

CHAPTER 1

Purpose of this Manual

BACKGROUND

The *Florida Energy Efficiency Code For Building Construction*, took effect statewide on October 1, 1980. The energy code, which is now Chapter 13 of the *Florida Building Code, Building*, sets minimum energy efficiency requirements for new and renovated buildings. New buildings, both residential and non-residential, except for those exempt, must comply. The code provides a uniform standard for thermal efficiency. It regulates the design of the building envelope and the selection of energy-consuming heating, air conditioning and water heating systems. The building plans and specifications must meet the requirements of the code before a building permit can be issued.

USING THIS MANUAL

This manual is an instructional tool designed to help building professionals, building officials, and other interested parties in understanding and applying Subchapter 6 of the code. The purpose of this manual is to instruct the reader in how to complete the required energy code forms. This text includes the following chapters:

- + *Chapter 1, Purpose of This Manual*, gives a brief history of the Florida Energy Efficiency Code and information about the use of this manual.
- + *Chapter 2, General Information*, explains which buildings are covered by the code, describes methods of compliance, and gives other general information about code compliance;
- + *Chapter 3, Completing the Residential Analysis Worksheet*, gives a detailed worksheet for organizing the measurements and other information needed to complete Form 600A-04.
- + *Chapter 4, Form Completion*, shows how to complete
 - 1) Form 600A-04, which demonstrates compliance by Method A, the Whole Building Performance Method,
 - 2) Form 600B-04, which demonstrates compliance by Method B, the Component Prescriptive Method, and
 - 3) Form 600C-04, which demonstrates compliance by Method C, the Limited Applications Prescriptive Method.
- + *Chapter 5, Special Cases*, gives additional information about more complex designs considerations and calculations.
- + *Appendix*, contains a sample floor plan, example take-off worksheet, example calculations, a blank worksheet, and an equipment efficiency directory list.

Throughout this manual, references to the "code" or "section of the code" or "section ____" pertain to Chapter 13 of the *Florida Building Code, Building* volume. You may order copies of the code online at www.floridabuilding.org. Residential sections of the code can be found in the Help menu of the EnergyGauge FLA/RES software. Questions on provisions of the code should be addressed to the Florida Department of Community Affairs at (850) 487-1824. Questions on the FLA/RES software should be addressed to the EnergyGauge Hotline at (321) 638-1492. Copies of forms can be found online at www.floridabuilding.org.

This manual supplements, but does not replace, the Florida energy code. The reader will need to refer to the code for detailed descriptions of the prescriptive measures that must be met, qualifying criteria for some materials and systems, and other specific information.

TERMS and DEFINITIONS

ADDITION. An extension or increase in conditioned floor area or height of a building or structure.

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.

AFUE (ANNUAL FUEL UTILIZATION EFFICIENCY). The ratio of annual output energy to annual input energy including any non-heating season pilot input loss.

AIR BARRIER.

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 C36, 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, a building 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 process of treating air to control its temperature, humidity, cleanliness and distribution to meet requirements of the conditioned space.

AIR DISTRIBUTION SYSTEMS. Include all building elements (duct systems, air handling units, cavities of the building structure and mechanical closets) through which air is delivered to or from the conditioned spaces.

AIR DUCT. A passageway for conducting air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum. For material requirements see local mechanical codes.

AIR HANDLING UNIT. The fan unit of a furnace and the fan-coil unit of a split-system, packaged air conditioner or heat pump.

AIR INFILTRATION. See “INFILTRATION”.

ANNUAL FUEL UTILIZATION EFFICIENCY (AFUE). Efficiency descriptor of the ratio of annual output energy to annual input energy as developed in accordance with the requirements of U.S. Department of Energy (DOE) 10CFR Part 430.

AS-BUILT. Building components to be actually installed in a structure. In some cases, this may be a worst case condition. (See “WORST CASE”).

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 13-404.2.B.1 in Subchapter 4 and Section 13-604.1.ABC.1 in subchapter 6. See “UNDER ATTIC”; “ROOF”.

ATTIC RADIANT BARRIER. See “RADIANT BARRIER”.

BASELINE. Building component performance target or the total building performance target which is compared with the As-Built building performance.

BEDROOM. Any residential room which has an area of 70 square feet or more and a clothes storage closet, and is not part of the common living area. For the purposes of this Code, the number of "main" bedrooms for homes of three bedrooms or more is the total number of bedrooms less one. In one and two bedroom homes, all bedrooms are "main" bedrooms.

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.

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BUILDING. Any structure that includes provision for any of the following or any combination of the following: a space heating system, a space cooling system, or a service water heating system. For each purpose of this Code each portion of a building separated from other portions by a rated fire wall shall be considered as a separate building. The term "building" shall be construed as if followed by the words "or part thereof."

BUILDING CONSTRUCTION. Any new building or structure or addition to any existing building or structure.

BUILDING ENVELOPE. The elements of a building which enclose conditioned spaces through which thermal energy may be transferred to or from the outdoors or to or from unconditioned spaces.

BUILDING OFFICIAL. The officer or other designated representative authorized to act on behalf of the authority having jurisdiction-

COEFFICIENT OF PERFORMANCE (COP) – COOLING. The ratio of the rate of heat removal to the rate of energy input, in consistent units, for a complete refrigerating system or some specific portion of that system under designated operating conditions

COMBUSTION APPLIANCE, DIRECT VENT. A system consisting of: (1) an appliance for indoor installation; (2) combustion air connections between the appliance and the outdoor atmosphere; (3) flue gas connections between the appliance and the vent cap; and, (4) vent cap for installation outdoors, supplied by the manufacturer and constructed so that all air for combustion is obtained from the outdoor atmosphere and all flue gases are discharged to the outdoor atmosphere.

COMFORT CONDITIONING. Treating air to control its temperature, relative humidity, cleanliness, and distribution to meet the comfort requirements of the occupants of the conditioned space.

