 20% increase in energy efficiency. 67 FR 36368.

The Natural Resources Defense Council (NRDC) and various public interest groups, joined by several state Attorneys General, filed suit in federal district court, and alternatively in the U.S. Court of Appeals for the Second Circuit, challenging DOE's withdrawal of the 13 SEER rule and promulgation of the 12 SEER standard. Among other things, they alleged that section 325(o)(1) of EPCA precluded DOE from adopting the 12 SEER rule.

On January 13, 2004, the U.S. Court of Appeals for the Second Circuit decided that once DOE published the 13 SEER rule for central air conditioners in the **Federal Register**, DOE was precluded from subsequently adopting a lower standard for those products. Thus, DOE's actions of withdrawing the 13 SEER standard and promulgating the 12 SEER standard violated section 325(o)(1). *Natural Resources Defense*

Rules and Regulations

Federal Register

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Monday, October 31, 2011

DEPARTMENT OF ENERGY

10 CFR Part 430

[Docket Number EERE–2011–BT–STD–0011]

RIN 1904–AC06

Energy Conservation Program: Energy Conservation Standards for Residential Furnaces and Residential Central Air Conditioners and Heat Pumps

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Notice of effective date and compliance dates for direct final rule.

SUMMARY: The U.S. Department of Energy (DOE) published a direct final rule to establish amended energy conservation standards for residential furnaces and residential central air conditioners and heat pumps in the **Federal Register** on June 27, 2011. DOE has determined that the adverse comments received in response to the direct final rule do not provide a reasonable basis for withdrawing the direct final rule. Therefore, DOE provides this notice confirming adoption of the energy conservation standards for residential furnaces and residential central air conditioners and heat pumps established in the direct final rule and announcing the effective date of those standards.

DATES: The direct final rule published on June 27, 2011 (76 FR 37408) became effective on October 25, 2011. Compliance with the standards in the direct final rule will be required on May 1, 2013 for non-weatherized furnaces and on January 1, 2015 for weatherized furnaces and central air conditioners and heat pumps.

ADDRESSES: The docket is available for review at *http://www.regulations.gov,* including **Federal Register** notices, framework documents, public meeting attendee lists and transcripts, comments, and other supporting documents/materials. All documents in the docket are listed in the *http://www.regulations.gov* index. Not all documents listed in the index may be publicly available, such as information that is exempt from public disclosure. A link to the docket Web page can be found at *http://www.regulations.gov.*

FOR FURTHER INFORMATION CONTACT:

Mr. Mohammed Khan (furnaces) or Mr. Wesley Anderson (central air conditioners and heat pumps), U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE–2J, 1000 Independence Avenue SW., Washington, DC 20585–0121. Telephone: (202) 586–7892 or (202) 586–7335. E-mail: *Mohammed.Khan@ee.doe.gov* or *Wes.Anderson@ee.doe.gov.*

Mr. Eric Stas or Ms. Jennifer Tiedeman, U.S. Department of Energy, Office of the General Counsel, GC–71, 1000 Independence Avenue SW., Washington, DC 20585–0121. Telephone: (202) 586–9507 or (202) 287–6111. Email: *Eric.Stas@hq.doe.gov* or *Jennifer.Tiedeman@hq.doe.gov.*

For further information on how to submit or review public comments or view hard copies of the docket, contact Ms. Brenda Edwards at (202) 586–2945 or email: *Brenda.Edwards@ee.doe.gov.*

SUPPLEMENTARY INFORMATION:

I. Authority and Rulemaking Background

The Energy Policy and Conservation Act of 1975 (EPCA; 42 U.S.C. 6291–6309, as codified), as amended, authorizes DOE to issue a direct final rule (DFR) establishing an energy conservation standard on receipt of a statement submitted jointly by interested persons that are fairly representative of relevant points of view (including representatives of manufacturers of covered products, States, and efficiency advocates) as determined by the Secretary of Energy (Secretary). EPCA further requires that a statement contain recommendations with respect to an energy conservation standard that are in accordance with the provisions of 42 U.S.C. 6295(o). A notice of proposed rulemaking (NOPR) that proposes an identical energy conservation standard must be published simultaneously with the final rule, and DOE must provide a public comment period of at least 110 days on the direct final rule. 42 U.S.C. 6295(p)(4). Not later than 120 days after issuance of the direct final rule, if one or more adverse comments or an alternative joint recommendation are received relating to the direct final rule, the Secretary must determine whether the comments or alternative recommendation may provide a reasonable basis for withdrawal under 42 U.S.C. 6295(o) or other applicable law. If the Secretary makes such a determination, DOE must withdraw the direct final rule and proceed with the simultaneously published NOPR. DOE must publish in the **Federal Register** the reasons why the direct final rule was withdrawn. *Id.*

During the rulemaking proceeding to consider amending energy conservation standards for residential furnaces and residential central air conditioners and heat pumps, DOE received the ''Agreement on Legislative and Regulatory Strategy for Amending Federal Energy Efficiency Standards, Test Procedures, Metrics and Building Code Provisions for Residential Central Air Conditioners, Heat Pumps, Weatherized and Non-Weatherized Furnaces and Related Matters'' (the ''Joint Petition'' or ''Consensus Agreement''), a comment submitted by representatives of the American Heating and Refrigeration Institute (AHRI), American Council for an Energy-Efficient Economy (ACEEE), Alliance to Save Energy (ASE), Natural Resources Defense Council (NRDC), Appliance Standard Awareness Project (ASAP), Northeast Energy Efficiency Partnerships (NEEP), Northwest Power and Conservation Council (NPCC), California Energy Commission (CEC), Bard Manufacturing Company Inc., Carrier Residential and Light Commercial Systems, Goodman Global Inc., Lennox Residential, Mitsubishi Electric & Electronics USA, National Comfort Products, Rheem Manufacturing Company, and Trane Residential (collectively, the ''Joint Petitioners''). This collective set of comments [1] recommends specific energy conservation standards for residential furnaces, central air conditioners, and

[1] DOE Docket No. EERE–2011–BT–STD–0011, Comment 16.

heat pumps that, in the commenters' view, would satisfy the EPCA requirements at 42 U.S.C. 6295(o). Numerous interested parties, including signatories of the Consensus Agreement, as well as other parties, expressed support for DOE adoption of the Consensus Agreement both at a public hearing and in written comments on the furnaces and central air conditioners rulemakings.

After careful consideration of the Consensus Agreement, the Secretary determined that it was submitted by interested persons who are fairly representative of relevant points of view on this matter. DOE noted in the direct final rule that Congress provided some guidance within the statute itself by specifying that representatives of manufacturers of covered products, States, and efficiency advocates are relevant parties to any consensus recommendation. (42 U.S.C. 6295(p)(4)(A)) As delineated above, the consensus agreement was signed and submitted by a broad cross-section of the manufacturers who produce the subject products, their trade associations, and environmental, energy efficiency, and consumer advocacy organizations. One State entity was a party to the Consensus Agreement, and no State expressed any opposition to the Consensus Agreement from the time of its submission to DOE through the close of the comment period on the direct final rule. Moreover, DOE stated in the direct final rule that it does not interpret the statute as requiring absolute agreement among all interested parties before DOE may proceed with issuance of a direct final rule. By explicit language of the statute, the Secretary has discretion to determine when a joint recommendation for an energy or water conservation standard has met the requirement for representativeness (*i.e.,* ''as determined by the Secretary''). Accordingly, DOE determined that the consensus agreement was made and submitted by interested persons fairly representative of relevant points of view.

Pursuant to 42 U.S.C. 6295(p)(4), the Secretary must also determine whether a jointly submitted recommendation for an energy or water conservation standard is in accordance with 42 U.S.C. 6295(o) or 42 U.S.C. 6313(a)(6)(B), as applicable. As stated in the direct final rule, this determination is exactly the type of analysis DOE conducts whenever it considers potential energy conservation standards pursuant to EPCA. DOE applies the same principles to any consensus recommendations it may receive to satisfy its statutory obligation to ensure that any energy conservation standard that it adopts achieves the maximum improvement in energy efficiency that is technologically feasible and economically justified and will result in significant conservation of energy. Upon review, the Secretary determined that the Consensus Agreement submitted in the instant rulemaking comports with the standard-setting criteria set forth under 42 U.S.C. 6295(o). Accordingly, the Consensus Agreement levels, included as trial standard level (TSL) 4 for both residential furnaces and residential central air conditioners and heat pumps, were adopted as the amended standard levels in the direct final rule.

In sum, as the relevant statutory criteria were satisfied, the Secretary adopted the amended energy conservation standards for residential furnaces and residential central air conditioners and heat pumps set forth in the direct final rule. These standards are set forth in Table I.1 and Table I.2. The standards apply to all products listed in Table I.1 and Table I.2 that are manufactured in, or imported into, the United States on or after May 1, 2013 for non-weatherized gas and oil-fired furnaces and mobile home furnaces and on or after January 1, 2015 for weatherized gas furnaces and central air conditioners and heat pumps. These compliance dates were set forth in the direct final rule published in the **Federal Register** on June 27, 2011. 76 FR 37408. For a detailed discussion of DOE's analysis of the benefits and burdens of the amended standards pursuant to the criteria set forth in EPCA, please see the direct final rule. 76 FR 37408 (June 27, 2011).

As required by EPCA, DOE also simultaneously published a NOPR proposing the identical standard levels contained in the direct final rule. As discussed in this section, DOE considered whether any adverse comment received during the 110-day comment period following the direct final rule provided a reasonable basis for withdrawal of the direct final rule and continuation of this rulemaking under the NOPR. As noted in the direct final rule, it is the substance, rather than the quantity, of comments that will ultimately determine whether a direct final rule will be withdrawn. To this end, DOE weighs the substance of any adverse comment(s) received against the anticipated benefits of the Consensus Agreement and the likelihood that further consideration of the comment(s) would change the results of the rulemaking. DOE notes that to the extent an adverse comment had been previously raised and addressed in the rulemaking proceeding, such a submission will not typically provide a basis for withdrawal of a direct final rule.

TABLE I.1—AMENDED ENERGY CONSERVATION STANDARDS FOR FURNACE, CENTRAL AIR CONDITIONER, AND HEAT PUMP ENERGY EFFICIENCY

Product class	National standards (percent)	Northern region ** standards (percent)
Residential Furnaces *		
Non-weatherized gas	AFUE = 80	AFUE = 90.
Mobile home gas	AFUE = 80	AFUE = 90.
Non-weatherized oil-fired	AFUE = 83	AFUE = 83.
Weatherized gas	AFUE = 81	AFUE = 81.
Mobile home oil-fired ‡‡	AFUE = 75	AFUE = 75.
Weatherized oil-fired ‡‡	AFUE = 78	AFUE = 78.
Electric‡‡	AFUE = 78	AFUE = 78.

Product class	National standards	Southeastern region ††	Southwestern region ‡ standards
Central Air Conditioners and Heat Pumps †			
Split-system air conditioners	SEER = 13	SEER = 14	SEER = 14. EER = 12.2 (for units with a rated cooling capacity less than 45,000 Btu/h). EER = 11.7 (for units with a rated cooling capacity equal to or greater than 45,000 Btu/h).
Split-system heat pumps	SEER = 14 HSPF = 8.2	SEER = 14 HSPF = 8.2	SEER = 14. HSPF = 8.2.
Single-package air conditioners ‡‡	SEER = 14	SEER = 14	SEER = 14. EER = 11.0.
Single-package heat pumps	SEER = 14 HSPF = 8.0	SEER = 14 HSPF = 8.0	SEER = 14. HSPF = 8.0.
Small-duct, high-velocity systems	SEER = 13 HSPF = 7.7	SEER = 13 HSPF = 7.7	SEER = 13. HSPF = 7.7.
Space-constrained products—air conditioners ‡‡	SEER = 12	SEER = 12	SEER = 12.
Space-constrained products—heat pumps ‡‡	SEER = 12 HSPF = 7.4	SEER = 12 HSPF = 7.4	SEER = 12. HSPF = 7.4.

* AFUE is annual fuel utilization efficiency.
** The Northern region for furnaces contains the following States: Alaska, Colorado, Connecticut, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, West Virginia, Wisconsin, and Wyoming.
† SEER is Seasonal Energy Efficiency Ratio; EER is Energy Efficiency Ratio; HSPF is Heating Seasonal Performance Factor; and Btu/h is British thermal units per hour.
†† The Southeastern region for central air conditioners and heat pumps contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.
‡ The Southwestern region for central air conditioners and heat pumps contains the States of Arizona, California, Nevada, and New Mexico.
‡‡ DOE is not amending energy conservation standards for these product classes in this rule.

TABLE I.2—AMENDED ENERGY CONSERVATION STANDARDS FOR FURNACE, CENTRAL AIR CONDITIONER, AND HEAT PUMP STANDBY MODE AND OFF MODE *

Product class	Standby mode and off mode standard levels
Residential Furnaces **	
Non-weatherized gas	$P_{W,SB}$ = 10 watts. $P_{W,OFF}$ = 10 watts.
Mobile home gas	$P_{W,SB}$ = 10 watts. $P_{W,OFF}$ = 10 watts.
Non-weatherized oil-fired	$P_{W,SB}$ = 11 watts. $P_{W,OFF}$ = 11 watts.
Mobile home oil-fired	$P_{W,SB}$ = 11 watts. $P_{W,OFF}$ = 11 watts.
Electric	$P_{W,SB}$ = 10 watts. $P_{W,OFF}$ = 10 watts.
Product class	**Off mode standard levels ††**
Central Air Conditioners and Heat Pumps ††	
Split-system air conditioners	$P_{W,OFF}$ = 30 watts.
Split-system heat pumps	$P_{W,OFF}$ = 33 watts.
Single-package air conditioners	$P_{W,OFF}$ = 30 watts.
Single-package heat pumps	$P_{W,OFF}$ = 33 watts.
Small-duct, high-velocity systems	$P_{W,OFF}$ = 30 watts.
Space-constrained air conditioners	$P_{W,OFF}$ = 30 watts.
Space-constrained heat pumps	$P_{W,OFF}$ = 33 watts.

* $P_{W,SB}$ is standby mode electrical power consumption, and $P_{W,OFF}$ is off mode electrical power consumption. For furnaces, DOE is proposing to change the nomenclature for the standby mode and off mode power consumption metrics for furnaces from those in the furnace and boiler test procedure final rule published on October 20, 2010. 75 FR 64621. DOE is renaming the P_{SB} and P_{OFF} metrics as $P_{W,SB}$ and $P_{W,OFF}$, respectively. However, the substance of these metrics remains unchanged.
** Standby mode and off mode energy consumption for weatherized gas and oil-fired furnaces is regulated as a part of single-package air conditioners and heat pumps.
† $P_{W,OFF}$ is off mode electrical power consumption for central air conditioners and heat pumps.
†† DOE is not adopting a separate standby mode standard level for central air conditioners and heat pumps, because standby mode power consumption for these products is already regulated by SEER and HSPF.

II. Comments Concerning Withdrawal of the Direct Final Rule

A. General Comments

1. Joint Petition

A number of commenters stated that DOE did not consider the views of all relevant parties, including appliance installers and energy suppliers. Some commenters also stated that DOE did not explain its process for determining whether the Joint Petition was submitted by relevant parties, including a determination of which parties are ''not'' relevant.

Specifically, UGI Distributors stated that there was not sufficient participation by interested persons. (UGI, No. 22 at p. 10) The American Public Gas Association (APGA) contended that the Consensus Agreement was not based on the most relevant sectors of the industry. (APGA, No. 24 at pp. 12–13) Metropolitan Utilities District of Omaha Nebraska (MUD) stated that the Consensus Agreement failed to represent consumer interests, because the Joint Petitioners (who submitted the Consensus Agreement) were comprised primarily of appliance manufacturers and various energy conservation groups, not individuals who deal with installation and inspection of these appliances on a daily basis. (MUD, No. 29 at p. 1) AGL Resources (AGL) commented that the petition did not include all relevant parties as required by the legislation granting authority for DFRs, and it recommended DOE should withdraw the DFR in favor of the NOPR process. Specifically, AGL cited appliance installers and energy suppliers as not being involved, noting that appliance installers could have provided more complete information regarding installation costs and that energy suppliers could have provided important information on consumer impacts. (AGL, No. 31 at p. 3) Heating, Air-conditioning and Refrigeration Distributors International (HARDI) stated that the Consensus Agreement excludes the input of U.S. small business owners, who represent two-thirds of the heating, ventilation, and air-conditioning (HVAC) supply chain and 32,264 HVAC contracting and distribution companies and branches nationwide. (HARDI, No. 39 at p. 1) The Air Conditioning Contractors of America (ACCA) stated that the Consensus Agreement represents the view of a minority of stakeholders, is an unsuitable use of the direct final rule process, and directly and adversely impacts several stakeholders not included in the Consensus Agreement. (ACCA, No. 50 at p. 2)

Conversely, the Joint Comment from ASAP, NRDC, ACEEE, ASE, NPCC, NEEP, the Consumer Federation of America (CFA), and EarthJustice (Joint Comment) supported DOE's determination of what constitutes an agreement that is submitted jointly by interested persons that are fairly representative of relevant points of view. (Joint Comment, No. 47 at p. 2) These stakeholders contend that DOE has properly exercised its authority to issue a direct final rule under 42 U.S.C. 6295(p)(4)(A).

As explained above in section I, EPCA authorizes DOE to issue a direct final rule establishing an energy conservation standard on receipt of a statement that, in relevant part, is submitted jointly by interested persons that are fairly representative of relevant points of view (including representatives of manufacturers of covered products, States, and efficiency advocates) as determined by the Secretary. While providing some guidance by specifying that representatives of manufacturers of covered products, States, and efficiency advocates are relevant parties to any consensus recommendation, EPCA affords DOE significant discretion in determining whether this requirement has been met. (42 U.S.C. 6295(p)(4)(A)) DOE notes that EPCA does not require that ''all'' relevant parties be parties to any Consensus Agreement, nor does it allow a small number of interested parties to exercise a veto power over the DFR process. EPCA also does not require DOE to specify parties that it determines are ''not relevant'' to any Consensus Agreement.

In the direct final rule, DOE explained how the Consensus Agreement met the requirement that it be submitted jointly by interested persons that are fairly representative of relevant points of view. DOE noted that the Consensus Agreement was signed and submitted by a broad cross-section of the manufacturers who produce the subject products, their trade associations, and environmental and energy efficiency organizations. DOE further noted that one State entity was a party to the Consensus Agreement, and no State expressed any opposition to it. States also did not file any adverse comments during the comment period for the direct final rule.

Moreover, DOE stated in the direct final rule that it does not interpret the statute as requiring absolute agreement among all interested parties before DOE may proceed with issuance of a direct final rule. By explicit language of the statute, the Secretary has considerable discretion to determine when a joint recommendation for an energy or water conservation standard has met the requirement for representativeness (*i.e.,* ''as determined by the Secretary''). DOE acknowledges that appliance installers and energy suppliers may also be relevant parties within the meaning of 42 U.S.C. 6295(p)(4), but does not believe that the existence of other potentially relevant parties indicates that the Consensus Agreement was not submitted jointly by interested persons that are fairly representative of relevant points of view (including representatives of manufacturers of covered products, States, and efficiency advocates).

For the reasons stated above, DOE affirms its conclusion in the direct final rule that the Joint Petition satisfies the requirement of 42 U.S.C. 6295(p)(4) that it be a statement submitted jointly by interested persons that are fairly representative of relevant points of view (including representatives of manufacturers of covered products, States, and efficiency advocates) as determined by the Secretary.

2. Comments on Withdrawal of the Direct Final Rule

As explained more fully below, DOE has determined that none of the comments requesting withdrawal, taken as a whole or individually, may provide a reasonable basis for the Secretary to withdraw the direct final rule. In setting efficiency standards such as those for furnaces, DOE uses a publicly-available, forward-looking model to evaluate the economic impact of several technically feasible energy efficiency levels pursuant to the criteria specified in 42 U.S.C. 6295(o). DOE runs its analysis starting at the most efficient technologically feasible level through progressively lower efficiency levels until its finds the most efficient trial standard level (TSL) that is economically justified. DOE has made its model and the data used in its model public on its Web site.

The American Gas Association (AGA)[2] and APGA submitted comments arguing that DOE used inappropriate data for several parameters in its life-cycle cost (LCC) model for furnaces, including future natural gas prices, the

[2] Philadelphia Gas Works, Nicor, Piedmont, Consolidated Edison of New York, NW Natural Gas Company, Atmos Energy and Alabama Gas submitted comments expressing general support for the comments by the American Gas Association (AGA). (Philadelphia Gas Works, No. 23 at pp. 1–2; Nicor, No. 32 at p. 1; Piedmont, No. 32 at p. 1; Consolidated Edison of New York, No. 32 at p. 1; NW Natural Gas Company, No. 32 at p. 1; Atmos Energy, No. 32 at p. 1; Alabama Gas, No. 32 at p. 1)

lifetime of non-weatherized gas furnaces, installation costs, and future consumer costs for furnaces. DOE explains below why, contrary to these comments, it used appropriate data for each such parameter.

However, even if the commenters were correct with respect to all the data issues they raised, that would still not result in an efficiency standard for furnaces that is different than the one in the DFR. In response to the comments from AGA and APGA, DOE re-ran its model using the data and assumptions provided by those organizations in their comments. DOE's analytical results, which it has made public on its Web site, showed that the standard set for furnaces in the DFR (TSL 4) still has a positive average LCC savings, even using all the commenters' data and assumptions. Because the commenters' objections, even if they were all correct, a scenario DOE does not believe likely, would not have resulted in a change to the efficiency standard for furnaces, they could not possibly provide a reasonable basis for withdrawing the rule.

In their comments, AGA and APGA assert that, taken together, their data assumptions cause the standard for furnaces in the DFR to have an average LCC savings that is slightly negative in the northern region of the United States. However, they have not provided sufficient information to allow DOE to replicate their results. As indicated above, DOE has made its spreadsheet model publicly available on its Web site and no commenter—including AGA and APGA—has questioned the methodology underlying the spreadsheet model (as opposed to the data used in the model). Therefore, notwithstanding the results assertedly reached by AGA and APGA using DOE's model, DOE has concluded that its model (which remains unchallenged in terms of its methodology) supports the efficiency standard in the DFR, even using the data and assumptions provided by the adverse commenters.

Further, as explained in the DFR (76 FR 37524), the consensus agreement represents the effort of diverse stakeholders representing widely varied interested parties to negotiate their differences, reach common ground, and expedite the rulemaking process. Those efforts, and the benefits they entail, were properly considered by the Secretary under 42 U.S.C. 6295(o)(2)(B)(i)(VII). DOE has encouraged stakeholders in all areas to work together to propose consensus agreements that can lead to DFRs where appropriate. Here, the benefits of the consensus agreement, reflected in the DFR, include additional energy savings resulting from accelerated compliance dates for covered products, as well as an increased likelihood for regulatory compliance and a decreased risk of litigation. The Secretary is cognizant of those benefits in analyzing the adverse comments, and in determining whether any of those comments may provide a reasonable basis for withdrawal of the DFR under 42 U.S.C. 6295(o).

B. Comments on Standards for Residential Furnaces

1. The Direct Final Rule Would Cause Certain Gas Furnaces in the Northern Region to Become Unavailable in Violation of the Act

The American Gas Association (AGA) stated that: (1) Establishing a minimum efficiency standard of 90-percent AFUE for the northern region would prevent the installation in that region of a Category I[3] gas furnace; (2) the regional standard, therefore, would necessarily result in the unavailability in the northern region of a covered product type with the performance characteristics of a non-positive vent static pressure, non-condensing (*i.e.,* Category I) gas furnace; (3) the Act prohibits DOE from prescribing a standard that is likely to result in the unavailability in the U.S. in any covered product type (or class) of performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as those generally available in the United States. (AGA, No. 27 at p. 5)

AGA further noted that: (1) In light of the requirements of the gas codes, a Category I non-positive vent, non-condensing gas furnace cannot be replaced with a Category IV positive vent, condensing gas furnace without addressing the venting and condensate disposal issues; (2) accordingly, the performance features of a Category I gas furnace (including its ability to be vented through a chimney, common vented with other gas appliances, and common vented in multi-unit, multistory housing, as well as its ability to vent without having to address disposal of flue gas condensate) provide tangible and cost-saving benefits to consumers justifying separate minimum efficiency standards for Category I and Category IV gas furnaces. (AGA, No. 27 at p. 6) AGL made comments similar to those of AGA. (AGL, No. 31 at p. 6)

AGA contends that DOE should withdraw the direct final rule and proceed with the notice of proposed rulemaking in this proceeding to consider establishing separate standards for Category I and Category IV gas furnaces based on their different venting and condensing characteristics. (AGA, No. 27 at p. 6)

Conversely, AHRI stated that the furnace design dictates what types of venting systems are acceptable, not the converse, and any suggestion that a similar natural draft furnace must be provided to replace an old natural draft furnace in order to maintain a unique utility of the furnace reverses the relationship between the furnace and the vent system. AHRI also stated that the function of any furnace is to provide heat for residences, and DOE is required to address the utility or unique features of appliances and equipment only. AHRI noted that a new gas furnace using a different type of venting system can be installed as a replacement without changing the occupants' comfort level or the heating ability of the furnace, and that the venting system concerns are simply a matter of cost and the existence of an appropriate pathway for the venting system, which are issues that have been analyzed by DOE and others in the past. (AHRI, No. 46 at pp. 3–4)

In response to these comments, DOE notes that, in evaluating and establishing energy conservation standards, EPCA directs DOE to divide covered products into classes based on differences including the type of energy used, capacity, or other performance-related feature that justifies a different standard for products having such feature. (42 U.S.C. 6295(q)) In deciding whether a feature justifies a different standard, DOE must consider factors such as the utility of the feature to users. *Id.* In evaluating AGA's suggestion to consider separate product classes for furnaces using Category I and Category IV venting, DOE considered the utility to consumers of being able to use one venting type versus the other. DOE believes that the utility derived by consumers from furnaces is in the form of the space heating function that the furnace performs. DOE notes that a furnace requiring Category I venting and a furnace requiring Category IV venting are both capable of providing the same heating function to the consumer, and, thus, provide virtually the same utility with respect to that primary function. AGA contends that the ability to vent a furnace with Category I venting provides furnace consumers with a special utility, due to the cost-saving benefits as compared to having to

[3] A Category I vented appliance is an appliance that operates with a non-positive vent static pressure and with a vent gas temperature that avoids excessive condensate production in the vent. (National Fuel Gas Code, NFPA54/ANSI Z223.1, American Gas Association, 2006)

retrofit a venting system to accommodate a Category IV furnace. DOE does not agree with the characterization of reduced costs associated with Category I venting in certain installations as a special utility, but rather, it is an economic impact on consumers that must be considered in the rulemaking's cost-benefit analysis. Accordingly, DOE did not establish separate product classes for furnaces utilizing Category I and Category IV venting systems, but instead considered the additional costs of Category IV venting in its analyses performed for the DFR.

2. Causing the Unavailability of Category I Gas Furnaces in the Northern Region May Have Serious Adverse Consequences for Consumers and the Environment

AGA stated that: (1) Causing the unavailability of Category I gas furnaces in the northern region has the potential to increase health and safety risks due to improper venting; (2) customers faced with having to replace an existing Category I non-condensing gas furnace with a Category IV condensing gas furnace may choose to repair the existing furnace to avoid expensive venting and condensate disposal modifications associated with the new furnace; (3) delayed replacement of equipment past their useful life has the potential to increase energy consumption and environmental impacts. (AGA, No. 27 at p. 6) AGL, CenterPoint Energy, Metropolitan Utilities District (MUD), National Fuel Gas Distribution Corporation (NFGD), and Questar Gas made comments similar to those of AGA. (AGL, No. 31 at p. 5; CenterPoint Energy, No. 33 at p. 2; MUD, No. 29 at p. 1; NFGD, No. 28 at p. 1; Questar Gas, No. 48 at p. 1)

On the other hand, AHRI stated that the concerns about safety when establishing a standard at 90-percent annual fuel utilization efficiency (AFUE) are no different that those already present in situations where consumers do not repair faulty equipment or perform unsafe home repairs. (AHRI, No. 46 at p. 4) National Grid stated that the proposed standards would help their customers achieve their heating needs while using less energy and saving money. (National Grid, No. 30 at p. 1)

In response, proper venting of a condensing furnace, which is guided by the National Fuel Gas Code and, in many cases, by local building codes, is designed to alleviate health and safety risks. DOE notes that contractors currently have a legal responsibility to perform repairs according to the requirements of applicable codes. Problems associated with contractors not following proper procedures could occur in the case of replacing a gas furnace with a non-condensing furnace as well.

Failure of the heat exchanger or combustion system is the event that is most likely to create a need for replacement. DOE believes that consumers faced with a furnace replacement situation would be unlikely to opt for repair because of the high cost of replacing these components, along with the possibility that further expensive repairs might be needed in the near future. Therefore, DOE believes that delayed replacement, and the associated environmental impacts, is unlikely.

AGA stated that customers that replace a Category I gas furnace with a Category IV gas furnace may orphan a common-vented gas water heater. It could lead to improperly vented water heaters, which may pose serious health and safety risks. (AGA, No. 27 at p. 7) AGL, CenterPoint Energy and MUD made comments similar to those of AGA. (AGL, No. 31 at pp. 6–7; CenterPoint Energy, No. 33 at p. 5; MUD, No. 29 at p. 1)

AHRI stated that: (1) In the past ten years, nearly 10 million condensing furnaces have been sold in the U.S., of which about 7.5 million units were replacement installations; (2) some of those must have resulted in ''orphaned'' gas water heaters; (3) there is no evidence from the field over that time that consumers are incurring a higher safety risk because they chose to not address the water heater's venting system when the new condensing furnace was installed. (AHRI, No. 46 at p. 4)

In response, proper venting of an orphaned water heater would alleviate the risks mentioned by the commenters. DOE again notes that proper venting of an orphaned water heater is guided by the National Fuel Gas Code and, in many cases, by local building codes. The same points made above about contractors apply in this case as well. DOE also notes that the above comment by AHRI suggests that serious health and safety risks are unlikely and that the service industry already has in place procedures for identifying and rendering unsafe equipment inoperable (red tag) to safeguard the consumer. In addition, DOE believes that through training and experience installing condensing furnaces, installers will become increasingly aware and skilled in the treatment of orphaned water heaters.

AGA argued that the unavailability of Category I, non-condensing gas furnaces could lead customers to make less-efficient appliance choices. Specifically, AGA stated that fuel switching or different initial fuel choice could occur where customers select: (1) Electric furnaces instead of gas furnaces; (2) electric heat pumps instead of gas furnaces, especially where central air conditioning is already installed; (3) electric water heaters instead of gas water heaters; or (4) electric heat pumps and electric water heaters instead of gas furnaces and gas water heaters. AGA stated that by installing electric appliances rather than natural gas appliances, consumers are likely to pay more in annual operating costs while contributing to increased total energy consumption and environmental emissions when measured on a source or full-fuel-cycle basis. (AGA, No. 27 at p. 7)

For the direct final rule, DOE did not explicitly quantify the potential for fuel switching from gas furnaces to electric heating equipment, based upon the following reasoning. DOE reviewed the 2005 Residential Energy Consumption Survey (RECS)[4] to assess the type of space-heating system utilized by consumers as a function of house heating load. Gas furnaces are primarily utilized in households with high heating loads, while electric space heating systems are almost exclusively used in households with low heating loads. Generally, this is because the operating costs of electric space heating systems are relatively high due to the price of electricity, so using an electric system in a cold climate is significantly more expensive than using a gas furnace. Based on the above finding, DOE inferred that few consumers in the northern region would be likely to switch to electric space heating systems as a result of the amended standard for gas furnaces.

In addition, replacing a gas furnace with electric space heating incurs substantial costs, because of the complexity involved in modifying the installation. As described in appendix 9–B of the DFR technical support document (TSD),[5] for a household with a gas furnace to switch to electric space heating, a separate circuit up to 120-amps would be needed, depending on the house heating design requirements.

[4] U.S. Department of Energy—Energy Information Administration, Residential Energy Consumption Survey: 2005 Public Use Data Files, 2008. *http://www.eia.doe.gov/emeu/recs/recspubuse05/pubuse05.html.*

[5] See: *http://www1.eere.energy.gov/buildings/appliance_standards/residential/residential_furnaces_central_ac_hp_direct_final_rule_tsd.html.*

The cost to install such a circuit would vary from approximately $293 to $608, and some installations would require a new panel board to serve this higher amp circuit, at a cost estimated at $985 to $2,625.[6] Given the initial costs involved in replacing a gas furnace with electric space heating, combined with the much higher operating costs of an electric heating system, DOE believes that the approach used for the DFR is reasonable.

With regard to initial fuel choice in new homes, DOE found fuel switching not to apply because the amended standard would not significantly change the situation currently faced by builders. On average, there is no total installed price differential between an 80-percent AFUE gas furnace and a 90-percent AFUE gas furnace, so DOE reasoned that builders are unlikely to alter their current behavior on the basis of amended energy conservation standards.

AGA stated that: (1) Replacing a non-condensing gas furnace with a condensing gas furnace may be infeasible for some homes where side-wall venting is not an option (*e.g.,* in row houses, historic homes, or multi-story housing complexes), may be cost-prohibitive in other homes, may lead to orphaned water heaters, and, in all cases, would increase installation costs and require trained installers to ensure proper venting of all combustion appliances.; (2) DOE's analysis in this proceeding significantly underestimates the costs associated with installation of condensing gas furnaces that consumers would actually incur, both as a result of underestimating specific cost items and of failing to include specific cost items. (AGA, No. 27 at p. 7) MUD made a similar comment. (MUD, No. 29 at pp. 1–2) Questar Gas also stated that with many older homes and multi-family units, the venting modifications and condensate disposal requirements would be cost-prohibitive and, in some cases, impossible. (Questar Gas, No. 48 at p. 1)

DOE acknowledges that there may be increased technical complexity associated with replacing a non-condensing gas furnace with a condensing gas furnace, but DOE disagrees with AGA's contention that replacing a non-condensing gas furnace with a condensing gas furnace may be infeasible for some homes where side-wall venting is not an option. Many condensing furnaces are vented using vertical vents, which provides an additional option to address cases where side-wall access in not available. Moreover, AGA has not demonstrated that trained installers are unavailable in the marketplace to handle installations under the amended standards at the time of compliance. Condensing furnaces have been available for more than 20 years, and in the north condensing furnaces represent 68 percent of the market. The large scale of installations demonstrates the availability of trained installers to handle installations under the amended standards.

Regarding AGA's second point, DOE believes that it has included all relevant cost items. As further described below in section II.B.7, DOE's estimates of specific cost items are similar to those provided by AGA in several instances. Where they are lower, DOE believes that the available evidence (discussed below) supports the costs used by DOE.

3. DOE's Regional Standard Harms Consumers

AGA stated that: (1) DOE's analysis shows that the 90-percent AFUE standard for the northern region would impose a net cost on 10 percent of consumers, have no impact on 71.4 percent of consumers, and have a net benefit for 18.6 percent of consumers; (2) the fact that a significant percentage of customers will experience a net cost reflects the substantial costs associated with replacing a Category I non-condensing gas furnace with a Category IV condensing gas furnace; (3) DOE has failed to explain why the fact that some consumers will see a net benefit justifies imposing net costs on other consumers. (AGA, No. 27 at p. 10)

In selecting the standards in the DFR, DOE needed to determine whether the benefits of the standard exceed its burdens to the greatest extent practicable, in light of the seven statutory factors provided by EPCA. (42 U.S.C. 6295(o)(2)(B)(i)) Impacts on consumers are one of those factors. Under the amended standard for non-weatherized gas furnaces, nearly twice as many consumers would have a net benefit as would have a net cost. Further, the standard would provide average LCC savings of $155 and a median payback period of 10.1 years. DOE believes that on balance, the consumer impacts of the amended energy conservation standard qualify as positive impacts within the context DOE has used in past standards rulemakings.

4. DOE's Analysis of Natural Gas Prices Is Inadequate

AGA and AGL stated that the direct final rule did not consider the impact that the regional standard would have on natural gas prices. (AGA, No. 27 at p. 11; AGL, No. 31 at 5) DOE did consider the impact of the chosen standards on natural gas prices, as described in section IV.G.6 of the DFR. As described in chapter 14 of the DFR TSD, the projected impact on natural gas prices is very small (0.14 to 0.21 percent). Because the impact is so small, DOE did not use a separate price forecast for the selected TSL.

AGA stated that: (1) DOE has not used the most recent version of the Energy Information Administration's (EIA) *Annual Energy Outlook* (*i.e., AEO 2011*) in support of the direct rule; (2) DOE has not explained why it could not have revised its analysis based on the most recent data; (3) EIA's *AEO 2011* forecast of residential natural gas prices through 2030 is substantially reduced from the 2010 forecast; (4) EIA's price forecast has been trending downward over the last several years; (5) DOE's use of the *AEO 2010* Reference Case in analyzing life-cycle-cost savings of gas furnaces overstates potential cost savings. (AGA, No. 27 at p. 11) APGA and MUD also objected to DOE's use of the *AEO 2010* rather than the *AEO 2011* projections. (APGA, No 24 at p. 2; MUD, No. 29 at p. 2)

In contrast, the joint comment from ASAP, NRDC, ACEEE, CFA, ASE, NPCC, NEEP, and EJ (Joint Comment) stated that the furnace standards are cost-effective, even if *AEO 2011* price trends are used in the LCC analysis. The Joint Comment noted that additional analysis published by DOE in response to a request from American Public Gas Association (APGA) showed average positive LCC savings for both replacement and new construction installations even if lower natural gas prices are used in the analysis. (Joint Comment, No. 47 at p. 4–5)

In response, DOE notes that the Department uses the latest available version of *AEO* that is possible under its rulemaking schedule. The *AEO 2011* was not available at the time the original DFR analysis was conducted. However, in response to comments on the DFR, DOE evaluated the impact of using the *AEO 2011* price forecast on the LCC results. In this case, the average LCC benefit decreases from $155 (using the *AEO 2010* forecast) to $127.

AGA contends that: (1) DOE should use a marginal price analysis when evaluating the impact of natural gas prices on the life-cycle-cost savings

[6] Costs estimated using 2010 RS Means Residential Cost Data. (RS Means Company Inc., RS Means Residential Cost Data. 29th Annual Edition ed. 2010: Kingston, MA).

associated with conservation standards; (2) a marginal price analysis reflects the incremental or decremental gas costs most closely associated with changes in the amount of gas consumed when comparing appliances of different efficiencies; (3) DOE uses marginal residential and commercial electricity prices in its life-cycle-cost analysis; (4) technical analysis by the Gas Technology Institute (GTI) includes a marginal price analysis for the 90-percent AFUE regional standard, by using citygate prices [7] as a proxy for marginal price and reducing the residential gas price to reflect a removal of a portion of fixed costs. AGA stated that: (1) The results of GTI's analysis show that the life-cycle-cost savings of replacing a non-condensing gas furnace with a condensing gas furnace are negative in the northern region using citygate prices as a proxy for marginal price, based on *AEO 2011* forecasts of natural gas prices; (2) under the alternative method of removing fixed costs as a proxy for marginal prices, the analysis similarly shows that the life-cycle-cost savings of installations of 90-percent AFUE condensing gas furnaces in the replacement market in the northern region are negative or only barely positive. (AGA, No. 27 at p. 13)

In contrast, the Joint Comment stated that DOE's approach for developing natural gas prices, which incorporates regional and seasonal variations, is appropriate and that the prices DOE derived reflect the prices faced by furnace users. (Joint Comment, No. 47 at pp. 4–5)

In response, DOE believes that average natural gas prices are suitable for evaluating the impacts of furnace standards. DOE also used average natural gas prices in the 2010 final rule for energy conservation standards for residential water heaters, direct heating equipment, and pool heaters. 75 FR 20112, 20158 (April 16, 2010). Although marginal energy prices are in theory preferable when evaluating the life-cycle-cost savings associated with standards, past analysis found that marginal natural gas prices were only 4.4 percent lower than average prices in the winter, when furnaces are used.[8] At the time of the DFR analyses, DOE was unable to obtain marginal gas prices for the following reasons. The RECS 2005 billing data that allow estimation of marginal prices were not available at that time due to EIA's concerns over maintaining confidentiality of the survey respondents. In the alternative, DOE investigated development of marginal prices from gas utility tariffs, but found that, in general, gas tariffs include provisions for modifying consumer prices on a monthly basis to account for changes in commodity price. Therefore, the tariffs themselves do not provide sufficient information to determine the consumer price.

In response to comments on the DFR, DOE estimated marginal natural gas prices using newly-available RECS 2005 billing data. Using this data in DOE's model, the average LCC benefits decrease from $155 (using average energy prices) to $128 (using marginal energy prices).

5. DOE Has Not Justified Its Use of Experience Curve Price Effects

AGA stated that: (1) DOE's use of experience curves to support the direct final rule is premature; and (2) DOE has not yet issued a final rule or policy regarding the use of experience curve or learning curve analyses or responded to the comments submitted in that proceeding. (AGA, No. 27 at p. 14)

To clarify, on February 22, 2011, DOE published a Notice of Data Availability (NODA, 76 FR 9696) in the **Federal Register** stating that DOE may consider changes to how it addresses equipment price trends, as part of DOE's ongoing efforts to keep improving its regulatory analyses. DOE responded to comments on the NODA and outlined its refined policy regarding the use of experience curves in the direct final rule in this proceeding and several other rulemakings mentioned below. In the DFR, DOE presented a range of estimates for product price trends, including trends derived using the experience curve approach.

AGA and APGA stated that DOE's experience curve analysis in the direct final rule is unexplained and unjustified. (AGA, No. 27 at p. 14; APGA, No. 24 at p. 3) AGA stated that DOE has not adequately shown that, based on historical price data, the price trend for Category IV condensing gas furnaces would continue to trend downward over time at the rate that DOE has assumed. Nor is there any justification, according to those commenters, as to why such curves should be so much greater for gas equipment than for electric equipment. (AGA, No. 27 at pp. 14–15) Laclede Gas also stated that the experience rates used by DOE were overstated. (Laclede Gas, No. 27 at pp. 2–3)

On the other hand, the Joint Comment supported DOE's use of learning rates in the analysis. (Joint Comment, No. 47 at p. 3) It stated that the incorporation of learning rates in this rulemaking is consistent with recent DOE final rules on refrigerators, clothes dryers, and room air conditioners, where DOE also applied learning rates. 76 FR 57516, 57548–50 (Sept. 15, 2011); 76 FR 52852–52854 (Aug. 24, 2011).

In response, DOE's derivation of price trends for central air conditioners, heat pumps, and furnaces is described in detail in appendix 8–J of the DFR TSD. The essential justification for using the experience curve approach is that it yields a statistically robust method for analyzing the long-term declining real price trend, based on Producer Price Indexes (PPI), observed for central air conditioners and furnaces. There exists an extensive economic literature on learning and experience curves, based on robust observations spanning many decades.[9] The concept was pioneered for the manufacturing sector, and it has since been applied to a diverse set of products and services.[10] Learning and experience curves are now regularly incorporated into economic modeling, including in the National Energy Modeling System (NEMS). Broader discussion of the reasons why DOE believes use of the experience curve approach is reasonable is provided in the final rule for refrigerators, refrigerator-freezers, and freezers. 76 FR 57516, 57548–50 (Sept. 15, 2011).

DOE did not have historical price data specific to condensing gas furnaces. However, the growing share of condensing furnaces over the past two decades (from approximately 23 percent in 1990 to approximately 50 percent in 2010) [11] is reflected in the PPI series that DOE used to derive an experience rate for furnaces.

[7] The ''city gate'' is generally the point where natural gas is transferred from an interstate or intrastate pipeline to a local natural gas utility. The ''city gate price'' is the sales price of the natural gas at this point; the price reflects the wholesale/wellhead price, as well as the cost of transporting the natural gas by pipeline to the citygate.

[8] Chaitkin, S., J. McMahon, C. Dunham-Whitehead, R. van Buskirk and J. Lutz. 2000. Estimating Marginal Residential Energy Prices in the Analysis of Proposed Appliance Energy Efficiency Standards. Conference Paper, Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings.

[9] A draft paper, ''Using the Experience Curve Approach for Appliance Price Forecasting,'' posted on the DOE Web site at *http://www.eere.energy.gov/buildings/appliance_standards,* summarizes the data and literature currently available to DOE that is relevant to price forecasts for selected appliances and equipment.

[10] Weiss, M., Junginger, M., Patel, M.K., Blok, K., 2010a. ''A review of experience curve analyses for energy demand technologies.'' Technological Forecasting and Social Change 77, 411–428.

[11] Gas Appliance Manufacturers Association (GAMA). Historical Shipment Data (1987–2003), provided to DOE April 10, 2005. AHRI. Historical Shipment Data (2004–2009), provided to DOE June 20, 2010.

For warm-air furnaces, the medium estimated learning rate (defined as the fractional reduction in price expected from each doubling of cumulative production) is 30.6 percent. For unitary air conditioners, the medium estimated learning rate is 18.1 percent. The higher rate for furnaces results from the steeper decline in the inflation-adjusted historic price index for warm air furnaces.[12]

In response to comments on the DFR, DOE evaluated the impact of not using the learning rate on the LCC results. Using this input in DOE's model, the average LCC benefits decrease from $155 (using medium estimated learning rates) to $148 (not using the learning rates).

6. DOE's Estimate of Expected Furnace Lifetime Is Unsupported

AGA stated that: (1) DOE's estimate of a 23.68 year lifetime for a gas furnace is contradicted by other DOE and manufacturer estimates; (2) in its latest DOE Multi-Year Program Plan, updated in October 2010, DOE estimated that the lifetime of a non-weatherized gas furnaces is 16 years; (3) according to GTI's recent technical analysis, the 16-year useful life estimate is consistent with other manufacturer estimates of useful life; (4) GTI's analysis shows that using a 16-year useful life estimate substantially reduces the life-cycle-cost savings for the 90-percent AFUE gas furnace in the northern region. (AGA, No. 27 at pp. 15–16) Laclede Gas Company made a similar comment. (Laclede, No. 27 at p. 4)

The Joint Comment stated that the fixed 16-year lifetime was unreasonable for non-weatherized gas furnaces. It noted that DOE used a distribution of lifetimes to reflect expected failure rates in the field and that DOE derived the average lifetime of 23.7 years for non-weatherized gas furnaces from a combination of sources. (Joint Comment, No. 47 at pp. 4–5)

In response, the value in DOE's 2010 Multi-Year Program Plan[13] was an estimate from the published literature, rather than the result of empirical analysis. DOE's DFR methodology utilized a more rigorous product lifetime analysis, including historical data on appliance shipments, total appliance stock, and the fraction of surviving appliances to estimate the mean life and mortality shape factor using the best-fitting Weibull survival function.[14] Changing the average lifetime to 16 years results in projected shipments that are approximately 30 percent to 40 percent greater than the forecast in the DFR. In this case, the NIA model's 'backcast' diverges significantly from historical shipments. That is, a 16-year average lifetime is inconsistent with historical data on furnace shipments. Consequently, DOE has confirmed that the DFR's estimated average lifetime of 23.7 years for non-weatherized gas furnaces remains the best estimate of that value. However, in response to comments on the DFR, DOE evaluated the impact of using the average fixed 16-year lifetime on the LCC results. Using that input in DOE's model, the average LCC benefits decrease from $155 (using DOE's lifetime methodology) to $72 (using a 16-year lifetime).