COMFORT ENVELOPE. The area on a psychrometric chart enclosing all those conditions described as being comfortable in Figure 1, ASHRAE Standard 55-81, Thermal Environmental Comfort Conditions for Human Occupancy.

COMMON CEILING. The ceiling/floor assembly separating conditioned tenancies, one above the other.

COMMON WALL. A wall separating conditioned tenancies, one next to the other.

CONDITIONED FLOOR AREA. The horizontal projection (outside measurements) of that portion of space which is conditioned directly or indirectly by an energy-using system. See “FLOOR AREA”; “GROSS FLOOR AREA”.

CONDITIONED SPACE. That volume of a structure which is either mechanically heated, cooled, or both heated and cooled by direct means. Spaces within the thermal envelope that are not directly conditioned shall be considered buffered unconditioned space. Such spaces may include, but are not limited to, mechanical rooms, stairwells, and unducted spaces beneath roofs and between floors. Air leakage into dropped ceiling cavities does not constitute conditioned space. See “SPACE”.

CONSTRUCTION. The fabrication and erection of a new building or any addition to or alteration of an existing building.

CONVENTIONAL ATTIC. Traditionally, the space directly below the roof and above the ceiling of the upper story of a building.

DESIGN PROFESSIONAL. An architect or engineer licensed to practice in accordance with applicable state licensing laws.

DISTRIBUTION SYSTEM. Conveying means, such as ducts, pipes, and wires, to bring substances or energy from a source to the point of use. The distribution system includes such auxiliary equipment as fans, pumps, and transformers.

DOOR. All operable opening areas (which are not fenestration) in the building envelope, including swinging and roll-up doors, fire doors, and access hatches. Doors that are more than one-half glass are considered fenestration. (See fenestration.) For the purposes of determining building envelope requirements, the classifications are defined as follows:

- (a) non-swinging: roll-up, sliding, and all other doors that are not swinging doors.
- (b) swinging: all operable opaque panels with hinges on one side and opaque revolving doors.

DOOR AREA. Total area of the door measured using the rough opening and including the door slab and the frame. See “FENESTRATION AREA”.

DUCTS IN CONDITIONED SPACE. Ductwork located on the conditioned side of the envelope insulation and constructed in such a manner that any leakage will be discharged into the conditioned space.

DWELLING UNIT. A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.

EFFICIENCY, HVAC SYSTEM. The ratio of useful energy output (at the point of use) to the energy input in consistent units for a designated time period, expressed in percent.

ENCLOSED SPACE. A volume substantially surrounded by solid surfaces such as walls, floors, roofs, and openable devices such as doors and operable windows.

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). –

ENERGY EFFICIENCY RATIO (EER). The ratio of net cooling capacity in Btu/h to total rate of electric input in watts under designated operating conditions. See “COEFFICIENT OF PERFORMANCE (COP)—COOLING”.

ENERGY FACTOR (EF). A measure of water heater overall efficiency.

ENERGY PERFORMANCE LEVEL. An indicator of the energy-related performance of a building, including, but not limited to, the levels of insulation, the amount and type of glass, and the HVAC and water heating system efficiencies.

ENERGY, RECOVERED. See “RECOVERED ENERGY”.

EXISTING BUILDING. A building or portion thereof that was previously occupied or approved for occupancy by the authority having jurisdiction.

EXISTING SYSTEM. A system or systems previously installed in an existing building.

EXTERIOR WALL. A wall of a structure that is exposed to outdoor climate conditions and which forms a boundary between a conditioned and an outdoor space. See “ADJACENT WALL”.

FACTORY-SEALED AIR HANDLING UNIT. A furnace, or an air conditioner or heat pump fan-coil unit which is certified by its manufacturer to withstand, without leakage, an air pressure of one (1) inch water gauge, when all air inlets, air outlets and condensate drain port(s), when present, are sealed at an air pressure of one (1) inch water gauge with no greater than 2 design CFM discharge.

FENESTRATION. All areas (including the frames) in the building envelope that let in light, including windows, plastic panels, clerestories, skylights, glass doors that are more than one-half glass, and glass block walls. (See building envelope and door.)

(a) skylight: a fenestration surface having a slope of less than 60 degrees from the horizontal plane. Other fenestration, even if mounted on the roof of a building, is considered vertical fenestration.

(b) vertical fenestration: all fenestration other than skylights. Trombe wall assemblies, where glazing is installed within 12 in. of a mass wall, are considered walls, not fenestration.

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. See “DOOR AREA”.

FENESTRATION, VERTICAL. See “FENESTRATION”; “SKYLIGHT”.

FIREWALL. Fire resistant wall, having protective openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

FLEXIBLE NON-METAL DUCT. A type of flexible air duct comprised of a wire-reinforced core (usually plastic), an insulation layer and an outer jacket (usually a durable reinforced plastic).

FLOOR, ENVELOPE. That lower portion of the building envelope, including opaque area and fenestration, that has conditioned space above and is horizontal or tilted at an angle of less than 60 degrees from horizontal but excluding slab-on-grade floors.

FLUE DAMPER. A device in the flue outlet or in the inlet of or upstream of the draft control device of an individual, automatically operated, fossil fuel-fired appliance that is designed to automatically open the flue outlet during appliance operation and to automatically close the flue outlet when the appliance is in a standby condition.

FOSSIL FUEL. Fuel derived from a hydrocarbon deposit such as petroleum, coal, or natural gas derived from living matter of a previous geologic time.

FUEL. A material that may be used to produce heat or generate power by combustion.

GRADE. The finished ground level adjoining a building at all exterior walls.

GROSS FLOOR AREA. The sum of the floor areas of the conditioned spaces including basements, mezzanine and intermediate-floored tiers and penthouses of headroom height 7.5 ft. or greater. It is measured from the exterior faces of exterior walls or from the centerline of walls separating buildings.

GROSS ROOF AREA. See “ROOF AREA, GROSS”.