7. DOE Has Not Justified Its Assumptions Regarding Installation Costs

AGA stated that: (1) DOE has not adequately supported the specific installation cost adders and distribution of occurrences that it has used; (2) DOE's analysis significantly underestimates the costs associated with installation of condensing gas furnaces that consumers would actually incur, both as a result of underestimating specific cost items and failing to include specific cost items; (3) AGA submitted data in this proceeding showing that the cost for installation of condensing furnaces in commonly-vented systems in total would range from $1,500 to $2,200 (in 2005$) based on a survey of its members. AGA recommended that DOE apply a probability distribution for each installation cost adder and include that variation as an independent variable in the calculation. (AGA, No. 27 at p. 16) ACCA also stated that the standard mandating condensing furnaces in the northern region is based on incomplete or inaccurate assumptions on the costs for retrofitting homes. (ACCA, No. 27 at p. 4) The UGI Distribution Companies commented that DOE's installation cost estimates for accommodating high-efficiency gas furnace and orphaned gas water heater venting issues seem unrealistically low, particularly for row homes, multi-family dwellings, and older urban structures with high masonry chimneys. (UGI Distribution Companies, No. 22 at p. 4)

In contrast, the Joint Comment stated that DOE had considered the comments from interested parties and conducted a thorough analysis of installation costs for both replacement and new construction installations. (Joint Comment, No. 47 at p. 2)

In response to AGA's first point, the sources and methods used to derive the specific installation cost adders and distribution of occurrences are described in detail in appendix 8–B of the DFR TSD. DOE believes that it has included all relevant cost items.

The range of $1,500 to $2,200 mentioned by AGA (in $2005; equivalent to $1,648 to $2,417 in 2009$) refers to the added cost for installation of condensing furnaces in common vented systems.[15] As shown in Table II.1, the range of many of DOE's specific costs are similar to the ranges given in AGA's survey. For the relining of an existing chimney or resizing of a vent to accommodate the remaining appliance, DOE believes that AGA's relining costs are more typical for long vertical vent lengths (households with two floors or more), whereas the costs used by DOE represent a wide range of installations. In terms of installing a drain pan for condensate, DOE's estimate is based on the material cost of the drain pan from two retail Web sites.[16] Despite these differences, DOE's total estimated average cost ($1,596) is close to the lower end of AGA's estimate. (DOE applied the structural modifications and the relining costs in Table II.1 to all commonly-vented systems that require venting modifications to satisfy the safety requirements. DOE estimated that such modifications are required for about 36 percent of all commonly-vented systems.) In summary, DOE concludes that its analysis of installation costs included all relevant items and used an appropriate range of costs for each item. In response to comments on the DFR, DOE evaluated the impact of using AGA's installation costs. Using these inputs in DOE's model, the average LCC benefits increase from $155 (using DOE's installation cost estimates) to $168 (using AGA's installation cost estimates). The main reason why the LCC benefits based on AGA's assumptions increase is that under DOE's estimates, performance of structural modifications is applied to all

[12] See appendix 8–J of the DFR TSD.

[13] U.S. Department of Energy Efficiency and Renewable Energy Building Technologies Program. Multi-Year Program Plan, Building Regulatory Programs: 2010–2015 (Oct. 2010). (*http://apps1.eere.energy.gov/buildings/publications/pdfs/corporate/regulatory_programs_mypp.pdf*)

[14] DOE's lifetime methodology is described in: Lutz, J. A. Hopkins, V. Letschert, V. Franco, and A. Sturges. ''Using national survey data to estimate lifetimes of residential appliances'' published in HVAC&R Research (Volume 17, Issue 5, 2011). (URL: *http://www.tandfonline.com/doi/abs/10.1080/10789669.2011.558166*)

[15] AGA Comment Letter to DOE on NOPR Furnace Rulemaking and TSD (Nov. 10, 2010). (Docket Number: EE–2009–BT–STD–0022)

[16] Alpine Home Air (URL: *http://www.alpinehomeair.com/viewproduct.cfm?productID=453056758*); Comfort Gurus (URL: *http://www.comfortgurus.com/product_info.php/products_id/5368*)

installations and has higher cost, whereas AGA's assumptions regarding relining chimney/resizing vents and condensate installation issues are applied to only a fraction of installations.

TABLE II.1—INSTALLATION COSTS FOR CONDENSING FURNACES IN COMMONLY-VENTED SYSTEMS

Additional venting system/installation requirements	AGA cost range (average) (2009$) *	DOE cost range for northern region (average) (2009$)
Perform structural modifications (including boring holes in interior walls, floors, exterior walls for vents and new vent termination kit)	$330–$494 ($412)	$131–$1887 ($518)
Reline existing chimney or resize vent to accommodate the remaining appliance (code requirement for proper vent sizing)	$659–$1098 ($879)	$95–$1404 ($548)
Install drain pan for condensate from condensing furnace (code requirement to avoid structural damage)	$165–$275 ($220)	$45–$45 ($45)
Install freeze protection for condensate line to ensure reliability of disposal (for installation outside of conditioned space)	$220–$220 ($220)	$101–$272 ($184)
Install condensate drain, pump, acid neutralizer, etc	$275–$330 ($302)	$216–$455 ($300)

* Cost adjusted using CPI from 2005$ to 2009$.

AHRI pointed out that the 1994 Gas Research Institute (GRI) Gas Furnace Survey [17] found that as more condensing furnaces were sold in a specific area, the cost of installation became lower, suggesting that this could occur in the case of the standard for the northern region (AHRI, No. 46 at p. 4). DOE agrees that the trend mentioned by AHRI could occur and potentially result in lower installation costs than those estimated for the DFR.

AGA stated that: (1) The 2007 Furnace Rule [18] relied on data from a 1994 GRI furnace survey to determine the percentage of homes in which gas appliances were commonly-vented; (2) DOE changed the data set in the direct final rule proceeding, relying instead on an older 1991 GRI water heater survey; [19] (3) DOE has not explained the basis for the change in the data set. (AGA, No. 27 at p. 16)

In response, to determine the fraction of installations with common venting, DOE used both the 1994 GRI furnace survey and a 1991 GRI water heater survey. DOE used the 1990 survey to develop regional fractions of the common venting installations, primarily because it is a larger survey (32,000 data points) compared to the 1994 survey (1,300 data points). On average, both surveys produce similar results: The 1990 survey showed 57 percent of households with a gas water heater had common venting, while the 1994 GRI study showed 52 percent of gas furnaces had common venting. Combining these fractions with the RECS 2005 household sample resulted in a nationwide estimate that 50 percent of gas furnaces are commonly vented with gas water heaters. For the northern region this fraction is 57 percent.

AGA stated that according to GTI, DOE appears to have used a national average figure of the percent of housing stock that would require the chimney to be relined when installing a condensing gas furnace as opposed to a northern regional fraction, potentially understating installation costs associated with chimney relining that would support a regional standard. (AGA, No. 27 at p. 17) DOE used the 1994 GRI furnace survey data to derive the fraction of households with chimney venting for the northern region. This survey showed that 72 percent of the northern installations utilize chimney venting (see TSD, appendix 8–B for details).

8. DOE Failed To Conduct an Adequate Analysis of Fuel Switching Between Natural Gas and Electric Appliances

AGA stated that: (1) DOE's analysis of the potential for fuel switching is cursory and ignores the problems consumers face when having to install a condensing gas furnace; (2) DOE's analysis fails to consider the wide range of options consumers actually face in making appliance choices; (3) consumers are sensitive to the relative differences in the total upfront cost of purchasing the appliance and having it installed, and often undervalue the differences in annual operating costs; (4) even assuming that switching from a gas furnace to an electric furnace will require additional installation costs for electrical circuitry, consumers will be encouraged to fuel switch where the total equipment and installation costs of a 90-percent AFUE condensing gas furnace exceed the total equipment and installation costs of a comparable electric furnace. (AGA, No. 27 at pp. 18–20) Concerns that the condensing furnace standard could lead consumers to switch to electric heating were also raised by AGL, APGA, CenterPoint Energy, the UGI Distribution Companies, City Utilities of Springfield, Laclede Gas Company, and Questar Gas. (AGL, No. 27 at pp. 7–8; APGA, No. 24 at p. 8; CenterPoint Energy, No. 33 at p. 3; UGI Distribution Companies, No. 22 at p. 4; City Utilities of Springfield, No. 26 at p. 1; Laclede, No. 44 at p. 3; Questar Gas, No. 48 at p. 1)

DOE agrees that consumers are sensitive to the relative differences in the total upfront cost of purchasing the appliance and having it installed, and often undervalue the differences in annual operating costs. However, AGA's contention that consumers will be encouraged to fuel switch where the total installed costs of a 90-percent AFUE condensing gas furnace exceed the total equipment and installation costs of a comparable electric furnace seems to take the extreme (and unsubstantiated) view that consumers place little value on differences in operating costs at all. Further, the difference in annual operating costs between a condensing gas furnace and an electric furnace in the northern region are very large. A household using 40 MMBtu/year of natural gas, which is the estimated average for a condensing furnace in the northern region, would incur annual costs of $400 to $600, while an electric furnace satisfying the same heating load would incur costs

[17] Jakob, F. E., J. J. Crisafulli, J. R. Menkedick, R. D. Fischer, D. B. Philips, R. L. Osbone, J. C. Cross, G. R. Whitacre, J. G. Murray, W. J. Sheppard, D. W. DeWirth, and W. H. Thrasher, *Assessment of Technology for Improving the Efficiency of Residential Gas Furnaces and Boilers, Volume I and II—Appendices,* September, 1994. Gas Research Institute. AGA Laboratories, Chicago, IL. Report No. GRI–94/0175.

[18] U.S. Department of Energy—Energy Efficiency & Renewable Energy, *Technical Support Document: Energy Efficiency Standards for Consumer Products: Residential Furnaces and Boilers,* 2007. Washington, DC.

[19] D.D. Paul et al., *Assessment of Technology for Improving the Efficiency of Residential Gas Water Heaters,* December, 1991. Battelle. Columbus. Report No. GRI–91/0298.

ranging from $800 to $1,700. Even in parts of the northern region where the heating load is half of the above average, the operating cost differential is still significant.

Given the initial costs involved in replacing a gas furnace with electric space heating, combined with the much higher operating costs of an electric heating system, DOE believes that the approach used for the DFR is reasonable.

AGA stated that: (1) DOE acknowledges but fails to address the possibility that requiring the replacement of a non-condensing gas furnace with a 90-percent AFUE condensing gas furnace will lead to an orphaned water heater, thereby encouraging consumers to replace the gas water heater with an electric resistance water heater; (2) consumers will be encouraged to switch to an electric water heater where the costs of addressing the venting issues associated with an orphaned gas water heater exceed the total equipment and installation costs of an electric water heater. (AGA, No. 27 at p. 19)

DOE believes that consumers are unlikely to engage in large-scale switching from a gas-fired water heater to an electric water heater. If the gas water heater is near the end of its useful lifetime, the consumer may elect to purchase a new power vent gas water heater rather than incur the expense of re-lining. Some consumers could elect to replace the gas water heater with an electric water heater to avoid the cost of relining, but estimates of electric water heater installation cost plus electrical service installation plus the extra energy cost indicate that the total is higher than the cost of relining, so this possibility is unlikely.[20]

9. DOE Has Not Considered the Costs of Enforcement

AGA stated that: (1) The technical support documents in this proceeding do not contain any analysis of the impacts of enforcement costs on consumers, manufacturers, or other market participants, including other entities that may additionally be required to enforce the regional standard, such as equipment distributor or installers; and (2) without an assessment of enforcement costs, the economic justification of the standards in this proceeding is incomplete. (AGA, No. 27 at p. 21) Concerns that DOE did not consider enforcement costs were also expressed by ACCA, AGL, HARDI, Laclede Gas Company, and NPGA. (ACCA, No. 50 at p. 5; AGL, No. 31 at p. 4; HARDI, No. 39 at p. 2; Laclede, No. 44 at p. 12; NPGA, No. 49 at p. 3)

In contrast, AHRI stated that: (1) DOE should act quickly to open a rulemaking on regional standards enforcement; and (2) the fact that DOE has not yet considered standards enforcement is not a defect in the final rule. (AHRI, No. 46 at p. 5) The Joint Comment stated that the enforcement plan proceeding, required after adoption of a regional standard, would be an appropriate time for consideration of a DOE Office of Hearings and Appeals (OHA) waiver process designed to address any special hardship situations. (Joint Comment, No. 47 at pp. 4–5)

In response, DOE does not believe that the cost of enforcement of regional standards impacts the life-cycle cost, payback period, or other factors considered in the establishment of energy conservation standards differently than the costs of enforcement of national energy conservation standards. Rather, enforcement costs will depend on the specific enforcement framework mechanism that is put in place. EPCA requires DOE to ''initiate'' an enforcement rulemaking not later than 90 days after the issuance of a final rule establishing regional standards and to complete the rulemaking not later than 15 months following the issuance of the rule. (42 U.S.C. 6295(o)(6)(G)(ii)). Clearly, the express provisions of the statute contemplate the rulemaking on enforcement of regional standards commencing after the energy conservation standards rulemaking has been completed. Having the standards in place is a necessary precursor to evaluating potential enforcement efforts. DOE plans to incorporate all feedback from this standards rulemaking process into the enforcement rulemaking, and will assess the impact of that enforcement regime in the context of the enforcement rulemaking.

10. Impact on Low-Income Consumers

UGI and CenterPoint Energy stated that the standard for the northern region could harm low-income consumers due to the higher first cost of installing a condensing furnace. (CenterPoint Energy, No. 33 at p. 6; UGI, No. 22 at p. 4)

On the other hand, CFA and NCLC highlighted the benefits that higher furnace standards would bring to low-income households, who are predominately renters. They stated that heating bills place a large burden on moderate-income and low-income families, and the standard would reduce their energy bills and reduce the demand for natural gas, thereby moderating future price increases for consumers. (CFA and NCLC, No. 36 at p. 2)

DOE's consumer subgroup analysis (described in chapter 11 of the DFR TSD) estimated that low-income households show somewhat higher LCC savings from more-efficient furnaces than the general population. Regarding the first cost, DOE agrees that because many low-income consumers are renters, the cost of replacing a furnace would be incurred by the landlord and would likely be passed on to the consumer gradually in the form of increased rent. DOE believes that these factors moderate the impacts of amended standards on low-income consumers.

11. Sensitivity Analysis of the Standard for Residential Gas Furnaces in the Northern Region

DOE believes that the analysis documented in the DFR and the accompanying TSD provides sufficient justification for its determination that TSL 4 achieves the maximum improvement in energy efficiency that is technologically feasible and economically justified and will result in significant conservation of energy. DOE further notes that it did not receive comments critical of the models it used in its analysis. However, because some of the commenters devoted considerable effort to developing recommendations for alternatives to some of the inputs that DOE used in its DFR analysis, DOE conducted a new analysis to assess the impact on consumers from using the recommended alternatives. The assumptions that DOE used in this sensitivity analysis were the same as the assertions made by AGA in its comment as follows: (1) A furnace lifetime of 16 years for all households; (2) no decline in furnace prices based on experience curve analysis; (3) the ranges for the added cost for installing condensing furnaces in commonly-vented systems recommended by AGA (see Table II.1); (4) a natural gas price forecast based on the *AEO 2011* Reference case; and (5) use of marginal natural gas prices (based on analysis of RECS 2005 billing data).[21] These assumptions reflect key comments made by AGA (described above) and a request made by APGA. (APGA, No. 20 at pp. 1–2)

[20] See Appendix C of the final rule TSD for the 2007 furnace and boiler rulemaking. *http://www1.eere.energy.gov/buildings/appliance_standards/residential/fb_tsd_0907.html.*

[21] Documentation of the sensitivity analysis may be found at DOE's Residential Furnaces and Boilers Web site—APGA Life-Cycle Cost Scenarios at: *http://www1.eere.energy.gov/buildings/appliance_standards/residential/residential_furnaces_cac_hp_direct_final_rule.html.*

Under the sensitivity analysis, the average LCC savings for consumers in the Northern region are $44. This value is less than the average cited in the DFR ($155), but is still positive. Regardless, this lower, but still positive, LCC savings value is sufficient to demonstrate economic justification of TSL 4 under the criteria in 42 U.S.C. 6295(o). Thus, even under the assumptions favored by AGA and APGA, even if they were all correct, a scenario DOE does not believe likely, the amended standard still have a positive impact on consumers in the northern region.

C. Comments on Standards for Residential Central Air Conditioners and Heat Pumps

The People's Republic of China (China) commented that the EER standards should be cancelled and that DOE should only adopt the SEER as the air conditioner's energy efficiency evaluation ratio. China noted that SEER reflects an air conditioner's efficiency over a whole season and in varying conditions, while EER only reflects performance under specific conditions and, therefore, cannot reflect the energy efficiency over an entire season. (China, No. 8 at p. 3) For this reason, China suggested that DOE only use SEER as the regulating metric. (China, No. 8 at p. 3)

As noted in the direct final rule, DOE believes that it has the authority to set dual metrics when considering a consensus agreement, and consequently, DOE analyzed setting an EER standard in the Hot-Dry region. 76 FR 37408, 37423 (June 27, 2011). DOE agrees with China that SEER is more representative of seasonal performance, but DOE also believes that there is merit to having an EER standard, because the conditions at which EER is measured are common for the Hot-Dry region. By using both SEER and EER as metrics, DOE will have standards for both seasonal efficiency and peak efficiency, which it believes will lead to additional energy savings in the Hot-Dry region. Therefore, DOE will not withdraw the EER standard levels from the Hot-Dry region.

China further commented that differences between DOE and international standards for definitions and test methods for off mode, as well the classification of air conditioners, will lead to increased costs for manufacturers, and suggested that DOE should harmonize its regulations with international standards. Specifically, China referenced International Standards IEC 62301,[22] ISO 5151 and ISO 13253.[23] (China, No. 8 at p. 3)

IEC Standard 62301 is a test method for measuring standby mode and off mode energy consumption of household appliances. As discussed in detail in the April 1, 2011 central air conditioner and heat pump test procedure SNOPR (76 FR 18105, 18108), DOE believes that the IEC 62301 definitions and test method are too broad to be applicable to residential central air conditioners and heat pumps. In response to China's concern about how DOE classifies air conditioners as compared to ISO 5151 and ISO 13253, DOE notes its definitions of residential ''central air conditioner'' and ''heat pump'' are determined by EPCA. (42 U.S.C. 6291(21) and 42 U.S.C. 6291(24)) DOE determines the product classes for central air conditioners and heat pumps subject to the criteria in 42 U.S.C. 6295(q) and cannot alter these criteria to align its definitions with international standards.

D. Comments on Standby Mode and Off Mode Standard Levels

1. Standby Mode and Off Mode Levels for Residential Furnaces

In response to the standby mode and off mode energy conservation standards promulgated for residential furnaces, DOE received several comments.

AHRI supported the standby mode and off mode standards for residential furnaces. (AHRI, No. 46 at p. 5) AHRI, EarthJustice, and ACEEE commented there is consensus agreement for the standby mode and off mode standards for furnaces promulgated in the DFR. (AHRI and EarthJustice, No. 52 at p. 1; ACEEE, No. 53 at p. 1)

Conversely, Horizon Plastics stated that the standby mode and off mode energy consumption requirements for residential furnaces are too high and will not drive any meaningful energy conservation. (Horizon Plastics, No. 15 at p. 1) Further, Horizon Plastics referenced Lawrence Berkeley National Laboratory (LBNL) test data on 16 residential furnaces that showed standby mode and off mode energy consumption values ranging from 0 to 9.8 watts (W) as evidence that lower levels are readily achievable. (Horizon Plastics, No. 15 at p. 1) Horizon Plastics also described an innovation developed by their company that requires only an additional capacitor, relay, and proprietary code to reduce standby mode and off mode power to 0 W, while adding minimal cost to the furnace. Given that their new technology would significantly reduce standby mode and off mode power consumption, Horizon Plastics asserted that the standby mode and off mode requirements for furnaces should be removed from the subject standard and moved to a separate rulemaking. (Horizon Plastics, No. 15 at pp. 2–3)

DOE agrees with Horizon Plastics that many furnace models already available on the market are capable of meeting the standby mode and off mode standards promulgated in the DFR. In preparation for the DFR, DOE tested a number of furnaces, many of which met the standby mode and off mode requirements in the DFR. However, DOE found that products with lower standby mode and off mode power consumption typically have less sophisticated designs and controls and are often less efficient when operating in active mode. Removing certain components, such as an electronically-commutated motor or sophisticated control systems (if equipped) will allow a furnace to achieve lower standby mode and off mode energy consumption, but it may also increase active mode energy consumption and reduce consumer utility (in the form of reduced comfort if certain controls are eliminated), which is contrary to the purpose of the DFR. In its analysis of standby mode and off mode levels, DOE did not consider levels that would limit manufacturer design choices when trying to achieve greater efficiency in the active mode, or that would reduce consumer utility. DOE started at the baseline (*i.e.,* the highest standby mode and off mode energy consuming) level, and implemented design options of which DOE was aware at the time of the analysis that would not impact the ability of the furnace to achieve greater active mode efficiency and would not reduce consumer utility.

Regarding the new design presented by Horizon Plastics, DOE is encouraged by innovations that reduce standby mode and off mode energy consumption to 0 W, and hopes that the minimum standards for standby mode and off mode consumption promulgated by the DFR spur further innovation in reducing standby mode and off mode consumption. However, DOE notes that it generally does not consider proprietary designs in its analysis, as it may unfairly skew the market to give one company an advantage over

[22] The comment from China references ''IEC 60321.'' However, DOE believes this was an error and that the comment was intended to reference IEC 62301, *Household Electrical Appliances—Measurement of Standby Power.*

[23] ISO 5151: *Non-ducted air conditioners and heat pumps—testing and rating for performance,* and ISO 13253: *Ducted air-conditioners and air to air heat pumps—Testing and rating for performance.*

competitors. For this reason, DOE believes that although the technology presented by Horizon Plastics may be a viable technology, it cannot be considered in DOE's rulemaking analysis, and does not provide a reasonable basis for withdrawal of the standby mode and off mode standards for residential furnaces.

2. Off Mode Levels for Central Air Conditioners and Heat Pumps

On August 24, 2011, AHRI, EarthJustice, and ACEEE submitted letters to DOE urging DOE to sever the central air conditioner and heat pumps off mode standards from the DFR for several reasons. (AHRI and EarthJustice, No. 52 at pp. 1–4; ACEEE, No. 53 at p. 1) Specifically, the commenters asserted that the test procedure had not yet been finalized, which was in violation of EPCA section 325(gg)(3), and consequently, DOE had not done the necessary background work for inclusion of these standards in the direct final rule. (AHRI and EarthJustice, No. 52 at pp. 2–3) AHRI and EarthJustice also commented that EPCA section 336(b)(3) provides DOE with the authority to partially withdraw a direct final rule and referenced several direct final rules from other Federal agencies that were partially withdrawn. (AHRI and EarthJustice, No. 52 at pp. 3, 5–10) In a supporting comment, ACEEE noted that off mode standards were not included in the Consensus Agreement which was submitted to DOE, and that while consensus among stakeholders had subsequently been reached for the furnace standby mode and off mode standards, no similar agreement had been reached on the central air conditioner and heat pump off mode standards. Consequently, ACEEE recommended that the off mode standards for central air conditioners and heat pumps be severed from the DFR and withdrawn pending further rulemaking. (ACEEE, No. 53 at p.1) Similarly, ACCA argued that this direct final rule is an unsuitable use of the direct final rule process, because it includes standby mode and off mode standards which were not part of the submitted Consensus Agreement. (ACCA, No. 50 at p. 2)

AHRI submitted a supplemental comment, which reiterated their concerns about the lack of a finalized test procedure for central air conditioners and heat pumps address standby mode and off mode energy consumption, and it also wrote that the off mode standards levels were too stringent and would eliminate the majority of products on the market by effectively outlawing crankcase heaters. Crankcase heaters are used to prevent lubrication oil from mixing with liquid refrigerant and are responsible for the bulk of an air conditioner or heat pumps off mode power consumption. AHRI believes that without crankcase heaters, the reliability of units will be decreased because this mixing will result in compressors seizing due to a lack of lubrication, and noted that according to EPCA, DOE cannot prescribe standards which would decrease the utility or performance of a product (42 U.S.C. 6295(o)(2)(B)(i)(IV)). (AHRI, No. 46 at pp. 5–7)

DOE published a supplementary notice of proposed rulemaking (SNOPR) for the residential central air conditioner and heat pump test procedure in the **Federal Register** on October 24, 2011. 76 FR 65616. DOE believes that AHRI's concerns regarding off mode would be addressed by adoption after public comment of the SNOPR. Regarding AHRI's comments about crankcase heaters, DOE believes that its proposed test procedure (as detailed in the October 2011 SNOPR) and energy conservation standards will not disallow the use of crankcase heaters. DOE notes that there is potential confusion because a 40-watt crankcase heater is commonly used in the industry, and the standard is lower than 40 watts. However, because the proposed method for calculating off mode energy consumption in DOE's test procedure is an average of the off mode energy consumption at multiple operating conditions, it is possible for a unit with a 40-watt crankcase heater to achieve a rating lower than 40 watts if the crankcase heater is controlled such that it is not always on when the unit is in off mode. Testing conducted by DOE for this SNOPR indicated that there are products with controlled crankcase heaters, which can already meet the proposed standard levels. 76 FR 65616, 65620 (Oct. 24, 2011). Therefore, DOE believes that the off-mode testing procedures proposed in the SNOPR would, if adopted in final, alleviate AHRI's concerns about product reliability stemming from not being able to find a crankcase heater that allows manufacturers to meet the standard. Further, DOE notes that the issues brought up by AHRI pertain specifically to the test method rather than to the standard levels promulgated in the direct final rule. As a result, these issues are better suited to be addressed in the test procedure rulemaking, and DOE is, in fact, doing so. DOE encourages AHRI, EarthJustice and ACEEE to submit written comments on the October 2011 SNOPR so that DOE can consider any additional issues with the off mode test procedure and resolve them as a part of that rulemaking process. As a result, DOE is confirming the off mode standard levels for central air conditioners and heat pumps that were originally promulgated in the direct final rule.

E. Other Comments

1. Adverse Impacts on States

AGL stated that by adopting the standards set forth in the DFR, States and local jurisdictions would be preempted from adopting more-stringent restrictions on less-efficient technology, thereby penalizing progressive local jurisdictions and discouraging them from being proactive and innovative. AGL further stated that the minimum efficiency for electric furnaces will preempt States/localities from restricting less-efficient technologies, specifically electric furnaces. (AGL, No. 31 at p. 10) Although DOE agrees that Federal energy efficiency standards preempt State regulations under 42 U.S.C. 6297, DOE does not believe that the requirements in the DFR will penalize States and local authorities. This situation is typical of all EPCA rulemakings calling upon DOE to consider amended energy conservation standards, not only for residential furnaces, central air conditioners, and heat pumps. However, DOE would remind interested parties that it is authorized to grant waivers from preemption for particular State laws or regulations, if such action is warranted in accordance with the procedures and provisions set forth in section 327(d) of EPCA. (42 U.S.C. 6297(d)) Therefore, DOE does not consider the inability of States to adopt regulations for the products subject to this rulemaking to be a significant adverse impact that would necessitate withdrawal of the direct final rule.

APGA stated that the adverse safety impacts from requiring condensing furnaces place a burden on local governments, because there may be additional costs imposed upon the cities (*e.g.,* for training of staff in codes and enforcements and the costs of additional inspections) to address the potential serious harm presented by improper venting. APGA contends that this represents an unfunded mandate that will have an impact on the cities/communities served by its members. (APGA, No. 24 at p. 9) In response, DOE notes that enforcement of building codes currently falls to local authorities, which is unchanged by the DFR. Further, DOE notes that a significant portion of furnace installations in the northern region are already condensing furnaces, and as such, local inspectors should already be well trained in the venting code requirements for those products and should not require additional training from local jurisdictions as a result of the DFR. As a result, the 90-percent AFUE minimum standard in the northern region promulgated by the DFR would not add any additional burden on local authorities, beyond what is already required in terms of enforcing building codes.

2. Evaluation of Adverse Comments

AGL asserted that DOE has stated that ''adverse'' impacts will be weighed against benefits of the DFR in its evaluation of whether to withdraw the DFR, and it believes that DOE does not have the statutory authority to weigh ''adverse'' impacts against the benefit of minimum efficiencies because the statutory language does not grant this power. AGL contends that the statute requires DOE to weigh adverse comments independent of other outcomes anticipated from the rule. AGL also argued that adverse comments may present issues previously unaddressed by DOE. AGL believes that weighing new issues against DOE's current analysis would be inappropriate, because the issues may not have been examined by the DOE. AGL stated that DOE must evaluate the ''adverse'' nature of all comments raised outside of the current analysis, except where the comments conflict with the current analysis as published by DOE. (AGL, No. 31 at p. 3)

In reviewing the statute, DOE notes that EPCA directs the Secretary to withdraw the direct final rule if one or more adverse public comments is received and, based on the rulemaking record, the Secretary determines that such adverse public comments provide a reasonable basis for withdrawing the direct final rule. (42 U.S.C. 6295(p)(4)(C)) DOE believes, therefore, that EPCA provides DOE the discretion to weigh the significance and credibility of the adverse comments received. When evaluating adverse comments, DOE weighed the significance of each comment individually and all comments cumulatively to determine whether they provided a reasonable basis for withdrawal of the final rule. DOE considered each adverse comment based on its merits and the background data and information that supported that comment. DOE notes that this weighting is done separately from the weighting of the benefits and burdens imposed by minimum efficiency standards, which weight the adverse impacts (*i.e.,* burdens) of standards against the benefits to consumers in determining which standard level is justified, as directed by EPCA (42 U.S.C. 6295(o)(2)(B)(i)) .

3. Time Allowed for Public Input

MUD commented that the rulemaking process was conducted too quickly to allow for input from the general public and the jurisdictions responsible for furnace installation. (MUD, No. 29 at p. 1)

In response, DOE notes that the Consensus Agreement was submitted to DOE on January 15, 2010. DOE subsequently posted the document on its Web site [24] and requested comment on the agreement in its March 2010 rulemaking analysis plan for residential furnaces [25] and in its March 2010 preliminary analysis for central air conditioners and heat pumps (75 FR 14368). After considering comments received in response to the rulemaking analysis plan for furnaces and preliminary analysis for central air conditioners and heat pumps, DOE performed an in depth analysis of the Consensus Agreement efficiency levels and other efficiency levels, and ultimately proposed the levels contained in the agreement as Federal energy conservation standard levels in the DFR. Then, as directed by EPCA, DOE accepted comments for 110 days. (42 U.S.C. 6295(p)(4)(B)) DOE notes that in the typical standards rulemaking procedure, the statute requires and DOE provides a 60-day comment period. Thus, the 110-day comment period was longer than usual for a similar rulemaking. Moreover, at the time of the close of the 110-day DFR comment period, the Consensus Agreement had been publicly available on DOE's Web site for more than one and a half years, and DOE has formally requested comments on the agreement in three separate rulemaking notices. Therefore, DOE believes that there has been ample opportunity for input from the general public and other interested parties on the Consensus Agreement and does not agree with MUD's assertion that it was implemented too quickly to allow for input from the general public or other interested parties.

In addition, the National Propane Gas Association (NPGA) and APGA requested that DOE extend the comment period on the DFR. NPGA cited delayed access to the technical support document, difficulties obtaining the software used to run the LCC analysis and lack of an enforcement plan as reasons that DOE should extend the comment period. (NPGA, No. 6 at pp. 1–2; APGA, No. 24, pp. 14–15).

DOE notes that EPCA provides that not later than 120 days after issuance of the DFR, DOE must publish a determination in the **Federal Register** whether the rule should take effect or be withdrawn based upon significant adverse comment. (42 U.S.C. 6295(p)(4)(C)) Given the statutory limitation on the time period provided in EPCA, DOE could not extend the comment period to allow interested parties additional time without jeopardizing its ability to meet the requirements of EPCA. As such, DOE was not able to extend the comment period on the DFR.

III. Department of Justice Analysis of Competitive Impacts

EPCA directs DOE to consider any lessening of competition that is likely to result from new or amended standards. It also directs the Attorney General of the United States (Attorney General) to determine the impact, if any, of any lessening of competition likely to result from a proposed standard and to transmit such determination to the Secretary within 60 days of the publication of a proposed rule, together with an analysis of the nature and extent of the impact. (42 U.S.C. 6295(o)(2)(B)(i)(V) and (B)(ii)) DOE published a NOPR containing energy conservation standards identical to those set forth the direct final rule and transmitted a copy of the direct final rule and the accompanying TSD to the Attorney General, requesting that the U.S. Department of Justice (DOJ) provide its determination on this issue. DOE has published DOJ's comments at the end of this notice.

DOJ reviewed the amended standards in the direct final rule and the final TSD provided by DOE. As a result of its analysis, DOJ concluded that the amended standards issued in the direct final rule are unlikely to have a significant adverse impact on competition. DOJ further noted that the amended standards established in the direct final rule were the same as recommended standards submitted in the Consensus Agreement, which was

[24] For more information see: *http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/furnaces_framework_jointstakeholdercomments.pdf*

[25] The rulemaking analysis plan was published on DOE's Web site and announced through the publication of a notice of public meeting in the **Federal Register**. 75 FR 12144 (March 15, 2010).

For more information see: *http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/furnaces_framework_rap.pdf.*

signed by a broad cross-section of industry participants.

IV. National Environmental Policy Act

Pursuant to the National Environmental Policy Act and the requirements of 42 U.S.C. 6295(o)(2)(B)(i)(VI), DOE prepared an environmental assessment (EA) of the impacts of the standards for residential furnaces, central air conditioners, and heat pumps in the direct final rule, which was included as chapter 15 of the direct final rule TSD. DOE found that the environmental effects associated with the standards for furnaces and central air conditioners and heat pumps were not significant. Therefore, after consideration of the comments received on the direct final rule, DOE issued a Finding of No Significant Impact (FONSI) pursuant to NEPA, the regulations of the Council on Environmental Quality (40 CFR parts 1500–1508), and DOE's regulations for compliance with NEPA (10 CFR part 1021). The FONSI is available in the docket for this rulemaking at *http://www.regulations.gov*.

V. Conclusion

In summary, based on the discussion above, DOE has determined that the comments received in response to the direct final rule for amended energy conservation standards for residential furnaces, central air conditioners, and heat pumps do not provide a reasonable basis for withdrawal of the direct final rule. As a result, the amended energy conservation standards set forth in the direct final rule become effective on October 25, 2011. Compliance with these standards is required on May 1, 2013 for non-weatherized gas and oil-fired furnaces and mobile home gas furnaces and on January 1, 2015 for weatherized gas furnaces and central air conditioners and heat pumps.

Issued in Washington, DC, on October 24, 2011.

Kathleen B. Hogan,

Deputy Assistant Secretary for Energy Efficiency, Energy Efficiency and Renewable Energy.

U.S. Department of Justice

Antitrust Division

Sharis A. Pozen,
Acting Assistant Attorney General,
RFK Main Justice Building,
950 Pennsylvania Avenue, NW.,
Washington, DC 20530–0001,
(202) 514–24011 (202) 616–2645 (Fax)

August 25, 2011

Mr. Eric Fygi, Deputy General Counsel, Department of Energy, Washington, DC 20585

Dear Deputy General Counsel Fygi: I am responding to your June 27, 2011 letter seeking the views of the Attorney General about the potential impact on competition of proposed energy conservation standards for residential furnaces, central air conditioners, and heat pumps. Your request was submitted under Section 325(o)(2)(B)(i)(V) of the Energy Policy and Conservation Act, as amended (ECPA), 42 U.S.C. 6295(o)(2)(B)(i)(5) and 42 U.S.C. 6316(a), which requires the Attorney General to make a determination of the impact of any lessening of competition that is likely to result from the imposition of proposed energy conservation standards. The Attorney General's responsibility for responding to requests from other departments about the effect of a program on competition has been delegated to the Assistant Attorney General for the Antitrust Division in 28 CFR 0.40(g).

In conducting its analysis the Antitrust Division examines whether a proposed standard may lessen competition, for example, by substantially limiting consumer choice, by placing certain manufacturers at an unjustified competitive disadvantage, or by inducing avoidable inefficiencies in production or distribution of particular products. A lessening of competition could result in higher prices to consumers, and perhaps thwart the intent of the revised standards by inducing substitution to less efficient products.

We have reviewed the proposed standards contained in the Direct Final Rule (76 Fed. Reg. 37408, June 27, 2011). We have also reviewed supplementary information submitted to the Attorney General by the Department of Energy. Based on this review, our conclusion is that the proposed energy conservation standards for residential furnaces, residential central air conditioners and heat pumps are unlikely to have a significant adverse impact on competition. In reaching our conclusion, we note that these proposed energy standards were adopted from a Consensus Agreement signed by a broad cross-section of industry participants.

Sincerely,

Sharis A. Pozen

[FR Doc. 2011–28146 Filed 10–28–11; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA–2011–1041; Directorate Identifier 2010–SW–109–AD; Amendment 39–16821; AD 2010–26–52]

RIN 2120–AA64

Airworthiness Directives; Bell Helicopter Textron, Inc. Model 204B, 205A, 205A–1, 205B, 210, 212, 412, 412CF, 412EP Helicopters

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; request for comments.

SUMMARY: We are publishing in the **Federal Register** an amendment which was sent previously to all known U.S. owners and operators that supersedes an existing airworthiness directive (AD) for the specified Bell Helicopter Textron, Inc. (BHT) Model helicopters with certain tail rotor blades (blades). The superseded AD requires, before further flight, replacing certain blades with airworthy blades. This AD retains the requirements of the superseded AD but adds new blade part numbers (P/Ns) and serial numbers (S/Ns) to the applicability. This AD was prompted by another incident in which the blade tip weight separated from a blade during flight, causing vibration. This incident led to the determination that additional blades could be affected, and should be added to the applicability. We are issuing this AD to prevent loss of the blade tip weight, loss of a blade, and subsequent loss of control of the helicopter.

DATES: This AD is effective November 15, 2011 to all persons except those persons to whom it was made immediately effective by Emergency AD 2010–26–52, issued on December 10, 2010, which contained the requirements of this amendment.

We must receive comments on this AD by December 30, 2011.

ADDRESSES: You may send comments by any of the following methods:

- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov*. Follow the instructions for submitting comments.
- *Fax:* (202) 493–2251.
- *Mail:* U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- *Hand Delivery:* Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this AD, contact Bell Helicopter Textron, Inc., P.O. Box 482, Fort Worth, TX 76101, telephone (817) 280–3391, fax (817) 280–6466, or at *http://www.bellcustomer.com/files/*.

Examining the AD Docket

You may examine the AD docket on the Internet at *http://www.regulations.gov*, or in person at the Docket Operations Office between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The street address for the Docket Operations Office (*telephone:* 1 (800) 647–5527) is in the

EN5804

Date Submitted	7/31/2012	**Section**	C403.2.3(2)	**Proponent**	Ann Stanton
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **No**

Related Modifications

Summary of Modification

Update Table C403.2.3(2) to federal efficiencies effective 1/1/15.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process. Update to revised federal standards for residential sized equipment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies. Updating to federal standards comes under the Commission's legislative mandate.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1st Comment Period History 08/09/2012 - 09/23/2012

5804-A2

Proponent Ann Stanton **Submitted** 9/19/2012 **Attachments** Yes

Rationale

Comment A2 reflects needed corrections to the table to make it correct after consultation with Karim Amrane of AHRI. Both ASHRAE 90.1 and IECC had listed the SEER for Small duct high velocity units at 10.0 SEER, while the US DOE has had it at SEER 13.0, effective in 2006. Also DOE has replaced the category "Through-the-wall" units by the term "Space-constrained products". See also the backup files from Mod 5803 A1 as backup for Mod 5804.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

None.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. It represents a national standard for equipment efficiencies.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. It represents a national standard for equipment efficiencies.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. It represents a national standard for equipment efficiencies.

Does not degrade the effectiveness of the code

No. It represents a national standard for equipment efficiencies.

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

EN5804-G3

Proponent Ann Stanton **Submitted** 12/14/2012 **Attachments** No

Comment:

This mod contains important information that will be incorporated on a timeline. It can wait until the Glitch fix cycle to incorporate commercial provisions as well.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5804-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

The proposed amendment does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process. (2015 cycle perhaps)

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

1st Comment Period History 08/09/2012 - 09/23/2012

EN5804-G2

Proponent Karim Amrane **Submitted** 9/22/2012 **Attachments** Yes

Comment:

See attached comments.

TABLE C403.2.3(2)

MINIMUM EFFICIENCY REQUIREMENTS

ELECTRICALLY OPERATED UNITARY AND APPLIED HEAT PUMPS

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency[b] Before 1/1/15	Minimum Efficiency[b] Effective 1/1/15	Test Procedure[a]
Air Cooled (Cooling mode)	<65,000 Btu/h[b]	All	Split System	13.0 SEER	14.0 SEER	AHRI 210/240
			Single Package	13.0 SEER	14.0 SEER	
Through-the Wall, Air-cooled cooling mode	=30,000 Btu/h[b]	All	Split System	13.0 SEER	No change	
			Single Packaged	13.0 SEER	No change	
Small-duct, high-velocity air cooled	<65,000 Btu/h[b]	All	Split system	10.0 SEER	No change	
Air cooled (cooling mode)	=65,000 Btu/h and <135,000 Btu/h	Electric resistance (or none)	Split System and Single Package	11.0 EER[c] 11.2 IEER[c]	No change	AHRI 340/360
		All other	Split System and Single Package	10.8 EER 11.2 IEER	No change	
	=135,000 Btu/h and <240,000 Btu/h	Electric resistance (or none)	Split System and Single Package	10.6 EER 10.7 IEER	No change	
		All other	Split System and Single Package	10.4 EER 10.5 IEER	No change	
	=240,000	Electric resistance (or none)	Split System and Single Package	9.5 EER 9.6 IEER	No change	

	Btu/h	All other	Split System and Single Package	9.3 EER 9.4 IEER	No change	
Water Source (cooling mode)	<17,000 Btu/h	All	86°F entering water	11.2 EER	No change	ISO 13256-1
	=17,000 Btu/h and <65,000 Btu/h	All	86°F entering water	12.0 EER	No change	
	=65,000 Btu/h and <135,000 Btu/h	All	86°F entering water	12.0 EER	No change	
Ground water source (cooling mode)	<135,000 Btu/h	All	59°F entering water	16.2 EER	No change	
		All	77°F entering water	13.4 EER	No change	
Water-source water to water (Cooling mode)	<135,000 Btu/h	All	86°F entering water	10.6 EER	No change	ISO 13256-2
		All	59°F entering water	16.3 EER	No change	
Ground water source – Brine to water (cooling mode)	<135,000 Btu/h	All	77°F entering water	12.1 EER	No change	
Air cooled (Heating mode)	<65,000 Btu/h[b]	--	Split system	7.7 HSPF	8.2 HSPF	AHRI 210/240
		--	Single package	7.7 HSPF	8.0 HSPF	
Through the wall (Air cooled, heating mode)	=30,000 Btu/h[b] (cooling capacity)	--	Split system	7.4 HSPF	No change	
		--	Single package	7.4 HSPF	No change	
Small-duct high velocity (air cooled, heating mode)	=65,000 Btu/h[b]	---	Split system	6.8 HSPF	7.7 HSPF	
Air cooled (Heating mode)	=65,000 Btu/h		47° db/43° wb	3.3 COP	No change	AHRI

	and <135,000 Btu/h (cooling capacity)	---	Outdoor Air			340/360
			17° db/15° wb Outdoor Air	2.25 COP	No change	
	=135,000 Btu/h (cooling capacity)	---	47° db/43° wb Outdoor Air	3.2 COP	No change	
			17° db/15° wb Outdoor Air	2.05 COP	No change	
Water source (Heating mode)	<135,000 Btu/h (cooling capacity)	---	68°F entering water	4.2 COP	No change	ISO 13256-1
Ground water source (Heating mode)	<135,000 Btu/h (cooling capacity)	---	50°F entering water	3.6 COP	No change	
Ground source (Heating mode)	<135,000 Btu/h (cooling capacity)	---	32°F entering water	3.1 COP	No change	
Water-source Water to water (heating mode)	<135,000 Btu/h (cooling capacity)	---	68°F entering water	3.7 COP	No change	ISO 13256-2
		---	50°F entering water	3.1 COP	No change	
Ground source Brine to water (heating mode)	<135,000 Btu/h (cooling capacity)	---	32°F entering water	2.5 COP	No change	

For SI : 1 British thermal unit per hour = 0.2931 W, °C = [(°F) – 32]/1.8

[a] Chapter 6 of the referenced standard contains a complete specification of the referenced test procedure, including the reference year version of the test procedure.

[b] Single-phase, air-cooled air-conditioners less than 65,000 Btu/h are regulated by NAECA. SEER values are those set by NAECA.

TABLE C403.2.3(2)

MINIMUM EFFICIENCY REQUIREMENTS

ELECTRICALLY OPERATED UNITARY AND APPLIED HEAT PUMPS

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency[b]		Test Procedure[a]
				Before 1/1/15	Effective 1/1/15	
Air Cooled (Cooling mode)	<65,000 Btu/h[b]	All	Split System	13.0 SEER	14.0 SEER	AHRI 210/240
			Single Package	13.0 SEER	14.0 SEER	
Space-constrained ~~Through-the Wall~~, Air-cooled cooling mode	=30,000 Btu/h[b]	All	Split System	12.0 ~~13.0~~ SEER	No change	
			Single Packaged	12.0 ~~13.0~~ SEER	No change	
Small ~~Single~~-duct, high-velocity, air cooled	<65,000 Btu/h[b]	All	Split system	13.0~~10.0~~SEER[c]	No change[c]	
Air cooled (cooling mode)	=65,000 Btu/h and <135,000 Btu/h	Electric resistance (or none)	Split System and Single Package	11.0 EER[c] 11.2 IEER[c]	No change	AHRI 340/360
		All other	Split System and Single Package	10.8 EER 11.2 IEER	No change	
	=135,000 Btu/h and <240,000 Btu/h	Electric resistance (or none)	Split System and Single Package	10.6 EER 10.7 IEER	No change	
		All other	Split System and Single Package	10.4 EER 10.5 IEER	No change	
	=240,000	Electric resistance (or none)	Split System and Single Package	9.5 EER 9.6 IEER	No change	

	Btu/h	All other	Split System and Single Package	9.3 EER 9.4 IEER	No change	
Water Source (cooling mode)	<17,000 Btu/h	All	86°F entering water	11.2 EER	No change	ISO 13256-1
	=17,000 Btu/h and <65,000 Btu/h	All	86°F entering water	12.0 EER	No change	
	=65,000 Btu/h and <135,000 Btu/h	All	86°F entering water	12.0 EER	No change	
Ground water source (cooling mode)	<135,000 Btu/h	All	59°F entering water	16.2 EER	No change	
		All	77°F entering water	13.4 EER	No change	
Water-source water to water (Cooling mode)	<135,000 Btu/h	All	86°F entering water	10.6 EER	No change	ISO 13256-2
		All	59°F entering water	16.3 EER	No change	
Ground water source – Brine to water (cooling mode)	<135,000 Btu/h	All	77°F entering water	12.1 EER	No change	
Air cooled (Heating mode)	<65,000 Btu/h[b]	--	Split system	7.7 HSPF	8.2 HSPF	AHRI 210/240
		--	Single package	7.7 HSPF	8.0 HSPF	
Space-constrained ~~Through the wall~~ (Air cooled, heating mode)	=30,000 Btu/h[b] (cooling capacity)	--	Split system	7.4 HSPF	No change	
		--	Single package	7.4 HSPF	No change	
Small-duct high velocity (air cooled, heating mode)	=65,000 Btu/h[b]	---	Split system	7.7 ~~6.8~~ HSPF[c]	No change[c]	

					~~7.7 HSPF~~	
Air cooled (Heating mode)	=65,000 Btu/h and <135,000 Btu/h (cooling capacity)	---	47° db/43° wb Outdoor Air	3.3 COP	No change	AHRI 340/360
			17° db/15° wb Outdoor Air	2.25 COP	No change	
	=135,000 Btu/h (cooling capacity)	---	47° db/43° wb Outdoor Air	3.2 COP	No change	
			17° db/15° wb Outdoor Air	2.05 COP	No change	
Water source (Heating mode)	<135,000 Btu/h (cooling capacity)	---	68°F entering water	4.2 COP	No change	ISO 13256-1
Ground water source (Heating mode)	<135,000 Btu/h (cooling capacity)	---	50°F entering water	3.6 COP	No change	
Ground source (Heating mode)	<135,000 Btu/h (cooling capacity)	---	32°F entering water	3.1 COP	No change	
Water-source Water to water (heating mode)	<135,000 Btu/h (cooling capacity)	---	68°F entering water	3.7 COP	No change	ISO 13256-2
		---	50°F entering water	3.1 COP	No change	
Ground source Brine to water (heating mode)	<135,000 Btu/h (cooling capacity)	---	32°F entering water	2.5 COP	No change	

For SI : 1 British thermal unit per hour = 0.2931 W, °C = [(°F) – 32]/1.8

[a] Chapter 6 of the referenced standard contains a complete specification of the referenced test procedure, including the reference year version of the test procedure.

[b] Single-phase, air-cooled air-conditioners less than 65,000 Btu/h are regulated by NAECA. SEER values are those set by NAECA.

[c]As granted by a U.S. Department of Energy letter of exception, specific to individual companies, SDHV products without a letter of exception shall have the same efficiency as air-cooled air-conditioners.

AHRI Air-Conditioning, Heating, and Refrigeration Institute

September 22, 2012

RE: Comments on Florida Building Code Proposal 5804

These comments are submitted by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). AHRI is a trade association representing manufacturers of heating, air conditioning and refrigeration products.

The proposed amendments to Table C403.2.3(2) are based on a final rule published in the Federal Register by the Department of Energy (DOE) on October 31, 2011. However, the final rule promulgated by DOE amends the federal minimum energy conservation standards for residential heat pumps less than 65,000 Btu/h as opposed to small commercial packaged air conditioner and heating equipment less than 65,000 Btu/h. As a way of background, the Energy Policy and Conservation Act (EPCA) regulates separately residential and commercial heat pumps. Definitions for residential central air conditioners and heat pumps are contained in 10 CFR 430.2 and minimum energy efficiency standards can be found in 10 CFR 430.32. On the other hand, definitions for small commercial air conditioners and heating equipment can be found in 10 CFR 431.92 and minimum energy efficiency standards are in 10 CFR 431.97.

The new minimum federal standards promulgated by DOE in 2011 apply to residential heat pumps and as such cannot be required for small commercial heat pumps contained in Table C403.2.3 (2). The current federal minimum efficiency standards for small commercial packaged heat pumps remain unchanged at 13 SEER/7.7 HSPF (as currently listed in ASHRAE standard 90.1-2010). Requiring higher minimum efficiencies for commercial heat pumps as proposed in the amendment would be a violation of federal preemption. Therefore, AHRI strongly recommends that the amendment be rejected to avoid that the Florida Building Code be in violation of Federal law. If the intent was to amend the minimum energy efficiency standards for residential heat pumps, then a separate amendment should be developed that would clearly state that the proposed efficiencies apply to residential and not commercial products.

Sincerely,

Karim Amrane
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EN5805

Date Submitted	7/31/2012	**Section**	C403.2.3(4)	**Proponent**	Ann Stanton
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

Summary of Modification

Update Table C403.2.3(4) to federal efficiencies effective 1/1/15.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process. Update to revised federal standards for residential sized equipment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies. Updating to federal standards comes under the Commission's legislative mandate.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5805-A1

Proponent Ann Stanton **Submitted** 12/14/2012 **Attachments** Yes

Rationale

The Energy TAC voted this mod NAR to give proponent the chance to respond to the comment by Stanonik to put the commercial three phase power efficiencies back in. Those efficiencies are in this alternative language comment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None. Keeps it consistent with federal rules.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1st Comment Period History 08/09/2012 - 09/23/2012

EN5805-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

The proposed amendment does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process. (2015 cycle perhaps)
The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

EN5805-G2

Proponent	Frank Stanonik	Submitted	9/23/2012	Attachments	No

Comment:

The 80% thermal efficiency requirement for gas and oil furnaces covered by footnote c in Table C403.2.3(4) should be retained. The DOE residential minumum AFUE requirements do not apply to gas or oil furnaces that use a three phase electric supply or which are part of a combination units with a cooling capacity greater than or equal to 65,000 Btu/h. Those furnaces may comply with either the minimum AFUE or thermal efficiency requirement.

TABLE C403.2.3(4)

WARM AIR FURNACES AND COMBINATION WARM AIR FURNACES/AIR-CONDITIONING UNITS,

WARM AIR DUCT FURNACES AND UNIT HEATERS

Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[d,e]	Test Procedure[a]
Warm Air Furnace, Gas-Fired Non-weatherized Weatherized gas furnace	 <225,000 Btu/h	---	 80 ~~78%~~ AFUE ~~or 80% E_t~~[e] 81% AFUE (Effective 1/1/15)	DOE 10 CFR, Part 430 or Section 2.39, Thermal Efficiency of ANSI Z 21.47
	=225,000 Btu/h	Maximum Capacity[c]	80% E_c[f]	Section 2.39, Thermal Efficiency of ANSI Z21.47
Warm Air Furnace, Oil-Fired Non-weatherized Weatherized oil-fired furnace	 <225,000 Btu/h	---	 83 ~~78%~~ AFUE ~~or 80% E_t~~[e] 78% AFUE (Effective 1/1/15)	DOE 10 CFR, Part 430 or Section 42, Combustion, of UL 727
	=225,000 Btu/h	Maximum Capacity[b]	81% E_t[g]	Section 42, Combustion, of UL 727
Warm Air Duct Furnaces, Gas-Fired	All Capacities	Maximum Capacity[b]	80% E_c	Section 2.10, Efficiency of ANSI Z83.8
Warm Air Unit Heaters, Gas-Fired	All Capacities	Maximum Capacity[b]	80% E_c	Section 2.10, Efficiency of ANSI Z83.8
Warm Air Unit Heaters, Oil-Fired	All Capacities	Maximum Capacity[b]	80% E_c	Section 40, Combustion, of UL 731
Mobile home furnace, gas-fired	<225,000 Btu/h	---	80 % AFUE (Effective 1/1/15)	DOE 10 CFR, Part 430
Mobile home furnace, oil-fired	<225,000 Btu/h	---	75 % AFUE (Effective 1/1/15)	DOE 10 CFR, Part 430

For SI: 1 British thermal unit per hour = 0.2931 W.

[a] Chapter 6 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

[b] Minimum and maximum ratings as provided for and allowed by the unit's controls.

[c] Combination units not covered by NAECA (3 phase power or cooling capacity greater than or equal to 65,000 Btu/h) may comply with either rating.

[d] E_t = Thermal efficiency. See test procedure for detailed discussion

[e] E_c= Combustion efficiency (100% less flue losses). See test procedure for detailed discussion.

[f] E_c = Combustion efficiency. Units must also include an IID, have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

[g] E_t = Thermal efficiency. Units must also include an IID, have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

TABLE 503.2.3(4)

WARM AIR FURNACES AND COMBINATION WARM AIR FURNACES/AIR-CONDITIONING UNITS,

WARM AIR DUCT FURNACES AND UNIT HEATERS

Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[d,e]	Test Procedure[a]
Warm Air Furnace, Gas-Fired Non-weatherized Weatherized gas furnace	<225,000 Btu/h	---	80 ~~78~~% AFUE or 80% E_t[c] 81% AFUE (Effective 1/1/15)	DOE 10 CFR, Part 430 or Section 2.39, Thermal Efficiency of ANSI Z 21.47
	=225,000 Btu/h	Maximum Capacity[c]	80% E_c[f]	Section 2.39, Thermal Efficiency of ANSI Z21.47
Warm Air Furnace, Oil-Fired Non-weatherized Weatherized oil-fired furnace	<225,000 Btu/h	---	83 ~~78~~% AFUE or 80% E_t[c] 78% AFUE (Effective 1/1/15)	DOE 10 CFR, Part 430 or Section 42, Combustion, of UL 727
	=225,000 Btu/h	Maximum Capacity[b]	81% E_t[g]	Section 42, Combustion, of UL 727
Warm Air Duct Furnaces, Gas-Fired	All Capacities	Maximum Capacity[b]	80% E_c	Section 2.10, Efficiency of ANSI Z83.8
Warm Air Unit Heaters, Gas-Fired	All Capacities	Maximum Capacity[b]	80% E_c	Section 2.10, Efficiency of ANSI Z83.8
Warm Air Unit Heaters, Oil-Fired	All Capacities	Maximum Capacity[b]	80% E_c	Section 40, Combustion, of UL 731
Mobile home furnace, gas-fired	<225,000 Btu/h	---	80 % AFUE (Effective 1/1/15)	DOE 10 CFR, Part 430
Mobile home furnace, oil-fired	<225,000 Btu/h	---	75 % AFUE	DOE 10 CFR, Part 430

			(Effective 1/1/15)	

For SI: 1 British thermal unit per hour = 0.2931 W.

[a] Chapter 6 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

[b] Minimum and maximum ratings as provided for and allowed by the unit's controls.

[c] Combination units not covered by NAECA (3 phase power or cooling capacity greater than or equal to 65,000 Btu/h) may comply with either rating.

[d] E_t = Thermal efficiency. See test procedure for detailed discussion

[e] E_c= Combustion efficiency (100% less flue losses). See test procedure for detailed discussion.

[f] E_c = Combustion efficiency. Units must also include an IID, have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

[g] E_t = Thermal efficiency. Units must also include an IID, have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

EN6013

Date Submitted	8/2/2012	**Section**	R402.4.1.2	**Proponent**	Jeff Sonne / FSEC
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

6014

Summary of Modification

Raise building air leakage rate limit, provide air leakage testing standard and clarify who is qualified to test air leakage.

Rationale

Temperature differences in Florida are small; the primary load from infiltration is humidity. However, it requires considerable energy use to remove excessive humidity that would be introduced through forced ventilation at the levels required below 5 ach50. The 9 ach50 allows slightly leakier homes to not have the expense and energy use associated with mechanical ventilation and maintains a level of air quality consistent with historical practice, which has not been shown to be problematic in Florida to date.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Assists by allowing a small range of leakage rates which would not require mechanical ventilation systems and associated verifications, and by providing a testing standard and clarification of who is qualified to test air leakage.

Impact to building and property owners relative to cost of compliance with code

Reduces first cost by allowing a small range of leakage rates which would not require mech. ventilation. May also lower ongoing costs by reducing humidity introduced by forced ventilation that would need to be removed. Testing standard and qualifications reduce confusion and potential related costs.

Impact to industry relative to the cost of compliance with code

Reduces first cost by allowing a small range of leakage rates which would not require mech. ventilation. May also lower ongoing costs by reducing humidity introduced by forced ventilation that would need to be removed. Testing standard and qualifications reduce confusion and potential related costs.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes; reduces costs while maintaining a level of air quality consistent with historical practice which has not been shown to be problematic in Florida to date; also provides a testing standard and clarifies who is qualified to test air leakage.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by reducing costs while maintaining a level of air quality consistent with historical practice which has not been shown to be problematic in Florida to date; also provides a testing standard and clarifies who is qualified to test air leakage.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate; provides a testing standard and clarification of who is qualified to test air leakage.

Does not degrade the effectiveness of the code

Improves code effectiveness by reducing costs while maintaining a level of air quality consistent with historical practice which has not been shown to be problematic in Florida to date, and by providing a testing standard and clarifying who is qualified to test air leakage.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

6013-A3

Proponent Mike Moore **Submitted** 12/7/2012 **Attachments** Yes

Rationale

This change is needed to ensure that there is consistency across Chapter 11 and Chapter 3 of the IRC, ensuring that both support the practice of building tight and ventilating right. Please see attached file for the rationale. Mechanical ventilation is needed to provide acceptable indoor air quality for tight homes, which are required by code. This need is recognized by R403.5, which requires mechanical ventilation. This change simply provides consistency across Chapter 3 and Chapter 11 of the IRC. As an alternative to this language, the committee could change R303.4 to say "less than or equal to 5 air changes per hour". This would also ensure consistency across both chapters, while giving builders a little more leniency to satisfy the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Reduces burden by ensuring consistency across codes.

Impact to building and property owners relative to cost of compliance with code

No impact, as mechanical ventilation is already required by R403.5.

Impact to industry relative to the cost of compliance with code

No impact, as mechanical ventilation is already required by R403.5.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Mechanical ventilation is needed to provide acceptable indoor air quality for tight homes, which are required by code. This need is recognized by R403.5, which requires mechanical ventilation. This change simply provides consistency across Chapter 3 and Chapter 11 of the IRC.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by providing consistency across chapters.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

There are may materials, products, methods, and systems that can be used to successfully provide mechanical ventilation.

Does not degrade the effectiveness of the code

Does not degrade effectiveness. Rather, it ensures consistency.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

6013-A2

Proponent Jeff Sonne / FSEC **Submitted** 12/13/2012 **Attachments** Yes

Rationale

Temperature differences in Florida are small; the primary load from infiltration is humidity. However, it requires considerable energy use to remove excessive humidity that would be introduced through forced ventilation at the levels required below 5 ach50. The 7 ach50 allows slightly leakier homes to not have the expense and energy use associated with mechanical ventilation and maintains a level of air quality consistent with historical practice, which has not been shown to be problematic in Florida to date.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Assists by allowing a small range of leakage rates which would not require mechanical ventilation systems and associated verifications, and by providing a testing standard and clarification of who is qualified to test air leakage.

Impact to building and property owners relative to cost of compliance with code

Reduces first cost by allowing a small range of leakage rates which would not require mech. ventilation. May also lower ongoing costs by reducing humidity introduced by forced ventilation that would need to be removed. Testing standard and qualifications reduce confusion and potential related costs.

Impact to industry relative to the cost of compliance with code

Reduces first cost by allowing a small range of leakage rates which would not require mech. ventilation. May also lower ongoing costs by reducing humidity introduced by forced ventilation that would need to be removed. Testing standard and qualifications reduce confusion and potential related costs.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes; reduces costs while maintaining a level of air quality consistent with historical practice which has not been shown to be problematic in Florida to date; also provides a testing standard and clarifies who is qualified to test air leakage.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by reducing costs while maintaining a level of air quality consistent with historical practice which has not been shown to be problematic in Florida to date; also provides a testing standard and clarifies who is qualified to test air leakage.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate; provides a testing standard and clarification of who is qualified to test air leakage.

Does not degrade the effectiveness of the code

Improves code effectiveness by reducing costs while maintaining a level of air quality consistent with historical practice which has not been shown to be problematic in Florida to date, and by providing a testing standard and clarifying who is qualified to test air leakage.

Is the proposed code modification part of a prior code version? No

1st Comment Period History 08/09/2012 - 09/23/2012

EN6013-G1

Proponent BOAF CDC **Submitted** 9/19/2012 **Attachments** No

Comment:

Codes in general do not cross reference for professional credentialing provisions that are found in State Statute. Further, while the BERS program may provide certification for these skill sets and trades, BERS is completely voluntarily as a residential program and not mandated to be completed as part of normal residential construction. It is not the intent to have a code mandated sole source for compliance. Rather, it allows the tester to be approved by the AHJ and it should remain that way. Original language should be preserved to allow for greater choice in the marketplace and maintain the building official's authority to recognize such entities.

1st Comment Period History 08/09/2012 - 09/23/2012

EN6013-G2

Proponent Mike Moore **Submitted** 9/22/2012 **Attachments** Yes

Comment:

Request disapproval of the component of EN6013 that increases the minimum building air leakage. Please see attachment for rationale.

1st Comment Period History 08/09/2012 - 09/23/2012

EN6013-G3

Proponent Mike Moore **Submitted** 9/22/2012 **Attachments** Yes

Comment:

Please see the attached for a comment that proposes alternate language. I tried to submit this as an alternate language comment, but the on-line form did not work for me.

R402.4.1.2 Testing.

The building or dwelling unit shall be tested and verified as having an air leakage rate ~~of~~ not exceeding ~~5~~9 air changes per hour in Climate Zones 1 and 2~~, and 3 air changes per hour in Climate Zones 3 through 8~~. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals) in accordance with Section 802 of RESNET Standards. ~~Where required by the code official, t~~Testing shall be conducted by ~~an approved third party~~a Class 1 Florida Rater. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.

[no changes to remaining text in section]

R402.4.1.2 Testing.

The building or dwelling unit shall be tested and verified as having an air leakage rate ~~of~~ not exceeding ~~5~~7 air changes per hour in Climate Zones 1 and 2~~, and 3 air changes per hour in Climate Zones 3 through 8~~. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals) in accordance with Section 802 of RESNET Standards. ~~Where required by the code official, t~~Testing shall be conducted by ~~an approved third party~~a Class 1 Florida Rater or as authorized by Florida statute. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.

Reject the body of EN6013, but make the following change to the base code:

R402.4.1.2 Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate ~~of not exceeding~~ less than 5 air changes per hour in Climate Zones1 and 2~~, and 3 air changes per hour in Climate Zones 3 through 8~~.

[Rest of section remains unchanged.]

NEWPORT VENTURES

September 21, 2012

Energy Technical Advisory Committee
Florida Building Commission
1940 North Monroe Street
Tallahassee FL 32399

Re: EN6013

Dear FBC Staff and Energy TAC:

Newport Ventures, representing Broan-NuTone, respectfully requests disapproval of the component of EN6013 that changes the minimum air leakage rate from 5 ACH 50 to 9 ACH 50. Based on EN6013's reason statement, its intention is to reduce energy costs and humidity loads associated with the 2012 IRC whole house mechanical ventilation (WHMV) flow rates and infiltration levels. However, calculations show that the 2012 IRC minimum requirement of 5 ACH 50 with WHMV would actually result in a 10% lower outdoor air flow rate than EN6013's proposed 9 ACH 50 without WHMV. Also, in trying to reach the 5 ACH 50 minimum infiltration rate, many builders will achieve even better levels of air tightness, meaning even less energy use to condition outdoor air than under the code-minimum requirement.

Maintaining the minimum 5 ACH 50 air tightness level and the requirement for WHMV has multiple advantages, including:

- Compliance with ASHRAE 62.2's minimum recommended flow rates
- Less outdoor air introduction than the leaky home scenario while still maintaining or improving IAQ
- A tight envelope with ability for greater occupant control over the introduction of outdoor air. If occupants determine they do not require continuous WHMV throughout the year, they may elect to turn off the WHMV system, and save even more energy.
- Less outdoor air introduction can translate to less energy required to dehumidify and condition the air
- More consistent indoor air quality throughout the year, instead of the spikes and troughs that occur with relying solely on building leakage
- Less dependence on temperature differentials and wind events to provide adequate outdoor air
- Low-cost and energy-efficient WHMV solutions are permitted by the 2012 IRC to serve double-duty as bath exhaust fans (note that ASHRAE 62.2-2010 addendum G has removed climatic restrictions on the use of exhaust fans in hot humid climates based on the rationale that climatic "restrictions were not justified by recent field experience. There was general agreement that the problems in both hot/humid and cold climates were caused by specific and easily avoidable errors in envelope design.")
- A wide variety of supply and balanced WHMV solutions are also available to the home builder

- In a separate comment to proposal EN5055, higher WHMV fan efficacy levels are proposed, which would result in even better energy performance of the WHMV system if approved by the committee

Calculations showing the 10% reduction in annual average outdoor air introduction combining infiltration and ventilation rates are shown below (Case B in the table). These results also demonstrate that up to a 19% reduction in annual average outdoor air introduction can be garnered when builders outperform the 2012 IECC minimum infiltration requirement and achieve 3 ACH 50 (Case C). Further, if homeowners determine that the level of WHMV provides is not necessary, they are free to turn off the WHMV system and even greater savings result (Case D).

$$Q_{comb} = Q_{bal} + \sqrt{Q_{unbal}^2 + Q_{infiltration}^2}$$ 2009 ASHRAE Fundamentals 16.25(51)

$$Q_{infiltration} = \frac{NL \cdot wsf \cdot A_{floor}}{7.3}$$ ASHRAE 62.2-2010 Addendum N, Equation 4.6a

$$NL = 1000 \cdot \frac{ELA}{A_{floor}} \cdot \left[\frac{H}{H_r}\right]^z$$ ASHRAE 62.2-2010 Addendum N, Equation 4.6a

$Q_{unbal} = 60$ 2012 IRC Table M1507.3.3(1) for 2-3 beds & 1,501-3,000 sqft

$Q_{bal} = 0$ Assume no balanced WHMV.

$A_{floor} = 2400$ Assume a 2400 sqft single family home for this example

$wsf = 0.39$ ASHRAE 62.2-2010 Addendum N, value for Orlando

$H = 17$ Assume a 2-story home for this example

Results of calculations are provided in the table below.

Case	A: EN6013	B: 2012 IECC Code Min	C: 2012 IECC w/Builder Outperforming Min Airtightness Requirements	D: 2012 IECC w/Builder Outperforming Min Airtightness & Homeowner Operating WHMV 2/3 of Time	Notes
Leakage Rate (ACH 50)	9	5	3	3	Assumed
Leakage Rate (ELA, ft2)	1.18	0.66	0.46	0.46	Calculated using Energy Gauge USA
Qinfiltration (cfm)	84	47	33	33	Effective annual avg infiltration rate
Qfan,balanced (cfm)	0	0	0	0	Balanced flow (none for these cases)
Qfan,unbalanced (cfm)	0	60	60	40	Exhaust only or supply only
Qcomb (cfm)	84	76	68	52	Combination of Qinf, Qbalanced, and Qunbalanced; per ASHRAE Fndmntls 16.25(51)
% reduction in combined infiltrtn/ventilation rate	**0%**	**10%**	**19%**	**39%**	

Thank you for the opportunity to provide this comment. We appreciate your consideration for disapproval and for retaining the model code requirements.

Sincerely,

Mike Moore

Newport Ventures 22 Jay St, Schenectady, NY 12305 518.377.9410 www.newportventures.net

NEWPORT VENTURES

September 21, 2012

Energy Technical Advisory Committee
Florida Building Commission
1940 North Monroe Street
Tallahassee FL 32399

Re: EN6013

Dear FBC Staff and Energy TAC:

Newport Ventures, representing Broan-NuTone, respectfully requests modification of EN6013 to clarify that whole house mechanical ventilation (WHMV) is required for all new homes. This change is needed for the following reasons:

- R403.5 mandates mechanical ventilation for all new dwellings in accordance with the IRC, IMC, or other approved methods. So, the intention of the code is to clearly require WHMV for all dwellings.
- To ensure consistency in WHMV requirements across the IRC and IECC, the language in R402.4.1.2 should be revised to require that air leakage rates of dwellings should be LESS THAN 5 air changes per hour. This change will ensure consistency with IRC R303.4, which requires WHMV when the air infiltration rate is determined to be LESS THAN 5 air changes per hour.
- Currently, the code's inconsistency results in a disincentive for builders to tighten a home below 5 ACH 50 (and to achieve the associated control over outdoor air introduction, moisture, and energy use that accompany this practice). If builders do not recognize the requirement for WHMV in R403.5, then they are incentivized to build homes right at 5 ACH 50, where, according to IRC 303.4, WHMV is not required. The result is a dwelling that, according to the IECC and ASHRAE 62.2, doesn't have the capacity to provide sufficient IAQ to the homeowners.

By mandating mechanical ventilation in R403.5, the IECC sends a clear signal to builders that a home should be built tightly and mechanically ventilated for maximum opportunity for energy savings while maintaining IAQ. The following change will ensure that this message is consistent across the codes.

R402.4.1.2 Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate ~~of not exceeding~~ <u>less than</u> 5 air changes per hour in Climate Zones1 and 2~~, and 3 air changes per hour in Climate Zones 3 through 8~~. [Rest of section remains unchanged.]

Thank you for the opportunity to provide this comment.

Sincerely,

Mike Moore

Newport Ventures 22 Jay St, Schenectady, NY 12305 518.377.9410 www.newportventures.net

NEWPORT VENTURES

September 21, 2012

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Florida Building Commission
1940 North Monroe Street
Tallahassee FL 32399

Re: EN6013

Dear FBC Staff and Energy TAC:

Newport Ventures, representing Broan-NuTone, respectfully requests modification of EN6013 to clarify that whole house mechanical ventilation (WHMV) is required for all new homes. This change is needed for the following reasons:

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- To ensure consistency in WHMV requirements across the IRC and IECC, the language in R402.4.1.2 should be revised to require that air leakage rates of dwellings should be LESS THAN 5 air changes per hour. This change will ensure consistency with IRC R303.4, which requires WHMV when the air infiltration rate is determined to be LESS THAN 5 air changes per hour.
- Currently, the code's inconsistency results in a disincentive for builders to tighten a home below 5 ACH 50 (and to achieve the associated control over outdoor air introduction, moisture, and energy use that accompany this practice). If builders do not recognize the requirement for WHMV in R403.5, then they are incentivized to build homes right at 5 ACH 50, where, according to IRC 303.4, WHMV is not required. The result is a dwelling that, according to the IECC and ASHRAE 62.2, doesn't have the capacity to provide sufficient IAQ to the homeowners.

By mandating mechanical ventilation in R403.5, the IECC sends a clear signal to builders that a home should be built tightly and mechanically ventilated for maximum opportunity for energy savings while maintaining IAQ. The following change will ensure that this message is consistent across the codes.

Proposed modification:
Reject the body of EN6013, but make the following change to the base code:

R402.4.1.2 Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate ~~of not exceeding~~ less than 5 air changes per hour in Climate Zones1 and 2~~, and 3 air changes per hour in Climate Zones 3 through 8~~. [Rest of section remains unchanged.]

Thank you for the opportunity to provide this comment.

Sincerely,

Mike Moore

EN5662

Date Submitted	7/25/2012	**Section**	R402.6	**Proponent**	Jeff Sonne / FSEC
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **Yes** **Alternate Language** **Yes**

Related Modifications

None.

Summary of Modification

Limitations to compliance by Section R402.

Rationale

Florida-specific limitations to use of Section 402 were imposed by the Energy Code Work Group charged with adding Florida's efficiencies to the new base code, the IECC. The 15% maximum glass area limitation is consistent with the performance compliance reference and helps provide compliance method equivalence.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Minor; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Impact to building and property owners relative to cost of compliance with code

Some, minor or reduced; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Impact to industry relative to the cost of compliance with code

Some, minor or reduced; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes; helps clarify the code and increase energy efficiency while still allowing some flexibility; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%)

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes; helps clarify the code and increase energy efficiency while still allowing some flexibility; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Does not degrade the effectiveness of the code

No; helps clarify the code and increase energy efficiency while still allowing some flexibility; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

Explanation of Choice

Florida-specific limitations to use of Section 402 were imposed by the Energy Code Work Group charged with adding Florida's efficiencies to the new base code, the IECC.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5662-A5

Proponent Paul Abernathy **Submitted** 12/13/2012 **Attachments** Yes

Rationale

Section 402.6 is a new section and section R402.6.1 takes electric resistance heat out of the mix all together. Electric resistance heat is being eliminated as a heating option with no supporting justification when we know that for certain applications, electric resistance heating is a viable option and cost effective. R402 which deals with the "Building Thermal Envelope". Space heating and air handlers have nothing to do with the envelope of a building. We ask that these references be removed to make it clear this section is dealing with the "Envelope". "NEMA does not agree with the proposed 15% limit of window area compared to conditioned floor area. The proper metric is window-to-wall ratio, which does not force very small windows in buildings that have a small footprint - as the proposed requirement does. The current national standard in ASHRAE 90.1-2010 is 40% window-to-wall ratio, with appropriate limits for Solar Heat Gain Coefficient and u-factor depending on climate zone. A reduction down to 15% is too large and will prevent buildings from making use of useful daylight, together with energy savings that results from daylighting controls used in the daylighted areas. Studies conducted by Pacific Northwest National Laboratory and Pennsylvania State University in the last 3 years indicate that the optimal window-to-wall ratio in commercial buildings is in the range 30% to 40% in all climate zones in the United States. At the very least the Florida code should have an exception to allow up to 40% window-to-wall ratio in building and/or spaces where automatic daylighting controls are used."

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None . Electric resistance heat is being eliminated as a heating option with no supporting justification when we know that for certain applications, electric resistance heating is a viable option and cost effective for property owners.

Impact to industry relative to the cost of compliance with code

None. These products are widely used in the industry and provide a reliable function.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The current national standard in ASHRAE 90.1-2010 is 40% window-to-wall ratio. A reduction down to 15% is too large and will prevent buildings from making use of useful daylight, together with energy savings that results from daylighting controls used in the daylighted areas.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Studies conducted by Pacific Northwest National Laboratory and Pennsylvania State University in the last 3 years indicate that the optimal window-to-wall ratio in commercial buildings is in the range 30% to 40% in all climate zones in the United States.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

None. The only one that would be descriminated against would be the manufacturers of products that have been tested and proven. Electric Resistance Heatings is a viable option that has many used in todays building market.

Does not degrade the effectiveness of the code

None. These are NRTL listed products with years of reliable testing and proven use.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5662-A3

Proponent Paul Abernathy **Submitted** 12/13/2012 **Attachments** Yes

Rationale

Section 402.6 is a new section and section R402.6.1 takes electric resistance heat out of the mix all together. Electric resistance heat is being eliminated as a heating option with no supporting justification when we know that for certain applications, electric resistance heating is a viable option and cost effective. R402 which deals with the "Building Thermal Envelope". Space heating and air handlers have nothing to do with the envelope of a building. We ask that these references be removed to make it clear this section is dealing with the "Envelope". "NEMA does not agree with the proposed 15% limit of window area compared to conditioned floor area. The proper metric is window-to-wall ratio, which does not force very small windows in buildings that have a small footprint - as the proposed requirement does. The current national standard in ASHRAE 90.1-2010 is 40% window-to-wall ratio, with appropriate limits for Solar Heat Gain Coefficient and u-factor depending on climate zone. A reduction down to 15% is too large and will prevent buildings from making use of useful daylight, together with energy savings that results from daylighting controls used in the daylighted areas. Studies conducted by Pacific Northwest National Laboratory and Pennsylvania State University in the last 3 years indicate that the optimal window-to-wall ratio in commercial buildings is in the range 30% to 40% in all climate zones in the United States. At the very least the Florida code should have an exception to allow up to 40% window-to-wall ratio in building and/or spaces where automatic daylighting controls are used."

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None . Electric resistance heat is being eliminated as a heating option with no supporting justification when we know that for certain applications, electric resistance heating is a viable option and cost effective for property owners.

Impact to industry relative to the cost of compliance with code

None. These products are widely used in the industry and provide a reliable function.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The current national standard in ASHRAE 90.1-2010 is 40% window-to-wall ratio. A reduction down to 15% is too large and will prevent buildings from making use of useful daylight, together with energy savings that results from daylighting controls used in the daylighted areas.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

. Studies conducted by Pacific Northwest National Laboratory and Pennsylvania State University in the last 3 years indicate that the optimal window-to-wall ratio in commercial buildings is in the range 30% to 40% in all climate zones in the United States.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

None. The only one that would be descriminated against would be the manufacturers of products that have been tested and proven. Electric Resistance Heatings is a viable option that has many used in todays building market.

Does not degrade the effectiveness of the code

None. These are NRTL listed products with years of reliable testing and proven use.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5662-A2

Proponent Jeff Sonne / FSEC **Submitted** 12/10/2012 **Attachments** Yes

Rationale

Florida-specific limitations to use of Section 402 were imposed by the Energy Code Work Group charged with adding Florida's efficiencies to the new base code, the IECC. The 15% maximum glass area limitation is consistent with the performance compliance reference and helps provide compliance method equivalence. Alternative 2 language is same as original mod 5662 language, except the duct section (R402.6.4) is removed.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Minor; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Impact to building and property owners relative to cost of compliance with code

Some, minor or reduced; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Impact to industry relative to the cost of compliance with code

Some, minor or reduced; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes; helps clarify the code and increase energy efficiency while still allowing some flexibility; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%)

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes; helps clarify the code and increase energy efficiency while still allowing some flexibility; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Does not degrade the effectiveness of the code

No; helps clarify the code and increase energy efficiency while still allowing some flexibility; similar language is in the 2010 Florida Building Code (except glass area limitation changed from 20% to 15%).

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

1st Comment Period History 08/09/2012 - 09/23/2012

5662-A1

Proponent Eric Lacey **Submitted** 9/23/2012 **Attachments** Yes

Rationale

A 15% glazing area limitation in the prescriptive/UA paths unnecessarily forces builders who use more windows and doors into the performance path, which is far more complex and more difficult for local jurisdictions to enforce.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This alternative to EN5662 will simplify enforcement because it will not unnecessarily force more builders into the more complex performance path.

Impact to building and property owners relative to cost of compliance with code

There should be no impact.

Impact to industry relative to the cost of compliance with code

There should be no impact.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This alternative would make enforcement and compliance simpler by allowing the use of the prescriptive compliance path in a larger percentage of homes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Maintains the efficiency of the 2012 IECC.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

Is the proposed code modification part of a prior code version? No

2nd Comment Period 10/31/2012 - 12/14/2012

EN5662-G4

Proponent Jeff Sonne / FSEC **Submitted** 12/14/2012 **Attachments** No

Comment:

The section in question (R402.6) is from the residential portion of the energy code. The proponent of alternatives A3 and A5 cites window to wall area, ASHRAE 90.1 and daylighting controls, all used with non-residential buildings and not appropriate concerns for residential energy code. The 15% glass to floor area ratio in the original mod and alternative A2 is consistent with the reference home of the IECC residential performance method. The A3 and A5 proponent’s request for electric resistance may not be intended for residential either. Even during atypical hard cold spells in Florida, heat pumps can perform at twice the efficiency of electric resistance furnaces, reducing utility peak winter energy use and some of Florida’s utility providers are winter peaking. 2012 IECC Section R405, Table R405.5.2(1) is clear that the Standard Reference Home specification for heating systems that the "baseline" is an air source heat pump. Sufficient exceptions are available in the code for additions, replacements, and based on earlier TAC decisions regarding equipment, via the performance method.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5662-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

1st Comment Period History 08/09/2012 - 09/23/2012

EN5662-G2

Proponent BOAF CDC **Submitted** 9/19/2012 **Attachments** No

Comment:

Codes in general do not cross reference for professional credentialing provisions that are found in State Statute. Further, while the BERS program may provide certification for these skill sets and trades, BERS is completely voluntarily as a residential program and not mandated to be completed as part of normal residential construction. It is not the intent to have a code mandated sole source for compliance. Rather, it allows the tester to be approved by the AHJ and it should remain that way. Original language should be preserved to allow for greater choice in the marketplace and maintain the building official’s authority to recognize such entities.

EN5662-G3

Proponent	Jeff Sonne / FSEC	**Submitted**	9/21/2012	**Attachments**	No

Comment:

BOAF indicates that there has been no attempt to put this mod in the base code. FSEC shared a draft ICC proposal on the window area as a percentage of the conditioned floor area item with BOAF in December 2011. FSEC will officially submit to ICC prior to the deadline.

BOAF also submitted that the mod does not demonstrate a Florida need. Because of Florida's high cooling loads, increased glass areas tend to increase air conditioning loads. The ICC put a reference home glass limit of 15% to account for this in the performance method. In the performance method homes can be built with higher glass areas but if that increases the energy use then it has to be made up with other energy-efficient features. Omitting glass area from the prescriptive methods risk greater peak and annual energy use.

R402.6 Limitations to compliance by Section R402 (Prescriptive).

R402.6.1 Electric space heating. Electric resistance space heating systems shall not be used when complying with this code by Section R402.

Exception: The prohibition on electric resistance heat does not apply to additions, renovations and replacement heating systems installed in existing buildings.

R402.6.2 Air handlers in attics. Air handlers may not be installed in attics when complying with Section R402.

R402.6.3 Maximum percent window area. The window area as a percentage of the conditioned floor area (CFA) shall not exceed 15 percent.

Exceptions: The following exceptions apply to additions.

1. When a fenestration(s) in an existing exterior wall is being removed or enclosed by an addition, an amount equal to the total area of this fenestration may be subtracted from the total glass area prior to determining the installed glass percentage.

2. Additions of 600 square feet (56 m^2) or less may have up to 50 percent glass to conditioned floor area.

3. Glass windows and doors that were previously located in an existing exterior wall that is being removed or enclosed by an addition do not have to comply with the U-factor and solar heat gain coefficient requirements in Table R402.1.1 when reinstalled as part of the addition.

R402.6.4 Ducts. Supply and return ducts, including air filter enclosures, air ducts and plenums shall be located inside the building thermal envelope and be insulated to a minimum of R-6. Duct tightness shall be verified by testing according to Section R403.2.2 by either a Class 1 BERS rater or a Class A, B or Mechanical air-conditioning contractor.

Exception: Ducts installed onto an existing air distribution system as part of an addition or renovation, duct must be R-6.

Amend Section R402.6.3 as follows:

R402.6.3 Maximum percent window area. The window area as a percentage of the conditioned floor area (CFA) shall not exceed 18 ~~15~~ percent.

R402.6 Limitations to compliance by Section R402 (Prescriptive).

R402.6.1 Electric space heating. Electric resistance space heating systems shall not be used when complying with this code by Section R402.

Exception: The prohibition on electric resistance heat does not apply to additions, renovations and replacement heating systems installed in existing buildings.

R402.6.2 Air handlers in attics. Air handlers may not be installed in attics when complying with Section R402.

R402.6.3 Maximum percent window area. The window area as a percentage of the conditioned floor area (CFA) shall not exceed 15 percent.

Exceptions: The following exceptions apply to additions.

1. When a fenestration(s) in an existing exterior wall is being removed or enclosed by an addition, an amount equal to the total area of this fenestration may be subtracted from the total glass area prior to determining the installed glass percentage.

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3. Glass windows and doors that were previously located in an existing exterior wall that is being removed or enclosed by an addition do not have to comply with the U-factor and solar heat gain coefficient requirements in Table R402.1.1 when reinstalled as part of the addition.

R402.6 Limitations to compliance by Section R402 (Prescriptive).

~~**R402.6.1 Electric space heating.** Electric resistance space heating systems shall not be used when complying with this code by Section R402.~~

~~Exception: The prohibition on electric resistance heat does not apply to additions, renovations and replacement heating systems installed in existing buildings.~~

R402.6.2 Air handlers in attics. Air handlers may not be installed in attics when complying with Section R402.

R402.6.3 Maximum percent window area. The window area as a percentage of exterior wall area in the conditioned portion of the building shall not exceed30 percent.

Exceptions: The following exceptions apply to additions.

1. When a fenestration(s) in an existing exterior wall is being removed or enclosed by an addition, an amount equal to the total area of this fenestration may be subtracted from the total glass area prior to determining the installed glass percentage.

2. Additions of 600 square feet (56 m2) or less may have up to 50 percent glass to wall area.

3. Glass windows and doors that were previously located in an existing exterior wall that is being removed or enclosed by an addition do not have to comply with the U-factor and solar heat gain coefficient requirements in Table R402.1.1 when reinstalled as part of the addition.

4. Up to 40% window area compared to exterior wall area is permitted for buildings where automatic daylighting controls are used in the daylighted areas adjacent to the wall having the windows.

R402.6.4 Ducts. Supply and return ducts, including air filter enclosures, air ducts and plenums shall be located inside the building thermal envelope and be insulated to a minimum of R-6. Duct tightness shall be verified by testing according to Section R403.2.2 by either a Class 1 BERS rater or a Class A, B or Mechanical air-conditioning contractor.

Exception: Ducts installed onto an existing air distribution system as part of an addition or renovation, duct must be R-6.

R402.6 Limitations to compliance by Section R402 (Prescriptive).

~~**R402.6.1 Electric space heating.** Electric resistance space heating systems shall not be used when complying with this code by Section R402.~~

~~Exception: The prohibition on electric resistance heat does not apply to additions, renovations and replacement heating systems installed in existing buildings.~~

R402.6.2 Air handlers in attics. Air handlers may not be installed in attics when complying with Section R402.

R402.6.3 Maximum percent window area. The window area as a percentage of exterior wall area in the conditioned ~~floor area (CFA)~~portion of the building shall not exceed ~~15~~30 percent.

Exceptions: The following exceptions apply to additions.

1. When a fenestration(s) in an existing exterior wall is being removed or enclosed by an addition, an amount equal to the total area of this fenestration may be subtracted from the total glass area prior to determining the installed glass percentage.

2. Additions of 600 square feet (56 m2) or less may have up to 50 percent glass to ~~conditioned floor~~wall area.

3. Glass windows and doors that were previously located in an existing exterior wall that is being removed or enclosed by an addition do not have to comply with the U-factor and solar heat gain coefficient requirements in Table R402.1.1 when reinstalled as part of the addition.

4. Up to 40% window area compared to exterior wall area is permitted for buildings where automatic daylighting controls are used in the daylighted areas adjacent to the wall having the windows.

R402.6.4 Ducts. Supply and return ducts, including air filter enclosures, air ducts and plenums shall be located inside the building thermal envelope and be insulated to a minimum of R-6. Duct tightness shall be verified by testing according to Section R403.2.2 by either a Class 1 BERS rater or a Class A, B or Mechanical air-conditioning contractor.

Exception: Ducts installed onto an existing air distribution system as part of an addition or renovation, duct must be R-6.

EN5662

The 2012 *IECC* does not place a limit on the glazing area percentage in the Prescriptive or Total UA compliance methods. A limitation of 15% glazing area in Section 402 unnecessarily forces many builders into using the performance path, which is more complex and more difficult for local jurisdictions to enforce. We recommend eliminating this limitation entirely, or at least raising the threshold to 18% or 20%.

Glazing area percentages were eliminated from the Prescriptive and Total UA compliance paths, beginning in the 2004 *IECC* supplement, for a number of reasons. The U.S. Department of Energy determined that the simplification of this approach would lead to better code compliance, more widespread adoption of the code, and ultimately energy efficiency gains. *See* "Eliminating Window Area Restrictions in the *IECC*," U.S. Department of Energy (Oct. 2001).

Given the economic pressures on local governments and Building Officials, we recommend that Florida adopt the simplified approach of the *IECC*, which does not limit the glazing area percentage for homes built to the simple prescriptive or Total UA compliance paths. This will greatly simplify compliance and verification for builders and code officials. If the Commission determines that a glazing area limitation is necessary, we recommend a more reasonable number, such as 18% or 20%.

Date Submitted	7/26/2012	**Section**	R403.2.2	**Proponent**	Jeff Sonne / FSEC
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

None.

Summary of Modification

Provide duct leakage testing standard, clarify duct leakage testing qualification requirements and remove leakage testing exception for ducts and air handlers within the building thermal envelope.

Rationale

Duct testing standard: RESNET Section 803 is the only standard available that addresses single-point testing, including error analysis, and that does not require both pressurization and depressurization testing to meet the standard.

Duct testing eligibility: The testing eligibility modification clarifies who is qualified to test duct leakage and aligns the section with Florida law and present FEC.

Exception deletion: Interstitial and other spaces that are intended or expected to be conditioned space are often not actually within a building's thermal envelope, so ducts and air handlers in these spaces are also often not within the air pressure boundary of the envelope; as a result, without testing, it is virtually impossible to determine the amount of air leakage that can be contributing to a reduced efficiency of the air distribution system.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Duct testing standard: None; testing clarification only.

Duct testing eligibility: None; aligns the section with Florida law and present FEC.

Exception deletion: Minor as most residential Florida duct systems are located in unconditioned attics.

Impact to building and property owners relative to cost of compliance with code

Duct testing standard: None; testing clarification only.

Duct testing eligibility: None; aligns the section with Florida law and present FEC.

Exception deletion: Minor as most residential Florida duct systems are located in unconditioned attics.

Impact to industry relative to the cost of compliance with code

Duct testing standard: None; testing clarification only.

Duct testing eligibility: None; aligns the section with Florida law and present FEC.

Exception deletion: Minor as most residential Florida duct systems are located in unconditioned attics.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes; provides clarification and helps reduce energy loss from duct leakage. Testing eligibility modification to align with Florida law and present FEC.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by providing clarification and helping reduce energy loss from duct leakage. Testing eligibility modification to align with Florida law and present FEC.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate; provides clarification and addresses when duct testing is necessary. Testing eligibility modification to align with Florida law and present FEC.

Does not degrade the effectiveness of the code

Increases effectiveness of the code by providing clarification and helping reduce energy loss from duct leakage. Testing eligibility modification to align with Florida law and present FEC.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Testing eligibility modification to align with Florida law and present FEC.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5677-A1

Proponent Jeff Sonne / FSEC **Submitted** 12/14/2012 **Attachments** Yes

Rationale

Duct testing standard: RESNET Section 803 is the only standard available that addresses single-point testing, including error analysis, and that does not require both pressurization and depressurization testing to meet the standard. Duct testing eligibility: The testing eligibility modification clarifies who is qualified to test duct leakage. Also, while there are still differences between the two mods, this alternative aligns language with mod 5763-A2 language.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Duct testing standard: None; testing clarification only. Duct testing eligibility: None; aligns the section with Florida law.

Impact to building and property owners relative to cost of compliance with code

Duct testing standard: None; testing clarification only. Duct testing eligibility: None; aligns the section with Florida law.

Impact to industry relative to the cost of compliance with code

Duct testing standard: None; testing clarification only. Duct testing eligibility: None; aligns the section with Florida law.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes; provides clarification and helps reduce energy loss from duct leakage. Testing eligibility modification to align with Florida law.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by providing clarification and helping reduce energy loss from duct leakage. Testing eligibility modification to align with Florida law.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate; provides clarification. Testing eligibility modification to align with Florida law.

Does not degrade the effectiveness of the code

Increases effectiveness of the code by providing clarification and helping reduce energy loss from duct leakage. Testing eligibility modification to align with Florida law.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Testing eligibility modification to align with Florida law.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1st Comment Period History 08/09/2012 - 09/23/2012

EN5677-G1

Proponent	Ann Stanton	**Submitted**	9/4/2012	**Attachments**	No

Comment:

Text in R403.2.2 should cite the Florida Building Code, Mechaical, and Florida Building Code, Residential, instead of the base code.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5677-G2

Proponent	BOAF CDC	**Submitted**	9/15/2012	**Attachments**	No

Comment:

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

This code change is unnecessary as the provisions contained in the proposed amendment are adequately addressed in the applicable international code. Per FS 553.73 (7) (g)

1st Comment Period History 08/09/2012 - 09/23/2012

EN5677-G3

Proponent	BOAF CDC	**Submitted**	9/19/2012	**Attachments**	No

Comment:

Codes in general do not cross reference for professional credentialing provisions that are found in State Statute. Further, while the BERS program may provide certification for these skill sets and trades, BERS is completely voluntarily as a residential program and not mandated to be completed as part of normal residential construction. It is not the intent to have a code mandated sole source for compliance. Rather, it allows the tester to be approved by the AHJ and it should remain that way. Original language should be preserved to allow for greater choice in the marketplace and maintain the building official's authority to recognize such entities.

R403.2.2 Sealing (Mandatory). Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with either the International Mechanical Code or International Residential Code, as applicable.

Exceptions:

1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.

2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.

3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

Duct tightness shall be verified by testing to Section 803 of the RESNET Standards by either a Class 1 BERS rater or a Class A, B or Mechanical air-conditioning contractor to be “substantially leak free” by either of the following:

1. Postconstruction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer’s air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer’s air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m^2) of conditioned floor area.

~~**Exception:** The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.~~

R403.2.2 Sealing (Mandatory). All d~~D~~ucts, air handlers, ~~and~~ filter boxes and building cavities that form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers, shall be constructed and sealed in accordance with Section C403.2.7.2 of the Commercial Provisions of this code and shall be shown to meet duct tightness criteria below~~sealed~~. ~~Joints and seams shall comply with either the *International Mechanical Code* or *International Residential Code*, as applicable.~~

~~**Exceptions:**~~

~~1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.~~

~~2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.~~

~~3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~

Duct tightness shall be verified by testing to Section 803 of the RESNET Standards by either a Class 1 BERS rater or as authorized by Florida Statutes to be "substantially leak free" by either of the following:

1. Postconstruction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m^2) of conditioned floor area.

Exception: The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.