GROSS WALL AREA. See WALL AREA, GROSS”.

HEAT. The form of energy that is transferred by virtue of a temperature difference or a change in the state of a material.

HEAT PUMP. A mechanical refrigeration-cycle system which has been designed to accomplish space heating, water heating or both and, when the evaporator and condenser effects are reverse, may be used for space air conditioning or water chilling.

HEAT TRAP. A device or arrangement of the hot water piping leaving the water heater, constructed to counteract the convective forces of the heated water (thermosyphoning) during stand-by periods.

HEATED BUILDING. Any building with heating equipment installed at the time of construction, or designed for the future installation of heating equipment, using electricity or fossil fuels.

HEATING SEASONAL PERFORMANCE FACTOR (HSPF). The total heating output of a heat pump during its normal annual usage period for heating (in Btu) divided by the total electric energy input during the same period

HISTORIC. A building or space that has been specifically designated as historically significant by the adopting authority or is listed in “The National Register of Historic Places” or has been determined to be eligible for listing by the U.S. Secretary of the Interior.

HOME INSULATION. Any material, mainly insulation, used to retard the flow of heat through the building envelope that is tested and labeled with an installed R-value as required by the Federal Trade Commission rules, 16 U.S. Code of Federal Regulations (CFR) Part 460.

HUMIDISTAT. An automatic control device used to maintain humidity at a fixed or adjustable set point.

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

INDOOR. Within the conditioned building envelope.

INFILTRATION. The uncontrolled inward air leakage 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

INFILTRATION BARRIER. A product or system designed to limit the free passage of air through a building envelope component (wall, ceiling or floor). Such products and systems are sealed together to form a continuous barrier against air infiltration.

INSULATION. Material mainly used to retard the flow of heat. See “HOME INSULATION”.

INSULATION BAFFLE. A device installed at the eave of an attic to prevent insulation from blocking the air flow channel between the soffits and attic.

INSULATION CHUTE. See “INSULATION BAFFLE”.

INSULATION DAMS. A flexible device used between rafters at the eave line of roof systems that holds loose fill insulation away from soffit ventilation areas and prevents blockage of natural ventilation flow.

KILOWATT (kW). The basic unit of electric power, equal to 1000 W

KNEE WALLS. Vertical walls which separate conditioned space from the attic.

LABELED. Equipment or materials to which has been attached a label, symbol, or other identifying mark acceptable to the Authority Having Jurisdiction and concerned with product evaluation and by whose labeling the manufacturer indicates compliance with appropriate standards.

LISTED. Equipment, materials or services included in a list published by an organization acceptable to the building official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment , material or service meets identified standards or has been tested and found suitable for a specified purpose

LOW-RISE RESIDENTIAL. Single-family houses, multiple-family structures of three stories or fewer above grade, manufactured houses (mobile homes), and manufactured houses (modular).

MANUFACTURED BUILDING. A closed structure, building assembly, or system of subassemblies, which may include structural, electrical, plumbing, heating, ventilating, or other service systems manufactured for installation or erection, with or without other specified components, as a finished building or as part of a finished building, which shall include, but not be limited to, residential, commercial, institutional, storage, and industrial structures.

MANUFACTURED HOME. As defined by the U.S. Department of Housing and Urban Development, residential units constructed in accordance with Federal Mobile Construction and Safety Standards, pursuant to 42 USC 55.5401, et. seq. and 24 CFR 3282 and 3283.

MASTIC. A thick, pliable substance that adheres well to specific materials and is used for sealing different building components together. Mastics are often used in conjunction with fibrous or mesh fabric.

MASTIC RIBBONS. Malleable, putty-like packings which are used in applications akin to those of gasketing; but, they do not have elasticity of gasketing. Such mastics contain nearly 100 percent solids, require no curing in air, and are used without reinforcing fabric.

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.

MECHANICAL EQUIPMENT PLENUM CHAMBER. In an air distribution system, that part of the casing, or an air chamber furnace, to or from which the air duct system delivers conditioned air.

MECHANICAL HEATING. Raising the temperature of a gas or liquid by use of fossil fuel burners, electric resistance heaters, heat pumps, or other systems that require energy to operate.

MECHANICAL COOLING. Reducing the temperature of a gas or liquid by using vapor compression, absorption, desiccant dehumidification combined with evaporative cooling, or another energy-driven thermodynamic cycle. Indirect or direct evaporative cooling alone is not considered mechanical cooling.

MECHANICAL VENTILATION. The process of supplying or removing air by mechanical means to or from any space.

MULTIPLE-FAMILY RESIDENCE. Any residential dwelling unit that is attached to another such unit by a common wall, ceiling or floor such as a duplex, townhouse, condominium or similar unit, regardless of ownership.

MULTI-ZONE SYSTEM(S). One or more HVAC system(s) designed to supply conditioned air to more than one independently serviced area of a building. Each zone must have separate thermostats and be separated by walls or closable doors not exceeding forty square feet between zones.

NON-DEPLETABLE ENERGY SOURCES. Sources of energy derived from incoming solar radiation, including photo-synthetic processes, wind, waves, and tides, lake or pond thermal differences and energy derived from the internal heat of the earth, including nocturnal thermal exchanges.

OPAQUE. All areas in the building envelope, except fenestration and building service openings such as vents and grilles. (See building envelope and fenestration.)

OPERABLE APERTURE AREAS. Areas of windows, sliding glass doors and screened entry doors that provide access to incoming breezes in their fully extended open position.

ORIENTATION. The direction an envelope element faces, i.e., the direction of a vector perpendicular to and pointing away from the surface outside of the element. For vertical fenestration, the two categories are north-oriented and all other. See "NORTH-ORIENTED".

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.

OVERHANG HEIGHT. The vertical measure of the distance from the bottom of a window to the bottom of the overhang.

OVERHANG LENGTH. The horizontal measure of how far a window overhang projects out from the glass surface.

PACKAGED TERMINAL AIR CONDITIONER (PTAC). A factory selected wall sleeve and separate unencased combination of heating and cooling components, assemblies, or sections. It may include heating capability by hot water, steam, or electricity and is intended for mounting through the wall to serve a single room or zone.

PACKAGED TERMINAL HEAT PUMP (PTHP). A PTAC capable of using the refrigerating system in a reverse cycle or heat pump mode to provide heat.

PERMANENTLY INSTALLED. Equipment that is fixed in place and is not portable or movable.

PLENUM CHAMBER. An air compartment or chamber of an air distribution system to which one or more ducts are connected. A mechanical closet for a central air conditioning unit or furnace may be considered a plenum chamber. A mechanical closet is considered a plenum chamber if, when return air enters the mechanical closet, it is confined only by the closet walls, floor and ceiling during its flow to the air handling unit inlet.

POST OR PIER CONSTRUCTION. Raised wood floor supported above grade on posts or piers with unenclosed space beneath.

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.

PRIMARY LIVING AREA. A family room or great room, or a living room if no family room or great room is present. Formal living rooms, where a family room or great room is present, dining rooms and kitchens are not considered primary living areas.

RADIANT BARRIER SYSTEM (RBS). A building construction consisting of a low emittance (normally 0.1 or less) surface (usually aluminum foil) bounded by an open air space. A RBS is used for the sole purpose of limiting heat transfer by radiation and is not specifically intended to reduce heat transfer by convection or conduction.

RATED R-VALUE OF INSULATION. The thermal resistance of the insulation alone as specified by the manufacturer in units of h·ft²·°F/Btu at a mean temperature of 75°F. Rated R-value refers to the thermal resistance of the added insulation in framing cavities or insulated sheathing only and does not include the thermal resistance of other building materials or air films. See “THERMAL RESISTANCE”.

READILY ACCESSIBLE. Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, chairs, etc. In public facilities, accessibility may be limited to certified personnel through locking covers or by placing equipment in locked rooms.

RECIRCULATING SYSTEM. A domestic or service hot water distribution system that includes a closed circulation circuit designed to maintain usage temperatures in hot water pipes near terminal devices (e.g., lavatory faucets, shower heads) in order to reduce the time required to obtain hot water when the terminal device valve is opened. The motive force for circulation is either natural (due to water density variations with temperature) or mechanical (recirculation pump).

RECOVERED ENERGY. Energy utilized which would otherwise be wasted from an energy utilization system.

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.

REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance.

REPLACEMENT. The installation of part or all of an existing mechanical or electrical system in an existing building.

RESISTANCE, ELECTRIC. The property of an electric circuit or of any object used as part of an electric circuit that determines for a given circuit the rate at which electric energy is converted into heat or radiant energy and that has a value such that the product of the resistance and the square of the current gives the rate of conversion of energy.

RETROFIT. Modification of existing equipment or systems to incorporate improved performance of operation.

ROOF AREA, GROSS. The area of the roof measured from the exterior faces of walls or from the centerline of party walls. See “ROOF”; “WALL”

ROOF ASSEMBLY. All components of the roof/ceiling envelope through which heat flows, thereby creating building heat loss or gain, where such assembly is exposed to outdoor air and encloses a conditioned space. The gross area of a roof assembly consists of the total interior surface of such assembly, including skylights exposed to the conditioned space.

ROOM AIR CONDITIONER. An encased assembly designed as a unit to be mounted in a window or through a wall, or as a console. It is designed primarily to provide direct delivery of conditioned air to an enclosed space, room, or zone. It includes a prime source of refrigeration for cooling and dehumidification and a means for circulating and cleaning air. It may also include a means for ventilating and heating.

SASH CRACK. The sum of all perimeters of all vents, windows, or doors based on overall dimensions of such parts expressed in feet.

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 joint or 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

SEASONAL ENERGY EFFICIENCY RATIO (SEER). The total cooling output of an air conditioner during its normal annual usage period for cooling (in Btu) divided by the total electric energy input during the same period (in Wh).

SERVICE WATER HEATING. Heating water for domestic or commercial purposes other than space heating and process requirements.

SOLAR HEAT GAIN COEFFICIENT (SHGC). The ratio of the total solar heat gain entering the space through the fenestration product to the incident solar radiant flux (power). Solar Heat Gain Coefficient includes the heat gain directly transmitted solar heat as well as absorbed solar radiation that is reradiated, conducted or convected into the interior of the building. Solar Heat Gain Coefficient is a more accurate measure of fenestration solar heat gain performance than Shading Coefficients, particularly for multi-pane and more complex glazing systems.

SINGLE-ZONE SYSTEM. An HVAC system serving a single HVAC zone.

SINGLE ASSEMBLY. A roof and ceiling structure that is constructed as one unit with no attic space in between.

SINGLE FAMILY RESIDENCE. Detached residential building suited for tenancy by one family unit.

SITE-INSTALLED COMPONENTS AND FEATURES. Equipment, materials, measures, practices and features which are affixed to a new manufactured home at its first set-up that are not initially installed by the manufacturer.

SKYLIGHT. See “FENESTRATION”.

SKYLIGHT WELL. The shaft from the skylight to the ceiling.

SLAB-ON-GRADE FLOOR. That portion of a slab floor of the building envelope that is in contact with the ground and that is either above grade or is less than or equal to 24 in. below the final elevation of the nearest exterior grade.

SOLAR ENERGY SOURCE. Source of thermal, chemical, or electrical energy derived from direct conversion of incident solar radiation at the building site

SOLAR HEAT GAIN COEFFICIENT (SHGC). The ratio of the solar heat gain entering the space through the fenestration area 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.

(a) conditioned space: a cooled space, heated space, or indirectly conditioned space defined as follows.

(1) 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.

(2) 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 the criteria in Table 3-2.

(3) 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).

(b) 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.

(c) 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.