EN5763

Date Submitted	7/30/2012	**Section**	R403.2.2	**Proponent**	Ann Stanton
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	No Affirmative Recommendation with a Second				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language** Yes

Related Modifications

Summary of Modification

Propose Florida-specific duct sealing and attachment standards.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5763-A2

Proponent Ann Stanton **Submitted** 12/10/2012 **Attachments** Yes

Rationale

Revise section to agree with standard approved in mod 5802 and reference Florida Statutes for others who may perform duct testing.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

None.

Impact to industry relative to the cost of compliance with code

None.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Refining the mod based on previous justification to agree with an approved mod and reference Florida Statutes as directed by Counsel.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5763-A1

Proponent Ann Stanton **Submitted** 11/16/2012 **Attachments** Yes

Rationale

Reference the more applicable RESNET standards and remove mention of who may provide the testing per Florida regulations.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

OTHER

Explanation of Choice

Florida has gone beyond the IECC on duct testing in previous code editions; this Alternate Language comment would change the reference to a more current standard and remove reference to who may provide the testing on advice of Counsel.

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Florida has gone beyond the IECC on duct testing in previous code editions; this Alternate Language comment would change the reference to a more current standard and remove reference to who may provide the testing on advice of Counsel.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

1st Comment Period History 08/09/2012 - 09/23/2012

EN5763-G1

Proponent	BOAF CDC	**Submitted**	9/15/2012	**Attachments**	No

Comment:

This code change is unnecessary as the provisions contained in the proposed amendment are adequately addressed in the applicable international code. Per FS 553.73 (7) (g)

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

The amendment does not demonstrate by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variations addressed by the foundation code. Per FS 553.73 (7) (g)

R403.2.2 Sealing (Mandatory). All d~~D~~ucts, air handlers, and filter boxes and building cavities that form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers, shall be constructed and sealed in accordance with Section C403.2.7.2 of the Commercial Provisions of this code and shall be shown to meet duct tightness criteria below. ~~Joints and seams shall comply with either the *International Mechanical Code* or *International Residential Code*, as applicable.~~

~~**Exceptions:**~~

~~1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.~~

~~2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.~~

~~3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~

Duct tightness shall be verified by testing to ASHRAE Standard 152 by either a Class 1 BERS rater or a Class A,B or Mechanical air-conditioning contractor to be "substantially leak free" by either of the following:

1. Postconstruction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m^2) of conditioned floor area.

Exceptions:

1. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.

2. Duct testing is not mandatory for buildings complying by Section 405 of this code.

R403.2.2 Sealing (Mandatory). All d~~D~~ucts, air handlers, and filter boxes and building cavities that form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers, shall be constructed and sealed in accordance with Section C403.2.7.2 of the Commercial Provisions of this code and shall be shown to meet duct tightness criteria below. ~~Joints and seams shall comply with either the *International Mechanical Code* or *International Residential Code*, as applicable.~~

~~**Exceptions:**~~

~~1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.~~

~~2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.~~

~~3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~

Duct tightness shall be verified by by testing to Section 803 of the RESNET Standards ~~ASHRAE Standard 152 by either a Class 1 BERS rater or a Class A,B or Mechanical air-conditioning contractor~~ to be "substantially leak free" by either of the following:

1. Postconstruction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m^2) of conditioned floor area.

Exceptions:

1. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.

2. Duct testing is not mandatory for buildings complying by Section 405 of this code.

R403.2.2 Sealing (Mandatory). All d~~D~~ucts, air handlers, and filter boxes and building cavities that form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers, shall be constructed and sealed in accordance with Section C403.2.7.2 of the Commercial Provisions of this code and shall be shown to meet duct tightness criteria below. ~~Joints and seams shall comply with either the *International Mechanical Code* or *International Residential Code*, as applicable.~~

~~**Exceptions:**~~

~~1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.~~

~~2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.~~

~~3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~

Duct tightness shall be verified by testing to Section 803 of the RESNET Standards ~~ASHRAE Standard 152~~ by either a Class 1 BERS rater or as authorized by *Florida Statutes* ~~a Class A,B or Mechanical air-conditioning contractor~~ to be "substantially leak free" by either of the following:

1. Postconstruction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m^2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m2) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m2) of conditioned floor area.

Exceptions:

1. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.

2. Duct testing is not mandatory for buildings complying by Section 405 of this code.

Date Submitted	7/26/2012	**Section**	R405.5.2, R402.1.1, R402.1.3	**Proponent**	Jeff Sonne / FSEC
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** Yes

Related Modifications

None.

Summary of Modification

Modify Tables R405.5.2(1) and R405.5.2(2) such that the performance efficiencies of the 2012 IECC Standard Reference Design equal or exceed the Florida-specific performance efficiencies of the 2010 Florida Energy Code and modify Tables R402.1.1 and R402.1.3 to align accordingly.

Rationale

See attached PDF document.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Very little; the change from requirement that Proposed Home have 80% or less energy loads than the Standard Reference Design may cause confusion.

Impact to building and property owners relative to cost of compliance with code

None, there is no substantive change in code stringency proposed by this modification.

Impact to industry relative to the cost of compliance with code

None, there is no substantive change in code stringency proposed by this modification.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, the welfare of the general public is protected by the proposed Mod.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Does not strengthen the code but does provide the equivalent stringency as the 2010 FEC.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No, it does not discriminate against any material, product, method or system of construction.

Does not degrade the effectiveness of the code

No, it maintains the same code effectiveness.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

It provides the same stringency as a previous version but changes the baseline substantially compared with the previous version to provide the same effective code effectiveness and stringency.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5687-A4

Proponent Jeff Sonne / FSEC **Submitted** 12/12/2012 **Attachments** Yes

Rationale

Please see attached file.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Very little; the change from the 2010 requirement that the Proposed Home have 80% or less projected annual energy loads than the Standard Reference Design may cause some temporary confusion.

Impact to building and property owners relative to cost of compliance with code

The cost of compliance may be reduced by the change in insulation value. However energy use and energy cost may increase slightly. For home designs with less than 15% glazing, the cost of compliance may be increased compared with the current 2010 Florida Energy Code.

Impact to industry relative to the cost of compliance with code

For the Above-grade wall specification, the cost of compliance could be reduced as Alternate A 4 slightly reduces compliance stringency for CMU wall insulation compared with the current 2010 Florida Energy Code. The Glazing Area specification should not have an impact on industry.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Represents a 2-6% increase in Florida Energy Code baseline energy use as compared with the current 2010 Florida Energy Code. Provides for a “floating” glazing area specification such that the more intrinsically efficient the home, the more overall energy efficiency is required of it.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Reduces code stringency by 2%-6% compared with the 2010 Code for wall insulation. Strengthens the 2010 Florida Energy Code somewhat for glazing at the expense of more stringent compliance for homes with less than 15% glazing area.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No, it does not discriminate against any material, product, method or system of construction.

Does not degrade the effectiveness of the code

The Above-grade wall specification does not degrade the effectiveness of the 2012 IECC Code but it will degrade the effectiveness of the 2010 Florida Code by 2-6%. The Glazing Area specification does not degrade the effectiveness of the 2012 IECC code or the 2010 Florida Code.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5687-A3

Proponent Jeff Sonne / FSEC **Submitted** 12/12/2012 **Attachments** Yes

Rationale

Please see attached file.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Very little; the change from the 2010 requirement that the Proposed Home have 80% or less projected annual energy loads than the Standard Reference Design may cause some temporary confusion.

Impact to building and property owners relative to cost of compliance with code

For home designs where the glazing area is less than 15% of the conditioned floor area, the cost of compliance may be increased compared with the current 2010 Florida Energy Code.

Impact to industry relative to the cost of compliance with code

None.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Glazing areas less than 15% will not be credited for the additional energy savings resulting from the reduced window area. This has impact of a “moving the goal line” – the more intrinsically efficient the home, the more overall energy efficiency is required of it.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Alternate A-3 strengthens the 2010 Florida Energy Code somewhat.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No, it does not discriminate against any material, product, method or system of construction.

Does not degrade the effectiveness of the code

No, it does not degrade the effectiveness of the 2012 IECC foundation code or the 2010 Florida Energy Code.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5687-A2

Proponent Jeff Sonne / FSEC **Submitted** 12/12/2012 **Attachments** Yes

Rationale

Please see attached file.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Very little; the change from the 2010 requirement that the Proposed Home have 80% or less projected annual energy loads than the Standard Reference Design may cause some temporary confusion.

Impact to building and property owners relative to cost of compliance with code

The cost of compliance may be reduced. However energy use and energy cost may increase slightly due to the slight reduction in stringency of Alternate A-2 to Mod #5687 compared with the current 2010 Florida Energy Code.

Impact to industry relative to the cost of compliance with code

The cost of compliance could be reduced as this Alternate A-2 slightly reduces compliance stringency compared with the current 2010 Florida Energy Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

According to the analysis, this alternative represents a 2-6% decrease in code stringency compared with the current 2010 Florida Energy Code. However, the cost effectiveness analysis shows marginal cost effective in the central Florida region where approximately 50% of new construction occurs.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Alternate A-2 does not strengthen the 2010 Florida Energy Code. Rather it reduces 2010 Florida Energy Code baseline CMU wall insulation values to those of the 2012 IECC, which are less stringent than the current 2010 Florida Energy Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No, it does not discriminate against any material, product, method or system of construction.

Does not degrade the effectiveness of the code

No, it does not degrade the effectiveness of the 2012 IECC foundation code. However, it will degrade the baseline effectiveness of the 2010 Florida Energy Code by 2-6%.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

5687-A1

Proponent Jeff Sonne / FSEC **Submitted** 12/12/2012 **Attachments** Yes

Rationale

Please see attached rationale.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Very little; the change from the 2010 requirement that the Proposed Home have 80% or less projected annual energy loads than the Standard Reference Design may cause some temporary confusion.

Impact to building and property owners relative to cost of compliance with code

None, there is no substantive stringency change with respect to the current 2010 Florida Energy Code proposed by this Alternate A-1.

Impact to industry relative to the cost of compliance with code

None, there is no substantive stringency change with respect to the current 2010 Florida Energy Code proposed by this Alternate A-1.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, the welfare of the general public is protected by Alternative A-1.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Does not strengthen the 2010 Florida Code but it does provide the equivalent stringency as the 2010 Florida Energy Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No, it does not discriminate against any material, product, method or system of construction.

Does not degrade the effectiveness of the code

No, it maintains the same code effectiveness as the 2010 Florida Energy Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G64

Proponent	Steven Palma	**Submitted**	12/10/2012	**Attachments**	No

Comment:

The legislation that required increases in energy efficiency, and was used to justify the increase in the 2010 FBC, was REPEALED.
That means that the 2011 legislature DID NOT want this type of costly change made to the 2013 code.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G65

Proponent	Ronald Karp	**Submitted**	12/10/2012	**Attachments**	No

Comment:

- I am against any increases to the IECC required value of masonry insulation that may be proposed in Mod # 5687. Using cost data developed by the Masonry Association of Florida in combination with energy analysis and return on investment analysis developed by FSEC there is no payback, anywhere in Florida, for anything less than a 30 year return period. A 30 year payback is simply not cost effective to the home buyer and is not used in similar calculations across the country.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G66

Proponent	Mike Ryan	**Submitted**	12/10/2012	**Attachments**	No

Comment:

I am oppossed to any increases to the IECC required value of masonry insulation that may be required in Mod # 5687. The value of thermal mass in Florida has been well established for years and requiring increases in insulation, that may take 25 to 30 years to pay for itself in energy savings, would be a costly mistake to impose on the public. The masonry insulation values suggested are not backed up by national codes. Where is the national technical consensus for these changes?

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G67

Proponent	Ryan Hobbie	**Submitted**	12/11/2012	**Attachments**	No

Comment:

The EnergyGauge software used in the justification for this code change may not give masonry proper credit for the value of thermal mass. There is newer more accurate software available to check the results which was not used. The payback for additional insulation in masonry is so marginal to non-existent that inaccuracies in the initial calculations are important. This needs to be carefully analyzed before deviating from the national code in a way that is costly and unjustified Florida home buyers.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G68

Proponent	Rick Bessett	**Submitted**	12/11/2012	**Attachments**	No

Comment:

I (We) oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values. Thank you, Rick Bessett, Cemex USA.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G69

Proponent Daniel Lagemann **Submitted** 12/11/2012 **Attachments** No

Comment:

We oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values. I live in a masonry home with very little insulation. It is extremely comfortable and my energy bills are lower than my neighbor who lives in an insulated wood frame home. I don't see how it is cost effective to force me to put more insulation on my masonry wall.

To pay for the cost of insulating masonry from R4 to R7.8 in Miami requires a 30 year payback period. This is using cost data from the Masonry Association and energy and payback analysis from FSEC. 30 years is not an appropriate length of time to consider in monetary investment. In business analysis, 3 to 7 years is used to determine the feasibility of an investment. Discussing 30 year paybacks is just playing games with numbers.
From the cost analysis provided by FSEC (energy use and return on investment) and MAF (1st cost of adding insulation) it turns out that even at 25 years it is not cost effective anywhere in Florida to increase insulation values above those in the IECC. I would request that the TAC reject any increase of masonry insulation above the values in the IECC. It is also important that builders using the performance method are not forced to add additional insulation because of a comparison of masonry wall values to baseline values calculated with wood frame walls. If increasing insulation is not cost effective, then it is not cost effective regardless of whether it is done through the prescriptive method or performance method.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G70

Proponent Steve Prince **Submitted** 12/11/2012 **Attachments** No

Comment:

The 2012 IECC has determined cost effective insulation values for the Florida energy zones. Florida does not need to adopt stricter requirements. Based on a cost analysis by the masonry industry there is NO REASONABLE PAYBACK for more insulation in masonry. This is EXACTLY what the Florida legislature said it DID NOT want.

The value of thermal mass in South Florida has been well established for over 3 decades. The higher proposed values are completely reversed from this established technical data and the 2012 IECC. The results of these changes will not be cost effectivefor consumers, especially in South Florida where the amount of code required insulation virtually doubles from the values in the 2012 IECC.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G71

Proponent Jason Jones **Submitted** 12/12/2012 **Attachments** No

Comment:

The added insulation values for masonry in Mod #5687 do not make economic sense.The home owner is never going to see a reasonable payback for the builder being forced to do this. The cost analysis done by the masonry industry shows that there is no area of Florida where an increase of masonry insulation values above those in the IECC result in cost effective savings to the home owner.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G72

Proponent Steven Leslie **Submitted** 12/12/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Vales.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G73

Proponent Denise Corrales **Submitted** 12/12/2012 **Attachments** No

Comment:

I am against any increases to the IECC required value of masonry insulation that may be proposed in Mod # 5687. Using cost data developed by the Masonry Association of Florida in combination with energy analysis and return on investment analysis developed by FSEC there is no payback, anywhere in Florida, for anything less than a 30 year return period. A 30 year payback is simply not cost effective to the home buyer and is not used in similar calculations across the country.

The legislation that required increases in energy efficiency, and was used to justify the increase in the 2010 FBC was REPEALED. That means that the 2011 legislature DID NOT want this type of costly change made to the 2013 code.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G74

Proponent	Larry Jenkins	**Submitted**	12/12/2012	**Attachments**	No

Comment:

I oppose the modification to Table R402.11 modifying the mass wall values and request retention of the base code values. The cost analysis done by the masonry industry shows that there is no area of Florida where an increase of masonry insulation values above those in the IECC result in cost effective savings to the home owner.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G75

Proponent	Jerry Haught	**Submitted**	12/13/2012	**Attachments**	No

Comment:

The value of thermal mass in South Florida has been well established for over 30 years. The higher proposed values are completely reversed from the established technical data and the 2012 IECC. The results of these changes will not be cost effective for consumers, especially in South Florida where the amount of code required insulation virtually doubles from the values in the 2012 IECC.

The EnergyGauge software used in the justification for this code change may not give masonry proper credit for the value of thermal mass. There is newer more accurate software available to check the results which was not used. The payback for additional insulation in masonry is so marginal to non-existent that inaccuracies in the initial calculations are important. This needs to be carefully analyzed before deviating from the national code in a way that is costly and unjustified Florida home buyers.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G76

Proponent	Mike Epifano	**Submitted**	12/13/2012	**Attachments**	No

Comment:

The cost analysis done by the masonry industry shows that there is no area of Florida where an increase of masonry insulation values above those in the IECC result in cost effective savings to the home owner. With increased construction costs and little savings this is an unnecessary modification.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G77

Proponent	CHARLES BULTMAN	**Submitted**	12/13/2012	**Attachments**	No

Comment:

- I am against any increases to the IECC required value of masonry insulation that may be proposed in Mod # 5687. Using cost data developed by the Masonry Association of Florida in combination with energy analysis and return on investment analysis developed by FSEC there is no payback, anywhere in Florida, for anything less than a 30 year return period. A 30 year payback is simply not cost effective to the home buyer and is not used in similar calculations across the country.

- The 2012 IECC has determined cost effective insulation values for the Florida energy zones. Florida does not need to adopt stricter requirements. Based on a cost analysis by the masonry industry there is NO REASONABLE PAYBACK for more insulation in masonry. This is EXACTLY what the Florida legislature said it DID NOT want.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G78

Proponent	Lora Tressler	**Submitted**	12/13/2012	**Attachments**	No

Comment:

I oppose the modification to table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values. I have lives in Florida for almost 30 years and have always resided in a concrete block home and never had a problem with energy effiency, especially compared to neighbors and friends that reside in wood frame homes. The amount of time required to recoup the investment to make these changes does not begin to make any economical sense and I strongly vote against this proposed change.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G79

Proponent	David Pfeffer	**Submitted**	12/13/2012	**Attachments**	No

Comment:

I oppose the modification to Table R402.1.1 and request the retention of the existing Base Code Values. Forcing these costs along to Home Builders that have little or no reasonable payback or benefits to the Home Owner places an unfair burden on him as well as the market place. The last thing we need right now is an additional unwaranted cost added to an already fragile segment of our econemy.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G80

Proponent	Misty Hasty	**Submitted**	12/13/2012	**Attachments**	No

Comment:

I (we) oppose the modification to Table 402-1-1 modifying the Mass Wall Values and request retention of the Base Code Values.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G81

Proponent	Bill Parsons	**Submitted**	12/13/2012	**Attachments**	No

Comment:

The legislation that required increases in energy efficiency, and was used to justify the increase in the 2010 FBC, was REPEALED. That means that the 2011 legislature DID NOT want this type of costly change made to the 2013 code.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G82

Proponent	Keyla Ayala	**Submitted**	12/13/2012	**Attachments**	No

Comment:

The masonry insulation values suggested are not backed up by national codes. Where is the national technical consensus for these changes?

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G83

Proponent	Rocky Jenkins	**Submitted**	12/13/2012	**Attachments**	No

Comment:

- To pay for the cost of insulating masonry from R4 to R7.8 in Miami requires a 30 year payback period. This is using cost data from the Masonry Association and energy and payback analysis from FSEC. 30 years is not an appropriate length of time to consider in monetary investment. In business analysis, 3 to 7 years is used to determine the feasibility of an investment. Discussing 30 year paybacks is just playing games with numbers.

- From the cost analysis provided by FSEC (energy use and return on investment) and MAF (1st cost of adding insulation) it turns out that even at 25 years it is not cost effective anywhere in Florida to increase insulation values above those in the IECC. I would request that the TAC reject any increase of masonry insulation above the values in the IECC. It is also important that builders using the performance method are not forced to add additional insulation because of a comparison of masonry wall values to baseline values calculated with wood frame walls. If increasing insulation is not cost effective, then it is not cost effective regardless of whether it is done through the prescriptive method or performance method.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G84

Proponent	Cuthbertson Garry	**Submitted**	12/13/2012	**Attachments**	No

Comment:

The IECC recognizes that there is no need for extra insulation in Masonry Wall Systems. The bottom line is that this legislation will only add unecessary burden to the consumer in terms of increased cost of the home as well as increased insurance costs by going to wood frame. This is not what the Florida Homeowner needs.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G85

Proponent	Sal DeRiggi	**Submitted**	12/13/2012	**Attachments**	No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G86

Proponent	Rusnak Sean	**Submitted**	12/13/2012	**Attachments**	No

Comment:

The code changes are based entirely on computer modeling using the EnergyGauge software. Similar national studies using other software do not back up the results of the EnergyGauge software and this is reflected in the 2012 IECC insulation requirements. It is possible that the problem is with the software, not the performance of thermal mass. This would be a costly mistake for the Florida Building Commission to impose on the public.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G87

Proponent	Ron LaRochelle	**Submitted**	12/13/2012	**Attachments**	No

Comment:

In the last Energy TAC meeting the argument came down to cost effectiveness of adding extra insulation to masonry walls. Our calculations show that it is ABSOLUTELY NOT cost effective anywhere in Florida to increase insulation above the levels in the 2012 IECC. A couple of examples to illustrate this:

1- In Miami going from R4 insulation to R7.8 saves a maximum of 413 kWh/year or about $4/month. The increased initial construction cost for this change requires 30 years for a break-even payback.

2- In Orlando the savings in going from R6 insulation to R7.8 insulation saves about 114 kWh/year or $1.10/month and requires a 60 year payback period!

These changes are simply NOT COST EFFECTIVE and thus goes squarely against common sense and the wishes of the 2011 Florida Legislature.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G88

Proponent	Scott Emerson	**Submitted**	12/14/2012	**Attachments**	No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values or similar. Masonry construction has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Penalizing masonry for imagined deficiencies doesn't help the Florida home buyer. Masonry is the ideal construction material for Florida's extreme environment.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G89

Proponent Patrick McLaughlin **Submitted** 12/14/2012 **Attachments** No

Comment:

Mod #5687: The October Energy TAC committee agreed that insulating mass walls provide little energy savings and requested the proponent to perform a cost benefit analysis in energy usage. The Masonry Association of Florida is not a proponent of increased insulation on mass walls above the IECC Code because the savings do not support the added cost.
We have met with the proponent and provided preliminary field construction data on the increased insulation costs. Our calculations showed a much higher insulation cost than those of the proponent's. Furthermore, we have confirmed that the proponent's 30 year payback analysis used in his determination of cost effectiveness has serious shortcomings (please see comments by Martha VanGeem).
We further disagree with the proponent's use of software in calculating energy savings with increased mass wall insulations, particularly in the Miami area. Technology has advanced and there is research proposed by the masonry industry that will further determine and define energy use in mass wall systems.
And lastly, going against the wishes of our Florida legislature to standardize our energy code to the international code defeats the purpose and will of the public; Notwithstanding putting a competitive disadvantage to one of Florida's core construction products, masonry.
In conclusion, the Masonry industry opposes the mass wall increases in R and U values and changes in the standard reference designs for above grade walls. They should be standardized to the IECC (international).

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G90

Proponent John Roberts **Submitted** 12/14/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and strongly request the retention of the Base Code Values.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G91

Proponent Deborah Bartolucci **Submitted** 12/14/2012 **Attachments** No

Comment:

I oppose the modification to Table R401.1.1 modifying Mass Wall Values and request retention of the Base Code Values. The added insulation values for masonry in Mod #5687 do not make economic sense. The home owner is never going to see a reasonable payback for the builder being forced to do this. I live in a masonry home with very only blown attic insulation. It is extremely comfortable and my energy bills are much much lower than my neighbor who lives in an insulated wood frame home. I don't see how it is cost effective to force me to put more insulation on my masonry wall.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G92

Proponent Richard Loeb **Submitted** 12/14/2012 **Attachments** No

Comment:

Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Being fixated on "energy equality" doesn't make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn't save the Florida home buyer any money and unfairly raises the cost of masonry construction.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G93

Proponent Rumsey David **Submitted** 12/14/2012 **Attachments** No

Comment:

I opppose the modifications to Table R402.1.1 modifying the Mass Wall Values. The 2012 IECC has determined cost effective insulation values for the Florida energy zones. Florida does not need to adopt stricter requirements. Based on a cost analysis by the masonry industry there is NO REASONABLE PAYBACK for more insulation in masonry. This is EXACTLY what the Florida legislature said it DID NOT want.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G94

Proponent Michele Stropoli **Submitted** 12/14/2012 **Attachments** No

Comment:

The testimony in August was clear. Proposed code change modification # 5687 is a bad idea. Even the industry which appears to benefit, insulation, spoke against it. Energy consultants spoke against it. Ethically, technically, and in economic feasibility - - it doesn't work. We (the Florida Independent Concrete and Associated Products Association) are against any increases to the IECC required value of masonry insulation that may be proposed in modification # 5687.
Please do not advance the proposed modification. Push back from the table with no seconds. The construction "body" will thank you.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G95

Proponent Kurt Trump **Submitted** 12/14/2012 **Attachments** No

Comment:

I am against any increases to the IECC required value of masonry insulation that may be proposed in Mod # 5687. Using cost data developed by the Masonry Association of Florida in combination with energy analysis and return on investment analysis developed by FSEC there is no payback, anywhere in Florida, for anything less than a 30 year return period. A 30 year payback is simply not cost effective to the home buyer and is not used in similar calculations across the country.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G96

Proponent Javier Acevedo **Submitted** 12/14/2012 **Attachments** No

Comment:

- I am against any increases to the IECC required value of masonry insulation that may be proposed in Mod # 5687. Using cost data developed by the Masonry Association of Florida in combination with energy analysis and return on investment analysis developed by FSEC there is no payback, anywhere in Florida, for anything less than a 30 year return period. A 30 year payback is simply not cost effective to the home buyer and is not used in similar calculations across the country.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G97

Proponent Jeff Buczkiewicz **Submitted** 12/14/2012 **Attachments** No

Comment:

The cost to increase the insulation R-values simply has no return on the investment for the end users and for that sake the State of Florida. For it to take at minimum 30 years and in some cases 60 years to get initial costs back on cost savings of energy is extreme. We are talking less than $4.00 per month and in some cases less than $1.10 per month. Were is the line going to be drawn for irrational energy savings? The state justly repealed legislation in the 2010 FBC which tried to make a similar illogical change. The state legislature saw the errors of the way for this change in 2011 and this should also be rejected now as it makes no sense to impose the additional cost for such little return.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G98

Proponent Craig Parrino **Submitted** 12/14/2012 **Attachments** No

Comment:

I am opposed to code modification EN5687 due to the increase in Mass Wall R-Values from the IECC. This modification should be denied because:

1. The legislation that was used to justify this code change in the 2010 Florida Building Code was repealed by the Florida Legislature.

2. The IECC addresses the required R-values for mass walls.

3. There is no consensus with the concrete masonry industry on the need to raise mass wall R-values. More research is needed to validate all software calibration of mass walls before the FBC mandates penalties for a wall system that has proven to protect the health, safety, and welfare of Floridians.

4. There are more cost effective equipment and techniques available to the consumer that must be considered before increasing the required R-Value for mass walls. The cost analysis done by the masonry industry shows that there is no area of Florida where an increase of masonry insulation values above those in the IECC result in cost effective savings to the home owner.

5. Most importantly, using energy equality alone as the basis of this proposed code modification is one dimensional. A complete analysis would include the increased costs due to future damages from termites, flood, rot, and hurricane winds. Also, insurance costs are higher for other wall systems. This code change would deprive the consumer of these benefits.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G99

Proponent Martha VanGeem **Submitted** 12/14/2012 **Attachments** Yes

Comment:

see attached pdf

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G100

Proponent Donald Beers **Submitted** 12/14/2012 **Attachments** Yes

Comment:

My comments are attached in "2nd round Dons comments on 5687 12-11-12.pdf". I have also attached a copy of the comment submittal from Martha VanGeem for reference.

2nd Comment Period 10/31/2012 - 12/14/2012

EN5687-G101

Proponent wade mullins **Submitted** 12/14/2012 **Attachments** No

Comment:

I oppose the implimentation of EN5687-G101. It is not cost effective. The legislation that required increases in energy efficiency, used to justify the increase found in the 2010 FBC has been repealed.
There are no national code codes that back up these suggested insulation values.
I live in a masonry home. My energy bill is as low or lower than a neighbor who lives in a wood frame home.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G1

Proponent Sandy Cinque **Submitted** 9/6/2012 **Attachments** No

Comment:

I've lived in a masonry home in South Florida all my life and I am intimately involved in the construction industry. My masonry home is more comfortable that any of my neighbors homes who have homes built with wood frame walls and bat insulation. There is no reason to attempt to increase the insulation requirements for masonry. Additionally the international code has done considerable research and specifies what I believe is the correct level of insulation for the climate zones of Florida. Please do not include these increased values of masonry insulation in the 2013 code. Thank you.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G2

Proponent Rocky Jenkins **Submitted** 9/7/2012 **Attachments** No

Comment:

I'm opposed to modification #EN5687 for the following reasons:

1. The requirements from the legislature that were used to justify the increase in the 2010 FBC were REPEALED. That means that the legislature DID NOT/DOES NOT want this type of costly change made to the code. The Code Commission does not have the legal right to ignore the wishes of the legislature.
2. The values suggested are not backed up by codes. These values were proposed in the national codes and struck down. Where is the technical consensus for these changes?
3. Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Being fixated on “energy equality” doesn't make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn't help the Florida home buyer.
4. There is no cost analysis associated with this proposal.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G3

Proponent Patrick McLaughlin **Submitted** 9/11/2012 **Attachments** No

Comment:

Past research has shown that very little added insulation is needed in a concrete masonry home in South Florida and a little more insulation is needed in Central and Northern Florida compared to a wood frame home with added R-13 bat insulation. There are a number of technical dynamics going on in the walls of a concrete home that favors lower energy consumption. To add more insulation than past research suggested for concrete masonry homes without increasing the energy efficiency of wood frame homes puts an unfair competitive advantage on the Florida concrete masonry industry, ultimately negatively affecting the consumers' choice to live in a fire resistant, rot proof, termite proof and storm resistant masonry home. The concrete masonry industry believes submittal #5687 gives an unfair advantage to wood frame construction and the concrete masonry industry will fight for the homeowner to live in a safe and affordable Florida home.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G4

Proponent Deborah Bartolucci **Submitted** 9/11/2012 **Attachments** No

Comment:

Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Being fixated on "energy equality" doesn't make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn't help the Florida home buyer. My masonry home survived hurricane Wilma no damge whatsoever to the masonry structure!

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G5

Proponent Mark Smith **Submitted** 9/11/2012 **Attachments** No

Comment:

I oppose the modification to table R402.1.1 modifying the mass wall values and request retention of the base code values. There is no technical consensus for these changes. Masonry position in Florida is because of wind resistance, termites, fire, rot, security, and energy. Penalizing masonry for imagined deficiencies does not help Florida home buyers.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G6

Proponent Scott Hossenlopp **Submitted** 9/11/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1 modifyting the mass wall values and request retenetion of the base code values.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G7

Proponent Kenneth Lord **Submitted** 9/11/2012 **Attachments** No

Comment:

I am a masonry contractor who owns and operates Central Broward Construction, Inc. I also am the President of the Masonry Association of Florida South East Chapter.

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values.

The value of thermal mass in South Florida has been well established for over 3 decades. The higher proposed values are completely reversed from this established technical data and the 2012 IECC. The results of these changes will be costly to builders and consumers, especially in South Florida where the amount of code required insulation virtually doubles from the values in the 2012 IECC

The 2012 IECC has determined cost effective insulation values for the Florida energy zones. Florida does not need to adopt stricter requirements based on research that does not contain a cost analysis. This is EXACTLY what the Florida legislature said it DID NOT want.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G8

Proponent Jack Smith **Submitted** 9/11/2012 **Attachments** No

Comment:

This needs to be analyzed carefuly before deviating from the national code. The value of thermal mass in Florida has been well established for over 30 years. This would be a costly mistake for the Florida Building Commission to force on the public.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G9

Proponent Kenneth Lord **Submitted** 9/11/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values.

The value of thermal mass in South Florida has been well established for over 3 decades. The higher proposed values are completely reversed from this established technical data and the 2012 IECC. The results of these changes will be costly to builders and consumers, especially in South Florida where the amount of code required insulation virtually doubles from the values in the 2012 IECC.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G10

Proponent Benavente Ben **Submitted** 9/11/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1. Energy equality does not make a wood home equal to a masonry home. Masonry is favored for many other reasons such as resistance to termites, rot, & fire and masonry adds security. The added costs associated with this ends up penalizing the the home buyer.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G11

Proponent SAMUEL GREENBER **Submitted** 9/11/2012 **Attachments** No

Comment:

There are no sound or good reasons to make this code change. It works as it is, leave it alone. If it ain't broke, don't fix it. The industry is starting to recover, leave it alone.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G12

Proponent Richard Lorenz **Submitted** 9/11/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1 modifying the R value and request retention of the base code values.
The value of thermal mass in South Florida has been well established for over 3 decades. The higher proposed values are completely reversed from this established technical data and the 2012 IECC. The results of these changes will be costly to builders and consumers, especially in South Florida where the amount of code required insulation virtually doubles from the values in the 2012 IECC.

Also, the legislation that required increases in energy efficiency and was used to justify the increase in the 2010 FBC was REPEALED. That means that the legislature DID NOT want this type of costly change made to the code.

Lastly, the values suggested are not backed up by national codes. Where is the national technical consensus for these changes?

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G13

Proponent	Wade Mullins	**Submitted**	9/12/2012	**Attachments**	No

Comment:
I oppose the modification to table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G14

Proponent	Daniel Lagemann	**Submitted**	9/13/2012	**Attachments**	No

Comment:
We oppose the modification to Table R402.1.1 modifting the Mass Wall Values and request retention of the Base Code Values.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G15

Proponent	Darryl Klein	**Submitted**	9/13/2012	**Attachments**	No

Comment:
We oppose the modification to Table R402.1.1 modifting the Mass Wall Values and request retention of the Base Code Values.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G16

Proponent	Michele Stropoli	**Submitted**	9/13/2012	**Attachments**	No

Comment:
I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values.
The justification for this code change is based entirely on computer modeling using the EnergyGauge software. There is no actual energy use measurement studies to back up or calibrate the software results and there is newer more accurate software available to check the results, which was not used. Similar national studies using other software do not back up the results of the EnergyGauge software and this is reflected in the 2012 IECC insulation requirements. It is possible that the problem is with the software, not the performance of thermal mass. This would be a costly mistake for the Florida Building Commission to impose on the public.
Furthermore, the value of thermal mass in South Florida has been well established for over 3 decades. The higher proposed values are completely reversed from this established technical data and the 2012 IECC. The results of these changes will be costly to builders and consumers, especially in South Florida where the amount of code required insulation virtually doubles from the values in the 2012 IECC.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G17

Proponent	Gayle Lord	**Submitted**	9/14/2012	**Attachments**	No

Comment:
I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values" or similar.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G18

Proponent CHARLES BULTMAN **Submitted** 9/14/2012 **Attachments** No

Comment:

- Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Being fixated on "energy equality" doesn't make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn't help the Florida home buyer.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G19

Proponent Charles Blakley **Submitted** 9/14/2012 **Attachments** No

Comment:

Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot and security - just to name a few. Being fixated on "energy equality" does not make wood equal to masonry. Penalizing masonry for imagined defeciencies dosen't help the Florida home buyer. Therfore I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G20

Proponent Steven Kester **Submitted** 9/14/2012 **Attachments** No

Comment:

I oppose modification # E5687 for the following reasons:

I have lived in a masonry home for years with very little insulation. I've always been extremely comfortable in my home and my energy bills are lower than my neighbor who lives in a wood frame home.

The values proposed are not backed up national codes. Where is the national technical consensus for these changes?

Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Being fixated on "energy equality" doesn't make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn't help the Florida home buyer.

Steven Kester

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G21

Proponent Modesitt William **Submitted** 9/14/2012 **Attachments** No

Comment:

I oppose this mod...
We have made some serious mistakes in the past pushing legislation based on opinions or models. This issue falls into a group of controls owned by the consumer. If the consumer decides to super-insulate their home whether building with wood or masonry that is and should remain the choice of the consumer. Additionally the economy is in recovery mode, it does not make sense in any logical fashion to further impede the process of recovery with unnecessary legislation.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G22

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

This code change is unnecessary as the provisions contained in the proposed amendment are adequately addressed in the applicable international code. Per FS 553.73 (7) (g)

The proposed amendment does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G23

Proponent Marc Roberts **Submitted** 9/17/2012 **Attachments** No

Comment:

1. Where is the cost analysis for the proposed changes? I cannot see the trade off in cost efficiency and cost passed on to the consumer and construction industry.

2. Comparing “Wood vs Masonry” construction on one basis does not hold water. There is several things that must be considered when figuring cost effectiveness.

   a. Insect infiltration into wood vs masonry
   b. Hurricanes – Where would you rather be?

3. Before proceeding, this needs to be gone over more thoroughly again. There must be a reason this was repealed a couple of years ago.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G24

Proponent Ron Holcomb **Submitted** 9/17/2012 **Attachments** No

Comment:

There is no need to increase the insulation requirement for masonry construction, if the requirement for wood construction is not increased by an even greater amount. The comparison of insulating values is not an accurate representation of the energy efficiency as the mass of the masonry provides superior performance. To implement this modification would merely add additional cost.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G25

Proponent Joe Conover **Submitted** 9/17/2012 **Attachments** No

Comment:

1) without legislative direction or mandate; 2) in conflict with to the 2012 International Energy Conversation Code (IECC) which is the BASE CODE for the 2013 Fla Energy Code*; 3) without national consensus to back it up – in fact it goes directly against the established research supporting the current values in the 2012 IECC; 4) disregarding superior performance and comfort enjoyed by masonry home owners; and 5) without regard for the increased cost that additional insulation requirements will impose on the construction industry.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G26

Proponent Sig Bo **Submitted** 9/17/2012 **Attachments** No

Comment:

There is no technical data or evidence to merit this change and additional requirement on masonry wall structures. The code changes are based entirely on computer modeling using the Energy Gauge software. There are no actual energy use measurement studies to back up or calibrate the software results. Similar national studies using other software do not back up the results of the Energy Gauge software and this is reflected in the 2012 IECC insulation requirements. It is possible that the problem is with the software, not the performance of thermal mass. This would be a costly mistake for the Florida Building Commission to impose on the public.
Having lived in both wood frame and masonry walled homes I find the masonry home more comfortable and more efficient with no additional insulation as compared to a wood frame home. Not to mention the added benefits over wood frame construction such as wind resistance, termites, fire, rot, security – just to name a few.

Thank You

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G27

Proponent christopher glover **Submitted** 9/18/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values. The reason for this is There is no cost analysis associated with this proposal. The EnergyGauge software used in the justification for this code change may not give masonry proper credit for the value of thermal mass. There is newer more accurate software available to check the results which was not used. This needs to be carefully analyzed before deviating from the national code in a way that is costly and unjustified. Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Being fixated on “energy equality” doesn’t make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn’t help the Florida home buyer.

Please have some common sense and look at the big picture for once. Our State economy is still suffering and the building industry is barely hanging on. It makes zero sense to impose additional costs to building a new home right now when we are trying to get things going again. If your concern is truly energy efficiency, then please focus on the existing homes in FL that are vastly behind the energy efficiency of our new homes. The efficiency of the existing homes should be the main focus as that will immediately start saving energy and reducing existing consumption without even building any new homes.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G28

Proponent Jason Jones **Submitted** 9/18/2012 **Attachments** No

Comment:

I have lived in both wood framed and masonary walled homes. From my experience I have found that masonary walled homes are far more energy efficient than those of wood frame construction. In addition, masonary walled homes are far more resistant to damages resulting from strong winds. Living in Florida, the threat of Hurricanes should be considered. Wood framed homes are much more vulnerable to damages resulting from these stormes and changes in the code will likely result in far more insurance claims leading to further escalating Insurance premiums.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G29

Proponent Lisa Pelham **Submitted** 9/18/2012 **Attachments** No

Comment:

The value of thermal mass in South Florida has been well established for over 3 decades; these higher proposed values are completely reversed from this established technical data and the 2012 IECC. The results of these changes will be costly to builders and consumers, especially in South Florida where the amount of code required insulation virtually doubles from the values in the 2012 IECC. With the economy being already in a downtrend, why propose something that is not only not necessary and misconstrued, but costly to boot?

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G30

Proponent Rumsey David **Submitted** 9/18/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values or similar. Masonry construction has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Penalizing masonry for imagined deficiencies doesn’t help the Florida home buyer. Masonry is the ideal construction material for Florida’s extreme environment.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G31

Proponent Shawn McGee **Submitted** 9/18/2012 **Attachments** No

Comment:

I live in a masonry home with very little insulation. It is extremely comfortable and my energy bills are lower than my neighbor who lives in a wood frame home.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G32

Proponent Jeffrey Porter **Submitted** 9/18/2012 **Attachments** No

Comment:

There is insufficient hard evidence to justify this code change. Additional "hands on" research should be conducted before suggesting such a significant change to Florida's masonry building requirements. Much of the information used to formulate the revision is based on software modeling, which does not provide sufficient proof by its self of the insulation's actual performance.

Masonry walled homes are safer and more durable than wooden alternatives and should not have these rigorous additional requirements placed on them without a great deal more evaluation and balanced review.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G33

Proponent Barry Brennen **Submitted** 9/19/2012 **Attachments** No

Comment:

The value of thermal mass in So Fl has been well established for over 3 decades. The higher proposed values ae completely reversed fron this established technical data and the 2012 IECC. The results of these changes will be costly to builders and consumers, especially in So Fl where the amount of code required insulation virtually doubles from values in the 2012 IECC.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G34

Proponent Jeff Buczkiewicz **Submitted** 9/19/2012 **Attachments** No

Comment:

There is great question as to the return on investment of the R-7 requirement. This will add additional unnecessary cost to the price of residential homes and realize very little benefit. Our organization (Mason Contractors Association of America) is currently working with the University of Louisville to address this very issue. Preliminary results have shown that there is a max to return on investment when R-value is considered and the lower the climate zone = less return.

Wall insulation becomes very minor in cost savings while other systems within the building that could reap much higher returns have been ignored. In climate zones 1 and 2 there is little to no return on insulation investment, particularly when insulation is added to thermal mass walls which inherently have insulating qualities not always recognized.

When you are looking at an annual return of less than $2.00 per month on the average home, it seems excessive to require a higher insulation r-value. You would be better off requiring one less window with exposure to the sun. A variety of other alternatives could be utilized to save even higher amounts of energy. Requiring a more efficient air conditioning unit, requiring waterless water heaters,etc. The costs associated with those would be less and the savings would be greater. If the added cost of insulation to reach an R-7 is $2,000.00 per home, it would take 125 years to be even on your initial investment (at $16 per year in savings from the new requirement). If that is not excessive, I am not quite sure what else would be.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G35

Proponent wayne bruner **Submitted** 9/19/2012 **Attachments** No

Comment:

- The value of thermal mass in South Florida has been well established for over 3 decades. The higher proposed values are completely reversed from this established technical data and the 2012 IECC. The results of these changes will be costly to builders and consumers, especially in South Florida where the amount of code required insulation virtually doubles from the values in the 2012 IECC.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G36

Proponent Mike Gossett **Submitted** 9/20/2012 **Attachments** No

Comment:

Having lived in Florida all my life I have had the opportunity to live in wood and masonry homes. The advantages of masonry far outweigh wood construction. My energy consumption and costs associated with masonry have been less than in compariable wood frame homes.With no cost analysis associated with this proposal and the values not being supported by the national codes I do NOT believe this propsal should be passed.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G37

Proponent	Preston Sparkman	**Submitted**	9/20/2012	**Attachments**	No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values. The code changes are based entirely on computer modeling using the EnergyGauge software.There is no actual energy use measurement studies to back up or calibrate the software results. Similar national studies using other software do not back up the results of the EnergyGauge software and this is reflected in the 2012 IECC insulation requirements. It is possible that the problem is with the software, not the performance of thermal mass. This would be a costly mistake for the Florida Building Commission to impose on the public.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G38

Proponent	Bill Parsons	**Submitted**	9/21/2012	**Attachments**	No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values - The EnergyGauge software used in the justification for this code change may not give masonry proper credit for the value of thermal mass. There is newer more accurate software available to check the results which was not used. This needs to be carefully analyzed before deviating from the national code in a way that is costly and unjustified.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G39

Proponent	Keyla Ayala	**Submitted**	9/21/2012	**Attachments**	No

Comment:

I oppose the modification to Table R402.1.1. Masonry vs wood is not just an energy or cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security-just to name a few. Being fixated on "energy quality" doesn't make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn't help the Florida home buyer.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G40

Proponent	Rusnak Sean	**Submitted**	9/21/2012	**Attachments**	No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values for the following reasons:

- There are no actual energy use measurement studies to back up the EnergyGauge software results. Similar national studies using other software do not back up the results of the EnergyGauge software and this is reflected in the 2012 IECC insulation requirements.
- The EnergyGauge software used in the justification for this code change may not give masonry proper credit for the value of thermal mass. There is newer more accurate software available to check the results, which was not used.
- Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind, termite, fire, and rot resistance, as well as security – just to name a few. Being fixated on “energy equality” doesn’t make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn’t help the Florida home buyer.
- I am a masonry homeowner in Florida and did not/would not consider a wood home due to the reasons above. Having lived in both wood and masonry homes, I have noticed that masonry homes are noticeably more thermally efficient/energy efficient, as well as being termite, fire, moisture, and wind resistant.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G41

Proponent Rusnak Kari **Submitted** 9/21/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values for the following reasons:

- I live in a masonry home with very little insulation. It is extremely comfortable and my energy bills are lower than my neighbor who lives in a wood frame home.

- The values suggested are not backed up by national codes. Where is the national technical consensus for these changes?

- Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Being fixated on “energy equality” doesn’t make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn’t help the Florida home buyer.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G42

Proponent Steve Bischke **Submitted** 9/21/2012 **Attachments** No

Comment:

I oppose these modifications to the Mass Wall values. To me this is nothing more than a thinly veiled effort by Dow to "codify" use of their insulation board. Can't blame them for trying.
The IECC code values were well thought out and should be retained by Florida. This change will result in increased costs to builders and owners with no benefit. We have run the numbers and the payback on this change is about 65 - 100 years.
The code changes are based entirely on computer modeling using the EnergyGauge software. There is no actual energy use measurement studies to back up or calibrate the software results. Similar national studies using other software do not back up the results of the EnergyGauge software and this is reflected in the 2012 IECC insulation requirements.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G43

Proponent Michael Murtha **Submitted** 9/21/2012 **Attachments** Yes

Comment:

See attached PDF file.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G44

Proponent Ron LaRochelle **Submitted** 9/21/2012 **Attachments** No

Comment:

I oppose the modification to Table R402.1.1 modifying the Mass Wall Values and request retention of the Base Code Values - The EnergyGauge software used in the justification for this code change may not give masonry proper credit for the value of thermal mass. There is newer more accurate software available to check the results which was not used. This needs to be carefully analyzed before deviating from the national code in a way that is costly and unjustified.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G45

Proponent albert petrie **Submitted** 9/21/2012 **Attachments** No

Comment:

- Masonry vs wood is not just an energy OR cost question. Masonry has maintained itself as the vastly predominate building product in South and Central Florida for many reasons including wind resistance, termites, fire, rot, security – just to name a few. Being fixated on “energy equality” doesn’t make wood equal to masonry. Penalizing masonry for imagined deficiencies doesn’t help the Florida home buyer.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G46

Proponent	Joseph Belcher	**Submitted**	9/21/2012	**Attachments**	Yes

Comment:

See uploaded file.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G47

Proponent	Rafael Jimenez	**Submitted**	9/21/2012	**Attachments**	No

Comment:

The modifications to Table 402.1.1 propose increased R-Values for mass walls. What is the basis for this increase? Is there research or data to suggest this specific value or is it arbitrary (i.e. why 7.8)? It is obvious that the Fiscal Impact Statements associated with this modification are false: increased insulation requirements will directly translate to increased costs for compliance. Please provide research or data that supports an increase to R = 7.8 for mass walls. Contrary to the intent of the modification, the proposed R-Values are NOT in alignment with the 2012 IECC Standard Reference Design. Therefore, I cannot support the proposed increase without backing from substantive quantitative research.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G48

Proponent	Craig Parrino	**Submitted**	9/21/2012	**Attachments**	No

Comment:

I am opposed to code modification EN5687 due to the increase in Mass Wall R-Values from the IECC. This modification should be denied because:

1. The legislation that was used to justify this code change in the 2010 Florida Building Code was repealed by the Florida Legislature.
2. The IECC addresses the required R-values for mass walls.
3. There is no consensus with the concrete masonry industry on the need to raise mass wall R-values. More research is needed to validate the EnergyGage calibration of mass walls before the FBC mandates penalties for a wall system that has proven to protect the health, safety, and welfare of Floridians.
4. There are more cost effective equipment and techniques available to the consumer that must be considered before increasing the required R-Value for mass walls.
5. Most importantly, using energy equality alone as the basis of this proposed code modification is one dimensional. A complete analysis would include the increased costs due to future damages from termites, flood, rot, and hurricane winds. Also, insurance costs are higher for other wall systems. This code change would deprive the consumer of these benefits.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G49

Proponent	David Luebs	**Submitted**	9/21/2012	**Attachments**	No

Comment:

Curious...it was pushed through via a repealed mandate without legislative direction and national consensus to back it up. It goes against established values in the 2012 IECC and adds cost to an already troubled construction and real estate market...all for a mere 1R. This has the markings of politics at it's worst favoring a special interest...the only logical deduction. Couple this with the recent requirement for stronger woods studs...once again the consumer takes it on the chin when we can least afford it. Tallahassee is regulating one of the states largest industries and employers right out of business. Get a grip...support business and the people who pay your salary. Show us Tallahassee cares

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G50

Proponent	Joshua Nathanson	**Submitted**	9/21/2012	**Attachments**	No

Comment:

- The code changes are based entirely on computer modeling using the EnergyGauge software. There is no actual energy use measurement studies to back up or calibrate the software results. Similar national studies using other software do not back up the results of the EnergyGauge software and this is reflected in the 2012 IECC insulation requirements. It is possible that the problem is with the software, not the performance of thermal mass. This would be a costly mistake for the Florida Building Commission to impose on the public.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G51

Proponent Mike Epifano **Submitted** 9/21/2012 **Attachments** No

Comment:

I live in a masonry home built in the 1070's and have very reasonable seasonal energy bills still providing comfortable year round living. Without a substantialted cost analysis I can not understand the potential cost impacts. Without understanding this it, and is impact to the industry, it would not be prudent to adopt these proposed insulation increases for residential masonry.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G52

Proponent Jeff Sonne / FSEC **Submitted** 9/21/2012 **Attachments** Yes

Comment:

Please see attached PDF.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G53

Proponent John Kern **Submitted** 9/22/2012 **Attachments** No

Comment:

As a home owner with a masonry home and having a wood frame home prior, I can honestly say that the masonry home is much more energy efficient vs. wood. As a prior wood frame owner that became infested with termites, living in a masonry gives more comfort knowing that this will not happen and also knowing it is more structural sound. And in most changes throughout any industry there MUST be real timebackup data, not a computerized data report that supports any change, which none has been provided for this change.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G54

Proponent tom franz **Submitted** 9/22/2012 **Attachments** No

Comment:

There is no cost analysis associated with this proposal. The EnergyGauge software used in the justification for this code change may not give masonry proper credit for the value of thermal mass. There is newer more accurate software available to check the results which was not used. This needs to be carefully analyzed before deviating from the national code in a way that is costly and unjustified.

I oppose the modification to table R402.1.1 modifying the mass wall values and request retention of the base code values

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G55

Proponent James Mross **Submitted** 9/22/2012 **Attachments** No

Comment:

The modifications requiring an increase to the prescriptive requirement in R values in masonry wall in south Florida does seem to be in conflict with the stated impact and requirements. This increase is unwarranted and should not be allowed to go through. It has no business in the 2013 Florida Energy Code yet it is still being proposed: 1) without legislative direction or mandate; 2) in conflict with to the 2012 International Energy Conversation Code (IECC) which is the BASE CODE for the 2013 Fla Energy Code*; 3) without national consensus to back it up – in fact it goes directly against the established research supporting the current values in the 2012 IECC; 4) disregarding superior performance and experienced comfort enjoyed by masonry home owners; and 5) without regard for the increased cost that additional insulation requirements will impose on the construction industry.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G56

Proponent Stephen Szoke **Submitted** 9/22/2012 **Attachments** Yes

Comment:

The Portland Cement Association opposes the modifications to Tables R402.1.1 and R402.1.3 for the reasons provided in the attached comments.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G57

Proponent Thomas Sheffield **Submitted** 9/23/2012 **Attachments** No

Comment:

Why would the Legislature enact code changes that are punitive to Floridians (jobs) AND are subjective in nature? Masonry has been a staple in construction for decades providing safe and economical housing for our families. Enacting these codes changes will add costs to the construction of masonry built homes steering homebuyers to alternative systems and potentially putting their lives in danger; HURRICANES!

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G58

Proponent Eric Lacey **Submitted** 9/23/2012 **Attachments** Yes

Comment:

This far-ranging proposal weakens the 2012 IECC by reversing improvements made to several IECC performance path assumptions on the national level over the past nine years.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G59

Proponent Lang Nick **Submitted** 9/23/2012 **Attachments** Yes

Comment:

The National Concrete Masonry Association opposes the changes in this proposal for the reasons stated in the attached file.

EN5687-G60

Proponent Martha VanGeem **Submitted** 9/23/2012 **Attachments** Yes

Comment:

See attachment for details.

Comment No. 1

Table R402.1.1 Insulation and Fenestration Requirements by Component, Mass Wall R-Value
Climate Zone 1: Do not make the proposed change in mass wall R-value from 3/4 to 6/7.8.
Climate Zone 2: Do not make the proposed change in mass wall R-value from 6/6 to 6/7.8.

See attached rationale.

Comment No. 2

Table R402.1.3 Equivalent U-Factors, Mass Wall U-Factors, Climate Zones 1 and 2; and footnote b
Do not make the proposed change in the mass wall U-factors for Climate Zones 1 and 2 and footnote b.

Rationale: The U-factors correspond to the R-values in Table R402.1.1. We are speaking against the proposed changes to the R-values for mass walls in Comment No. 1, above. Therefore, we are speaking against the corresponding proposed changes to the U-factors for the same reasons as stated in Comment 1, above.

Comment No. 3

Table R405.5.2(1) Specifications for the Standard Reference and Proposed Designs

2nd row of table on above-grade walls: Do not make any of the proposed changes except change remittance to emitttance.

Rationale: The U-factor of the standard reference design (baseline) wall should be the U-factor of a mass wall if the proposed design wall is a mass wall for the following reasons:

a.) This was debated during the hearings for the 2012 IECC and this conclusion was reached.

b.) The U-factor of the standard reference design mass wall should be based on the prescriptive criteria for mass walls just as is done for frame walls, basements, ceilings and glazing.

c.) In some cases the house with the R13 wall insulation will use more energy than the house with prescriptive mass wall insulation and in some cases it will use less. Therefore the baseline should be the prescriptive mass wall insulation criteria.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G61

Proponent Bill Lippy **Submitted** 9/23/2012 **Attachments** No

Comment:

Comment: Code Section 405, Simulated Performance Alternative (Performance) and R402 Table R402.1.1 and Table R 402.1.3

Delete all changes to R-values and U-factors related to mass walls.

Add the following to Footnote i in Table 402.1.1 The addition to read:

An attic radiant barrier shall be required in climate zones 1 and 2.

Add the following to footnote b. in R402.1.3. The addition to read.

An attic radiant barrier shall be required in Climate Zones 1 and 2.

Justification: The addition of an attic radiant barrier will achieve the e-ratio
objective without limiting the insulation products available to insulate
to the single hydrocarbon based material recommended in the code change
justification.

EN5687-G62

Proponent	Tien Peng	Submitted	9/23/2012	Attachments	No

Comment:

The concrete industry supports the State of Florida's initiatives in reducing energy consumption and increase operational efficiency under the Florida Energy Conservation Code. However, because Florida's state-developed residential energy efficiency code differs extensively from the 2009 International Energy Conservation Code (IECC), the industry believes it unfairly discriminates against mass walls. Similar to the IECC, Wood Framed Wall requirements maintained a minimum of R-13 under the Florida Code (Table 402.1.1). However, the prescriptive requirement for Mass Wall R-value under Florida's Code is R-6/7.8- an increase from the model code for Climate Zone 1 and Zone 2. Clearly, this unfairly penalizes one industry.

1. There is extensive research indicating advantages to building with mass walls. Due to the thermal mass of the mass walls (concrete or masonry), houses with mass walls had lower heating and cooling costs than similar code-houses with wood frame walls. Homes with mass walls also showed additional savings from a reduction in the required heating and cooling system capacity. Houses with mass walls require smaller HVAC systems than wood-framed walls (See "Energy Use of Single Family Houses with Various Exterior Walls", J. Gajda, 2001, PCA).

2. While the research provided by the Florida Solar Energy Center is informative, it is only one source for the justification for the increase. As a national model code, the IECC was developed with strong technical consensus. There is simply not enough justification for Florida, with its mild energy climate, to modify the model code. There is substantive change in code stringency proposed by this modification especially as it pertains to the concrete and masonry industry.

1st Comment Period History 08/09/2012 - 09/23/2012

EN5687-G63

Proponent	Donald Beers	Submitted	9/23/2012	Attachments	Yes

Comment:

Please see attached files

[Modify Tables R405.5.2(1), R405.5.2(2), R402.1.1 and R402.1.3 as follows:]

TABLE R405.5.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: ~~mass wall if proposed wall is mass; otherwise~~wood frame. Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3 for frame walls Solar absorptance = 0.75 ~~Re~~Emittance = 0.90	As proposed As proposed As proposed As proposed As proposed
Basement and crawl space walls	Type: same as ~~p~~Proposed Design Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3, with insulation layer on interior side of walls	As proposed As proposed As proposed
Above-grade floors	Type: wood frame Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3, except floors over crawlspaces which shall not have added floor insulation.	As proposed As proposed As proposed
Ceilings	Type: wood frame Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3	As proposed As proposed As proposed
Roofs	Type: composition shingle on wood sheathing Gross area: same as ~~p~~Proposed Design Solar absorptance = 0.75 Emittance = 0.90	As proposed As proposed As proposed As proposed
Attics	Type: vented with aperture = 1 ft^2 per 300 ft^2 ceiling area	As proposed
Foundations	Type: same as ~~p~~Proposed Design foundation wall area above and below grade ~~and s~~ Soil characteristics: same as ~~p~~Proposed Design.	As proposed As proposed
Doors	Area: 40 ft^2 Orientation: North U-factor: same as fenestration from Table R402.1.3.	As proposed As proposed As proposed
Glazing[a]	Total area[b] = ~~(a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area.~~ ~~(b)~~ 15% of the conditioned floor area~~; where the proposed glazing area is 15% or more of the conditioned floor area.~~	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).	As proposed
	U-factor: from Table R402.1.3	As proposed
	SHGC: From Table R402.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.	As proposed ~~0.92 (0.21 ×~~

	Interior shade fraction: ~~0.92 (0.21 × SHGC for the standard reference design)~~ Summer: 0.70 Winter: 0.85 External shading: none	~~SHGC as proposed)~~ Same as Standard Reference Design Same as Standard Reference Design As proposed
Skylights	None	As proposed
Thermally isolated sunrooms	None	As proposed

(continued)

TABLE R405.5.2(1)—continued SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Air exchange rate	Air leakage rate of 5 air changes per hour ~~in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8~~ at a pressure difference of 0.2 inches w.g (50 Pa). The mechanical ventilation rate shall be in addition to the air leakage rate and the same as in the proposed design, but not greater than ~~0.01 × CFA + 7.5 × (N~~~~br~~ ~~+ 1)~~ the value calculated in accordance with ASHRAE Standard 62.2-2010, addendum 'r' ~~where:~~ ~~CFA = conditioned floor area~~ ~~N~~~~br~~ ~~= number of bedrooms~~ Energy recovery shall not be assumed for mechanical ventilation.	For residences that are not tested, the same air leakage rate as the ~~s~~Standard ~~r~~Reference ~~d~~Design. For tested residences, the measured air exchange rate[c]. The mechanical ventilation rate[d] shall be in addition to the air leakage rate and shall be as proposed.
Mechanical ventilation	None, except where mechanical ventilation is specified by the ~~p~~Proposed Design, in which case: Annual vent fan energy use: kWh/yr = ~~0.03942 × CFA + 29.565 × (N~~~~br~~ ~~+1)~~0.5*(supVfan + exhVfan)*8.76 where: ~~CFA = conditioned floor area~~ ~~N~~~~br~~ ~~= number of bedrooms~~ supVfan = cfm of supply ventilation fan exhVfan = cfm of exhaust ventilation fan where supVfan and exhVfan are calculated in accordance with ASHRAE Standard 62.2-2010 addendum 'r'	As proposed
Internal gains	IGain = ~~17,900~~18,869 + ~~23.8~~15.13 × CFA + ~~4104~~8250× N_{br} (Btu/day per dwelling unit)	Same as ~~s~~Standard ~~r~~Reference ~~d~~Design
Internal mass	An internal mass for furniture and contents of 8 pounds per	Same as ~~s~~Standard

	square foot of floor area.	~~r~~Reference ~~d~~Design, plus any additional mass specifically designed as a thermal storage element[e] but not integral to the building envelope or structure.
Structural mass	For masonry floor slabs, 80% of floor area covered by R-2 carpet and pad, and 20% of floor directly exposed to room air. For masonry basement walls, as proposed, but with insulation required by Table R402.1.3 located on the interior side of the walls For other walls, for ceilings, floors, and interior walls, wood frame construction	As proposed As proposed As proposed
Heating systems[f, g]	Fuel Type: Same ~~A~~as ~~p~~Proposed Design. ~~for other than electric heating without a heat pump.~~ Where the proposed design utilizes electric heating ~~without a heat pump~~ the standard reference design shall be an air source heat pump meeting the requirements of Section R403 of the IECC—Commercial Provisions. Efficiency: In accordance with prevailing federal minimum standards Capacity: sized in accordance with Section R403.6	As proposed As proposed As proposed
Cooling systems[f, h]	~~As proposed~~Efficiency: In accordance with prevailing federal minimum standards Capacity: sized in accordance with Section R403.6.	As proposed As proposed
Service water Heating[f, g, h, i]	Fuel Type: same ~~A~~as ~~p~~Proposed Design Efficiency: In accordance with prevailing federal minimum Standards Hot water ~~U~~use: gal/day = 30 + (10 × N_{br})~~same as proposed design~~	As proposed As proposed ~~gal/day = 30 + (10 × N_{br})~~ Same as Standard Reference Design
Thermal distribution systems	Distribution System Efficiency: 0.88 Duct location: fully within directly conditioned space Duct insulation: R-6	As tested in accordance with Section 803 of RESNET Standards or as specified in Table R405.5.2(2) if not tested. As proposed As proposed ~~Thermal distribution system efficiency shall be as tested or as specified in Table R405.5.2(2) if not tested. Duct insulation~~

		~~shall be as proposed.~~
Thermostat	Type: Manual, cooling temperature setpoint = ~~75~~78°F; Heating temperature setpoint = ~~72~~68°F	Same as ~~s~~Standard ~~r~~Reference Design

For SI: 1 square foot = 0.93 m^2, 1 British thermal unit = 1055 J, 1 pound per square foot = 4.88 kg/m^2, 1 gallon (U.S.) = 3.785 L, °C = (°F-3)/1.8, 1 degree = 0.79 rad.

a. Glazing shall be defined as sunlight-transmitting fenestration, including the area of sash, curbing or other framing elements, that enclose conditioned space. Glazing includes the area of sunlight-transmitting fenestration assemblies in walls bounding conditioned basements. For doors where the sunlight-transmitting opening is less than 50 percent of the door area, the glazing area is the sunlight transmitting opening area. For all other doors, the glazing area is the rough frame opening area for the door including the door and the frame.

b. For residences with conditioned basements, R-2 and R-4 residences and townhouses, the following formula shall be used to determine glazing area:

$AF = A_s \times FA \times F$

where:

AF = Total glazing area.

A_s = ~~Standard reference design total glazing area.~~0.15 × Conditioned Floor Area

FA = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).

F = (Above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.

and where:

Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

Below-grade boundary wall is any thermal boundary wall in soil contact.

Common wall area is the area of walls shared with an adjoining dwelling unit.

L and CFA are in the same units.

c. ~~Where required by the code official,~~ ~~t~~Testing shall be conducted by either a Class 1 BERS rater or a Class A, B or Mechanical air-conditioning contractor ~~by an approved party~~. Hourly calculations as specified in the ASHRAE Handbook of Fundamentals, or the equivalent shall be used to determine the energy loads resulting from infiltration.

d. The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with Equation 43 of 2001 ASHRAE Handbook of Fundamentals, page 26.24 and the "Whole-house Ventilation" provisions of 2001 ASHRAE Handbook of Fundamentals, page 26.19 for intermittent mechanical ventilation.

e. Thermal storage element shall mean a component not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element must be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or must be connected to such a room with pipes or ducts that allow the element to be actively charged.

~~f. For a proposed design with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.~~

f. For a Proposed Design with multiple heating or cooling systems using different fuel types, each system shall be included in the performance calculations. For the Standard Reference Design, the prevailing federal minimum efficiency shall be assumed except that the efficiencies given in Table R405.5.2(3) will be assumed when:

1) A type of device not covered by NAECA is found in the Proposed Home;

2) The Proposed Design is heated by electricity using a device other than an air source heat pump; or

3) The Proposed Design does not contain one or more of the required HVAC equipment systems.

g. For a proposed design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design.

h. For a proposed design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.

i. For a proposed design with a nonstorage-type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum energy factor for the same fuel as the predominant heating fuel type shall be assumed. For the case of a proposed design without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.

TABLE R405.5.2(2) DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS[a]

DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION	FORCED AIR SYSTEMS	HYDRONIC SYSTEMS[b]
Distribution system components located in unconditioned space	—	0.95
Default value for use with ~~U~~untested distribution systems. Duct locations used for untested distribution systems must be As Proposed. ~~entirely located in conditioned space~~[c]	0.88	1
"Ductless" systems[d]	1	—

For SI: 1 cubic foot per minute = 0.47 L/s, 1 square foot = $0.093m^2$, 1 pound per square inch = 6895 Pa, 1 inch water gauge = 1250 Pa.

a. Default values given by this table are for untested distribution systems, which must still meet minimum requirements for duct system insulation.

b. Hydronic systems shall mean those systems that distribute heating and cooling energy directly to individual spaces using liquids pumped through closed-loop piping and that do not depend on ducted, forced airflow to maintain space temperatures.

c. Entire system in conditioned space shall mean that no component of the distribution system, including the air-handler unit, is located outside of the conditioned space.

d. Ductless systems shall be allowed to have forced airflow across a coil but shall not have any ducted airflow external to the manufacturer's air-handler enclosure.

TABLE R402.1.1 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING R-VALUE	WOOD FRAME WAL	MASS WALL R-VALUE[i]	FLOOR R-VALUE	BASEMENT[c] WALL R-VALUE	SLAB[d] R-VALUE &	CRAWL SPACE[c] WALL

					L R-VALUE				DEPTH	R-VALUE
1	NR	0.75	0.25	~~30~~38	13	~~3/4~~6/7.8	13	0	0	0
2	0.40	0.65	0.25	38	13	~~4/6~~ 6/7.8	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h]	8/13	19	5/13[f]	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h]	8/13	19	10 /13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h]	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h]	19/21	38[g]	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

a. R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.

b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

c. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.

i. The second R-value applies when more than half the insulation is on the interior of the mass wall.

TABLE R402.1.3 EQUIVALENT U-FACTORS[a]

CLIMATE	FENESTRATION	SKYLIGHT	CEILING	FRAME	MASS	FLOOR	BASEMENT	CRAWL

ZONE	U-FACTOR	U-FACTOR	U-FACTOR	WALL U-FACTOR	WALL U-FACTOR[b]	U-FACTOR	WALL U-FACTOR	SPACE WALL U-FACTOR
1	0.50	0.75	~~0.035~~0.030	0.082	~~0.197~~0.105	0.064	0.360	0.477
2	0.40	0.65	0.030	0.082	~~0.165~~0.105	0.064	0.360	0.477
3	0.35	0.55	0.030	0.057	0.098	0.047	0.091[c]	0.136
4 except Marine	0.35	0.55	0.026	0.057	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.057	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	0.048	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.048	0.057	0.028	0.050	0.055

a. Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of ~~0.17~~0.096 in Climate Zone 1 and 2, ~~0.14 in Climate Zone 2,~~ 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.

c. Basement wall U-factor of 0.360 in warm-humid locations as defined by Figure R301.1 and Table R301.1.

[Add the following Table from 2010 FEC (Table B-1.1.2(2)):]

TABLE R405.5.2(3) DEFAULT STANDARD REFERENCE DESIGN HOME[a, b, c, d]

Proposed Home Fuel	Function	Standard Reference Home Device
Electric	Heating	7.7 HSPF air source heat pump
Non-electric warm air furnace or space heater	Heating	78% AFUE gas furnace
Non-electric boiler	Heating	80% AFUE gas boiler
Any type	Cooling	13 SEER electric air conditioner

a. For a Proposed Design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the Standard Reference Design home and Proposed Design. For electric heating systems, the prevailing federal minimum efficiency air-source heat pump shall be selected.

b. For a Proposed Design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the Standard Reference Design and the Proposed Design.

c. For a Proposed Design home with a non-storage type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum energy factor for the same fuel as the predominant fuel type. For the case of a Proposed Design home without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the Proposed Design and Standard Reference Design.

d. Tested duct leakage shall be determined and documented by either a Class 1 BERS rater or a Class A, B or Mechanical air-conditioning contractor.

[Modify Tables R405.5.2(1), R405.5.2(2), R402.1.1 and R402.1.3 as follows:]

TABLE R405.5.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: ~~mass wall if proposed wall is mass; otherwise~~wood frame. Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3 for frame walls Solar absorptance = 0.75 ~~Re~~Emittance = 0.90	As proposed As proposed As proposed As proposed As proposed
Basement and crawl space walls	Type: same as ~~p~~Proposed Design Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3, with insulation layer on interior side of walls	As proposed As proposed As proposed
Above-grade floors	Type: wood frame Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3, except floors over basements and crawlspaces which shall not have added floor insulation.	As proposed As proposed As proposed
Ceilings	Type: wood frame Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3	As proposed As proposed As proposed
Roofs	Type: composition shingle on wood sheathing Gross area: same as ~~p~~Proposed Design Solar absorptance = 0.75 Emittance = 0.90	As proposed As proposed As proposed As proposed
Attics	Type: vented with aperture = 1 ft^2 per 300 ft^2 ceiling area	As proposed
Foundations	Type: same as ~~p~~Proposed Design foundation wall area above and below grade ~~and s~~ Soil characteristics: same as ~~p~~Proposed Design.	As proposed As proposed
Doors	Area: 40 ft^2 Orientation: North U-factor: same as fenestration from Table R402.1.3.	As proposed As proposed As proposed
Glazing[a]	Total area[b] = ~~(a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area.~~ ~~(b)~~ 15% of the conditioned floor area~~; where the proposed glazing area is 15% or more of the conditioned floor area.~~	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).	As proposed
	U-factor: from Table R402.1.3	As proposed

	SHGC: From Table R402.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used. Interior shade fraction: ~~0.92-(0.21 × SHGC for the standard reference design)~~ Summer: 0.70 Winter: 0.85 External shading: none	As proposed ~~0.92-(0.21 × SHGC as proposed)~~ Same as Standard Reference Design Same as Standard Reference Design As proposed
Skylights	None	As proposed
Thermally isolated sunrooms	None	As proposed

(continued)

TABLE R405.5.2(1)—continued SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Air exchange rate	Air leakage rate of 5 air changes per hour ~~in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8~~ at a pressure difference of 0.2 inches w.g (50 Pa). The mechanical ventilation rate shall be in addition to the air leakage rate and the same as in the proposed design, but not greater than ~~$0.01 \times CFA + 7.5 \times (N_{br} + 1)$~~ the value calculated in accordance with ASHRAE Standard 62.2-2010, addendum 'r' ~~where:~~ ~~CFA = conditioned floor area~~ ~~N_{br} = number of bedrooms~~ Energy recovery shall not be assumed for mechanical ventilation.	For residences that are not tested, the same air leakage rate as the ~~s~~Standard ~~r~~Reference ~~d~~Design. For tested residences, the measured air exchange rate[c]. The mechanical ventilation rate[d] shall be in addition to the air leakage rate and shall be as proposed.
Mechanical ventilation	None, except where mechanical ventilation is specified by the ~~p~~Proposed Design, in which case: Annual vent fan energy use: kWh/yr = ~~$0.03942 \times CFA + 29.565 \times (N_{br} + 1)$~~0.5*(supVfan + exhVfan)*8.76 where: ~~CFA = conditioned floor area~~ ~~N_{br} = number of bedrooms~~ supVfan = cfm of supply ventilation fan exhVfan = cfm of exhaust ventilation fan	As proposed

	where supVfan and exhVfan are calculated in accordance with ASHRAE Standard 62.2-2010 addendum 'r'	
Internal gains	IGain = ~~17,900~~18,869 + ~~23.8~~15.13 × CFA + ~~4104~~8250 × N_{br} (Btu/day per dwelling unit)	Same as ~~s~~Standard ~~r~~Reference ~~d~~Design
Internal mass	An internal mass for furniture and contents of 8 pounds per square foot of floor area.	Same as ~~s~~Standard ~~r~~Reference ~~d~~Design, plus any additional mass specifically designed as a thermal storage element[e] but not integral to the building envelope or structure.
Structural mass	For masonry floor slabs, 80% of floor area covered by R-2 carpet and pad, and 20% of floor directly exposed to room air. For masonry basement walls, as proposed, but with insulation required by Table R402.1.3 located on the interior side of the walls For other walls, for ceilings, floors, and interior walls, wood frame construction	As proposed As proposed As proposed
Heating systems[f, g]	Fuel Type: Same ~~A~~as ~~p~~Proposed Design. ~~for other than electric heating without a heat pump.~~ Where the proposed design utilizes electric heating ~~without a heat pump~~ the standard reference design shall be an air source heat pump meeting the requirements of Section R403 of the IECC—Commercial Provisions. Efficiency: In accordance with prevailing federal minimum standards Capacity: sized in accordance with Section R403.6	As proposed As proposed As proposed
Cooling systems[f, h]	~~As proposed~~Efficiency: In accordance with prevailing federal minimum standards Capacity: sized in accordance with Section R403.6.	As proposed As proposed
Service water Heating[f, g, h, i]	Fuel Type: same ~~A~~as ~~p~~Proposed Design Efficiency: In accordance with prevailing federal minimum Standards Hot water ~~U~~use: gal/day = 30 + (10 × N_{br}) ~~same as proposed design~~	As proposed As proposed ~~gal/day = 30 + (10 × N_{br})~~ Same as Standard Reference Design
Thermal distribution systems	Distribution System Efficiency: 0.88	Thermal distribution system efficiency shall be as tested in

	Duct location: entirely within the building thermal envelope Air Handler location: entirely within the building thermal envelope Duct insulation: R-6	accordance with Section 803 of RESNET Standards or as specified in Table R405.5.2(2) if not tested. As proposed As proposed As proposed ~~Thermal distribution system efficiency shall be as tested or as specified in Table R405.5.2(2) if not tested. Duct insulation shall be as proposed.~~
Thermostat	Type: Manual, cooling temperature setpoint = ~~75~~78°F; Heating temperature setpoint = ~~72~~68°F	Same as ~~s~~Standard ~~r~~Reference Design

For SI: 1 square foot = 0.93 m^2, 1 British thermal unit = 1055 J, 1 pound per square foot = 4.88 kg/m^2, 1 gallon (U.S.) = 3.785 L, °C = (°F-3)/1.8, 1 degree = 0.79 rad.

a. Glazing shall be defined as sunlight-transmitting fenestration, including the area of sash, curbing or other framing elements, that enclose conditioned space. Glazing includes the area of sunlight-transmitting fenestration assemblies in walls bounding conditioned basements. For doors where the sunlight-transmitting opening is less than 50 percent of the door area, the glazing area is the sunlight transmitting opening area. For all other doors, the glazing area is the rough frame opening area for the door including the door and the frame.

b. For residences with conditioned basements, R-2 and R-4 residences and townhouses, the following formula shall be used to determine glazing area:

$AF = A_s \times FA \times F$

where:

AF = Total glazing area.

A_s = ~~Standard reference design total glazing area.~~0.15 × Conditioned Floor Area

FA = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).

F = (Above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.

and where:

Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.
Below-grade boundary wall is any thermal boundary wall in soil contact.
Common wall area is the area of walls shared with an adjoining dwelling unit.
L and CFA are in the same units.

c. ~~Where required by the *code official*,~~ ~~t~~Testing shall be conducted by ~~an approved party~~ a Class 1 BERS rater or as authorized by Florida statutes and be reported on Form XXX-2013. Hourly calculations as specified in the ASHRAE *Handbook of Fundamentals,* or the equivalent shall be used to determine the energy loads resulting from infiltration.

d. The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with Equation 43 of 2001 ASHRAE *Handbook of Fundamentals,* page 26.24 and the "Whole-house Ventilation" provisions of 2001 ASHRAE *Handbook of Fundamentals,* page 26.19 for intermittent mechanical ventilation.

e. Thermal storage element shall mean a component not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element must be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or must be connected to such a room with pipes or ducts that allow the element to be actively charged.

~~f. For a proposed design with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.~~

f. For a *Proposed Design* with multiple heating or cooling systems using different fuel types, each system shall be included in the performance calculations. For the *Standard Reference Design*, the prevailing federal minimum efficiency shall be assumed except that the efficiencies given in Table R405.5.2(3) will be assumed when:

1) A type of device not covered by NAECA is found in the Proposed Home;

2) The Proposed Design is heated by electricity using a device other than an air source heat pump; or

3) The Proposed Design does not contain one or more of the required HVAC equipment systems.

g. For a proposed design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design.

h. For a proposed design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.

i. For a proposed design with a nonstorage-type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum energy factor for the same fuel as the predominant heating fuel type shall be assumed. For the case of a proposed design without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.

TABLE R405.5.2(2) DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS[a]

DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION	FORCED AIR SYSTEMS	HYDRONIC SYSTEMS[b]
Distribution system components located in unconditioned space	—	0.95
Default value for use with ~~U~~untested distribution systems. Duct locations used for untested distribution systems must be As Proposed. ~~entirely located in conditioned space~~[c]	0.88	1

"Ductless" systems[d]	1	—

For SI: 1 cubic foot per minute = 0.47 L/s, 1 square foot = $0.093m^2$, 1 pound per square inch = 6895 Pa, 1 inch water gauge = 1250 Pa.

a. Default values given by this table are for untested distribution systems, which must still meet minimum requirements for duct system insulation.

b. Hydronic systems shall mean those systems that distribute heating and cooling energy directly to individual spaces using liquids pumped through closed-loop piping and that do not depend on ducted, forced airflow to maintain space temperatures.

c. Entire system in conditioned space shall mean that no component of the distribution system, including the air-handler unit, is located outside of the conditioned space.

d. Ductless systems shall be allowed to have forced airflow across a coil but shall not have any ducted airflow external to the manufacturer's air-handler enclosure.

TABLE R402.1.1 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE[i]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c] WALL *R*-VALUE
1	NR	0.75	0.25	~~30~~38	13	~~3/4~~6/7.8	13	0	0	0
2	0.40	0.65	0.25	38	13	~~4/6~~ 6/7.8	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h]	8/13	19	5/13[f]	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h]	8/13	19	10 /13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h]	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h]	19/21	38[g]	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.

b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

c. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation *R*-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.

i. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

TABLE R402.1.3 EQUIVALENT U-FACTORS[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR	SKYLIGHT *U*-FACTOR	CEILING *U*-FACTOR	FRAME WALL *U*-FACTOR	MASS WALL *U*-FACTOR[b]	FLOOR *U*-FACTOR	BASEMENT WALL *U*-FACTOR	CRAWL SPACE WALL *U*-FACTOR
1	0.50	0.75	~~0.035~~<u>0.030</u>	0.082	~~0.197~~<u>0.105</u>	0.064	0.360	0.477
2	0.40	0.65	0.030	0.082	~~0.165~~<u>0.105</u>	0.064	0.360	0.477
3	0.35	0.55	0.030	0.057	0.098	0.047	0.091[c]	0.136
4 except Marine	0.35	0.55	0.026	0.057	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.057	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	0.048	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.048	0.057	0.028	0.050	0.055

a. Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of ~~0.17~~<u>0.096</u> in Climate Zone 1<u> and 2</u>, ~~0.14 in Climate Zone 2,~~ 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.

c. Basement wall U-factor of 0.360 in warm-humid locations as defined by Figure R301.1 and Table R301.1.

[Add the following Table from 2010 FEC (Table B-1.1.2(2)):]

TABLE R405.5.2(3) DEFAULT STANDARD REFERENCE DESIGN HOME[a, b, c, d]

Proposed Home Fuel	Function	Standard Reference Home Device
Electric	Heating	7.7 HSPF air source heat pump
Non-electric warm air furnace or space heater	Heating	78% AFUE gas furnace
Non-electric boiler	Heating	80% AFUE gas boiler
Any type	Cooling	13 SEER electric air conditioner

a. For a *Proposed Design* without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the *Standard Reference Design* home and *Proposed Design*. For electric heating systems, the prevailing federal minimum efficiency air-source heat pump shall be selected.

b. For a *Proposed Design* home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the *Standard Reference Design* and the *Proposed Design.*

c. For a *Proposed Design* home with a non-storage type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum energy factor for the same fuel as the predominant fuel type. For the case of a *Proposed Design* home without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the *Proposed Design and Standard Reference Design.*

d. Tested duct leakage shall be determined and documented by a Class 1 BERS rater or as authorized by Florida statutes and be reported on Form XXX-2013.

[Modify Tables R405.5.2(1), R402.1.1 and R402.1.3 of Alternate A-1 to Mod #5687 to read as follows:]

TABLE R405.5.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass wall if proposed wall is mass; otherwise wood frame. Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3 Solar absorptance = 0.75 ~~Re~~Emittance = 0.90	As proposed As proposed As proposed As proposed As proposed

TABLE R402.1.1 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE[i]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c] WALL *R*-VALUE
1	NR	0.75	0.25	~~30~~38	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h]	8/13	19	5/13[f]	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h]	8/13	19	10 /13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h]	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h]	19/21	38[g]	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.

b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

c. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation *R*-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.

i. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

TABLE R402.1.3 EQUIVALENT U-FACTORS[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR	SKYLIGHT *U*-FACTOR	CEILING *U*-FACTOR	FRAME WALL *U*-FACTOR	MASS WALL *U*-FACTOR[b]	FLOOR *U*-FACTOR	BASEMENT WALL *U*-FACTOR	CRAWL SPACE WALL *U*-FACTOR
1	0.50	0.75	~~0.035~~0.030	0.082	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.082	0.165	0.064	0.360	0.477
3	0.35	0.55	0.030	0.057	0.098	0.047	0.091[c]	0.136
4 except Marine	0.35	0.55	0.026	0.057	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.057	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	0.048	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.048	0.057	0.028	0.050	0.055

a. Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of 0.17 in Climate Zone 1, 0.14 in Climate Zone 2, 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.

c. Basement wall U-factor of 0.360 in warm-humid locations as defined by Figure R301.1 and Table R301.1.

[Modify Table R405.5.2(1) of Alternate A-1 of Mod#5687 to read as follows:]

TABLE R405.5.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Glazing[a]	Total area[b] = (a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area. (b) 15% of the conditioned floor area; where the proposed glazing area is 15% or more of the conditioned floor area.	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).	As proposed
	U-factor: from Table R402.1.3	As proposed
	SHGC: From Table R402.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used. Interior shade fraction: ~~0.92-(0.21 × SHGC for the standard reference design)~~ Summer: 0.70 Winter: 0.85 External shading: none	As proposed ~~0.92-(0.21 × SHGC as proposed)~~ Same as Standard Reference Design Same as Standard Reference Design As proposed

[Modify Tables R405.5.2(1), R402.1.1 and R402.1.3 of Alternate A-1 to Mod #5687 to read as follows:]

TABLE R405.5.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass wall if proposed wall is mass; otherwise wood frame. Gross area: same as ~~p~~Proposed Design U-factor: from Table R402.1.3 Solar absorptance = 0.75 ~~Re~~Emittance = 0.90	As proposed As proposed As proposed As proposed As proposed
Glazing[a]	Total area[b] = (a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area. (b) 15% of the conditioned floor area; where the proposed glazing area is 15% or more of the conditioned floor area.	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).	As proposed
	U-factor: from Table R402.1.3	As proposed
	SHGC: From Table R402.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used. Interior shade fraction: ~~0.92-(0.21 × SHGC for the standard reference design)~~ Summer: 0.70 Winter: 0.85 External shading: none	As proposed ~~0.92-(0.21 × SHGC as proposed)~~ Same as Standard Reference Design Same as Standard Reference Design As proposed

TABLE R402.1.1 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING *R*-VALUE	WOOD FRAME	MASS WALL *R*-VALU	FLOOR *R*-VALU	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALU	CRAWL SPACE[c]

					WALL *R*-VALUE	**E[i]**	**E**		**E & DEPTH**	**WALL *R*-VALUE**
1	NR	0.75	0.25	~~30~~38	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h]	8/13	19	5/13[f]	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h]	8/13	19	10 /13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h]	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h]	19/21	38[g]	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.

b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

c. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation *R*-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.

i. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

TABLE R402.1.3 EQUIVALENT U-FACTORS[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR	SKYLIGHT *U*-FACTOR	CEILING *U*-FACTOR	FRAME WALL *U*-FACTOR	MASS WALL *U*-FACTOR[b]	FLOOR *U*-FACTOR	BASEMENT WALL *U*-FACTOR	CRAWL SPACE WALL *U*-FACTOR
1	0.50	0.75	~~0.035~~0.030	0.082	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.082	0.165	0.064	0.360	0.477
3	0.35	0.55	0.030	0.057	0.098	0.047	0.091[c]	0.136
4 except Marine	0.35	0.55	0.026	0.057	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.057	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	0.048	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.048	0.057	0.028	0.050	0.055

a. Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of 0.17 in Climate Zone 1, 0.14 in Climate Zone 2, 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.

c. Basement wall U-factor of 0.360 in warm-humid locations as defined by Figure R301.1 and Table R301.1.

Additional Comments addressed to Mod #5687 and TAC comments on Mod #5687

Submitted by Donald Beers, PE, Structural Engineer for the

Masonry Association of Florida

Comment on proposed table R402.1.1

Climate Zone 1: Do **not** make the proposed change in mass wall R-value from 3/4 to 6/7.8.
Climate Zone 2: Do **not** make the proposed change in mass wall R-value from 4/6 to 6/7.8.

Comment on proposed table R402.1.3

Do **not** make the proposed change in the mass wall U-factors for Climate Zones 1 and 2 and footnote b.

Comment on proposed table R405.5.2(1)

The U-factor of the standard reference design mass wall should be based on the prescriptive criteria of the standard for mass walls as called out in the 2012 IECC, that is R3/4 for Zone 1 and R4/6 for Zone 2.

Therefore, I am supporting FSEC comment EN5687-A2 submitted 12-13-12

Current Rational Submitted during 2nd 45 day comment period (after Oct 8, 2012 Energy TAC)

In the TAC meeting of Oct 8th the discussion over the above referenced changes focused on the cost effectiveness of adding additional insulation to mass and masonry walls. Discussions with FSEC, after the 10/8/12 TAC, uncovered substantial differences between FSEC and the Masonry Assoc of FL in the estimated costs associated with increasing the insulation levels for masonry walls in residential construction.

In the Rationale submitted under comment EN5687-A1 FSEC has adopted the products and costs put forth by MAF with the exceptions listed below under Table A.

We feel strongly that our numbers accurately and conservatively reflect the cost of increased insulation. They are generated from discussions with large track builders and insulation suppliers and installers. A discussion of these costs shown in Table A are as follows:

<u>Product and R Value Columns</u> – Products used to compare costs are DOW R-Max ¾" ISO board w/foil facing, Fi-Foil VR+Shield and Fi-Foil AA2. These 3 products represent what we have found to be the most cost effective ways to meet the R7.8, R6 and R4 code requirements, respectively. We do not believe that comparing products that achieve the same insulation at a higher price is realistic thinking from a builder's perspective.

<u>Product Cost per SF</u> - These costs come directly from suppliers of the products in Florida. They represent costs to contractors of product delivered to the job.

<u>Product Cost with 10% Board Waste</u> - From one of the largest residential contractors in the US. Verified by a major insulation contractor.

<u>Installation Cost per SF</u> - Values were obtained from major Florida residential builders, insulation contractors and insulation suppliers. The $.175/sf installation value for ¾" ISO is approx. 1/3 of the commercial installation values that we came up with.

<u>Additional Furring Cost Per SF</u> - Furring was assumed at 24" o/c. We added $.02/sf for additional fastener length and $.10/sf for the additional cost of 2x2 furring over 1x2 furring.

<u>One Story Cost (1252sf)(Includes 10% Builder Mark-up)</u> - 1252 sf is the value for one story homes used in EnergyGauge software. All costs given thus far are contractor costs. 10% is a reasonable and customary mark-up to use in this type of estimate.

<u>Two Story Cost (1788sf)(Includes 10% Builder Mark-up)</u> - 1788 sf is the value for two story homes used in EnergyGauge software. All costs given thus far are contractor costs. 10% is a reasonable and customary mark-up to use in this type of estimate.

<u>Incremental 1st Cost for One Story Change</u>

- R4 to R7.8 --- $700
- R6 to R7.8 --- $342

<u>Incremental 1st Cost for Two Story Changes</u>

- R4 to R7.8 --- $999
- R6 to R7.8 --- $488

Martha VanGeem has incorporated these numbers into her comment (attached) to determine that these changes are NOT cost effective anywhere in Florida. Additionally, comments in <u>**Problem 6**</u> below concerning the EnergyGauge Software calculations still apply.

Product	R Value	Product Cost per SF	Product Cost with 10% Board Waste	Installation Cost per SF	Additional Furring Cost Per SF	Total Cost/SF	One Story Cost (1252sf) (Includes 10% Builder Mark-up)	Incremental 1st Cost for One Story Change to R-Max Board Insulation	Two Story Cost (1788sf) (Includes 10% Builder Mark-up)	Incremental 1st Cost for Two Story Change to R-Max Board Insulation
R-Max	7.8	$0.430	$0.473	$0.175	$0.020	$0.668	$920	$0	$1,314	$0
VR + Shield	7.1	$0.150	$0.150	$0.150	$0.120	$0.420	$578	$342	$826	$488
AA2 Foil	4.1	$0.090	$0.090	$0.070	$0.000	$0.160	$220	$700	$315	$999

Table A – Estimated cost increases resulting from an increase of masonry insulation

NOTE ON FSEC COMMENT EN5687-A1 "ALT-1 RATIONALE" SUBMITTED 12/13/12

The cost numbers submitted from Jeff Sonne at FSEC differ from the MAF cost numbers above in two ways:

1- FSEC has an error in their spread sheet. They accidently included the 10% waste in the VR+Shield and AA2 Foil products. They correctly state in a "*" Note under Table 10 that the 10% was NOT intended to be included in the VR+Shield or AA2 product costs.
2- We have modified our costs to include a 10% markup for profit and overhead from the contractor to the end consumer in ALL of the products. This omission was simply an oversight in the information supplied to FSEC by MAF.

Rationale Submitted during 1st 45 day comment period (prior to Oct 8th Energy TAC):

I have reviewed the public comments to Mod #5687 submitted by Joe Belcher, Martha VanGeem, and Michael Murtha. I have attached pdf files of each of these comments for ease of viewing although they were all properly submitted to the Florida Building Commission as Public e Comments to Mod #5687. I would like to use these three comments to explain in straightforward language why the masonry industry is so concerned by the above changes which were incorporated into the 2010 Florida Building Code, Energy Conservation, and are now being suggested for the 2013 Florida Building Code, Energy Conservation.

Problem 1 – The only legislative mandate that currently exists is for the above reference changes NOT to be made in the 2013 FEC. Making the requirements for CMU insulation more restrictive than the IECC (2006, 2009, 2012 and 2015) or requiring CMU to be "equivalent" by making the baseline home have R13 wood walls is not what the legislature asked to be done (See comments by Michael Murtha and further explanation by Joe Belcher in his comments - Item 1).

Problem 2 – The idea that the code requires competitive building products to be "equivalent" is reviewed adequately by Joe Belcher in his comments - Item 2.

Problem 3 – We disagree with the technical conclusions portrayed in tables 1 and 2 (inserted below) produced by FSEC (see Martha VanGeem's comment – Item b and j) and, as of the filing of this comment, are unable to obtain the back-up information from FSEC to show exactly how they arrived at their numbers in these tables. We have formally requested this information in writing.

These calculations are technical/scientific and an open discussion requires a full disclosure of source. We are hopeful that FSEC will release this information prior to the Energy TAC on Oct. 8th and in time for our industry's technical group to determine where the variances are.

Problem 4 – There is no cost justification included in the FSEC rationale. Per Martha VanGeem's calculation sheet (Marth VanGeem's last page "Results using EnergyGauge") the cost savings in Miami going from R4 to R7.8 is around $27 per year. The upfront cost of the additional insulation is roughly $1300 (this figure does not include builder modifications required due to the ¾" increased wall thickness). No matter how you calculate it there is a negative return on this investment, even at bank savings account interest rates.

Problem 5 – Tables 1 and 2 from the FSEC rationale (inserted below) are somewhat misleading and can be easily misinterpreted and taken out of context. These tables represent only a portion of the total energy used in a home (see Joe Belcher's comment Item - #5 and Martha VanGeem's comment Item - a). Reference Problem #3 above – we are also in disagreement with the actual values in these tables and are waiting on FSEC to supply us with the source.

Table 1. 2012 IECC Std.Ref.Design vs. 2010 FEC

Home Configuration:					Florida 2010 Code e-Ratio Results			
CFA	Nbr	Stories	Floor	Walls	Miami	Orlando	Tally	Average
2000	3	1	SOG	CMU	89	80	79	**82.7**
2000	3	1	SOG	Frame	81	77	77	**78.3**
2200	3	2	SOG	CMU	88	80	77	**81.7**
2200	3	2	SOG	Frame	80	77	76	**77.7**
				Average:	**84.5**	**78.5**	**77.3**	**80.1**

Table 2. 2012 IECC Std.Ref.Design (+ R-7.8 mass walls) vs. 2010 FEC

Home Configuration:					Florida 2010 Code e-Ratio Results			
CFA	Nbr	Stories	Floor	Walls	Miami	Orlando	Tally	Average
2000	3	1	SOG	CMU	83	78	77	**79.3**
2000	3	1	SOG	Frame	81	77	77	**78.3**
2200	3	2	SOG	CMU	81	77	75	**77.7**
2200	3	2	SOG	Frame	80	77	76	**77.7**
				Average:	**81.3**	**77.3**	**76.3**	**78.3**

Problem 6 - FSEC EnergyGauge software is currently running on DOE2.1e which tends to be deficient in calculating the performance of thermal mass (see Martha VanGeem's comments – Item k). Additionally, as stated in Problem #3, it does not agree with other software based on the same DOE2.1e engine (see Martha VanGeem's comments – Item j).

Problem 7 – Changing the code value of required insulation by almost double in South Florida indicates to Florida home buyers that homes built with CMU are not energy efficient when in truth the energy efficiency of a Florida home has very little to do with the exterior wall material. According to Martha VanGeem's calculations (Marth VanGeem's last page "Results using EnergyGauge"), using the FSEC's EnergyGauge software, the energy use of an R6 interior insulated CMU one story baseline home in Tallahassee is 12440 kWH per year. Compare this to the energy use of the same baseline home with R13 wood frame walls at 12383 kWH per year. The R13 home is 12440-12383=57 kWH per year or $6.85 per year or 0.46% cheaper to operate according to EnergyGauge. Taking into account our concerns with the accurate portrayal of thermal mass by the EnergyGauge software, our industry does not consider a $.57 a month or 0.46% difference in energy use significant.