SPACE PERMITTING – INSULATION. Where an enclosed space exists in which insulation can be placed without the creation of space for that purpose only; e.g. dropped ceiling below a floor deck or space between joists.

STEM WALL CONSTRUCTION. A type of raised floor system consisting of a wood floor supported above grade by a continuous stem wall around its perimeter.

STORY. Portion of a building that is between one finished floor level and the next higher finished floor level or the roof, provided, however, that a basement or cellar shall not be considered a story

STRUCTURE. That which is built or constructed.

SUN SPACE. A totally enclosed, unconditioned space which is built substantially of glass, attached to the conditioned space of the building, and designed primarily for winter space heating.

SUPPLEMENTARY HEAT. Heat provided, generally electric resistance heat, to make up the difference between heat provided by the refrigeration cycle of a heat pump and that required to meet the heating load at low temperatures. Supplementary heat shall not be construed as the heat required to provide 100% backup in case of system failure.

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 RESISTANCE (R-VALUE). The reciprocal of the time rate of heat flow through a unit area induced by a unit temperature difference between two defined surfaces of material or construction under steady-state conditions. Units of R are h·ft²·°F/Btu.

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.

THERMAL MASS. Materials with mass heat capacity and surface area capable of affecting building loads by storing and releasing heat as the interior and/or exterior temperature and radiant conditions fluctuate. See “WALL HEAT CAPACITY”).

THERMAL MASS WALL INSULATION POSITION

1. Exterior Insulation Position----a wall having all or nearly all of its mass exposed to the room air with the insulation on the exterior of that mass.
2. Integral Insulation Position----a wall having mass exposed to both room and outside air with substantially equal amounts of mass on the inside and outside of the insulation layer.
3. Interior Insulation Position----a wall not meeting either of the above definitions, particularly a wall having most of its mass external to an insulation layer.

THERMOSTAT. An automatic control device used to maintain temperature at a fixed or adjustable set point.

TINTED. As applied to fenestration: bronze, green, blue, or gray coloring that is integral with the glazing material. Tinting does not include surface applied films such as reflective coatings, applied either in the field or during the manufacturing process.

TOWNHOUSE. A single-family dwelling unit constructed in a series or group of attached units with property lines separating such units. For the purpose of this Code, townhouses shall be considered multiple-family dwellings.

TRANSFER GRILLE. A louvered or perforated covering for an opening in an air passage through a wall or door allowing transport of return air from a separated conditioned space of a building to the space containing the air distribution system's primary return.

U-FACTOR (THERMAL TRANSMITTANCE). Heat transmission in unit time through unit area of a material or construction and the boundary air films, induced by unit temperature difference between the environments on each side. Units of U are Btu/h ft²°F.

UNCONDITIONED SPACE. See "SPACE".

UNDER ATTIC. Location of ceiling area in residential occupancies where the roof assembly and ceiling assembly are separated by a continuous ventilated unconditioned space spanning the ceiling area. Scissors truss structures are considered under attic where a ventilated air space is provided.

UNITARY HEAT PUMP. One or more factory-made assemblies that normally include an indoor conditioning coil, compressor(s), and an outdoor refrigerant-to-air coil or refrigerant-to-water heat exchanger. These units provide both heating and cooling functions. -

VENT DAMPER. A device intended for installation in the venting system of an individual, automatically operated, fossil fuel-fired appliance in the outlet or downstream of the appliance draft control device, which is designed to automatically open the venting system when the appliance is in operation and to automatically close off the venting system when the appliance is in a standby or shutdown condition.

VENTILATION. The process of supplying or removing air by natural or mechanical means to or from any space. Such air is not required to have been conditioned

WALL. That portion of the building envelope, including opaque area and fenestration, that is vertical or tilted at an angle of 60° 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:

- (a) above-grade wall: a wall that is not a below-grade wall.
- (b) 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.
- (c) 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.
- (d) 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).
- (e) 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).
- (f) wood-framed and other walls: all other wall types, including wood stud walls.

WALL AREA, GROSS. The area of the wall measured on the exterior face from the top of the floor to the bottom of the roof.

WATER HEATER. Vessel in which water is heated and is withdrawn for use external to the system.

WATT. The electrical unit of power or rate of doing work. One watt = 0.00134 h.p.

WHOLE HOUSE FAN. A mechanical ventilation system usually installed in the ceiling of a residence which is used to exhaust air from the interior of a building to an attic space with sufficient venting area to transfer the air to the outside.

WING WALLS. An architectural projection which is designed to create positive pressure over one window and negative over another that redirects natural winds in through windows or doors.

WORST CASE. A unit of a residential structure with the same general layout and percent glass which generates the highest As-Built points in a Method A, Subchapter 6 calculation procedure. The worst case unit will have the largest amount of glass facing east and west (primary orientation) and south (secondary orientation).

ZONE. A space or group of spaces within a building with any combination of heating, cooling, or lighting requirements sufficiently similar so that desired conditions can be maintained throughout by a single controlling device.

CHAPTER 2

General Information

Before a building permit may be issued for any non-exempt building, the builder must submit certification of code compliance to the local building official. Forms specified in the code must be used. The owner of the new building, or his designated agent, is responsible for providing the appropriate completed and signed forms to the building official.

EXEMPT BUILDINGS

All residential buildings including new construction, additions and renovations to existing buildings are covered by the code with the following exceptions:

1. Existing buildings except those considered renovated buildings, changes of occupancy type, or previously unconditioned buildings to which comfort conditioning is added.
2. Any building or portion thereof whose peak design rate of energy usage for all purposes is less than 1 watt (3.4 British thermal units per hour) per square foot of floor area for all purposes.
3. Any building which is neither heated nor cooled by a mechanical system designed to control or modify the indoor temperature and powered by electricity or fossil fuels. Such buildings shall not contain electrical, plumbing or mechanical systems which have been designed to accommodate the future installation of heating or cooling equipment.
4. Any building for which federal mandatory standards preempt state energy codes.
5. Any historical building as described in Section 267.021, *Florida Statutes*.
6. Any building of less than 1,000 square feet whose primary use is not as a principal residence and which is constructed and owned by a natural person for hunting or similar recreational purposes; however, no such person may build more than one exempt building in any 12 month period.
7. Any building where heating or cooling systems are provided which are designed for purposes other than general space comfort conditioning. Buildings included in this exemption include:
 - a). Buildings containing a system(s) designed and sold for dehumidification purposes only and controlled only by a humidistat. No thermostat shall be installed on systems thus exempted from this code.