Inserted below is paragraph 2 of the Conclusions from FSEC CR-1831-09, pp 21. This document was the justification used for the increase in prescriptive masonry insulation to R7.8 in the 2010 FEC. We do not believe that masonry is so energy deficient that it deserved to be singled out by the FSEC and, consequently, the 2010 FEC as a major negative factor in the energy efficiency of Florida homes.

> The analysis of the 2009 IECC indicates that this code is either 8% more efficient than the 2007 FEC (i.e. 2006 IECC) or 19% more efficient than the 2007 FEC, depending on whether compliance is by the prescriptive procedures of Section 402, 403 and 404 or by the simulated compliance alternative specifications of Section 405. The 2009 IECC analysis further shows that air distribution system efficiency is a major determinant of overall home energy efficiency in Florida. Finally, the analysis shows that the 2009 IECC mass wall R-value requirements of Table 402.1.1 and equivalent U-factor requirements of Table 402.1.3 do not comport well with the frame wall R-value and U-factor requirements in Florida's climates. As a result, the study also recommends that minimum R-value for mass walls in the prescriptive compliance procedure be increased to R-7.8 for all of Florida.

By being put in the same category as "air distribution system efficiency" our industry is concerned that the 2010 Energy Code has damaged the image of masonry in Florida by portraying the energy in-efficiency of masonry as well known, straight forward and considerably larger than what it really is. The damage done to masonry sales in the state of Florida by this portrayal in the 2010 FEC as energy in-efficient can be calculated in the millions of dollars in lost market share. What is worse is that home owners are being dissuaded from building their homes out of the strongest and best possible building material in Florida.

Problem 8 - Trying to create energy efficient homes by increasing exterior wall insulation does not agree, in any way, with what is happening at the IECC (see Martha VanGeem's comments - Item l and m).

Problem 9 – The code has inserted a specific product by specification. The R7.8 was not determined by calculation but was placed in the code with ¾" poly-iso board being the only single product exactly meeting that value. Wall systems and insulation systems are extremely competitive and our industry does not think that it is appropriate for a specific product specification to be used in determining insulation values.

Conclusion – Relating R value to increased energy efficiency is easy to understand. Every time you put on a heavy coat on a cold day you reinforce the value of insulation. The performance of thermal mass is not easy to understand – it is very complicated and without the help of powerful and sophisticated computer programs would be nearly impossible to fairly evaluate.

Since walls are often the only thing to be seen on a building it is natural to assume that they play a major role in the energy efficiency of a building, yet walls, as long as they are nominally insulated, have very little to do with the amount of energy used by a structure.

"More is better" so it would seem that the more insulation you used the more energy efficient a building would become, yet the point of diminishing returns quickly reduces the efficiency of added wall insulation.

These misconceptions are used relentlessly in the promotion strategies of our competitors. We are hopeful that the Energy TAC and the Florida Building Commission will assist us in striking out the sections of Mod #5687 referenced above. These sections do little to contribute to the energy efficiency of Florida homes and do significant and unfair damage to the perception of masonry by home buyers.

Thank-you

Don Beers, P.E.

don@floridamasonry.com

Comments on FSEC Code Change Submittal 5687

Submitted by:
Martha G. VanGeem, PE, LEED AP, FACI
Principal Engineer
December 14, 2012

Comment No. 1

Table R402.1.1 Insulation and Fenestration Requirements by Component, Mass Wall R-Value
Climate Zone 1: Do **not** make the proposed change in mass wall R-value from 3/4 to 6/7.8.
Climate Zone 2: Do **not** make the proposed change in mass wall R-value from 6/6 to 6/7.8.

I am therefore in support of Alternate A-2 submitted by FSEC on December 12, 2012.

Rationale:

a.) **Revised costs.** On October 29, 2012, Mr. Philip Fairey provided the Masonry Association of Florida (MAF) and Ms. VanGeem an excel spreadsheet (file name 2012IECC_FlaCode_CMU, hereafter called the FSEC economic spreadsheet) showing the economic justification of the FSEC submittal 5687 for masonry walls. The MAF has examined the costs provided and is submitting their justification on revising the costs in a separate comment from Mr. Don Beers. I concur that the revised costs from MAF should include labor and contractor profit and not just costs from a store. This methodology for revised costs is consistent with the methodology used in the development the ASHRAE 90.1 and 90.2 energy standards. The comment submitted by FSEC on December 12, 2012 does not reflect the latest cost information from MAF.

b.) **FSEC proposal not cost effective for Orlando and Tallahassee.** Using the FSEC economic spreadsheet with revised costs shown in yellow in Table 1 and no other changes, we see that the proposed changes to the Florida code for Miami are not cost effective. A "Present Value Benefits/Costs Ratio" less than 1.0 indicates that the measure is not cost-effective. For Orlando the average is 0.78 and for Tallahassee the value is 0.97. **Therefore the proposed values are not cost effective and the 2012 IECC mass walls values should be used.**

Table 1 – FSEC Economic Spreadsheet with Revised Costs (supporting IECC in Orlando and Tallahassee)

Incremental 1st Cost: SRD → R-7.8 CMU

Model	1st Cost	Miami	Orlando	Tally	Average
1-sty CMU	total $	$700	$342	$342	$461
2-sty CMU	total $	$999	$488	$488	$658
Average	total $	$850	$415	$415	$560

Present Value of Costs (2): SRD → R-7.8 CMU

Model	Cost	Miami	Orlando	Tally	Average
1-sty CMU	PVcost	$799	$390	$390	$527
2-sty CMU	PVcost	$1,140	$557	$557	$751
Average	PVcost	$970	$474	$474	$639

5687 G-100 Vangeem letter

Comments on FSEC Code Change Submittal 5687
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Table 1 (cont.) – FSEC Economic Spreadsheet with Revised Costs (supporting IECC in Orlando and Tallahassee)

Present Value Benefits/Costs Ratio (2): SRD → R-7.8 CMU

Model	B/C Ratio	Miami	Orlando	Tally	Average
1-sty CMU	PVBC	[redacted]	0.79	1.02	[redacted]
2-sty CMU	PVBC	[redacted]	0.77	0.94	[redacted]
Average	PVBC	[redacted]	0.78	0.97	[redacted]

c.) **FSEC Proposal Not Cost Effective in Miami with Reduced Scalar Ratio**. The FSEC proposal and the above economic analysis use a scalar ratio of 20.69. This is too high. A scalar ratio of 8 was used in analyses by the SSPC ASHRAE 90.1 (the committee that develops the standard) in its development of criteria in the 90.1 standards from 1999 through 2010.

The calculations below in Table 2 show the results of the FSEC economic spreadsheet with revised costs and a scalar of 15.47. Once again, a "Present Value Benefits/Costs Ratio" less than 1.0 indicates that the measure is not cost-effective. **Therefore, the proposed change is not cost effective in any city including Miami (where the average value is 0.99) and the 2012 IECC values should be used.**

Table 2 - FSEC Economic Spreadsheet with Revised Costs and Scalar Ratio (**supporting IECC in all regions)**

Incremental 1st Cost: SRD → R-7.8 CMU

Model	1st Cost	Miami	Orlando	Tally	Average
1-sty CMU	total $	$700	$342	$342	$461
2-sty CMU	total $	$999	$488	$488	$658
Average	total $	$850	$415	$415	$560

Present Value of Costs (2): SRD → R-7.8 CMU

Model	Cost	Miami	Orlando	Tally	Average
1-sty CMU	PVcost	$996	$487	$487	$656
2-sty CMU	PVcost	$1,422	$694	$694	$937
Average	PVcost	$1,209	$591	$591	$797

Present Value Benefits/Costs Ratio (2): SRD → R-7.8 CMU

Model	B/C Ratio	Miami	Orlando	Tally	Average
1-sty CMU	PVBC	1.05	0.59	0.76	0.87
2-sty CMU	PVBC	0.95	0.57	0.70	0.80
Average	PVBC	0.99	0.58	0.72	0.82

There are many ways to achieve a given scalar ratio. In this case, it was achieved by using a Florida property tax rate of 1.6% and making the fuel inflation rate the same as the general inflation rate as shown below in Table 3 (values in yellow are those that were changed as well as the new scalar ratio). The fuel inflation rate has historically been the same as the general inflation rate because fuel is an integral part of the general inflation rate; fuel is used to manufacture products, provide heating and cooling to buildings, and transport materials. These are realistic assumptions. However, the main point is that a scalar ratio of 15.47 is reasonable and much higher (showing increased potential for more insulation) than the scalar ratio of 8 traditionally used. The scalar ratio for the 2012 IECC is not available from the proponents of the successful proposals. A scalar as high as 20 has not been used in any minimum code or national standard that has been published (that I am aware of).

Table 3 – FSEC Economic Spreadsheet Revised Scalar

Downpayment %	10.00%
Mort Interest Rate (i)	5.70%
Gen.Inflation Rate (g)	2.42%
Fuel Inflation Rate (f)	2.42%
Discount Rate (d)	4.42%
N_mortgage (N-m)	30
N_analysis (N-a)	30
Marginal Inc. Tax Rate (t)	0.00
Property Tax Rate (p)	0.016
Ratio: Assess Val / Invest Val	0.80
Maintanence_FR	0.000
Measure Life	30
P1 =	**22.01013**
P2 =	**1.42301**
Scalar Ratio =	**15.46726**

d.) **e-Ratio**. Using the e-ratio inflates the energy savings in a home. The code change proposal uses the Energy Performance Index (EPI or e-ratio) as justification. The e-Ratio is not an indication of the total loads on the home. It is defined by FSEC [1] as including only the heating, cooling, and domestic hot water loads. Analyses performed using Energy Gauge and other programs show that this load is less than half the energy load of the home. See also Figure 2 in another FSEC report[2], reprinted below. The light blue is all other loads; these are larger than heating, cooling, and hot water loads combined. **The energy savings in a home using an e-Ratio is inflated to about twice of that shown using total loads.** This is further demonstrated below.

[1] Fairey, Philip. *Evaluation of Alternatives for Florida's 2010 Energy Code Update for Residential Buildings*. FSEC-CR-1831-09. October 30, 2009.
[2] Fairey, Philip. *Effectiveness of Florida's Residential Energy Code, Energy Code: 1979 – 2009.* FSEC-CR-1806-09. June 15, 2009.

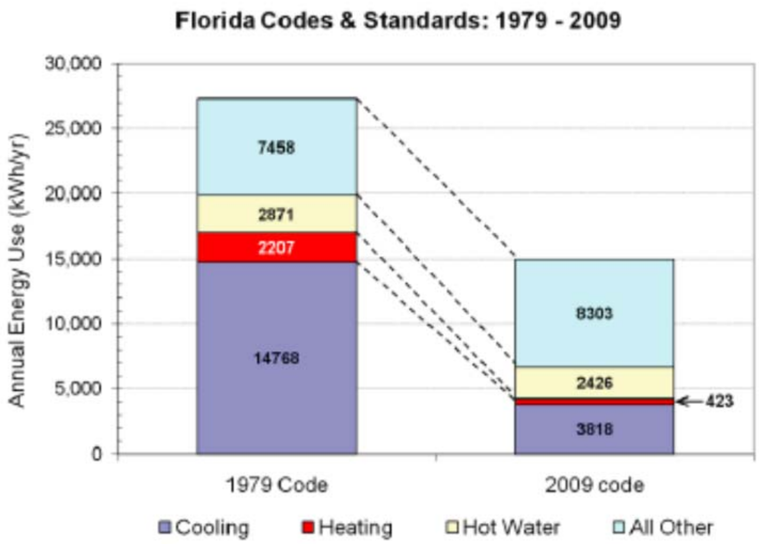

Figure 2 Average Florida home savings resulting from Florida Energy Code implementation.

More energy savings can be found from reducing these other loads (lighting, appliances, and plug loads) than the loads in the e Ratio.

e.) **How small is 114 kWh?** The cost savings by the proposal are as small as 114 kWh per year in Orlando. Note that a kWh is the amount of energy that a small 1000 Watt coffee maker (or any other 1000 W appliance) uses in 1 hour. So the energy savings by this proposal for a single story house is equivalent to having a coffee maker turned on in Orlando for 1 hour for 114 days of the year; in Tallahassee for 1 hour for 146 days a year, and in Miami for 1.5 hours for 275 days a year. Far more energy savings can be gained by educating the occupant on appliance use to reduce plug loads (e.g., turning off a TV or monitor) and blind use (to reduce solar loads when the air conditioning is on and increase solar loads when heating is on). This proposed change significantly increases the cost of construction for mass walls while showing very little cost savings.

f.) **Hot water energy same as heating and cooling energy.** For Tallahassee and Orlando, analyses using EnergyGauge show that the domestic hot water heating energy use, which is included in the e-Ratio, is approximately the same as the energy use for heating and cooling. Therefore, the focus should be on the domestic hot water use rather than the heating and cooling use. Using percentages does not provide an indication of how small these loads are.

g.) **Doubling insulation saves very little energy**. These analyses and others show that doubling the amount of insulation in a mass wall does not result in very much energy savings. In climates such as Florida with reversals in heat flow through the wall during most of the year, thermal mass works well.

Thermal mass performs best when the heat flow is reversed in the wall during any point during the day. In these cases, rather than flowing through the wall, the heat flow in one direction cancels out the heat flow in the other resulting in very low heat flow through the wall for many hours. Thermal mass works best in climates where the temperature fluctuates above and below the balance point of the building (a little less than room temperature of houses) during the day. In these cases, the thermal mass will have the outer side cooler during the nighttime (heat loss) and warmer during the daytime (heat gain) than the balance point of the building – resulting in reversals in heat flow through the wall – and therefore resulting in periods of very low heat flow through the mass wall. This occurs for all months in Orlando, about 11 months in Tallahassee, and about eight months in Miami[3]. Thermal mass works well in Florida.

h.) **Miami should have less energy use.** The IECC requires less insulation in Miami because most energy simulations show less energy use in Climate Zone 1 (Miami) than in Climate Zone 2 (Orlando and Tallahassee). However, the EnergyGauge software does not show this. This indicates a possible error in the EnergyGauge software or assumptions in the base model.

i.) **DOE2.1 based programs would show less significant energy savings.** An additional reduction in energy use in houses with mass walls would be predicted if EnergyPlus or the old BLAST software were used. The EnergyGauge software uses a DOE2.1e engine for calculation purposes. This DOE2.1e engine uses regression equations rather than true energy balance to determine thermal mass effects. This has been shown to underestimate thermal mass effects. It is therefore predicted that the results would show even less significant energy savings if EnergyPlus were used.

j.) **Changes not supported by the *2012 IECC*.** The International Code Council (ICC) held hearings to determine the *2012 IECC*. These hearings included consideration of insulation levels and energy savings in all climates including Climate Zones 1 (Miami) and 2 (Orlando); and resulted in the values in the *2012 IECC*. More insulation for mass walls than is in the *2012 IECC* in not justified.

k.) **Changes not supported by IECC code changes proposed by DOE and others for 2015.** Lastly, the Department of Energy (DOE) and others (Denver, November 9, 2012 meeting) have recently released their tentative proposed code changes for the residential portion of the next version of the IECC to be published in 2015[4]. The DOE is aggressively trying to save energy through the IECC. However, they as well as others have not proposed any changes to the mass wall criteria in Climate Zones 1 and 2. This demonstrates that changes to increase the R-values of mass walls in Florida above the current 2012 IECC levels are not warranted.

[3] Using *NOAA Comparative Climatic Data for the United States through 2007* for average daily minimum and maximum temperatures.

[4] Residential Code Change Proposals for the 2015 IECC

Comment No. 2

Table R402.1.3 Equivalent U-Factors, Mass Wall U-Factors, Climate Zones 1 and 2; and footnote b
Do **not** make the proposed change in the mass wall U-factors for Climate Zones 1 and 2 and footnote b.

I am therefore in support of Alternate A-2 submitted by FSEC on December 12, 2012.

Rationale: The U-factors correspond to the R-values in Table R402.1.1. We are speaking against the proposed changes to the R-values for mass walls in Comment No. 1, above. Therefore, we are speaking against the corresponding proposed changes to the U-factors for the same reasons as stated in Comment 1, above.

Comment No. 3

Table R405.5.2(1) Specifications for the Standard Reference and Proposed Designs

2nd row of table on above-grade walls: Do **not** make any of the proposed changes except change remittance to emitttance.

I am in support of Alternate A-2 submitted by FSEC on December 12, 2012.

Rationale: The U-factor of the standard reference design (baseline) wall should be the U-factor of a mass wall if the proposed design wall is a mass wall for the following reasons:

a.) This was debated during the hearings for the *2012 IECC* and this conclusion was reached.

b.) The U-factor of the standard reference design mass wall should be based on the prescriptive criteria for mass walls just as is done for frame walls, basements, ceilings and glazing.

c.) In some cases the house with the R13 wall insulation will use more energy than the house with prescriptive mass wall insulation and in some cases it will use less. Therefore the baseline should be the prescriptive mass wall insulation criteria.

Martha G. VanGeem, PE, LEED AP BD+C, is a self-employed principal engineer in the Chicago area with 35 years of experience. She serves as a project principal investigator and specialized consultant in the areas of green buildings and infrastructure, energy use in buildings, energy codes, thermal mass, and moisture mitigation. Her accumulated experience during her career has included over 500 large and small consulting, testing, and research projects. Ms. VanGeem has investigated moisture problems and performed energy analyses and testing for numerous concrete, steel, and wood framed buildings. In the area of green technologies, Ms. VanGeem provides expertise on environmentally preferable materials, LEED and other green rating systems, product category rules (PCRs), and environmental product declarations (EPDs). She has more than 15-years- experience with environmental life-cycle inventories (LCIs) and life-cycle assessments (LCAs) of cement, concrete, and other construction products as well as life cycle cost (LCC) analyses. Ms. VanGeem is a licensed professional engineer in Illinois, a LEED AP BD+C, a Registered Energy Professional (residential and commercial) for the city of Chicago, and a fellow of the American Concrete Institute. She received her bachelor's degree of civil engineering (high honors) from the University of Illinois (Urbana) and her MBA from the University of Chicago. She is a member of many energy and green building standard committees including ASHRAE energy standards (SSPC 90.1 and SSPC 90.2), ASHRAE/USGBC/IES High Performance Green Building Standard (SSPC 189.1) – where she is also energy working group chair, ASTM, ACI, SEI, and ISO. She presents on various aspects of green buildings on a regular basis, and has authored more than 100 articles and published reports. Two of her articles have won awards – the Charles C. Zollman Award from the Precast/Prestressed Concrete Institute in 2006 and the F. Ross Brown Award from Construction Canada in 2005.

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September 21, 2012

Florida Department of Business and
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Florida Building Commission
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In regards to: Modification EN5687

The FSEC is out of order proposing any changes to the IECC base code on a variety of different levels. Specifically, they are relying on an outdated and invalid Executive Order and statutes that no longer exist as justification to move forward with changes to the IECC which clearly have been rejected by the Legislature.

It is understood that Governor Crist had set out sweeping changes to energy policy in 07-127 and subsequently in 2008, HB7135 and HB697 and included scheduled increases in thermal efficiency standards and the direction to use the IECC as the base code, yet allowing for modifications in order to maintain the efficiencies of the of the FEEC.

That's all well and good, and had things stopped there, the FSEC amendment would be viable, however, three things have happened, 1) Charlie Crist is no longer Governor, 2) the Florida Legislature went out of its way to remove most all of those energy and greenhouse initiatives that had been codified in statutes and 3) the Florida Legislature told the FBC that the International Base Codes would not only be the base for Florida's codes, yet they instructed that there would be a high threshold should someone want to tailor them in order to further a specific agenda in Florida.

The FSEC's amendment is contradictory to HB849 of the 2011 session which completely removed all scheduled increases in thermal efficiency standards. That is not merely "housekeeping" and it signals that the intent of the Legislature was to cease and desist those activities. Legislatures do not remove statutes that they intend for agencies to continue to enforce. In fact, the FSEC would have greater footing to forward the amendment, had the Legislature never created those standards in the first place. However, an agency can't hang its statutory authority on a section of law that the Legislature proactively removed.

Further, it was clearly the intent of the Legislature in HB849 of the 2011 session that the 2013 code cycle would commence with the international base codes, and placed a high threshold on amending those base codes with Florida specific amendments.

That legislation said, "Hey, you folks can keep the Florida stuff until 2013 (with exception of wind resistance, you're keeping that) and then you have to explain if the issue your proposing has been addressed in the International Codes and if have you tried to get them to incorporate whatever you want to do at that level before coming to us and if there is a specific 'Florida need'."

"If they've already addressed it in an equivalent manner in the International Codes, you can't have it in our Florida codes."

The FSEC may incorrectly argue that current law allows them to incorporate "modifications in (in the IECC) order to maintain the efficiencies of the FEEC". However, as previously mentioned, the thermal efficiency standards schedule has been removed by the Legislature, and the language in HB849 takes precedence because it was last Legislative Directive passed. That language in HB849 says that all "codes", including the IECC are subject to the litmus test as to whether a Florida specific code is allowed.

Specifically, the Session Committee Report on HB849 states that the bill "Specifies efficiency standards for the Building Code are changed by replacing scheduled enhancements to the energy code provisions with language referring to the model code;", i.e. "Thermal efficiency standards will be dictated by the International Code".

The argument is pretty clear - the Legislature expunged most all of Governor Crist's initiatives, including the Greenhouse standards in HB4001 of 2012 session. The FSEC is attempting to carry out the previous Administration's agenda. There is no indication that Governor Scott has reissued 07-127, and the Legislature spoke very clearly in HB849 as to how it wanted Florida to abide by the international standards, yet the FSEC is still quoting 07-127 and HB697 of 2008 as authority; that makes little sense.

The language contained in the proposal by the FSEC completely ignores what has occurred over the last several years in this respect and simply wants everyone to believe that this amendment is some kind of "administrative clean up" by reverting the standards back to the 2010 Code which are no longer valid.

However, this proposed measure will get a great deal of scrutiny. If the FBC were to pass this clearly out of order amendment, it would be completely ripe for an administrative challenge. Further, it would have to go to the Joint Administrative Procedures Committee in the Legislature for review and final approval, at which time, staff would have to address just as to how and why such a clear directive by the House and Senate was ignored and our industry had to spend our time, money and effort to combat it, when we all should be working together to get our folks back to work.

Respectfully SUBMITTED SEPT 21, 2012

Michael P. "Mike" Murtha
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This is a Public Comment to request the retention of the International Energy Conservation Code R-values for Mass Walls in Table 402.1.1and the U-Factors for Mass Walls in Table 402.1.3. The changes from R-3/4 in Zone 1 and R-4/6 in Zone 2 to R -6/7.8 throughout the state and the modifications of the U-Factors are Florida Specific Amendments to the International Energy Conservation Code (IECC) and are unwarranted for the following reasons:

1. The impetus for the changes in the 2010 Florida Building Code, Energy Conservation, (FBCEC) was compliance with a legislative directive to increase the energy efficiency of the 2007 Florida Building Code (FBC) by 20% in the 2010 FBC. The legislative mandate, including legislative mandates for future increases, was subsequently repealed by the legislature. Prior to enactment of the legislative mandate, an Executive Order (EO 07-127) was issued then Governor Christ requiring the Florida Building Commission (Commission) to increase the energy efficiency of the Florida Building Code by 15% over the energy efficiency of the 2007 Florida Building Code. The targeted implementation date of the Executive Order was January 1, 2009. The order was implemented by the Commission with a 2009 Supplement to the 2007 Florida Building Code. In developing the 2010 FBCEC an additional 5% increase in energy efficiency was added to the 15% increase mandated by EO 07-127 for a total of a 20% increase in energy efficiency over the efficiency of the FBC 2007. Evidence of this intent may be found throughout studies conducted by the Florida Solar Energy Center (FSEC) under contract to the Department of Community Affairs (DCA now under DBPR) and in other documents related to the development of the 2010 Florida Building Code. For example, the 2010 Florida Energy Code Workgroup Report to the Florida Building Commission in the section titled Overview states:

   > "Governor Crist directed the Commission to increase building energy efficiency requirements by 15% in his July 2007 Executive Order 127. In addition, the 2008 Legislature through passage of The Energy Act of 2008 created a suite of energy related assignments for the Building Commission. The Energy Code provisions were a major focus of the Commission during 2008, and the Commission increased the thermal efficiency requirements for the Florida Energy Code by 15% and integrated the enhanced requirements into the 2007 Florida Building Code. The Commission reviewed energy related code amendments adopted in the 2007 Florida Building Code Update to determine their cumulative level of increased efficiency, and adopted additional amendments required to achieve Governor Crist's directive of 15% increased efficiency. During 2008 the Energy Code was amended by administrative rule and then the revised Energy Code was adopted into the 2007 Florida Building Code during the 2008 "glitch" cycle concurrently with the March 1, 2009 effective date for the 2007 Florida Building Code. Working with stakeholders using consensus-building workgroups, the Commission was able to achieve the

15% increase in efficiency in buildings and implement code amendments that are efficient, consistent, understandable and enforceable for the full spectrum of Energy Code users. **The Commission's Energy Code Workgroup will develop recommendations regarding energy conservation measures for increasing efficiency requirements in the 2010 FBC by 20% as required by law"** [1] (**Emphasis** provided.)

2. The rationale submitted for Mod #5687 and the 2010 Energy Code Workgroup Report both appear to assume a requirement for mass walls to be equivalent to the wood frame baseline house used in Florida. Information regarding the input, assumptions, presets, algorithms, and internal operations of the software produced by the Florida Solar Energy Center are unavailable to the public. There is no way to verify that the calculations are correct. (Note: A formal request for this information was made to FSEC by the industry.) In addition, there is new software available which is reportedly much more accurate in handling the complexities of whole building energy simulation. (DOE Energy Plus) The industry believes the new engine will much more accurately analyze the complex issues related to energy use and mass walls and is working to raise the funds necessary to conduct the research.

   Further, there is no requirement in the code, in statute, or in any rule requiring equivalency between materials. Florida establishes the baseline home as a wood frame wall with R-13 insulation. The base code establishes the baseline based on the materials used. Mass is not compared to or required to be equivalent with other materials. Should such equivalency be mandated for energy in Florida, the industry believes this should be carried out through all areas of the code such as termite resistance, sound attenuation, fire resistance, decay resistance, to name a few of the many other provisions of the code related to the properties of materials.

3. The United States Department of Energy (DOE) was instrumental in the rewrite of the 2009 IECC resulting in the 2012 IECC, the base code for the 2013 FBCEC. The DOE goal was a 30% increase in energy efficiency over the 2006 IECC and DOE reports that goal was achieved. The base code does not modify the R-Values or U-Factors for mass walls and these values have been in the base code for many years. Further, the DOE recently released their proposed code changes for the residential portion of the next version of the IECC to be published in 2015[2]. The DOE is aggressively trying to save energy through the IECC. However, they have not proposed any changes to the wall criteria. This clearly demonstrates that changes to increase the R-values of mass walls in Florida above the current 2012 IECC levels are not warranted.

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[1] Blair, J., 2009. "2010 Florida Energy Code Workgroup Report to the Florida Building Commission, Nov. 12, 2009 – Meeting VIII," FCRC Consensus Center, Florida State University, Tallahassee.

[2] Residential Code Change Proposals for the 2015 IECC

4. While FSEC claims substantial and significant savings, the industry evaluation does not indicate the increase in energy efficiency by modifying the base code R-Values and U-Factors for mass walls justifies the $1100.00 plus in increased cost. (Industry estimates savings at $8.00 per year in Orlando and $26.00 per year in Miami.)

5. If true energy savings is desired, the Commission should include all home energy. Florida's treatment of energy use by considering only heating, cooling, and hot water is outmoded and needs to be updated. According to FSEC when the energy code was first adopted other uses accounted for only 28% of the energy use in Florida homes. Today FSEC estimates those other uses account for more than 55% of home energy use.

> "Include all home energy uses in Florida's Energy Code as is currently done in national Home Energy Rating Systems. The data from this study show that the home energy uses that are not covered by Florida's Energy Code now account for more than 55% of home energy use. In 1979 these "other" energy uses accounted for only 28% of total energy use. By virtue of the fact that Florida's Energy Code has consistently addressed the energy uses of heating, cooling and hot water, these uses have been substantially moderated. On the other hand, these "other" energy uses have not been substantially addressed and have increased over time as home size has increased."[3]

Further, there is a long standing recommendation from FSEC to address whole house energy use as national programs do.

> "Thus, the quickest, easiest and most straight forward way to address home energy use in a comprehensive manner is to adopt this national Home Energy Rating System and simply require a HERS Index less than 88 for Florida Energy Code compliance, much like is done for ENERGY STAR qualification."
>
> "There are additional advantages to this approach, as follows:
>
> • It does not require any change to Florida's Energy Code Baseline Home because RESNET's American Standard Home already aligns with Florida's Energy Code Baseline Home for envelope features and heating, cooling and hot water equipment. Thus, no previously existing agreements on the configuration of the Florida Energy Code Baseline Home need be renegotiated.
>
> • It allows all energy efficiency technologies, not just heating, cooling, hot water and envelope measures to compete on an equal footing in achieving the most cost effective improvements in overall home energy efficiency.

[3] Fairey, P., 2009. "Effectiveness of Florida's Residential Energy Code: 1979 - 2009 (Revision of 1979 - 2007 Report)," FSEC-CR-1806-09, Florida Solar Energy Center, Cocoa, FL, p.18.

• It makes Florida's Energy Code system seamlessly compatible with virtually all national 'beyond code" programs, including ENERGY STAR program, DOE's Builders Challenge program and the federal income tax credit qualification for highly efficient homes.

• The system can be used to provide "advanced warnings" to industry of code stringency increases, which they will understand intrinsically. Rather than changing Florida's Energy Code Baseline Home requirements, the implications of which are difficult and complex to grasp and understand, industry can be given advanced notice that in some certain number of years the requirements for Energy Code compliance will change from a HERS Index of 'x' to a HERS Index of 'y', a concept that will be easy to understand and evaluate using existing Energy Code compliance software.

• It allows opportunities to privatize Florida Energy Code enforcement system through an infrastructure of Home Energy Raters that already exist within the state and for which there is an existing infrastructure within Florida for training and certification and quality assurance based on national consensus standards.

• This HERS Index can be used as a measure of energy efficiency for green building and other "beyond code" programs.

• The HERS index incorporates the evaluation of renewable energy systems, including solar hot water and on-site PV power production.

• It provides a very simple means of measuring progress into the future. " [4]

In conclusion, in the treatment of mass wall the industry believes the base code has it right. The industry strongly urges the Energy TAC and the Commission to adopt the R-Values and U-Factors for Mass Walls as published in the base code, the 2012 International Energy Conservation Code. Should increases in energy efficiency be desired, the Commission should consider modifying the code to use the whole house energy use concept adopted nationally.

[4] Ibid. p.19.

There are many responses to this proposed mod indicating misconceptions. First, some indicate that mass is not properly considered. That is not true. If there was no mass effect, then the same approximate R-value would apply to wood and block. That is not the case. The frame insulation wall R-Value in the prescriptive table is R13 and the mod indicates the equivalent level for a block wall when the insulation is on the outside is R6.

Second, some indicate that this mod will require the home to include the table insulation level and be costly. For performance code compliance and for the Total UA alternative method there is no minimum requirement for mass wall insulation. HOMES CAN CONTINUE TO BE BUILT IN FLORIDA WITH R3 WALL INSULATION EVEN IF THE PRESCRIPTIVE TABLE HAS A HIGHER VALUE.

Third, some indicate that EnergyGauge is inaccurate and does not represent any measured data. Validating simulations against measured data is not an inexpensive task. However, it was done when EnergyGauge USA first entered the marketplace and a peer-reviewed paper was presented on it. The paper indicates excellent agreement in the three homes that were monitored, one with concrete block walls, one with frame walls and one with autoclave concrete walls (Reference Publication: Fuehrlein, B., S. Chandra, D. Beal, D. Parker, and R. Vieira, "Evaluation of EnergyGauge® USA, A Residential Energy Design Software, Against Monitored Data." Proceedings of ACEEE 2000 Summer Study, pp 2.115 - 2.126, American Council for an Energy Efficient Economy, Washington, DC, August 2000.) EnergyGauge USA has also passed national simulation tests required by Florida, RESNET and the IRS. (Reference Publications: 2010 Florida Energy Code Software Verification Test Report: EnergyGauge® USA version 3.0, Florida Solar Energy Center, January 23, 2012; Fairey, P. and Wichers, S. "Validation of EnergyGauge® USA Using the HERS BESTEST" submitted to Residential Energy Services Network. Florida Solar Energy Center, Cocoa, FL, December 15, 2004.).

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Comments on the 2013 Triennial Original Modification

07/01/2012 – 08/02/2012

Sub Code: Energy Conservation

Chapter and Topic: **Chapter 4 – [RE] – Residential Energy Efficiency**

Section: R402.1.1 and R402.1.3

Respectfully submitted,
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The Portland Cement Association (PCA) is in opposition to the modifications to revise criteria for mass walls in TABLE R402.1.1 INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT and TABLE R402.1.3 EQUIVALENT U-FACTORS as presented in EN5687 submitted by the Florida Solar Energy Center.

PCA has a history of working with the State of Florida to assure its citizens have access to construction that is appropriate and affordable for the multiple design conditions present in Florida. PCA has invested heavily in developing information that quantifies the thermal inertia (mass) benefits of concrete and masonry construction and these have been used to assist Florida in the development of appropriate energy efficiency criteria for building envelopes. In addition, the benefits of thermal mass have been demonstrated through calibrated hot box tests, computer simulations, building performance modeling and whole building simulations with much of this work conducted by the United States Departments of Housing and Urban Development, Commerce (National Institute for Standards and Technology) and Energy. Copies of the Portland Cement Association reports listed as resources can be made available upon request.

PCA has four primary reasons for opposing the proposed modifications:

1) The proposed modifications are inconsistent with the combined thermal performance and economic-based thermal resistance insulation levels for mass walls developed by the U.S. Department of Energy at Pacific Northwest National Laboratories and used in nationally developed building codes and standards which include the International Code Council *International Residential Code* and *International Energy Conservation Code* and American Society of Heating Refrigerating and Air-conditioning Engineers Standard 90.2 *Energy Efficient Design of Low-Rise Residential Buildings*.
2) The minimum thermal resistance insulation values for mass walls appear to be increased without a corresponding increase in the thermal resistance insulation values for frame walls which may place a technically inappropriate and potentially unfair bias for frame wall construction in lieu of mass wall construction.
3) The proposed revisions inappropriately discourage the use of concrete and masonry construction as a standard method of construction in Florida. In so doing, this reduces or removes the opportunity for Floridians to reside and work in structures that are appropriately designed to provide shelter

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from storms and related debris; resist mold, mildew, and rot; and resist termite infestations and damage while affordably providing thermal comfort.

4) If the goal is to achieve affordable energy efficiency through building envelope design, the proposal is remiss in that it ignores modifications to the building envelope where significantly more energy conservation may be obtained. Examples include increasing fenestration shading coefficients, reducing maximum fenestration U-values, reducing allowable fenestration area, and further increases in minimum ceiling/attic thermal resistance insulation R-values. Each of these potentially provides more economical energy conservation than increasing the minimum amount of thermal resistance insulation in mass wall construction.

For these reasons, the Portland Cement Association respectfully requests disapproval to the modifications in the referenced tables or any similar modifications that may appear elsewhere in the code and recommends that the original language be retained.

Resources:

1. *Energy Efficient Design of Buildings Except Low-Rise Residential Buildings,* American Society of Heating Refrigerating and Air-conditioning Engineers Standard 90.1, 2010.
2. *Energy Efficient Design of Low-Rise Residential Buildings,* American Society of Heating Refrigerating and Air-conditioning Engineers Standard 90.2, 2007.
3. *Thermal Mass Credits Relating to Building Envelope Energy Standards,* J. E. Christian, American Society of Heating and Refrigerating and Air-Conditioning Engineers, 1991, Vol. 97, Pt. 2.
4. *International Residential Code,* International Code Council, 2012.
5. *International Energy Conservation Code,* International Code Council, 2012.
6. *Thermal Mass Assessment: An Explanation of the Mechanisms by Which Building Mass Influences Heating and Cooling Energy Requirements,* by K. W. Childs, G. E. Courville, E. L. Bales, Oak Ridge National Laboratory, 1991.
7. *Thermal Inertia in Architectural Walls,* National Concrete Masonry Association, F.N. Arumi, 1977.
8. *Thermal Performance of Masonry Walls*, by A. E. Fiorato and C. R. Cruz, Portland Cement Association, 1979.
9. *Heat Transfer Characteristics of Walls Under Dynamic Temperature Conditions* by A. E. Fiorato, Portland Cement Association, 1981.
10. *Calibrated Hot Box Test Results Data Manual – Volume II* by M. G. Van Geem and S. C. Larson, Construction Technology Laboratories, A Division of the Portland Cement Association, 1985.
11. *Calibrated Hot Box Test results Data Manual – Volume 1* by M. G. Van Geem, Construction Technology Laboratories, A Division of the Portland Cement Association, 1982.
12. *A Field Study of the Effect of Wall Mass on the Heating and Cooling Loads of Residential Buildings*, D.M. Burch, W.R. Remmert, D.J. Krintz, and C.S. Barnes, Thermal Mass Effects in Buildings Seminar, 1982.
13. *NBS Building Science Series 134 Determining cost-Effective Insulation Levels for Masonry and Wood Frame Walls in New Single Family Housing* by Stephen R. Petersen, Kimberley A. Barnes and Bradford A. Peavy, National Institute of Standards and Technology, U.S. Department of Commerce, 1981 .

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This proposal should be disapproved because it weakens the efficiency of the 2012 IECC performance path in several ways. Under the Florida statute, the proponent must show that these modifications to the foundation code – the 2012 IECC – are needed to accommodate the specific needs of this state. We are aware of no evidence, and proponent has offered none, of a Florida-specific need for these changes to the performance path that have not been adopted in any other state that has adopted either the 2009 or 2012 *IECC*. We would like to see Florida performance approach to be as consistent as possible with the national model, making it easier for the same good energy code compliance practices to be utilized nationwide.

The most significant weakening amendments are the following:

1. **Assumption of a fixed 15% glazing area in the standard reference design.**

The "fixed" glazing area assumption was eliminated in the 2006 *IECC*, and that section of the performance path has not changed in the 2009 or 2012 *IECC* (except that it was further strengthened in 2009). The glazing area assumption in the 2012 *IECC* performance path ensures that adequately efficient windows, and sufficient amounts of insulation, are installed in new homes. To set the assumed glazing area percentage at 15% in all cases would reduce energy savings by restoring a loophole permitting builders to build homes with poorly-insulated walls if they are "offset" by installing fewer windows than 15%. This is the perverse incentive that existed prior to 2006, when the current approach was incorporated into the code. It is even more important to retain the 2012 *IECC* approach to glazed area if equipment trade-offs are allowed as also proposed.

The 2012 *IECC* performance path applies a dynamic assumption to glazing area that incentivizes energy efficiency. In the 2012 *IECC*, when a proposed home has less than 15% glazing area, it is compared (for purposes of calculating energy efficiency) against a reference home with the same glazing area percentage. This eliminates the loophole described above. If the proposed home has 15% or more glazing area, it is compared against a reference home with 15% glazing area. This requires homes with larger-than-average glazing area percentages to meet a higher efficiency standard, depending on the amount of glazing. Thus, the 2012 *IECC* promotes efficiency for homes with glazing area at all levels. This approach has been adopted in every state that has adopted the 2006, 2009 or 2012 *IECC* except for Florida.

2. **Use of incorrect shading factor multipliers.**

We recommend maintaining the updated assumptions for interior shade fractions as published in the 2012 *IECC*. Proposal EN5687 incorrectly treats interior shade fraction as a constant without regard to the type of shade or the type of the glass. Recently completed research by ASHRAE shows that it is not a constant. *See* Wright, J., et.al., *Improved Cooling Load Calculations for Fenestration with Shading Devices* (Jan. 14, 2009). The 2012 *IECC* provides a simplified equation for determining interior shading fraction depending on the SHGC of the glazed fenestration product (based on the

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assumption of a specific type of interior shade, recognizing that the code has no control over the type of shade ultimately employed). Proposal EN5687 also assumes that shades are used twice as much in the summer as in winter, although no available data supports this conclusion. The 2012 *IECC* assumes that shades are closed 50% of the time throughout the entire year, allowing the performance path to provide a more precise treatment of shade fraction depending on the SHGC of the glazing product.

3. Restoration of the equipment trade-off for cooling systems and service water heating.

The elimination of the equipment trade-off in the 2009 and 2012 versions of the *IECC* closes a significant compliance loophole that had been used for many years to weaken building efficiency. Higher efficiency air conditioners, furnaces, and water heating equipment can be tremendous energy savers. However, Federal law preempts states from setting efficiency requirements any higher than the federal minimums (which typically lag behind common builder practice by years, even decades). The inability of states to set higher efficiency requirements leaves a "trade-off gap" within any code that allows equipment trade-offs – a gap that has been exploited to install low-quality fenestration and insufficient insulation in houses all over Florida (and nationwide) for many years. In short, since the code must specify an inefficient unit due to federal minimum standards, any builder who would otherwise use a better unit, because of utility incentives or consumer demand, is actually given a strong incentive to reduce the efficiency of insulation, windows or other measures. This is the definition of a free-rider, and in each case, the home will use more energy (and cost the homeowner more) over its lifetime than if the trade-off were not available.

The amount of energy efficiency lost through free-ridership is substantial. According to a comprehensive analysis by ICF International, the efficiency impact of an air conditioner at the federal minimum (13 SEER), versus a more common 16 SEER typically installed in Florida is an efficiency difference of 13.1% in climate zone 1 and 7.7% in climate zone 2. Under proposal EN5445, a 13.1% or 7.7% "credit" could result in a 7.7-13.1% weakening of a home's efficiency through trade-offs (typically inadequate insulation or poorly-performing windows). <u>Even if the homeowner later replaces the original furnace with a unit with equivalent or superior energy savings, the home would continue to have a 7.7-13.1% less efficient thermal envelope than a home built to the code without the equipment trade-off.</u> The results are similar for water heaters. The difference between the federal minimum efficiency and a common efficiency level for storage water heaters in climate zones 1 and 2 is 7.6-7.7%. The combination of potential air conditioner and water heater credit is between 15.4 and 20.7% in Florida's climate zones – a significant gap that could be detrimentally exploited if the equipment trade-offs are included in the Florida Building Code, Energy Efficiency.

Many builders install and consumers demand upgraded equipment regardless of whether it is required by code. More efficient equipment is cost-effective on its own, and there is no need to give credit against the permanent thermal envelope for HVAC upgrades. The U.S. Department of Energy found, in its Final Determination on the 2009 IECC, that

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"Because building envelopes have substantially longer lives than HVAC and/or water heating equipment, energy savings from envelope improvements may persist for many more years than comparable equipment improvements. Also, because high-efficiency equipment is already the predominant choice in many markets, disallowing envelope/equipment tradeoffs is likely to result in improved overall efficiency in many situations." 76 Fed. Reg. 42688, 42697 (Jul. 19, 2011). Unless the equipment trade-off can be shown to save *more* energy than the 2012 *IECC* (which it cannot), it should not be added back to the *IECC*'s performance baseline.

Nicholas Lang
Comments on Code Change Proposal 5687

The National Concrete Masonry Association opposes the changes to Tables R402.1.1 and R402.1.3 as included in Proposal 5687 for the Florida Building Code. These modifications place additional unnecessary burdens on mass wall construction in the state of Florida. The primary reasons for NCMA's opposition are:

1. The changes to both tables for mass walls are not consistent with national consensus codes and standards, including the 2012 International Energy Conservation Code, the 2012 International Residential Code, and ASHRAE 90.2, *Energy Efficient Design of Low-Rise Residential Construction*.
2. The modeling software used to develop these changes (Energy Gauge) uses an engine that underestimates the benefits of thermal mass, and as such overestimates the energy costs for mass wall construction. Using another software program (such as Energy Plus) would not show as great an energy savings with increased mass wall insulation.
3. There is no construction cost component to this proposal. There is an increased cost of construction to adding additional insulation to mass walls, and that cost is not factored into this proposal. Since the proposed increases in energy efficiency appear to provide an annual energy savings to the homeowner of less than $50, the payback for increased construction cost will have a very long payback period.
4. Recently, the Department of Energy (DOE) has released their proposed modifications to the residential section of the 2015 IECC. While DOE is pursing increased energy efficiency within the IECC, their proposals do not include changes to wall criteria. This demonstrates that further increases to the wall thermal properties (such as those in Proposal 5687) do not translate into significant energy savings.
5. This proposal only includes increases in wall thermal efficiency for mass walls, but not for frame construction. This appears to create a bias towards frame construction rather than mass wall construction, which may discourage the use of masonry and concrete construction. In addition to thermal mass, masonry construction provides many other benefits, including resistance to mildew, rot, and infestation, as well as proving resilient shelter during extreme events.

For these reasons, the National Concrete Masonry Association opposes the changes in proposal 5687, and urges disapproval of these modifications.

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Comments on FSEC Code Change Submittal 5687
Submitted by:
Martha G. VanGeem, PE, LEED AP, FACI
Principal Engineer
September 23, 2012

Comment No. 1

Table R402.1.1 Insulation and Fenestration Requirements by Component, Mass Wall R-Value
Climate Zone 1: Do **not** make the proposed change in mass wall R-value from 3/4 to 6/7.8.
Climate Zone 2: Do **not** make the proposed change in mass wall R-value from 6/6 to 6/7.8.

Rationale:

a.) **e-Ratio**. Using the e-ratio inflates the energy savings in a home. The code change proposal uses the Energy Performance Index (EPI or e-ratio) as justification. The e-Ratio is not an indication of the total loads on the home. It is defined by FSEC [1] as including only the heating, cooling, and domestic hot water loads. Analyses performed using Energy Gauge and other programs show that this load is less than half the energy load of the home. See also Figure 2 in another FSEC report[2], reprinted below. The light blue is all other loads; these are larger than heating, cooling, and hot water loads combined. **The energy savings in a home using an e-Ratio is inflated to about twice of that shown using total loads.** This is further demonstrated below.

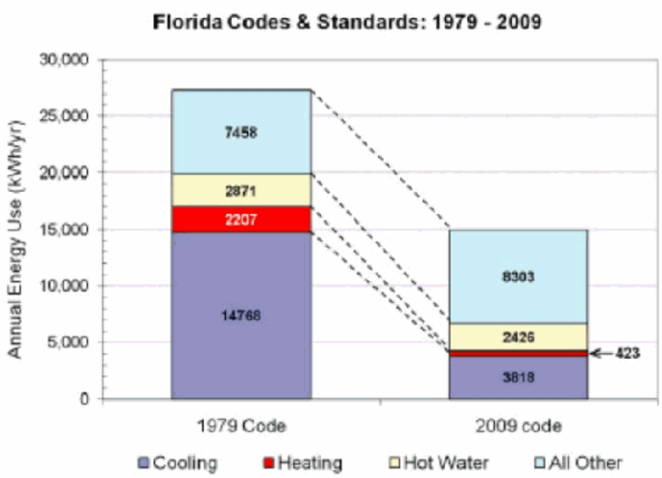


Figure 2 Average Florida home savings resulting from Florida Energy Code implementation.

More energy savings can be found from reducing these other loads (lighting, appliances, and plug loads) than the loads in the e Ratio.

[1] Fairey, Philip. *Evaluation of Alternatives for Florida's 2010 Energy Code Update for Residential Buildings*. FSEC-CR-1831-09. October 30, 2009.
[2] Fairey, Philip. *Effectiveness of Florida's Residential Energy Code, Energy Code: 1979 – 2009*. FSEC-CR-1806-09. June 15, 2009.