- b) Commercial service areas where only ceiling radiant heaters or spot coolers are to be installed which will provide heat or cool only to a single work area and do not provide general heating or cooling for the space.
- c) Buildings heated with a system designed to provide sufficient heat only to prevent freezing of products or systems. Such systems shall not provide heating above 50°F.
- d) Pre-manufactured freezer or refrigerated storage buildings and areas where the temperature is set below 40°F and in which no operators work on a regular basis.
- e) Electrical equipment switching buildings which provide space conditioning for equipment only and in which no operators work on a regular basis.

METHODS OF COMPLIANCE

Code compliance for new residential buildings may be accomplished by the following methods:

Subchapter 4: Subchapter 4, Commercial Building Compliance Methods, must be used for multiple-family residential buildings over 3 stories. It may not be used for single-family detached residential buildings or multiple-family residential buildings with three or fewer stories.

Subchapter 6:

Method A, "the Whole Building Performance Method," may be used to demonstrate compliance with the energy code for new construction and additions to single-family detached dwellings, and multiple-family attached dwellings of 3 stories or less. Under this method, the annual energy use of the heating, cooling and water heating systems of the As-Built house is calculated and compared to the annual energy use for a similar home assuming Baseline features on Form 600A-04. If the As-Built points are equal to or less than the Baseline points, the building achieves a PASS status and Form 600A-04 may be submitted to obtain a building permit.

	<u>BaselineFeatures</u>	<u>Example As-Built</u>
Windows:	U-factor 0.5, SHGC 0.4 18% window/floor ratio, no OH	Double pane clear 15% wfr, 2' OH
Walls:	R-11 frame wall	R-3 CBS, some frame R-11
Ceiling:	R-30 flat	R-30 flat
Floor:	North, Central: SOG R-3.5 South: SOG R-0	SOG R-0
HVAC:	Heat pump, 10 SEER/6.8 HSPF	10.5 SEER/7.0 HSPF
Ducts:	R-6 in the attic, leaky	R-6 in attic, leaky?
Air handler:	In the garage	In the garage
Hot water:	EF .92	EF .92

As-Built/Baseline = E-Ratio (1.0 or less PASSES)

Example: 26,455 / 26,499 = E-Ratio 1.0 PASSES

Single-Family Detached Dwellings. This text describes in detail the applications of Method A. See Chapters 3 and 4 of this manual. A sample calculation for the single-family detached EXAMPLE residence in Central Florida is given in the Appendix.

Multiple-family Attached Dwellings. Subchapter 6 also may be used to certify compliance for multiple-family dwellings. The Code defines a multiple-family residence as any residential dwelling unit attached to another such unit (tenancy) by a common wall, ceiling or floor. Duplexes, townhouses, condominiums or similar units, regardless of the type of ownership, are multiple-family buildings. Using this method, individual tenancies of a building are brought into compliance with the code; a “worst case” calculation may be submitted that represents a number of different units.

If spaces such as conditioned lobbies and halls in a multiple-family building occupy more than 5 percent of the conditioned building space, use Subchapter 4 to certify compliance. If less than 5 percent of the building is composed of such areas, no energy calculation is required for those areas. Should the building contain other non-residential areas, such as offices, restaurants, or stores, those areas will need to comply by Subchapter 4. Calculations for multiple-family buildings, exclusive of duplexes and townhouses in accordance with Ch. 481.229, *Florida Statutes* and other buildings as required by Ch. 471.003, *Florida Statutes*, must bear the seal of a Florida registered architect or engineer. Calculation for multiple-family units having air-conditioning systems of ≤ 15 tons capacity may be signed by mechanical contractors licensed in accordance with Chapter 489, *Florida Statutes* or by State of Florida certified commercial building energy raters.

Method B. "The Component Prescriptive Method," is an alternative to Method A and requires few calculations. Form 600B-04 may be used to certify new single-family detached buildings, multiple-family attached buildings of three stories or less, and additions to such buildings. Several packaged lists of minimum construction requirements are given on Form 600B-04. To comply using this method, the building must meet or exceed all prescriptive requirements for one of the packages. For details see Chapter 4, "Form Completion."

Method C. "The Limited Applications Prescriptive Method," may be used to certify residential additions that have 600 square feet or less of conditioned area, renovations and new systems added to existing residential buildings, and site-added components of manufactured homes and manufactured buildings. Minimum requirements are given on Form 600C-04 for building components and equipment. For details see "Form Completion."

WORST CASE CALCULATIONS

When performing a Method A analysis for a residential building, only the "worst case" unit needs to be calculated. The units calculated under the worst case condition must all have the same configuration, square footage, building materials, windows, etc. The worst case condition is the configuration which results in potentially the most energy consuming unit resulting in the highest "as built" points. The worst case is usually the unit with:

- + The most unshaded glass facing east/west and the second most unshaded glass area facing south;
- + The greatest amount of exterior walls or ceilings, and
- + Ducts in unconditioned space.

A code compliance analysis must be performed for each type of unit within the dwelling. For example, if a building contains both two and three bedroom apartments, a worst case for each configuration must be calculated separately.

ADDITIONS TO EXISTING BUILDINGS

The code defines an addition as an extension or increase in conditioned floor area or height of a building or structure. Code compliance may be calculated using the addition alone, or the entire house including the addition. See page 70 of this manual or section 13-101.4.2 of the code. Compliance may be by either Methods A, B, or C of Subchapter 6 for buildings with three or fewer stories. Additions to residential buildings over three stories should comply by Subchapter 4.

RENOVATIONS

The code defines a renovated building as a building undergoing alterations that vary or change insulation, HVAC systems, water heating systems, or exterior envelope conditions. If the estimated cost of the renovation does not exceed 30 percent of the assessed value of the building, it is exempt from the requirements of the code. Renovations to residential buildings with three or fewer stories must comply with the prescriptive packages specified for renovations in Method C of Subchapter 6, Form 600C-04. Renovated residential buildings over three stories must comply by Subchapter 4 (typically, Form 400C-04). Only the energy-related items actually being renovated need meet the prescriptive requirements. See page 77.

BUILDING SYSTEMS

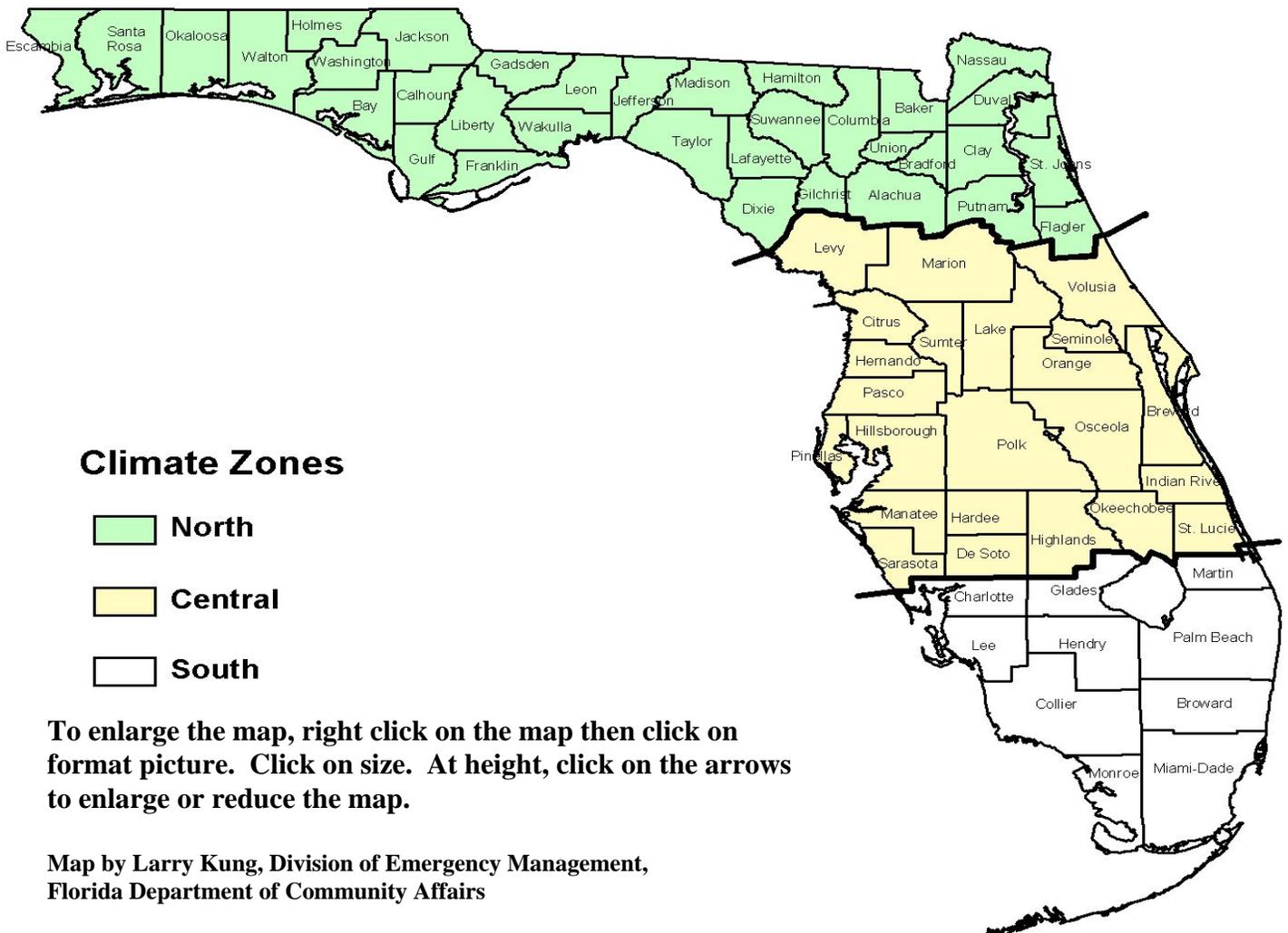
New heating, cooling and water heating systems added to existing homes must be brought into code compliance using Form 600C-04 for the new system being installed regardless of whether the building meets the definition of renovation. This does not apply to installation of, or repairs to, existing equipment, nor does it require replacement of associated systems (such as ductwork) if such systems are not replaced. In most cases, sizing calculations are not required for installation of heating and cooling equipment under this clause.

MANUFACTURED HOMES AND MANUFACTURED BUILDINGS

Prescriptive requirements specified for manufactured homes (mobile homes) and residential manufactured buildings must be met for all site-installed components and features at the time of first set-up (see page 77). Although manufactured *homes* are exempt from the code where features are installed at the factory, complete code compliance must be demonstrated for manufactured *buildings* (see Definitions, page 9).

CLIMATE ZONES

In Florida there are significant climatic differences between the northern, central, and southern portions of the state. To account for this, you will find the calculations in the code specific to the section of the state in which you are building. Make sure that the form you use is for the region of the state in which the building will be built. Climate zone and jurisdiction number information is listed by county in Appendix A to Chapter 13 of the *Florida Building Code, Building* volume.



FORMS

You may obtain the forms discussed below from the Florida Building Commission website, www.floridabuilding.org, as .pdf files or copy them from Appendix D of Chapter 13 of the *Florida Building Code*. Current editions of the forms are dated 2004 (example, Form 600A-04).