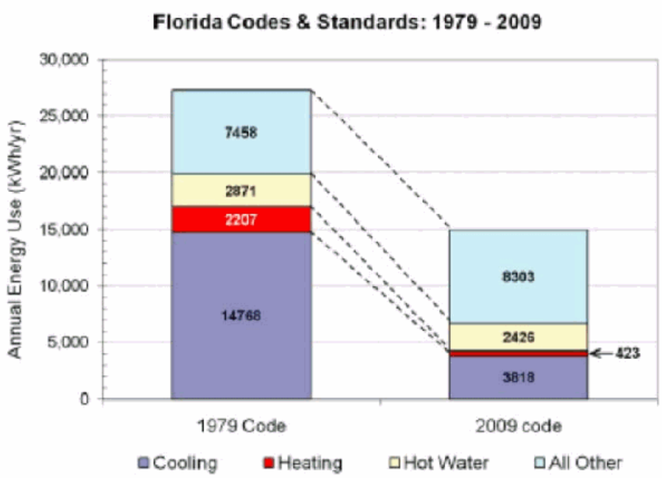
Comments on FSEC Code Change Submittal 5687
Submitted by:
Martha G. VanGeem, PE, LEED AP, FACI
Principal Engineer
September 23, 2012

Comment No. 1

Table R402.1.1 Insulation and Fenestration Requirements by Component, Mass Wall R-Value
Climate Zone 1: Do **not** make the proposed change in mass wall R-value from 3/4 to 6/7.8.
Climate Zone 2: Do **not** make the proposed change in mass wall R-value from 6/6 to 6/7.8.

Rationale:

a.) **e-Ratio**. Using the e-ratio inflates the energy savings in a home. The code change proposal uses the Energy Performance Index (EPI or e-ratio) as justification. The e-Ratio is not an indication of the total loads on the home. It is defined by FSEC [1] as including only the heating, cooling, and domestic hot water loads. Analyses performed using Energy Gauge and other programs show that this load is less than half the energy load of the home. See also Figure 2 in another FSEC report[2], reprinted below. The light blue is all other loads; these are larger than heating, cooling, and hot water loads combined. **The energy savings in a home using an e-Ratio is inflated to about twice of that shown using total loads.** This is further demonstrated below.



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More energy savings can be found from reducing these other loads (lighting, appliances, and plug loads) than the loads in the e Ratio.

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[2] Fairey, Philip. *Effectiveness of Florida's Residential Energy Code, Energy Code: 1979 – 2009*. FSEC-CR-1806-09. June 15, 2009.

Comments to Mod #5687 submitted by Donald Beers, PE, Structural Engineer for the Masonry Association of Florida

Comment on proposed table R402.1.1

Climate Zone 1: Do **not** make the proposed change in mass wall R-value from 3/4 to 6/7.8.
Climate Zone 2: Do **not** make the proposed change in mass wall R-value from 4/6 to 6/7.8.

Comment on proposed table R402.1.3

Do **not** make the proposed change in the mass wall U-factors for Climate Zones 1 and 2 and footnote b.

Comment on proposed table R405.5.2(1)

The U-factor of the standard reference design mass wall should be based on the prescriptive criteria of the standard for mass walls as called out in the 2012 IECC, that is R3/4 for Zone 1 and R4/6 for Zone 2.

Rationale:

I have reviewed the public comments to Mod #5687 submitted by Joe Belcher, Martha VanGeem, and Michael Murtha. I have attached pdf files of each of these comments for ease of viewing although they were all properly submitted to the Florida Building Commission as Public e Comments to Mod #5687. I would like to use these three comments to explain in straightforward language why the masonry industry is so concerned by the above changes which were incorporated into the 2010 Florida Building Code, Energy Conservation, and are now being suggested for the 2013 Florida Building Code, Energy Conservation.

Problem 1 – The only legislative mandate that currently exists is for the above reference changes NOT to be made in the 2013 FEC. Making the requirements for CMU insulation more restrictive than the IECC (2006, 2009, 2012 and 2015) or requiring CMU to be "equivalent" by making the baseline home have R13 wood walls is not what the legislature asked to be done (See comments by Michael Murtha and further explanation by Joe Belcher in his comments - Item 1).

Problem 2 – The idea that the code requires competitive building products to be "equivalent" is reviewed adequately by Joe Belcher in his comments - Item 2.

Problem 3 – We disagree with the technical conclusions portrayed in tables 1 and 2 (inserted below) produced by FSEC (see Martha VanGeem's comment – Item b and j) and, as of the filing of this comment, are unable to obtain the back-up information from FSEC to show exactly how they arrived at their numbers in these tables. We have formally requested this information in writing.

These calculations are technical/scientific and an open discussion requires a full disclosure of source. We are hopeful that FSEC will release this information prior to the Energy TAC on Oct. 8th and in time for our industry's technical group to determine where the variances are.

Problem 4 – There is no cost justification included in the FSEC rationale. Per Martha VanGeem's calculation sheet (Marth VanGeem's last page "Results using EnergyGauge") the cost savings in Miami going from R4 to R7.8 is around $27 per year. The upfront cost of the additional insulation is roughly $1300 (this figure does not include builder modifications required due to the ¾" increased wall thickness). No matter how you calculate it there is a negative return on this investment, even at bank savings account interest rates.

Problem 5 – Tables 1 and 2 from the FSEC rationale (inserted below) are somewhat misleading and can be easily misinterpreted and taken out of context. These tables represent only a portion of the total energy used in a home (see Joe Belcher's comment Item - #5 and Martha VanGeem's comment Item - a). Reference Problem #3 above – we are also in disagreement with the actual values in these tables and are waiting on FSEC to supply us with the source.

Table 1. 2012 IECC Std.Ref.Design vs. 2010 FEC

Home Configuration:					Florida 2010 Code e-Ratio Results			
CFA	Nbr	Stories	Floor	Walls	Miami	Orlando	Tally	Average
2000	3	1	SOG	CMU	89	80	79	**82.7**
2000	3	1	SOG	Frame	81	77	77	**78.3**
2200	3	2	SOG	CMU	88	80	77	**81.7**
2200	3	2	SOG	Frame	80	77	76	**77.7**
				Average:	**84.5**	**78.5**	**77.3**	**80.1**

Table 2. 2012 IECC Std.Ref.Design (+ R-7.8 mass walls) vs. 2010 FEC

Home Configuration:					Florida 2010 Code e-Ratio Results			
CFA	Nbr	Stories	Floor	Walls	Miami	Orlando	Tally	Average
2000	3	1	SOG	CMU	*83*	*78*	*77*	**79.3**
2000	3	1	SOG	Frame	81	77	77	**78.3**
2200	3	2	SOG	CMU	*81*	*77*	*75*	**77.7**
2200	3	2	SOG	Frame	80	77	76	**77.7**
				Average:	**81.3**	**77.3**	**76.3**	**78.3**

Problem 6 - FSEC EnergyGauge software is currently running on DOE2.1e which tends to be deficient in calculating the performance of thermal mass (see Martha VanGeem's comments – Item k). Additionally, as stated in Problem #3, it does not agree with other software based on the same DOE2.1e engine (see Martha VanGeem's comments – Item j).

Problem 7 – Changing the code value of required insulation by almost double in South Florida indicates to Florida home buyers that homes built with CMU are not energy efficient when in truth the energy efficiency of a Florida home has very little to do with the exterior wall material. According to Martha VanGeem's calculations (Marth VanGeem's last page "Results using EnergyGauge"), using the FSEC's EnergyGauge software, the energy use of an R6 interior insulated CMU one story baseline home in Tallahassee is 12440 kWH per year. Compare this to the energy use of the same baseline home with R13 wood frame walls at 12383 kWH per year. The R13 home is 12440-12383=57 kWH per year or $6.85 per year or 0.46% cheaper to operate according to EnergyGauge. Taking into account our concerns with the accurate portrayal of thermal mass by the EnergyGauge software, our industry does not consider a $.57 a month or 0.46% difference in energy use significant.

Inserted below is paragraph 2 of the Conclusions from FSEC CR-1831-09, pp 21. This document was the justification used for the increase in prescriptive masonry insulation to R7.8 in the 2010 FEC. We do not believe that masonry is so energy deficient that it deserved to be singled out by the FSEC and, consequently, the 2010 FEC as a major negative factor in the energy efficiency of Florida homes.

The analysis of the 2009 IECC indicates that this code is either 8% more efficient than the 2007 FEC (i.e. 2006 IECC) or 19% more efficient than the 2007 FEC, depending on whether compliance is by the prescriptive procedures of Section 402, 403 and 404 or by the simulated compliance alternative specifications of Section 405. The 2009 IECC analysis further shows that air distribution system efficiency is a major determinant of overall home energy efficiency in Florida. Finally, the analysis shows that the 2009 IECC mass wall R-value requirements of Table 402.1.1 and equivalent U-factor requirements of Table 402.1.3 do not comport well with the frame wall R-value and U-factor requirements in Florida's climates. As a result, the study also recommends that minimum R-value for mass walls in the prescriptive compliance procedure be increased to R-7.8 for all of Florida.

By being put in the same category as "air distribution system efficiency" our industry is concerned that the 2010 Energy Code has damaged the image of masonry in Florida by portraying the energy in-efficiency of masonry as well known, straight forward and considerably larger than what it really is. The damage done to masonry sales in the state of Florida by this portrayal in the 2010 FEC as energy in-efficient can be calculated in the millions of dollars in lost market share. What is worse is that home owners are being dissuaded from building their homes out of the strongest and best possible building material in Florida.

Problem 8 - Trying to create energy efficient homes by increasing exterior wall insulation does not agree, in any way, with what is happening at the IECC (see Martha VanGeem's comments - Item l and m).

Problem 9 – The code has inserted a specific product by specification. The R7.8 was not determined by calculation but was placed in the code with ¾" poly-iso board being the only single product exactly meeting that value. Wall systems and insulation systems are extremely competitive and our industry does not think that it is appropriate for a specific product specification to be used in determining insulation values.

Conclusion – Relating R value to increased energy efficiency is easy to understand. Every time you put on a heavy coat on a cold day you reinforce the value of insulation. The performance of thermal mass is not easy to understand – it is very complicated and without the help of powerful and sophisticated computer programs would be nearly impossible to fairly evaluate.

Since walls are often the only thing to be seen on a building it is natural to assume that they play a major role in the energy efficiency of a building, yet walls, as long as they are nominally insulated, have very little to do with the amount of energy used by a structure.

"More is better" so it would seem that the more insulation you used the more energy efficient a building would become, yet the point of diminishing returns quickly reduces the efficiency of added wall insulation.

These misconceptions are used relentlessly in the promotion strategies of our competitors. We are hopeful that the Energy TAC and the Florida Building Commission will assist us in striking out the sections of Mod #5687 referenced above. These sections do little to contribute to the energy efficiency of Florida homes and do significant and unfair damage to the perception of masonry by home buyers.

Thank-you

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September 21, 2012

Florida Department of Business and
Professional Regulations
Florida Building Commission
1940 North Monroe Street
Tallahassee, Florida 32399

In regards to: Modification EN5687

The FSEC is out of order proposing any changes to the IECC base code on a variety of different levels. Specifically, they are relying on an outdated and invalid Executive Order and statutes that no longer exist as justification to move forward with changes to the IECC which clearly have been rejected by the Legislature.

It is understood that Governor Crist had set out sweeping changes to energy policy in 07-127 and subsequently in 2008, HB7135 and HB697 and included scheduled increases in thermal efficiency standards and the direction to use the IECC as the base code, yet allowing for modifications in order to maintain the efficiencies of the of the FEEC.

That's all well and good, and had things stopped there, the FSEC amendment would be viable, however, three things have happened, 1) Charlie Crist is no longer Governor, 2) the Florida Legislature went out of its way to remove most all of those energy and greenhouse initiatives that had been codified in statutes and 3) the Florida Legislature told the FBC that the International Base Codes would not only be the base for Florida's codes, yet they instructed that there would be a high threshold should someone want to tailor them in order to further a specific agenda in Florida.

This is a Public Comment to request the retention of the International Energy Conservation Code R-values for Mass Walls in Table 402.1.1and the U-Factors for Mass Walls in Table 402.1.3. The changes from R-3/4 in Zone 1 and R-4/6 in Zone 2 to R -6/7.8 throughout the state and the modifications of the U-Factors are Florida Specific Amendments to the International Energy Conservation Code (IECC) and are unwarranted for the following reasons:

1. The impetus for the changes in the 2010 Florida Building Code, Energy Conservation, (FBCEC) was compliance with a legislative directive to increase the energy efficiency of the 2007 Florida Building Code (FBC) by 20% in the 2010 FBC. The legislative mandate, including legislative mandates for future increases, was subsequently repealed by the legislature. Prior to enactment of the legislative mandate, an Executive Order (EO 07-127) was issued then Governor Christ requiring the Florida Building Commission (Commission) to increase the energy efficiency of the Florida Building Code by 15% over the energy efficiency of the 2007 Florida Building Code. The targeted implementation date of the Executive Order was January 1, 2009. The order was implemented by the Commission with a 2009 Supplement to the 2007 Florida Building Code. In developing the 2010 FBCEC an additional 5% increase in energy efficiency was added to the 15% increase mandated by EO 07-127 for a total of a 20% increase in energy efficiency over the efficiency of the FBC 2007. Evidence of this intent may be found throughout studies conducted by the Florida Solar Energy Center (FSEC) under contract to the Department of Community Affairs (DCA now under DBPR) and in other documents related to the development of the 2010 Florida Building Code. For example, the 2010 Florida Energy Code Workgroup Report to the Florida Building Commission in the section titled Overview states:

   > "Governor Crist directed the Commission to increase building energy efficiency requirements by 15% in his July 2007 Executive Order 127. In addition, the 2008 Legislature through passage of The Energy Act of 2008 created a suite of energy related assignments for the Building Commission. The Energy Code provisions were a major focus of the Commission during 2008, and the Commission increased the thermal efficiency requirements for the Florida Energy Code by 15% and integrated the enhanced requirements into the 2007 Florida Building Code. The Commission reviewed energy related code amendments adopted in the 2007 Florida Building Code Update to determine their cumulative level of increased efficiency, and adopted additional amendments required to achieve Governor Crist's directive of 15% increased efficiency. During 2008 the Energy Code was amended by administrative rule and then the revised Energy Code was adopted into the 2007 Florida Building Code during the 2008 "glitch" cycle concurrently with the March 1, 2009 effective date for the 2007 Florida Building Code. Working with stakeholders using consensus-building workgroups, the Commission was able to achieve the

15% increase in efficiency in buildings and implement code amendments that are efficient, consistent, understandable and enforceable for the full spectrum of Energy Code users. **The Commission's Energy Code Workgroup will develop recommendations regarding energy conservation measures for increasing efficiency requirements in the 2010 FBC by 20% as required by law"** [1] (**Emphasis** provided.)

2. The rationale submitted for Mod #5687 and the 2010 Energy Code Workgroup Report both appear to assume a requirement for mass walls to be equivalent to the wood frame baseline house used in Florida. Information regarding the input, assumptions, presets, algorithms, and internal operations of the software produced by the Florida Solar Energy Center are unavailable to the public. There is no way to verify that the calculations are correct. (Note: A formal request for this information was made to FSEC by the industry.) In addition, there is new software available which is reportedly much more accurate in handling the complexities of whole building energy simulation. (DOE Energy Plus) The industry believes the new engine will much more accurately analyze the complex issues related to energy use and mass walls and is working to raise the funds necessary to conduct the research.

   Further, there is no requirement in the code, in statute, or in any rule requiring equivalency between materials. Florida establishes the baseline home as a wood frame wall with R-13 insulation. The base code establishes the baseline based on the materials used. Mass is not compared to or required to be equivalent with other materials. Should such equivalency be mandated for energy in Florida, the industry believes this should be carried out through all areas of the code such as termite resistance, sound attenuation, fire resistance, decay resistance, to name a few of the many other provisions of the code related to the properties of materials.

3. The United States Department of Energy (DOE) was instrumental in the rewrite of the 2009 IECC resulting in the 2012 IECC, the base code for the 2013 FBCEC. The DOE goal was a 30% increase in energy efficiency over the 2006 IECC and DOE reports that goal was achieved. The base code does not modify the R-Values or U-Factors for mass walls and these values have been in the base code for many years. Further, the DOE recently released their proposed code changes for the residential portion of the next version of the IECC to be published in 2015[2]. The DOE is aggressively trying to save energy through the IECC. However, they have not proposed any changes to the wall criteria. This clearly demonstrates that changes to increase the R-values of mass walls in Florida above the current 2012 IECC levels are not warranted.

---

[1] Blair, J., 2009. "2010 Florida Energy Code Workgroup Report to the Florida Building Commission, Nov. 12, 2009 – Meeting VIII," FCRC Consensus Center, Florida State University, Tallahassee.

[2] Residential Code Change Proposals for the 2015 IECC

4. While FSEC claims substantial and significant savings, the industry evaluation does not indicate the increase in energy efficiency by modifying the base code R-Values and U-Factors for mass walls justifies the $1100.00 plus in increased cost. (Industry estimates savings at $8.00 per year in Orlando and $26.00 per year in Miami.)

5. If true energy savings is desired, the Commission should include all home energy. Florida's treatment of energy use by considering only heating, cooling, and hot water is outmoded and needs to be updated. According to FSEC when the energy code was first adopted other uses accounted for only 28% of the energy use in Florida homes. Today FSEC estimates those other uses account for more than 55% of home energy use.

> "Include all home energy uses in Florida's Energy Code as is currently done in national Home Energy Rating Systems. The data from this study show that the home energy uses that are not covered by Florida's Energy Code now account for more than 55% of home energy use. In 1979 these "other" energy uses accounted for only 28% of total energy use. By virtue of the fact that Florida's Energy Code has consistently addressed the energy uses of heating, cooling and hot water, these uses have been substantially moderated. On the other hand, these "other" energy uses have not been substantially addressed and have increased over time as home size has increased."[3]

Further, there is a long standing recommendation from FSEC to address whole house energy use as national programs do.

> "Thus, the quickest, easiest and most straight forward way to address home energy use in a comprehensive manner is to adopt this national Home Energy Rating System and simply require a HERS Index less than 88 for Florida Energy Code compliance, much like is done for ENERGY STAR qualification."
>
> "There are additional advantages to this approach, as follows:
>
> • It does not require any change to Florida's Energy Code Baseline Home because RESNET's American Standard Home already aligns with Florida's Energy Code Baseline Home for envelope features and heating, cooling and hot water equipment. Thus, no previously existing agreements on the configuration of the Florida Energy Code Baseline Home need be renegotiated.
>
> • It allows all energy efficiency technologies, not just heating, cooling, hot water and envelope measures to compete on an equal footing in achieving the most cost effective improvements in overall home energy efficiency.

[3] Fairey, P., 2009. "Effectiveness of Florida's Residential Energy Code: 1979 - 2009 (Revision of 1979 - 2007 Report)," FSEC-CR-1806-09, Florida Solar Energy Center, Cocoa, FL, p.18.

• It makes Florida's Energy Code system seamlessly compatible with virtually all national 'beyond code" programs, including ENERGY STAR program, DOE's Builders Challenge program and the federal income tax credit qualification for highly efficient homes.

• The system can be used to provide "advanced warnings" to industry of code stringency increases, which they will understand intrinsically. Rather than changing Florida's Energy Code Baseline Home requirements, the implications of which are difficult and complex to grasp and understand, industry can be given advanced notice that in some certain number of years the requirements for Energy Code compliance will change from a HERS Index of 'x' to a HERS Index of 'y', a concept that will be easy to understand and evaluate using existing Energy Code compliance software.

• It allows opportunities to privatize Florida Energy Code enforcement system through an infrastructure of Home Energy Raters that already exist within the state and for which there is an existing infrastructure within Florida for training and certification and quality assurance based on national consensus standards.

• This HERS Index can be used as a measure of energy efficiency for green building and other "beyond code" programs.

• The HERS index incorporates the evaluation of renewable energy systems, including solar hot water and on-site PV power production.

• It provides a very simple means of measuring progress into the future. " [4]

In conclusion, in the treatment of mass wall the industry believes the base code has it right. The industry strongly urges the Energy TAC and the Commission to adopt the R-Values and U-Factors for Mass Walls as published in the base code, the 2012 International Energy Conservation Code. Should increases in energy efficiency be desired, the Commission should consider modifying the code to use the whole house energy use concept adopted nationally.

[4] Ibid. p.19.

Comments on FSEC Code Change Submittal 5687
Submitted by:
Martha G. VanGeem, PE, LEED AP, FACI
Principal Engineer
December 14, 2012

Comment No. 1

Table R402.1.1 Insulation and Fenestration Requirements by Component, Mass Wall R-Value
Climate Zone 1: Do **not** make the proposed change in mass wall R-value from 3/4 to 6/7.8.
Climate Zone 2: Do **not** make the proposed change in mass wall R-value from 6/6 to 6/7.8.

I am therefore in support of Alternate A-2 submitted by FSEC on December 12, 2012.

Rationale:

a.) **Revised costs.** On October 29, 2012, Mr. Philip Fairey provided the Masonry Association of Florida (MAF) and Ms. VanGeem an excel spreadsheet (file name 2012IECC_FlaCode_CMU, hereafter called the FSEC economic spreadsheet) showing the economic justification of the FSEC submittal 5687 for masonry walls. The MAF has examined the costs provided and is submitting their justification on revising the costs in a separate comment from Mr. Don Beers. I concur that the revised costs from MAF should include labor and contractor profit and not just costs from a store. This methodology for revised costs is consistent with the methodology used in the development the ASHRAE 90.1 and 90.2 energy standards. The comment submitted by FSEC on December 12, 2012 does not reflect the latest cost information from MAF.

b.) **FSEC proposal not cost effective for Orlando and Tallahassee.** Using the FSEC economic spreadsheet with revised costs shown in yellow in Table 1 and no other changes, we see that the proposed changes to the Florida code for Miami are not cost effective. A "Present Value Benefits/Costs Ratio" less than 1.0 indicates that the measure is not cost-effective. For Orlando the average is 0.78 and for Tallahassee the value is 0.97. **Therefore the proposed values are not cost effective and the 2012 IECC mass walls values should be used.**

Table 1 – FSEC Economic Spreadsheet with Revised Costs (supporting IECC in Orlando and Tallahassee)

Incremental 1st Cost: SRD → R-7.8 CMU

Model	1st Cost	Miami	Orlando	Tally	Average
1-sty CMU	total $	$700	$342	$342	$461
2-sty CMU	total $	$999	$488	$488	$658
Average	total $	$850	$415	$415	$560

Present Value of Costs (2): SRD → R-7.8 CMU

Model	Cost	Miami	Orlando	Tally	Average
1-sty CMU	PVcost	$799	$390	$390	$527
2-sty CMU	PVcost	$1,140	$557	$557	$751
Average	PVcost	$970	$474	$474	$639

Table 1 (cont.) – FSEC Economic Spreadsheet with Revised Costs (supporting IECC in Orlando and Tallahassee)

Present Value Benefits/Costs Ratio (2): SRD → R-7.8 CMU

Model	B/C Ratio	Miami	Orlando	Tally	Average
1-sty CMU	PVBC	[redacted]	0.79	1.02	[redacted]
2-sty CMU	PVBC	[redacted]	0.77	0.94	[redacted]
Average	PVBC	[redacted]	0.78	0.97	[redacted]

c.) **FSEC Proposal Not Cost Effective in Miami with Reduced Scalar Ratio**. The FSEC proposal and the above economic analysis use a scalar ratio of 20.69. This is too high. A scalar ratio of 8 was used in analyses by the SSPC ASHRAE 90.1 (the committee that develops the standard) in its development of criteria in the 90.1 standards from 1999 through 2010.

The calculations below in Table 2 show the results of the FSEC economic spreadsheet with revised costs and a scalar of 15.47. Once again, a "Present Value Benefits/Costs Ratio" less than 1.0 indicates that the measure is not cost-effective. **Therefore, the proposed change is not cost effective in any city including Miami (where the average value is 0.99) and the 2012 IECC values should be used.**

Table 2 - FSEC Economic Spreadsheet with Revised Costs and Scalar Ratio (**supporting IECC in all regions)**

Incremental 1st Cost: SRD → R-7.8 CMU

Model	1st Cost	Miami	Orlando	Tally	Average
1-sty CMU	total $	$700	$342	$342	$461
2-sty CMU	total $	$999	$488	$488	$658
Average	total $	$850	$415	$415	$560

Present Value of Costs (2): SRD → R-7.8 CMU

Model	Cost	Miami	Orlando	Tally	Average
1-sty CMU	PVcost	$996	$487	$487	$656
2-sty CMU	PVcost	$1,422	$694	$694	$937
Average	PVcost	$1,209	$591	$591	$797

Present Value Benefits/Costs Ratio (2): SRD → R-7.8 CMU

Model	B/C Ratio	Miami	Orlando	Tally	Average
1-sty CMU	PVBC	1.05	0.59	0.76	0.87
2-sty CMU	PVBC	0.95	0.57	0.70	0.80
Average	PVBC	0.99	0.58	0.72	0.82

There are many ways to achieve a given scalar ratio. In this case, it was achieved by using a Florida property tax rate of 1.6% and making the fuel inflation rate the same as the general inflation rate as shown below in Table 3 (values in yellow are those that were changed as well as the new scalar ratio). The fuel inflation rate has historically been the same as the general inflation rate because fuel is an integral part of the general inflation rate; fuel is used to manufacture products, provide heating and cooling to buildings, and transport materials. These are realistic assumptions. However, the main point is that a scalar ratio of 15.47 is reasonable and much higher (showing increased potential for more insulation) than the scalar ratio of 8 traditionally used. The scalar ratio for the 2012 IECC is not available from the proponents of the successful proposals. A scalar as high as 20 has not been used in any minimum code or national standard that has been published (that I am aware of).

Table 3 – FSEC Economic Spreadsheet Revised Scalar

Downpayment %	10.00%
Mort Interest Rate (i)	5.70%
Gen.Inflation Rate (g)	2.42%
Fuel Inflation Rate (f)	2.42%
Discount Rate (d)	4.42%
N_mortgage (N-m)	30
N_analysis (N-a)	30
Marginal Inc. Tax Rate (t)	0.00
Property Tax Rate (p)	0.016
Ratio: Assess Val / Invest Val	0.80
Maintanence_FR	0.000
Measure Life	30
P1 =	**22.01013**
P2 =	**1.42301**
Scalar Ratio =	**15.46726**

d.) **e-Ratio**. Using the e-ratio inflates the energy savings in a home. The code change proposal uses the Energy Performance Index (EPI or e-ratio) as justification. The e-Ratio is not an indication of the total loads on the home. It is defined by FSEC [1] as including only the heating, cooling, and domestic hot water loads. Analyses performed using Energy Gauge and other programs show that this load is less than half the energy load of the home. See also Figure 2 in another FSEC report[2], reprinted below. The light blue is all other loads; these are larger than heating, cooling, and hot water loads combined. **The energy savings in a home using an e-Ratio is inflated to about twice of that shown using total loads.** This is further demonstrated below.

[1] Fairey, Philip. *Evaluation of Alternatives for Florida's 2010 Energy Code Update for Residential Buildings*. FSEC-CR-1831-09. October 30, 2009.

[2] Fairey, Philip. *Effectiveness of Florida's Residential Energy Code, Energy Code: 1979 – 2009.* FSEC-CR-1806-09. June 15, 2009.

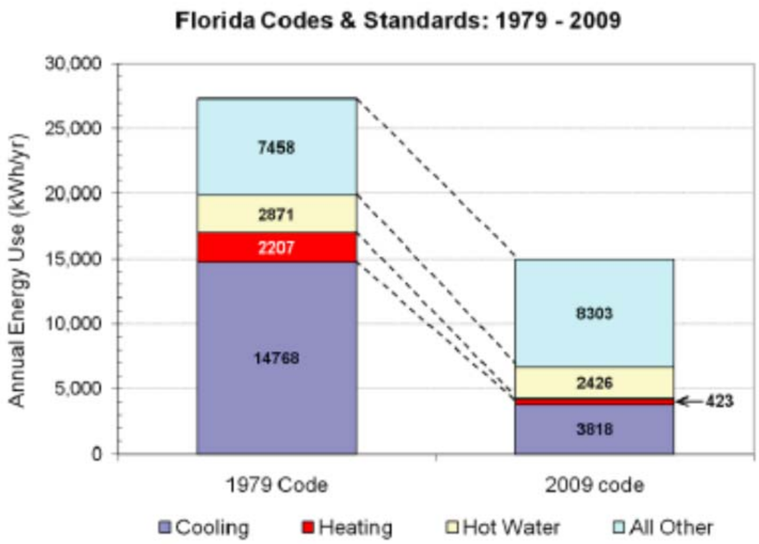

Figure 2 Average Florida home savings resulting from Florida Energy Code implementation.

More energy savings can be found from reducing these other loads (lighting, appliances, and plug loads) than the loads in the e Ratio.

e.) **How small is 114 kWh?** The cost savings by the proposal are as small as 114 kWh per year in Orlando. Note that a kWh is the amount of energy that a small 1000 Watt coffee maker (or any other 1000 W appliance) uses in 1 hour. So the energy savings by this proposal for a single story house is equivalent to having a coffee maker turned on in Orlando for 1 hour for 114 days of the year; in Tallahassee for 1 hour for 146 days a year, and in Miami for 1.5 hours for 275 days a year. Far more energy savings can be gained by educating the occupant on appliance use to reduce plug loads (e.g., turning off a TV or monitor) and blind use (to reduce solar loads when the air conditioning is on and increase solar loads when heating is on). This proposed change significantly increases the cost of construction for mass walls while showing very little cost savings.

f.) **Hot water energy same as heating and cooling energy.** For Tallahassee and Orlando, analyses using EnergyGauge show that the domestic hot water heating energy use, which is included in the e-Ratio, is approximately the same as the energy use for heating and cooling. Therefore, the focus should be on the domestic hot water use rather than the heating and cooling use. Using percentages does not provide an indication of how small these loads are.

g.) **Doubling insulation saves very little energy**. These analyses and others show that doubling the amount of insulation in a mass wall does not result in very much energy savings. In climates such as Florida with reversals in heat flow through the wall during most of the year, thermal mass works well.

Thermal mass performs best when the heat flow is reversed in the wall during any point during the day. In these cases, rather than flowing through the wall, the heat flow in one direction cancels out the heat flow in the other resulting in very low heat flow through the wall for many hours. Thermal mass works best in climates where the temperature fluctuates above and below the balance point of the building (a little less than room temperature of houses) during the day. In these cases, the thermal mass will have the outer side cooler during the nighttime (heat loss) and warmer during the daytime (heat gain) than the balance point of the building – resulting in reversals in heat flow through the wall – and therefore resulting in periods of very low heat flow through the mass wall. This occurs for all months in Orlando, about 11 months in Tallahassee, and about eight months in Miami[3]. Thermal mass works well in Florida.

h.) **Miami should have less energy use.** The IECC requires less insulation in Miami because most energy simulations show less energy use in Climate Zone 1 (Miami) than in Climate Zone 2 (Orlando and Tallahassee). However, the EnergyGauge software does not show this. This indicates a possible error in the EnergyGauge software or assumptions in the base model.

i.) **DOE2.1 based programs would show less significant energy savings.** An additional reduction in energy use in houses with mass walls would be predicted if EnergyPlus or the old BLAST software were used. The EnergyGauge software uses a DOE2.1e engine for calculation purposes. This DOE2.1e engine uses regression equations rather than true energy balance to determine thermal mass effects. This has been shown to underestimate thermal mass effects. It is therefore predicted that the results would show even less significant energy savings if EnergyPlus were used.

j.) **Changes not supported by the *2012 IECC*.** The International Code Council (ICC) held hearings to determine the *2012 IECC*. These hearings included consideration of insulation levels and energy savings in all climates including Climate Zones 1 (Miami) and 2 (Orlando); and resulted in the values in the *2012 IECC*. More insulation for mass walls than is in the *2012 IECC* in not justified.

k.) **Changes not supported by IECC code changes proposed by DOE and others for 2015.** Lastly, the Department of Energy (DOE) and others (Denver, November 9, 2012 meeting) have recently released their tentative proposed code changes for the residential portion of the next version of the IECC to be published in 2015[4]. The DOE is aggressively trying to save energy through the IECC. However, they as well as others have not proposed any changes to the mass wall criteria in Climate Zones 1 and 2. This demonstrates that changes to increase the R-values of mass walls in Florida above the current 2012 IECC levels are not warranted.

[3] Using *NOAA Comparative Climatic Data for the United States through 2007* for average daily minimum and maximum temperatures.

[4] Residential Code Change Proposals for the 2015 IECC

Comment No. 2

Table R402.1.3 Equivalent U-Factors, Mass Wall U-Factors, Climate Zones 1 and 2; and footnote b
Do **not** make the proposed change in the mass wall U-factors for Climate Zones 1 and 2 and footnote b.

I am therefore in support of Alternate A-2 submitted by FSEC on December 12, 2012.

Rationale: The U-factors correspond to the R-values in Table R402.1.1. We are speaking against the proposed changes to the R-values for mass walls in Comment No. 1, above. Therefore, we are speaking against the corresponding proposed changes to the U-factors for the same reasons as stated in Comment 1, above.

Comment No. 3

Table R405.5.2(1) Specifications for the Standard Reference and Proposed Designs

2nd row of table on above-grade walls: Do **not** make any of the proposed changes except change remittance to emitttance.

I am in support of Alternate A-2 submitted by FSEC on December 12, 2012.

Rationale: The U-factor of the standard reference design (baseline) wall should be the U-factor of a mass wall if the proposed design wall is a mass wall for the following reasons:

a.) This was debated during the hearings for the *2012 IECC* and this conclusion was reached.

b.) The U-factor of the standard reference design mass wall should be based on the prescriptive criteria for mass walls just as is done for frame walls, basements, ceilings and glazing.

c.) In some cases the house with the R13 wall insulation will use more energy than the house with prescriptive mass wall insulation and in some cases it will use less. Therefore the baseline should be the prescriptive mass wall insulation criteria.

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Comments on Objections to Mod #5687

Proponent
Florida Solar Energy Center

Stated Objections to Mod #5687

Mod #5687 was voted NAR (No Affirmative Recommendation) by the Energy TAC at its October 8, 2012 meeting in Daytona Beach. There were three stated objections by commentators that contributed to this Energy TAC vote as follows:

1. There was objection to the fact that Mod #5687 proposes language authorizing specific entities to perform required air distribution system testing.
2. There was objection to the fact that Mod #5687 proposes that the Standard Reference Design for wall type be a wood frame wall with R-13 insulation and that Table R402.1.1 and R403.1.3 be modified to reflect the equivalent mass wall R-values and U-Factors that will provide equivalent energy use as the R-13 frame wall. The basis of the objection to this modification is that increasing the 2012 IECC mass wall R-value requirement would not be cost effective to the consumer.
3. There was objection to the fact that Mod #5687 proposes that the Standard Reference Design glazing area be set at 15% of the conditioned floor area rather than the lesser of 15% of the conditioned floor area or the Proposed Design window area. As proposed, Mod #5687 would allow homes with window area less than 15% of the conditioned floor area to gain a credit within Section R405, Simulated Performance Alternative. The objection is based on the fact that this credit would allow the efficiency of either the glazing or some other component of the home to be reduced.

Summary of Findings by Proponent

1. The objection to the authorization of specific entities to perform required air distribution system testing is valid and the language is revised accordingly in the proposed alternates.
2. Cost effectiveness analysis performed by the proponent and reported in detail later in this comment finds that the proposed modification to the 2012 IECC mass wall R-Values is cost effective in Miami and Tallahassee and marginally cost effective in Orlando.
3. The proponent finds that adopting the 2012 IECC Standard Reference Design specification for glazing area would require homes with window area less than 15% (often smaller, low-cost homes) to have a whole-house energy budget that is stricter than homes with large window areas thus negating a cost-effective trade-off.

Proposed Alternatives

Notwithstanding the analysis and findings of the proponent, this comment proposes a series of four alternates to Mod #5687 that address each of the stated objections, as follows:

A-1. Replace the language authorizing specific entities to perform required testing with language specifying that the required testing be performed by a “Class 1 BERS rater

or as authorized by Florida statutes" and reported on a standard form. This revised language is common to all proposed alternatives.

A-2. Alternate A-1 plus revise the specification for the Standard Reference Design walls to be identical to the 2012 IECC specification, specifying the standard Reference Design wall type to be a mass wall when the Proposed Design is a mass wall and revising the mass wall R-values and U-Factors in Tables R402.1.1 and R402.1.3 to be identical to the values in the 2012 IECC.

A-3. Alternate A-1 plus revise the specification for the Standard Reference Design glazing area to be identical to the 2012 IECC specification such that the glazing area for the Standard Reference Design is equal to 15% of the conditioned floor area or the window area of the Proposed Design, whichever is less.

A-4. Alternate A-1 plus alternate A-2 plus alternate A-3.

General Discussion

It is important to point out that HB 849, passed by the 2011 Florida Legislature, repealed §553.9061 F.S., which required that each triennial edition of the Florida Energy Code be progressively more stringent than the 2007 Florida Energy Code. As a result, the 2013 Florida Energy Code Standard Reference Design (the baseline) will be modified to align with the specifications of the 2012 IECC (the foundation code) rather than the 2007 Florida Energy Code (i.e. 2006 IECC), which is the case for the 2010 Florida Energy Code.

This has the following implications:

- While the performance compliance requirement of the 2010 Florida Energy Code is that the energy loads of a Proposed Design be equal to or less than 80% of the energy loads of the 2007 Florida Energy Code Standard Reference Design (the 2010 baseline), the compliance requirement of the 2013 Florida Energy Code will be that the energy loads of the Proposed Design be equal to or less than 100% of the energy loads of the 2013 Standard Reference Design (the 2013 baseline).
- As a result, in the 2013 Florida Energy Code, there will not be a compliance requirement that energy performance exceed the energy performance of the "baseline" home, only that it equals the energy performance of the revised 2013 baseline.
- Since the 2013 baseline against which compliance is to be measured will change to align with the 2012 IECC, Florida-specific changes to the 2012 IECC Standard Reference Design specification may be required to satisfy the provisions of §553.901 F.S., which requires that the foundation code (the 2012 IECC in this case) be modified "to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction."
- The only way to determine if Florida-specific changes to the 2012 IECC (foundation code) are required is to evaluate the Standard Reference Design specifications of the 2012 IECC using the 2010 Florida Energy code.

Detailed Findings on Alternate A-1

Alternate A-1 is almost identical to the original Mod #5687. It differs only with respect to the revised language on "approved party" testing. Alternate A-1 does not incorporate alternative language for Standard Reference Design mass walls or glazing area. The rational for leaving these components as originally specified in Mod #5687 follows.

Mass walls

The 2010 Florida Energy Code Standard Reference Design specification requires that the wall type be a frame wall with a U-factor of 0.082 (R-13 cavity insulation), regardless of the wall type of the Proposed Design. The result of this specification is that the energy performance of both Proposed Design frame wall systems and mass wall systems are compared against the performance of the same Standard Reference Design wall system. Thus, energy performance equivalence is established between frame wall systems and mass wall systems in the 2010 Florida Energy Code.

On the other hand, the 2012 IECC Standard Reference Design specification allows mass wall systems to be considered differently than frame wall systems by specifying that the Standard Reference Design wall type is to be a frame wall system when the Proposed Design is a frame wall system and is to be a mass wall system when the Proposed Design is a mass wall system. Mod #5687 proposed to maintain the wall performance equivalence contained in the 2010 Florida Energy Code. This wall performance equivalence in the 2010 Florida Energy Code means that mass wall system insulation needs to be R-6 for exterior insulation and R-7.8 for interior insulation to achieve equivalent performance to the 2010 Florida Energy Code Standard Reference Design frame wall system.

For the 2012 IECC Standard Reference Design specification, the mass wall specification is R-3 for exterior insulation and R-4 for interior insulation for Climate Zone 1 and R-4 for exterior insulation and R-6 for interior insulation in Climate Zone 2. The result is that the two wall system types will not achieve equivalent energy performance under the 2012 IECC Standard Reference Design specification.

The principle objection to the Standard Reference Design wall specifications in Mod #5687 is that an increase in mass wall R-value compared with the IECC 2012 specification will not be cost-effective to the consumer. The original Mod #5687 presented no information on the change in energy use or the cost effectiveness of the proposed increase in mass wall R-value. Rather it presented only the differences in the 2010 Florida Energy Code e-Ratios that result from the proposed change. To determine the energy savings values, the original analysis was redone. In the process, a small input error was found and corrected for the 2012 IECC Standard Reference Design hot water heating system. This correction resulted in slightly larger e-Ratios for a few but not all of the home models. The revised Florida 2010 Code e-Ratio results are as follows:

Table 1. 2012 IECC Std.Ref.Design vs. 2010 FEC

Home Configuration:					**Florida 2010 Code e-Ratio Results**			
CFA	**Nbr**	**Stories**	**Floor**	**Walls**	**Miami**	**Orlando**	**Tally**	**Average**
2000	3	1	SOG	CMU	90	80	80	**83.3**
2000	3	1	SOG	Frame	82	77	78	**79.0**
2200	3	2	SOG	CMU	89	80	78	**82.3**
2200	3	2	SOG	Frame	80	78	77	**78.3**
				Average:	**85.3**	**78.8**	**78.3**	**80.8**

A1 RATIONALE

As indicated in Table 1, the concrete block wall systems (CMU) as specified by the 2012 IECC do not perform as well as the frame wall systems. Note a couple of important points here:

1. the baseline home for the 2010 FEC is a frame wall with R-13 cavity insulation so the CMU homes in this example are being directly compared against the R-13 frame wall system, and
2. the CMU wall R-value used in this evaluation are as they are specified in the 2012 IECC (i.e. 4/3 for Miami and 6/4 for Orlando and Tallahassee) and not those used in the 2010 FEC (i.e. 7.8/6 statewide).

What the above table shows is that in a number of instances, the 2012 IECC Standard Reference Design will not comply with the 2010 FEC. The second thing it shows is that the block walls R-values are potentially a large factor in the matter. Thus, we conducted another set of simulations that changed the CMU wall R-values from the 2012 IECC values to the 2010 FEC R-values (i.e. 7.8 interior or 6.0 exterior). The results from this analysis are as follows:

Table 2. 2012 IECC Std.Ref.Design (+ R-7.8 mass walls) vs. 2010 FEC

Home Configuration:					**Florida 2010 Code e-Ratio Results**			
CFA	**Nbr**	**Stories**	**Floor**	**Walls**	**Miami**	**Orlando**	**Tally**	**Average**
2000	3	1	SOG	CMU	*84*	*78*	*77*	**79.7**
2000	3	1	SOG	Frame	82	77	78	**79.0**
2200	3	2	SOG	CMU	*82*	*78*	*75*	**78.3**
2200	3	2	SOG	Frame	80	78	77	**78.3**
				Average:	**82.0**	**77.8**	**76.8**	**78.8**

The italicized values are those that are different from Table 1. As seen in the results, changing the mass wall R-values significantly reduces the e-Ratio difference between the block and frame wall systems. However, Miami still stands out somewhat with respect to the other two climates. One reason is that the 2012 IECC specifies R30 ceiling insulation in Miami and R-38 ceiling insulation in Orlando and Tallahassee. Thus, we made one additional change to the IECC 2012 Standard Reference Design homes, changing the Miami ceiling insulation from R-30 to R-38, with the following results.

Table 3. 2012 IECC Std.Ref.Design (+ R-7.8 mass walls + R-38 Ceil) vs. 2010 FEC

Home Configuration:					**Florida 2010 Code e-Ratio Results**			
CFA	**Nbr**	**Stories**	**Floor**	**Walls**	**Miami**	**Orlando**	**Tally**	**Average**
2000	3	1	SOG	CMU	*82*	78	77	**79.0**
2000	3	1	SOG	Frame	*80*	77	78	**78.3**
2200	3	2	SOG	CMU	*81*	78	75	**78.0**
2200	3	2	SOG	Frame	*79*	78	77	**78.0**
				Average:	**80.5**	**77.8**	**76.8**	**78.3**

Again the values in italics are those that changed from Table 2. With this final change we get the 2012 IECC Standard Reference Design homes very close to the Florida specific efficiencies of the 2010 FEC.

Cost Effectiveness Analysis

Chapter 553 of the Florida Statutes refers to "cost effective" in numerous locations and states in §553.901 F.S. that "The term "cost-effective," for the purposes of this part, shall be construed to mean cost-effective to the consumer."

To examine the cost-effectiveness of the proposed modification, a cost effectiveness analysis was conducted in accordance with the guidance provided by FAC Rule 61G20-5.0071 (formally Rule 9B-13.0071). This cost effectiveness analysis procedure is structured to yield the present value benefit to cost ratio (PVBC) to the consumer, where PVBC values greater than unity indicate that the present value of the life cycle benefits is greater than the present value of the life cycle costs. While this Rule is still "on the books" in the Florida Administrative Code, there are legal questions as to whether it remains in effect due to the fact that the 2011 Florida Legislature, through HB 849, repealed the section of the Florida Statute that authorized the rulemaking. While this is a legal matter beyond our purview, this procedure remains the most comprehensive, documented, Florida-specific guidance we have at our disposal on cost effectiveness analysis from the perspective of the consumer.

From the procedure, the following data (from the sources specified by the procedure) are used to determine the general interest rate, the fuel escalation rate and the mortgage interest rate used in the analysis. The values specified to be used are the greater of the 5-year and 10-year values presented in Tables 4 and 5 below (the highlighted values).

Table 4. General and Fuel Inflation Rates

Year	CPI-U	$/kWh
2001	177.1	$0.0859
2006	201.6	$0.1133
2011	224.9	$0.1151
5-yr Compound Rate	2.22%	0.31%
10-yr Compound Rate	2.42%	2.96%

Table 5. Mortgage Interest Rates

Year	30-yr Mort
2002	6.54%
2003	5.83%
2004	5.84%
2005	5.87%
2006	6.41%
2007	6.34%
2008	6.03%
2009	5.04%
2010	4.69%
2011	4.45%
5-year average	5.31%
10-year average	5.70%

The projected annual energy use for heating, cooling and hot water (the energy end uses addressed by the Florida Code) from the analysis are as given by Table 6.

Table 6. Code Annual kWh Use: SRD → R-7.8 CMU

Model	Config	Miami	Orlando	Tally	WtdAvg
1-sty CMU	SRD	7,755	5,884	6,244	**6,563**
	R-7.8	7,342	5,770	6,098	**6,343**
2-sty CMU	SRD	8,231	6,439	6,715	**7,082**
	R-7.8	7,697	6,282	6,523	**6,792**
Average	SRD	7,993	6,162	6,480	**6,822**
	R-7.8	7,520	6,026	6,311	**6,567**

The weighted average (WtdAvg) values for energy use are calculated based on the percentage of new CMU homes constructed in each geographic region of the State (north, central and south) and the percentages of new home construction in each region of the state as shown in Table 7. [1]

Table 7. Regional Weighting Factor

	North	Central	South	Total
New Construction	20%	50%	30%	
CMU Walls	33%	75%	77%	
Weight Factor	**6.6%**	**37.5%**	**23.1%**	**67.2%**

The Weight Factors shown in Table 7 are computed by multiplying the New Construction percentage for each region by the CMU Wall percentage for each region. The Total column shows that 67.2% (sum of the Weight Factors) of all new construction in the State is of CMU wall construction. The weighted averages in the tables are calculated by summing the products of the Miami, Orlando and Tallahassee results and their respective Weight Factors and then dividing the results of this product summation by 67.2%.

From the data given in Table 6 and the 2011 average Florida revenue-based electricity price as reported by the U.S. Energy Information Administration of 11.51¢/kWh, Table 8 showing kWh savings and Cost savings and percent savings is developed as shown in Table 8.

Table 8. Code Energy and Cost Savings: SRD → R-7.8 CMU

Model	Savings	Miami	Orlando	Tally	WtdAvg
1-sty CMU	kWh/y	413	114	146	**220**
	$/y	$47.54	$13.12	$16.80	**$25.31**
	%	5.3%	1.9%	2.3%	**3.1%**
2-sty CMU	kWh/y	534	157	192	**290**
	$/y	$61.46	$18.07	$22.10	**$33.38**
	%	6.5%	2.4%	2.9%	**3.9%**
Average	kWh/y	474	136	169	**255**
	$/y	$54.50	$15.60	$19.45	**$29.35**
	%	5.9%	2.2%	2.6%	**3.5%**

From the cost savings in Table 8, the present value of the life cycle energy cost savings (the benefits) can be determined in accordance with the procedures provided by the cost effectiveness

[1] Fairey, P., 2009, "Evaluation of Alternatives for Florida's Energy Code Update for Residential Buildings." Contract Report FSEC-CR-1831-09, Florida Solar Energy Center, Cocoa, FL (http://www.fsec.ucf.edu/en/publications/pdf/FSEC-Cr-1831-09.pdf)

procedure. This calculation requires only one additional economic parameter, which is specified in Section (II)(3) of the cost effectiveness analysis procedure, stating "The economic evaluation shall be conducted using the appropriate service lives of the measures." For a concrete block wall system, the service life could easily be 100 years or more. However, for this analysis a service life of 50 years is used.

Table 9. Present Value of Benefits: SRD → R-7.8 CMU

Model	Savings	Miami	Orlando	Tally	WtdAvg
1-sty CMU	PVsave	$1,122	$310	$397	**$597**
2-sty CMU	PVsave	$1,450	$426	$522	**$788**
Average	PVsave	$1,286	$368	$459	**$693**

To determine the present value costs associated with these benefits, it is necessary to estimate the incremental cost of improving the CMU wall insulation from its 2012 IECC Standard Reference Design (SRD) configuration to R-7.8. For these incremental cost values, cost estimates provided by the Masonry Association of Florida are used as shown in Table 10.[2]

Table 10. Installed Costs of CMU Insulation Options

Product Name	Product R-Value	Product $/ft^2	Install $/ft^2	Furring $/ft^2	Total $/ft^2
R-Max*	7.8	$0.430	$0.175	$0.020	$0.668
VR + Shield on 1 1/2" furring	7.1	$0.150	$0.150	$0.120	$0.435
AA2 Foil	4.1	$0.090	$0.070	$0.000	$0.169

* Includes 10% waste in total cost for R-max but no waste for alternative products

The top two rows in Table 10 (R-Max and VR + Shield) represent the lowest cost alternatives for R-7.8 and R-6 CMU wall systems. The third row (AA2 Foil) represents the lowest cost alternative for R-4 CMU wall systems. The incremental costs of going from R-4 to R-7.8 in CZ 1 and from R-6 to R-7.8 in CZ 2 are as follows:

R-7.8 minus R-4 = **$0.508/ft^2** CZ 1 incremental cost
R-7.8 minus R-6 = **$0.248/ft^2** CZ 2 incremental cost

And the net wall areas for the one-story and two-story homes used in the analysis are:
1-Story = 1,252 ft^2
2-Story = 1,788 ft^2

The incremental 1st cost of going from the SRD R-value requirement to R-7.8 CMU walls is calculated by multiplying the appropriate per square foot incremental cost by the square feet of net wall area for each model. The resulting incremental first costs are given in Table 11.

Table 11. Incremental 1st Cost: SRD → R-7.8 CMU

Model	1st Cost	Miami	Orlando	Tally	WtdAvg
1-sty CMU	total $	$636	$310	$310	**$422**
2-sty CMU	total $	$908	$443	$443	**$603**

[2] E-mail message from Pat McLaughlin to Philip Fairey, dated 11/7/2012

Average	total $	$772	$377	$377	**$513**

The present value of these incremental first costs can then be calculated using the provisions of the cost effectiveness analysis procedure. Results of this calculation are given in Table 12.

Table 12. Present Value of Costs (2): SRD → R-7.8 CMU

Model	Cost	Miami	Orlando	Tally	WtdAvg
1-sty CMU	PVcost	$610	$298	$298	**$405**
2-sty CMU	PVcost	$871	$425	$425	**$579**
Average	PVcost	$741	$362	$362	**$492**

Using the present value of the life cycle costs and the present value of the life cycle benefits, the present value benefits/cost ratio (PVBC) can be calculated in accordance with the provisions of the cost effectiveness procedure. Table 13 gives the results of this calculation.

Table 13. Present Value Benefits/Costs Ratio: SRD → R-7.8 CMU

Model	B/C Ratio	Miami	Orlando	Tally	WtdAvg
1-sty CMU	PVBC	1.84	1.04	1.33	**1.47**
2-sty CMU	PVBC	1.67	1.00	1.23	**1.36**
Average	PVBC	1.74	1.02	1.27	**1.41**

The economic cost effectiveness analysis results indicate that increasing CMU wall R-values from the 2012 IECC SRD value to R-7.8 is cost effective in south Florida and north Florida but only marginally cost effective in central Florida. On a weighted average basis, the measure is also shown to be cost effective statewide with $1.41of present value life cycle benefits for each $1.00 in present value life cycle costs.

Based on this cost effectiveness analysis, the proponent recommends that the CMU wall system R-Values and U-Factors and the Florida Code Standard Reference Design be maintained as they exist in the 2010 Florida Energy Code.

Glazing Area

Glazed areas are the least efficient and most costly components of homes. Even the best windows and glass doors admit much more solar heat gain than walls, roofs and floors. And even the best windows and doors have thermal conductances that are far inferior to walls, roofs and floors.

Table 14 below presents the 2012 IECC requirements for envelope components in IECC climate zone 2, which comprises most of Florida. While there are no IECC requirements for the SHGC of opaque envelope components like walls, ceilings and floors, an equivalent SHGC can be calculated using the component U-Factor, a reasonable sol-air temperature, a reasonable interior temperature (75 ^{o}F) and a reasonable incident solar radiation, as follows:

$$SHGC_{equiv} = \text{U-Factor}*(T_{sol\text{-}air} - T_{int}) / (Solar_{Incident})$$

A1 RATIONALE

For Table 14, the assumed sol-air temperatures were 140 ^{o}F for walls and 160 ^{o}F for roofs (ceilings) and the assumed incident solar radiation was 250 Btu/h for walls and 300 Btu/h for roofs (ceilings). Floors receive no solar radiation and thus do not experience heat gains due to direct solar radiation as do fenestration, walls and roofs (ceilings).

Table 14. Envelope Component Efficacies

Envelope Component	IECC* U-Factor	U-Factor Ratio	IECC* SHGC	SHGC Ratio
Fenestration	0.400	1.00	0.250	1.00
Frame walls	0.082	4.88	0.021**	11.73
Mass walls	0.165	2.42	0.043**	5.83
Ceilings	0.030	13.33	0.009**	29.41
Floors	0.064	6.25	0.000**	∞

* IECC U-Factor and SHGC values for Climate Zone 2
** Computed estimate

The U-Factor and SHGC ratios in Table 14 compare the heat retardation efficacy of each of the other envelope components to the heat retardation efficacy of fenestrations. These ratios show that the opaque envelope components are 2.42 to 13.33 times as efficacious in retarding heat flow by conductance as fenestrations and 5.83 to 29.41 times as efficacious in retarding solar heat gains as fenestrations.

Per unit area, fenestrations are also the most expensive envelope components in new homes. Estimates from the 2011 R.S. Means Residential Cost Data show typical code compliant concrete block wall construction prices to be about $15/ft^2 while typical code compliant window prices are somewhat more than double this amount, at about $32/ft^2.

The data show that fenestrations are relatively costly home amenities, which are not particularly energy efficient compared with other envelope components. The principle function of fenestration is to visually bring the outdoors into the comfort conditioned interior living space. Thus, cost is the principle determinant of fenestration area as a percentage of conditioned floor area, with larger fenestration percentages much more likely in high-end, expensive homes than in low-end, smaller homes.

Reductions in glazing area improve the energy performance of homes. If homes are evaluated on an energy performance basis then, all other things being equal, the home with the smaller window area will have less energy consumption. That being the case, a simulated performance alternative should recognize this smaller energy consumption rather than adjust the Standard Reference Design glazing area such that this smaller energy use is effectively disallowed as an energy performance characteristic of the home.

Most homes that choose smaller fenestration area are small, low-cost homes. Thus, the choice to incorporate less fenestration area is an economic decision – made to reduce the cost of the home. The fact that these homes are smaller than the typical new home also significantly reduces the energy use of the home compared to the more typical larger new home. As a result, this “sliding” glazing area in the 2012 IECC Standard Reference Design actually requires the smaller, low-cost home with less window area to meet a higher energy performance standard than the larger more

A1 RATIONALE

energy intensive typical home. This constitutes a strong affirmation of the old saw that "no good deed shall go unpunished."

For reasons of cost effectiveness and the equitable treatment of smaller, low-cost homes, the Florida Code should set a single standard for glazing area in the Standard Reference Design and not allow it to "float down" with the window area of the Proposed Design.

Interior Shading Coefficient

The 2012 IECC modifies the interior shading coefficient of fenestrations as a function of the SHGC of the fenestration. It does this in both the Standard Reference Design and the Proposed Design. The equation for the 2012 IECC interior shading coefficient is as follows:

$$\text{Interior Shade} = 0.92 * (0.21*\text{SHGC})$$

Compared with the 2009 IECC interior shading coefficients, which were not dependent on the SHGC of the fenestration but were based on the likely behavior of the home occupants, this equation effectively penalizes high performance windows in climates like Florida where lower SHGCs are desirable. The equation shows that the better the SHGC (lower is better in Florida), the lower the interior shading coefficient. Thus, a window with a SHGC of 0.5 would have an interior shading coefficient of 0.82 while a window with a SHGC of 0.2 would have an interior shading coefficient of 0.88. This results in the poorer performing window getting more energy performance credit from interior shading than the better performing window.

Table 15 examines how the change from the 2009 IECC interior shading coefficients to the 2012 IECC interior shading coefficients impact projected performance. A 2-story, 2400 ft^2, slab-on-grade frame wall IECC 2012 Standard Reference Design home is used for both sets of simulations. The only change is the manner in which interior shading is treated. The values in the table are the annual kWh for heating and cooling in the cities specified.

Table 15. H&C Interior Shading Example

Condition	Miami	Orlando	Tally
IECC 2009	4981	3507	3426
IECC 2012	5237	3685	3579
kWh change	256	178	153
% change	5.1%	5.1%	4.5%

Table 15 shows that these high performance (SHGC-0.25) windows show 4.5% - 5.1% greater energy use for the IECC 2012 interior shading coefficient specification than for the 2009 IECC interior shading coefficient specification. This means that these high-performance windows will achieve less energy performance credit using the 2012 IECC specification that they do using the 2009 IECC specification. Surely this was not the intent of the 2012 change to the IECC interior shading coefficient.

In addition to the performance differences shown in Table 15, the 2012 IECC interior shading coefficients also do not reflect the likely behavior of the occupants. Occupants are more likely to use shades and blinds principally for privacy reasons but are also likely to use somewhat more

A1 RATIONALE

shades and blinds during the air conditioning season to keep the sun out of the living space and use somewhat less shades and blinds during the heating season to let the sun into the living space. This occupant behavior is reflected in the 2009 IECC interior shading coefficient specification but abandoned for unknown reasons in the 2012 IECC interior shading coefficient specification.

Based on this analysis, the proponent recommends that Florida's code set a single, non-floating window area to conditioned floor area ratio of 15% for the Standard Reference Design and that the IECC 2009 specification (which is identical to the 2010 FEC specification) for interior shading coefficient be maintained for both the Standard Reference Design and the Proposed Design.

A2 RATIONALE

Comments on Objections to Mod #5687

Proponent
Florida Solar Energy Center

Stated Objections to Mod #5687

Mod #5687 was voted NAR (No Affirmative Recommendation) by the Energy TAC at its October 8, 2012 meeting in Daytona Beach. There were three stated objections by commentators that contributed to this Energy TAC vote as follows:

1. There was objection to the fact that Mod #5687 proposes language authorizing specific entities to perform required air distribution system testing.
2. There was objection to the fact that Mod #5687 proposes that the Standard Reference Design for wall type be a wood frame wall with R-13 insulation and that Table R402.1.1 and R403.1.3 be modified to reflect the equivalent mass wall R-values and U-Factors that will provide equivalent energy use as the R-13 frame wall. The basis of the objection to this modification is that increasing the 2012 IECC mass wall R-value requirement would not be cost effective to the consumer.
3. There was objection to the fact that Mod #5687 proposes that the Standard Reference Design glazing area be set at 15% of the conditioned floor area rather than the lesser of 15% of the conditioned floor area or the Proposed Design window area. As proposed, Mod #5687 would allow homes with window area less than 15% of the conditioned floor area to gain a credit within Section R405, Simulated Performance Alternative. The objection is based on the fact that this credit would allow the efficiency of either the glazing or some other component of the home to be reduced.

Summary of Findings by Proponent

1. The objection to the authorization of specific entities to perform required air distribution system testing is valid and the language is revised accordingly in the proposed alternates.
2. Cost effectiveness analysis performed by the proponent and reported in detail later in this comment finds that the proposed modification to the 2012 IECC mass wall R-Values is cost effective in Miami and Tallahassee and marginally cost effective in Orlando.
3. The proponent finds that adopting the 2012 IECC Standard Reference Design specification for glazing area would require homes with window area less than 15% (often smaller, low-cost homes) to have a whole-house energy budget that is stricter than homes with large window areas thus negating a cost-effective trade-off.

Proposed Alternatives

Notwithstanding the analysis and findings of the proponent, this comment proposes a series of four alternates to Mod #5687 that address each of the stated objections, as follows:

A-1. Replace the language authorizing specific entities to perform required testing with language specifying that the required testing be performed by a “Class 1 BERS rater

or as authorized by Florida statutes" and reported on a standard form. This revised language is common to all proposed alternatives.

A-2. Alternate A-1 plus revise the specification for the Standard Reference Design walls to be identical to the 2012 IECC specification, specifying the standard Reference Design wall type to be a mass wall when the Proposed Design is a mass wall and revising the mass wall R-values and U-Factors in Tables R402.1.1 and R402.1.3 to be identical to the values in the 2012 IECC.

A-3. Alternate A-1 plus revise the specification for the Standard Reference Design glazing area to be identical to the 2012 IECC specification such that the glazing area for the Standard Reference Design is equal to 15% of the conditioned floor area or the window area of the Proposed Design, whichever is less.

A-4. Alternate A-1 plus alternate A-2 plus alternate A-3.

[See Alt-1 rationale for full Mod #5687 alternatives discussion.]

A3 RATIONALE

Comments on Objections to Mod #5687

Proponent
Florida Solar Energy Center

Stated Objections to Mod #5687

Mod #5687 was voted NAR (No Affirmative Recommendation) by the Energy TAC at its October 8, 2012 meeting in Daytona Beach. There were three stated objections by commentators that contributed to this Energy TAC vote as follows:

1. There was objection to the fact that Mod #5687 proposes language authorizing specific entities to perform required air distribution system testing.
2. There was objection to the fact that Mod #5687 proposes that the Standard Reference Design for wall type be a wood frame wall with R-13 insulation and that Table R402.1.1 and R403.1.3 be modified to reflect the equivalent mass wall R-values and U-Factors that will provide equivalent energy use as the R-13 frame wall. The basis of the objection to this modification is that increasing the 2012 IECC mass wall R-value requirement would not be cost effective to the consumer.
3. There was objection to the fact that Mod #5687 proposes that the Standard Reference Design glazing area be set at 15% of the conditioned floor area rather than the lesser of 15% of the conditioned floor area or the Proposed Design window area. As proposed, Mod #5687 would allow homes with window area less than 15% of the conditioned floor area to gain a credit within Section R405, Simulated Performance Alternative. The objection is based on the fact that this credit would allow the efficiency of either the glazing or some other component of the home to be reduced.

Summary of Findings by Proponent

1. The objection to the authorization of specific entities to perform required air distribution system testing is valid and the language is revised accordingly in the proposed alternates.
2. Cost effectiveness analysis performed by the proponent and reported in detail later in this comment finds that the proposed modification to the 2012 IECC mass wall R-Values is cost effective in Miami and Tallahassee and marginally cost effective in Orlando.
3. The proponent finds that adopting the 2012 IECC Standard Reference Design specification for glazing area would require homes with window area less than 15% (often smaller, low-cost homes) to have a whole-house energy budget that is stricter than homes with large window areas thus negating a cost-effective trade-off.

Proposed Alternatives

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A3 RATIONALE

or as authorized by Florida statutes" and reported on a standard form. This revised language is common to all proposed alternatives.

A-2. Alternate A-1 plus revise the specification for the Standard Reference Design walls to be identical to the 2012 IECC specification, specifying the standard Reference Design wall type to be a mass wall when the Proposed Design is a mass wall and revising the mass wall R-values and U-Factors in Tables R402.1.1 and R402.1.3 to be identical to the values in the 2012 IECC.

A-3. Alternate A-1 plus revise the specification for the Standard Reference Design glazing area to be identical to the 2012 IECC specification such that the glazing area for the Standard Reference Design is equal to 15% of the conditioned floor area or the window area of the Proposed Design, whichever is less.

A-4. Alternate A-1 plus alternate A-2 plus alternate A-3.

[See Alt-1 rationale for full Mod #5687 alternatives discussion.]

A4 RATIONALE

Comments on Objections to Mod #5687

Proponent
Florida Solar Energy Center

Stated Objections to Mod #5687

Mod #5687 was voted NAR (No Affirmative Recommendation) by the Energy TAC at its October 8, 2012 meeting in Daytona Beach. There were three stated objections by commentators that contributed to this Energy TAC vote as follows:

1. There was objection to the fact that Mod #5687 proposes language authorizing specific entities to perform required air distribution system testing.
2. There was objection to the fact that Mod #5687 proposes that the Standard Reference Design for wall type be a wood frame wall with R-13 insulation and that Table R402.1.1 and R403.1.3 be modified to reflect the equivalent mass wall R-values and U-Factors that will provide equivalent energy use as the R-13 frame wall. The basis of the objection to this modification is that increasing the 2012 IECC mass wall R-value requirement would not be cost effective to the consumer.
3. There was objection to the fact that Mod #5687 proposes that the Standard Reference Design glazing area be set at 15% of the conditioned floor area rather than the lesser of 15% of the conditioned floor area or the Proposed Design window area. As proposed, Mod #5687 would allow homes with window area less than 15% of the conditioned floor area to gain a credit within Section R405, Simulated Performance Alternative. The objection is based on the fact that this credit would allow the efficiency of either the glazing or some other component of the home to be reduced.

Summary of Findings by Proponent

1. The objection to the authorization of specific entities to perform required air distribution system testing is valid and the language is revised accordingly in the proposed alternates.
2. Cost effectiveness analysis performed by the proponent and reported in detail later in this comment finds that the proposed modification to the 2012 IECC mass wall R-Values is cost effective in Miami and Tallahassee and marginally cost effective in Orlando.
3. The proponent finds that adopting the 2012 IECC Standard Reference Design specification for glazing area would require homes with window area less than 15% (often smaller, low-cost homes) to have a whole-house energy budget that is stricter than homes with large window areas thus negating a cost-effective trade-off.

Proposed Alternatives

Notwithstanding the analysis and findings of the proponent, this comment proposes a series of four alternates to Mod #5687 that address each of the stated objections, as follows:

A-1. Replace the language authorizing specific entities to perform required testing with language specifying that the required testing be performed by a “Class 1 BERS rater

A4 RATIONALE

or as authorized by Florida statutes" and reported on a standard form. This revised language is common to all proposed alternatives.

A-2. Alternate A-1 plus revise the specification for the Standard Reference Design walls to be identical to the 2012 IECC specification, specifying the standard Reference Design wall type to be a mass wall when the Proposed Design is a mass wall and revising the mass wall R-values and U-Factors in Tables R402.1.1 and R402.1.3 to be identical to the values in the 2012 IECC.

A-3. Alternate A-1 plus revise the specification for the Standard Reference Design glazing area to be identical to the 2012 IECC specification such that the glazing area for the Standard Reference Design is equal to 15% of the conditioned floor area or the window area of the Proposed Design, whichever is less.

A-4. Alternate A-1 plus alternate A-2 plus alternate A-3.

[See Alt-1 rationale for full Mod #5687 alternatives discussion.]

"R405 and R402 Table R402.1.1 and Table R402.1.3" Code Mod Rationale

Integral to this proposal, an analysis has been conducted by the Florida Solar Energy Center to determine the relative efficiency of the 2012 IECC Standard Reference Design as compared with the current 2010 Florida Energy Code (FEC). The analysis was conducted by configuring two prototypes – a one-story, 2000 square foot, 3 bedroom home and a two-story, 2400 square foot, 3 bedroom home – in accordance with the Standard Reference Design specifications of the 2012 IECC and then evaluating the homes using the performance-based compliance provisions of the 2010 FEC.

The prototype homes were configured with both concrete masonry wall systems and with wood frame wall systems so that these differences in the 2012 IECC could be directly evaluated as well. (Note that the 2010 FEC uses wood frame wall systems as the Standard Reference Design specification in all cases so, by definition, this evaluation provides a direct comparison between wood frame and concrete masonry wall systems.)

To comply with the current FEC, the 2012 IECC Standard Reference Design homes need to achieve energy load performances equal to or less than 80% of the 2010 FEC Standard Reference Design loads. For the purposes of this discussion, we report the "e-Ratio" of the analyzed homes. This e-Ratio is equal to the energy loads for the 2010 FEC Standard Reference Design divided by the normalized Modified Loads for the 2012 IECC Standard Reference Design times 100. Thus, if the e-Ratio of the home is greater than 80 it would not comply with the current FEC and if it is equal to or less than 80, it will.

The objective of this analysis was to determine exactly what, if anything, needs to change in Table R405.5.2(1) of the 2012 IECC in order to meet or exceed existing "Florida-specific efficiencies." It was immediately clear that the IECC 2012 Standard Reference Design specification for Thermal Distribution System cannot simply be left blank. So we start there. The criteria for the Proposed Design under this section of the table provides enough of a clue to fill in the Standard Reference Design specification for this section. For untested Proposed Designs, Table R405.5.2(2) provides a Distribution System Efficiency of 0.88 when all ductwork is in the conditioned space.

We chose to propose this specification for the Standard Reference Design. In this way, if the home is untested, and the ducts are located in the conditioned space, there will be no difference in performance between the Standard Reference Design and the Proposed Design. On the other hand, if the ducts are not tested and are not located in the conditioned space, then there will be a heat transfer penalty, depending on the location of the ducts in the Proposed Design. Likewise, if the air distribution system is tested, and the results are favorable, there will be a credit for the Proposed Design air distributions system.

After creating a series of homes with the exact characteristics of the 2012 IECC Table R405.5.2(1) Standard Reference Design (including the above provision for the thermal distribution system), we determined the 2010 FEC e-Ratio that these Standard Reference Design home would achieve in Miami, Orlando and Tallahassee. The results are as follows:

Table 1. 2012 IECC Std.Ref.Design vs. 2010 FEC

Home Configuration:					Florida 2010 Code e-Ratio Results			
CFA	Nbr	Stories	Floor	Walls	Miami	Orlando	Tally	Average
2000	3	1	SOG	CMU	89	80	79	**82.7**
2000	3	1	SOG	Frame	81	77	77	**78.3**
2200	3	2	SOG	CMU	88	80	77	**81.7**
2200	3	2	SOG	Frame	80	77	76	**77.7**
				Average:	**84.5**	**78.5**	**77.3**	**80.1**

A couple of things are clear from these results. The most important is the fact that the concrete block wall systems (CMU) as specified by the 2012 IECC do not perform nearly as well as the frame wall systems. Note a couple of important points here:

1. the baseline home for the 2010 FEC is a frame wall with R-13 cavity insulation so the CMU homes in this example are being directly compared against the R-13 frame wall system, and
2. the CMU wall R-value used in this evaluation are as they are specified in the 2012 IECC (i.e. 4/3 for Miami and 6/4 for Orlando and Tallahassee) and not those used in our 2010 FEC (i.e. 7.8/6 statewide).

What the above table shows is that in a number of instances, the 2012 IECC Standard Reference Design will not comply with the 2010 FEC. The second thing it shows is that the block walls R-values are potentially a large culprit in the matter. Thus, we made another set of simulations that changed the CMU wall R-values from the 2012 IECC values to the 2010 FEC R-values (i.e. 7.8 interior or 6.0 exterior). The results from this analysis are as follows:

Table 2. 2012 IECC Std.Ref.Design (+ R-7.8 mass walls) vs. 2010 FEC

Home Configuration:					Florida 2010 Code e-Ratio Results			
CFA	Nbr	Stories	Floor	Walls	Miami	Orlando	Tally	Average
2000	3	1	SOG	CMU	*83*	*78*	*77*	**79.3**
2000	3	1	SOG	Frame	81	77	77	**78.3**
2200	3	2	SOG	CMU	*81*	*77*	*75*	**77.7**
2200	3	2	SOG	Frame	80	77	76	**77.7**
				Average:	**81.3**	**77.3**	**76.3**	**78.3**

The italicized values are those that are different from Table 1. As seen in the results, changing the mass wall R-values significantly reduces the e-Ratio difference between the block and frame wall systems. However, Miami still stands out somewhat with respect to the other two climates. One reason is that the 2012 IECC specifies R30 ceiling insulation in Miami and R-38 ceiling insulation in Orlando and Tallahassee. Thus, we made one additional change to the IECC 2012 Standard Reference Design homes, changing the Miami ceiling insulation from R-30 to R-38, with the following results.

Table 3. 2012 IECC Std.Ref.Design (+ R-7.8 mass walls + R-38 Ceil) vs. 2010 FEC

Home Configuration:					Florida 2010 Code e-Ratio Results			
CFA	**Nbr**	**Stories**	**Floor**	**Walls**	**Miami**	**Orlando**	**Tally**	**Average**
2000	3	1	SOG	CMU	*82*	78	77	**79.0**
2000	3	1	SOG	Frame	*80*	77	77	**78.0**
2200	3	2	SOG	CMU	*81*	77	75	**77.7**
2200	3	2	SOG	Frame	*79*	77	76	**77.3**
				Average:	**80.5**	**77.3**	**76.3**	**78.0**

Again the values in italics are those that changed from Table 2. With this final change we get the 2012 IECC Standard Reference Design homes very close to the Florida specific efficiencies of the 2010 FEC.

This analysis forms the basis for the proposed changes to 2012 IECC Tables R405.5.2(1), R405.5.2(2), R402.1.1 and R402.1.3.

Summary of Proposed Table changes:

Wall System Type – All wall systems types should produce equivalent performance. The performance of mass wall systems is dependent on climatic conditions and this can only be properly evaluated from a performance basis by having a single reference wall type.

Basement/Crawlspace wall specification has changed substantially – This is stating that an unvented crawlspace with insulation on the interior of crawlspace walls will be the reference for home with crawlspace foundations. This will increase code stringency for homes with crawlspace foundations. We also must assume that there will be no floor insulation in crawlspace foundations. Is this what we want to do?

Above Grade Floors – Exception required for clarification by the fact that crawlspaces are defined above as unventilated spaces with insulation on the interior of their walls.

Glazing Area – This provision has the effect of penalizing homes that have window to floor area ratios that are less than 15%. If this is done, then it is not possible to distinguish the energy savings that accrue from smaller window-to-floor area ratios that might be more typical of smaller, less expensive homes, which inherrently use less energy than larger, more expensive homes.

Internal Shade Factor – There is no evidence that homes with lower SHGC fenestrations use less interior blinds and shades. The interior shade fractions used in previous versions of the code are a much more likely occurrence than interior shade fractions that vary by the SHGC of the fenestration. Again, there is no evidence of which we are aware that homeowners will use less interior shades and blinds if their windows have lower SHGCs.

Air Exchange Rate –

Climate Zones 3-8 are not pertinent to Florida's Energy Code.

Mechanical ventilation equation: The subject equation has substantially changed in the most recent version of ASHARE Standard 62.2 and the code should reflect this change. (see next section.)

Mechanical Ventilation – ASHRAE now calculates ventilation fan cfm requirements as the total ventilation/infiltration cfm requirement for the home minus the annual average effective infiltration cfm for the home. While the total ventilation/infiltration cfm is calculated based on the homes size and number of bedrooms, the annual average effective infiltration cfm is calculated as a function of the climate location of the home. Thus, the required ventilation fan cfm will vary by climate location. The proposed equation calculates the ventilation fan energy use at an efficiency of 0.5 watts per cfm of the total ventilation fan flow.

Internal Gains – This change is in line with the most recent research on internal gains caused by people and appliance in homes. The values proposed here stem directly from DOE-funded Building America research conducted by FSEC. The research report may be found online here: http://www.fsec.ucf.edu/en/publications/pdf/archive/FSEC-CR-1837-10.pdf

Standard Reference Design Heating, Cooling and Hot Water systems – There is no sound reason that the efficiency of equipment should not be considered in the energy performance of new homes. Furthermore, if this IECC provision is implemented it will actually work in contradiction to the installation of higher efficiency heating, cooling and air conditioning equipment.

Standard Reference Design Thermal Distribution Systems – This section left blank in the 2012 IECC. The values proposed are chosen to reflect the provision of Table R405.5.2(2) for forced air HVAC systems. In this way untested air distribution systems that are within the conditioned space will evaluate exactly as the proposed home evaluates. Systems that are tested in accordance with the reference standard can exceed this performance.

Proposed Design Thermal Distribution Systems – There are no values for untested systems that are not fully within the directly conditioned space in Table R405.5.2(2). This leaves a gap on the proposed homes side of the evaluation procedure. This gap is handled through proposed changes to Table R405.5.2(2) that allows the air leakage and heat transfer for the thermal distribution system to be treated separately.

Thermostat – The proposed setpoints are as in previous versions of the code. Changing these setpoint to those proposed by the IECC has the impact of substantially increasing projected energy use in home, something which is not justified by the field research. In addition, changing to the IECC setpoints will substantially reduce the beneficial impact of mass walls because the temperature range over which thermally massive walls will positively impact the energy use in homes will be reduced from a 10 degree F bandwidth to a 3 degree F bandwidth, reducing the effectiveness of thermally massive wall systems to mediate indoor temperatures by a factor of almost three times.

Definition of A_s – This is a more specific statement of the meaning of the term in mathematical terms, which is necessary to avoid any confusion on the part of compliance software producers.

Table R405.5.2(1), table note 'c' – This change to align with Florida law and present FEC on this subject.

Table R405.5.2(1), table note 'f' – This change is necessary to define the Standard Reference Design equipment specification when a non-NAECA rated heating, cooling or hot water device is proposed in the Proposed Design. The proposed change is identical to the 2010 FEC language for this table note language. This change also requires the addition of Table B-1.1.2(1) from the 2010 FEC (as specified in the proposed change) be added to provide the efficiencies that shall be used for the Standard Reference Design when the specified circumstances occur.

Table R405.5.2(2) Distribution System Configuration and Condition – This change is required to fill a gap for untested air distribution systems that are not fully within the conditioned space. This change allows the heat gains from ducts in unconditioned spaces to be evaluated separately from the distribution system air leakage such that if the ducts are within the directly conditioned space the air distribution system will evaluate exactly as the Standard Reference Design but if they are not within the conditioned space they will evaluate at a reduced performance level consistent with their heat gain/loss as compared with the Standard Reference Design.

Table 402.1.1 – This table is modified to make the values internally consistent with the values required for use in section R405 SIMULATED PERFORMANCE ALTERNATIVE (PERFORMANCE).

Table 402.1.3 – This table is modified to make the values internally consistent with the values required for use in section R405 SIMULATED PERFORMANCE ALTERNATIVE (PERFORMANCE).

EN6004

Date Submitted	8/2/2012	**Section**	R-All	**Proponent**	Ann Stanton
Chapter	5	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments No **Alternate Language** Yes

Related Modifications

Summary of Modification

Update standards list to reflect Florida specific references.

Rationale

To comply with s. 553.73(7)(a) Florida Statutes, the proposed modification will supplement the most current version of the International Energy Conservation Code (IECC) base code with Florida specific requirements in order to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction adopted and amended pursuant to s. 553.901,FS, and in accordance with the Commission's approved code change process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to building and property owners relative to cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Impact to industry relative to the cost of compliance with code

None. Proposed language is currently in the 2010 Florida Building Code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. Proposed language is currently in the 2010 Florida Building Code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. Proposed language is currently in the 2010 Florida Building Code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No. Proposed language is currently in the 2010 Florida Building Code.

Does not degrade the effectiveness of the code

No. Proposed language is currently in the 2010 Florida Building Code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

6004-A3

Proponent Jennifer Hatfield **Submitted** 12/14/2012 **Attachments** Yes

Rationale

The addendum will revise the pump selection requirements and eliminate the 36 gpm language in section 5.2 of the Standard as it pertains to pools with less than 13,000 gallons.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

The addendum provides a fix to the orginal standard that will positively impact property owners.

Impact to industry relative to the cost of compliance with code

The addendum provides a fix to the original standard that will positively impact the industry.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, by providing an addedum to the original standard.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No, it improves its effectiveness.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period 10/31/2012 - 12/14/2012

6004-A2

Proponent Ann Stanton **Submitted** 12/11/2012 **Attachments** Yes

Rationale

The Energy TAC moved NAR on this mod with instructions to review the list of standards in light of approved mods. The reviewed list of standards is attached as an alternate language comment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

OTHER

Explanation of Choice

Proposed language was in the 2010 FBC. It was processed in accordance with an approved plan from the Florida Building Commission for the purpose of maintaining Florida efficiencies.

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

1st Comment Period History 08/09/2012 - 09/23/2012

6004-A1

Proponent Jennifer Hatfield **Submitted** 9/23/2012 **Attachments** Yes

Rationale

The addendum will revise the pump selection requirements and eliminate the 36 gpm language in section 5.2 of the Standard as it pertains to pools with less than 13,000 gallons.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

The addendum provides a fix to the orginal standard that will positively impact property owners.

Impact to industry relative to the cost of compliance with code

The addendum provides a fix to the original standard that will positively impact the industry.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, by providing an addedum to the original standard.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No, it improves its effectiveness.

Is the proposed code modification part of a prior code version? No

1st Comment Period History 08/09/2012 - 09/23/2012

EN6004-G1

Proponent BOAF CDC **Submitted** 9/15/2012 **Attachments** No

Comment:

The proposed amendment was does not appear to have been submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process.

CHAPTER 5

REFERENCED STANDARDS

ACCA

Air Conditioning Contractors of America

2800 Shirlington Road, Suite 300

Arlington, VA 22206

Standard referenced number Title
Reference in code section number

ACCA Manual D-09 Residential Duct Systems R403.2.5

ACCA Manual J-11 Residential Load Calculation, Eighth Edition with posted updates/errata. R403.6.1

ACCA Manual S-10 Residential Equipment Selection R403.6.1

AHRI

Air Conditioning, Heating, and Refrigeration Institute

4100 North Fairfax Drive

Suite 200

Arlington, VA 22203

Standard referenced number Title Reference in code section number

470-06 Performance Rating of Desuperheater/Water Heaters .... R405.7.7, Appendix C Form 400D

1160—08 Performance Rating of Heat Pump Pool Heaters R403.9.1.2

ANSI

American National Standards Institute

25 West 43rd Street

Fourth Floor

New York, NY 10036

Standard referenced number Title Reference in code section number

Z21.56-2006 Gas-Fired Pool Heaters R403.9.1.1

APSP

Association of Pool & Spa Professionals

2211 Eisenhower Avenue

Alexandria, VA 22314

Standard referenced number Title Reference in code section number

ANSI/APSP-14-11 Portable Electric Spa Energy Efficiency Standard R403.9

ANSI/APSP-15-11 Residential Swimming Pool and Spa Energy Efficiency Standard R403.9

ARDM

Association of Refrigerant Desuperheater Manufacturers, Inc,

c/o Doucette Industries

4151 112 Terrace N

Clearwater, FL 33762

Standard referenced number Title Reference in code section number

ARDM-88 Residential Heat Recovery Installation Guide, First Edition R405.7.7

ASHRAE

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

1791 Tullie Circle, NE

Atlanta, GA 30329-2305

Standard referenced number Title Reference in code section number

ANSI/ASHRAE Std. 62.2-10 Ventilation for Acceptable Indoor Air Quality R403.5.2, Table R405.5.2(1)

ANSI/ASHRAE 124-1991 Methods of Testing for Rating Combination Space-Heating and Water-Heating Appliances R403.4.3.2.2.2

ASHRAE 152-2004 Method of Test for Determining the Design and Seasonal Efficiencies of Residential Thermal Distribution Systems R403.2.2, Table R405.5.2

ASHRAE—09 ASHRAE Handbook of Fundamentals . . . . .R202, R402.1.4, Table R405.5.2(1)

ASTM

ASTM International

100 Barr Harbor Drive

West Conshohocken, PA 19428-2959

Standard referenced number Title Reference in code section number

C272-01 Test Method for Water Absorption of Core Materials for Structural Sandwich Construction R303.2.1.3

C 516-02 Vermiculite Loose Fill Thermal Insulation Table R303.2.1

C 549-06 Perlite Loose Fill Insulation

C 578-06 Rigid, Cellular Polystyrene Thermal Insulation Table R303.2.1

C 665-06 Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing Table R303.2.1

C 727-01 Standard Practice for Installation and Use of Reflective Insulation in Building Constructions. Table R303.2.1

C 739-05b Cellulosic Fiber Loose-Fill Thermal Insulation Table R303.2.1

C 764-06a Mineral Fiber Loose-Fill Thermal Insulation
Table R303.2.1

C 1015-06 Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation Table R303.2.1

C 1029-05a Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation Table R303.2.1

C 1158-05 Standard Practice for Use and Installation of Radiant Barrier Systems (RBS) in Building Construction Table R303.2.1, R405.7.1

C 1224-03 Reflective Insulation for Building Applications Table R303.2

C 1289-06 Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board Table 303.2

C 1313-05 Sheet Radiant Barriers for Building Construction Applications
Table R303.2.1, R405.7.1

C 1320-05 Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light-Frame

Construction Table R303.2.1

C 1321-04 Standard Practice for Installation and Use of Interior Radiation Control Coating Systems (IRCC)

in Building Construction Table 303.2, 405.7.1

C 1371-04a Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable

Emissometers. R405.7.1, R405.7.2

C 1549-04 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature

Using a Portable Solar Reflector R405.7.2

E 283—04 Test Method for Determining the Rate of Air Leakage Through Exterior Windows,

Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen R402.4.4

E 903-96 Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials

Using Integrating Spheres R405.7.2

E 1918-06 Standard Test Method for Measuring Solar Reflectance of Horizontal and

Low-Sloped Surfaces in the Field R405.7.2

CRRC

Cool Roof Rating Council

1738 Excelsior Avenue

Oakland, CA 94602

Standard referenced number Title
Reference in code section number

CRRC-1-2006 CRRC-1 Product Rating Program
R405.7.2

DOE

U.S. Department of Energy

c/o Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402-9325

Standard referenced number Title
Reference in code section number

10 CFR Part 430, Subpart B, Uniform Test Method for Measuring the Energy Consumption
R403.4.3.2.1. R403.4.3.2.2, R403.4.3.2.2.1

Appendix E (1998). of Water Heater
R403.4.3.2.2.2

EPACT, 92 42 USC 6831, Energy Policy Act of 1992 et seq Public Law 102-486 R403.6.2.1.1

NAECA, 1987 National Appliance Energy Conservation Act of 1987 R403.6.2.1

Florida Codes

Building Codes and Standards Office

Florida Department of Businesss and Professional Regulation

140 N. Monroe Street

Tallahassee, FL 32399-2100

Standard referenced number Title
Reference in code section number

FBC-B 2010 Florida Building Code, Building R202, R303.2,
FBC-M 2010

Florida Building Code, Mechanical R403.5

FBC-R 2010 Florida Building Code, Residential R303.2,
R403.5, R405.7.3

FS 2010 Florida Statutes R103.2.3.2,
R401.3, R103.1.1.2

ESTATAM 2012 Energy Simulation Tool Approval Technical Assistance Manual
R405.4

FSEC

Florida Solar Energy Center

1679 Clearlake Road

Cocoa, FL 32922-5703

Standard referenced number Title
Reference in code section number

FSEC-RR-54-00 "The HERS Rating Method and the Derivation of the Normalized Modified

Loads Method", October 11, 2000, Fairey, P., J. Tait, D. Goldstein, D. Tracey,

M. Holtz, and R. Judkoff . Appendix B, B-1

Available online at: http://www2.fsec.ucf.edu/en/publications/html/FSEC-RR-54-00/index.htm

GAMA

Gas Appliance Manufacturers Association

PO Box 9245

Arlington, VA 22209

Standard referenced number Title
Reference in code section number

GAMA Consumers' Directory of Certified Efficiency Ratings for Water Heating Equipment
R403.4.3.2.2.2

ISO

International Standards Organization

1, rue de Varembe, Case postale 56,

CH-1211 Geneve 20, Switzerland

Standard referenced number Title
Reference in code section number

9806 (1994, 1995) TEST Methods for Solar Collectors

Part 1: Thermal Performance of glazed liquid heating collectors including pressure drop,

December 1, 1994

Part 2: Qualification test procedures", August 15, 1995.

Part 3: Thermal performance of unglazed liquid heating collectors (sensible heat transfer only)

including pressure drop", December 15, 1995. R403.4.3.2.3

SRCC

Solar Rating and Certification Corporation

c/o Florida Solar Energy Center

1679 Clearlake Road

Cocoa, FL 32922-5703

Standard referenced number Title
Reference in code section number

FSEC Directory of Certified Solar Systems
R403.4.3.2.3

SRCC TM-1 Solar Domestic Hot Water System and Component Test Protocol,

December 6, 2002 R403.4.3.2.3

US—FTC

United States - Federal Trade Commission

600 Pennsylvania Avenue NW

Washington, DC 20580

Standard referenced number Title
Reference in code section number

CFR Title 16, Part 460 R-value Rule. . . . . R202, R303.1.1.1, R303.1.1.1.2 ~~R303.1.4~~

Under APSP Standards, add the following addendum reference under APSP-15 (in bold):

ANSI/APSP-15-11 Residential Swimming Pool and Spa Energy Efficiency Standard**, including Addendum 1, Dated 2012** R403.9

ACCA

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ACCA Manual D-09	Residential Duct Systems	C~~R~~403.2.7.5
ACCA Manual J-11	Residential Load Calculation, Eighth Edition with posted updates/errata.	R403.6.1
ACCA Manual S-10	Residential Equipment Selection	R403.6.1

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4100 North Fairfax Drive

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Standard referenced number	Title	Reference in code section number
470-06	Performance Rating of Desuperheater/Water Heaters	R405.7.7, Appendix C Form 400D
1160—08	Performance Rating of Heat Pump Pool Heaters	R403.9.1.2

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Z21.56-2006	Gas-Fired Pool Heaters	R403.9.1.1

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ANSI/ASHRAE 124-1991 Methods of Testing for Rating Combination Space-Heating and Water-Heating Appliances R403.4.3.2.2.2

~~ASHRAE 152-2004 Method of Test for Determining the Design and Seasonal Efficiencies of Residential Thermal Distribution Systems R403.2.2, Table R405.5.2~~

ASHRAE—09 ASHRAE Handbook of Fundamentals . . . . .R202,.R402.1.4, Table R405.5.2(1)

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C272-01	Test Method for Water Absorption of Core Materials for Structural Sandwich Construction	R303.2.1.3
C 516-08~~02~~	Vermiculite Loose Fill Thermal Insulation	Table R303.2.1
C 549-06	Perlite Loose Fill Insulation	Table R303.2.1
C 578-08b~~06~~	Rigid, Cellular Polystyrene Thermal Insulation	Table R303.2.1
C 665-06	Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing	Table R303.2.1
C 727-01	Standard Practice for Installation and Use of Reflective Insulation in Building Constructions.	Table R303.2.1
C 739-08~~05b~~	Cellulosic Fiber Loose-Fill Thermal Insulation	Table R303.2.1
C 764-07~~06a~~	Mineral Fiber Loose-Fill Thermal Insulation	Table R303.2.1
C 1015-06	Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation	Table R303.2.1
C 1029-08~~05a~~	Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation	Table R303.2.1
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C 1224-03	Reflective Insulation for Building Applications	Table R303.2
C 1289-08~~06~~	Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board	Table 303.2
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CRRC-1-2006 CRRC-1 Product Rating
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Standard referenced number Title Reference in code section number

~~10 CFR Part 430, Subpart B, Uniform Test Method for Measuring the Energy Consumption R403.4.3.2.1, R403.4.3.2.2,~~

~~Appendix E (1998). of Water Heater R403.4.3.2.2.1, R403.4.3.2.2.2~~

~~EPACT, 92 42 USC 6831, Energy Policy Act of 1992~~

~~et seq Public Law 102-486 R403.6.2.1.1~~

NAECA, 1987 National Appliance Energy Conservation Act of 1987 R303.1.2 ~~R403.6.2.1~~

Florida Codes

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Florida Department of Businesss and Professional Regulation

140 N. Monroe Street

Tallahassee, FL 32399-2100

Standard referenced number Title Reference in code section number

FBC-B 2013~~0~~ Florida Building Code, Building R202, R303.2,

FBC-M 2013~~0~~ Florida Building Code, Mechanical R403.5

FBC-R 2013~~0~~ Florida Building Code, Residential
R303.2, R403.5, R405.7.3

FS 2013~~0~~ Florida Statutes
R103.2.3.2, R401.3, R103.1.1.2

~~ESTATAM 2012 Energy Simulation Tool Approval Technical Assistance Manual R405.4~~

FSEC

Florida Solar Energy Center

1679 Clearlake Road

Cocoa, FL 32922-5703

Standard referenced number Title
Reference in code section number

FSEC-RR-54-00 "The HERS Rating Method and the Derivation of the Normalized Modified

Loads Method", October 11, 2000, Fairey, P., J. Tait, D. Goldstein, D. Tracey,

M. Holtz, and R. Judkoff . Appendix B, B-1

Available online at: http://www2.fsec.ucf.edu/en/publications/html/FSEC-RR-54-00/index.htm

~~**GAMA**~~

~~Gas Appliance Manufacturers Association~~

~~PO Box 9245~~

~~Arlington, VA 22209~~

~~Standard referenced number Title~~
~~Reference in code section number~~

~~GAMA Consumers' Directory of Certified Efficiency Ratings for Water Heating Equipment R403.4.3.2.2.2~~

ISO

International Standards Organization

1, rue de Varembe, Case postale 56,

CH-1211 Geneve 20, Switzerland

Standard referenced number Title
Reference in code section number

9806 (1994, 1995) TEST Methods for Solar Collectors

Part 1: Thermal Performance of glazed liquid heating collectors including pressure drop,

December 1, 1994

Part 2: Qualification test procedures", August 15, 1995.

Part 3: Thermal performance of unglazed liquid heating collectors (sensible heat transfer only)

including pressure drop", December 15, 1995.
R403.4.4.2.1 ~~3.2.3~~

RESNET

Residential Energy Services Network, Inc.

2170 E. El Camino Real

Oceanside, CA 92054

Standard referenced number Title
Reference in code section number

2006 Mortgage Industry National Home Energy Rating Systems Standards (March 2, 2012 edition).

R403.2.2, R405 Table R405.5.2(1)

SRCC

Solar Rating and Certification Corporation

c/o Florida Solar Energy Center

1679 Clearlake Road

Cocoa, FL 32922-5703

Standard referenced number Title
Reference in code section number

FSEC Directory of Certified Solar Systems R403.4.4.2.1 ~~3.2.3~~

SRCC TM-1 Solar Domestic Hot Water System and Component Test Protocol,

December 6, 2002 R403.4.4.2.1 ~~3.2.3~~

US—FTC

United States - Federal Trade Commission

600 Pennsylvania Avenue NW

Washington, DC 20580

Standard referenced number Title
Reference in code section number

CFR Title 16, Part 460 R-value Rule. . . . . R202, R303.1.1.1, R303.1.1.1.2 ~~R303.1.4~~

Under APSP Standards, add the following addendum reference under APSP-15 (in bold):

ANSI/APSP-15-11 Residential Swimming Pool and Spa Energy Efficiency Standard**, including Addenda A, Dated February 2013** R403.9