See Appendix A of Chapter 13 of the code for climate zone information. In general, counties above the Ocala area are north Florida (climate zones 1, 2, 3), counties from Ocala south to just north of Lake Okeechobee are central Florida (climate zones 4, 5, 6), and Martin County/Sarasota County south are south Florida (climate zones 7, 8, 9).

The code compliance form remains on file at the local building department. An extra copy of the front page of the form must be sent by the building official to the UF Shimberg Center, P.O. Box 115703, Gainesville, Florida 32611-5703 on a quarterly basis for reporting purposes.

FORM 600A.

Form 600A may be submitted to demonstrate code compliance for new single-family detached and multiple-family attached dwellings, or additions complying under Method A of the Whole Building Performance Method. Existing residential buildings not exempt from the code may be brought into code compliance by use of Form 600A. The forms are identical in format; however the multipliers change to reflect differences in climatic conditions. Make sure you have the correct form for the region in which you are building.

Form 600A is different for the three climate regions:

- + The north Florida form for zones 1, 2, and 3;
- + The central Florida form for zones 4, 5, and 6;
- + The south Florida form for zones 7, 8, and 9.

The printout from the FLA/RES component of the EnergyGauge computer program may be submitted in lieu of Form 600A. The FLA/RES program electronically performs the calculation described in this manual. All instructions contained herein apply to the FLA/RES computer analysis as well. Because the program automatically interpolates for a more specific multiplier, the As-Built calculation will be lower when using the program, making code compliance slightly easier. For a completed copy of the printout of FLA/RES EnergyGauge, see pages 105-112.

FORM 600B.

Form 600B may be submitted to demonstrate code compliance for new single-family detached dwellings or additions to such dwellings, and for new multiple-family dwellings or additions to multiple-family dwellings certifying compliance under Subchapter 6, Method B, the Component Prescriptive Method of the code. Make sure you have the correct form for the climate zone in which you are building.

Form 600B is different for north, central and south Florida climate regions:

- + The north Florida form for zones 1, 2, and 3;
- + The central Florida form for zones 4, 5, and 6;
- + The south Florida form for zones 7, 8, and 9.

FORM 600C.

Form 600C may be submitted to demonstrate code compliance in the following residential cases:

1. Additions of 600 square feet or less of conditioned area certifying under Method C, Subchapter 6, of the code;
2. Any renovated residential building certifying under Method C of the code.
3. Site-installed components of manufactured homes (mobile homes) and manufactured buildings.
4. New heating, cooling or water heating systems installed in existing buildings.

Form 600C is different for three climate regions. Make sure you have the correct form for the region in which you are building:

- + The north Florida form for zones 1, 2, and 3;
- + The central Florida form for zones 4, 5, and 6;
- + The south Florida form for zones 7, 8, and 9.

Form 600D-04.

Waste heat recovery hot water heating system. The supplier of the equipment provides this form to show that the equipment meets the minimum standards of the Code. If the equipment is listed in the *ARDM Directory of Certified Refrigerant Desuperheater Heat Recovery Unit Water Heater* and bears an ARDM label, Form 600D is not required. See page 54 for additional information.

INSPECTIONS

As with other building construction and work requiring a permit, all non-exempt structures are subject to inspection by the local building official. No work can be done on any part of the building or structure beyond the point indicated in each successive inspection without first obtaining the written approval of the building official. No construction shall be concealed without inspection approval. There will be an inspection for energy code compliance on all buildings before their completion.

ENERGY PERFORMANCE LEVEL (EPL) DISPLAY CARD

The builder must submit a signed Energy Performance Level Display Card to the building department with the code compliance documents. It is then checked for consistency with the code compliance form by the plans examiner and returned to the builder. Florida law requires this card to be included as an addendum to the sales contract for all new homes. It provides the consumer with information about the efficiency of the building components and equipment installed in the home.

HVAC CARD

Unless information has been previously submitted and is at the construction site, the building official shall insure that an HVAC card or FTC Energy Guide label is posted on the cabinet of the indoor air handler or furnace of each HVAC system that is installed until purchase of the home is final. The card, if used shall contain the following relevant HVAC information:

1. manufacturer's name
2. brand name
3. model numbers
4. efficiency rating numbers
5. name and address of installer
6. dated signature of HVAC installing contractor
7. dated signature of Building Official (or representative).

INSULATION CERTIFICATION CARD

Where the R-value of insulation is not labeled on the product, such as blown insulation, the code requires that an Insulation Certification Card with some basic information about the type of insulation, its thickness, manufacturer, installer, etc. be posted where it can be easily found. A number of agencies (e.g. HUD) already require such cards so insulation contractors should readily post this information. There are also insulation installation standards in the code (see section 1.2 of Appendix C of Chapter 13) to insure the insulation is installed properly so as to achieve its rated R-value.

FENESTRATION ENERGY RATING LABELS

The code requires that U-factors and solar heat gain coefficients (SHGC) of windows be verifiable. If the features claimed on the code calculation form are not readily apparent, a fenestration energy rating label is required. If a building has a lot of glass and is having difficulty passing code, more efficient glass types may be claimed to lower the home's points to achieve a PASS status. If solar heat gain coefficients $\leq .7$ are claimed when determining code compliance, the windows installed must have a Fenestration Energy Rating Label on them indicating they have been tested and rated in accordance with National Fenestration Rating Council (NFRC) procedures and the rating achieved. If the windows are not labeled, the calculation requires that a default value be utilized for that generic type of glass (single pane clear, single pane tinted, double pane clear, double pane tinted).

OTHER CONSTRUCTION OPTIONS

Subchapter 6 addresses the most commonly used construction methods and materials. Multipliers for some less commonly installed efficiency levels or technologies are contained in Appendix C of the code and are included in the FLA/RES computer program. If you wish to use a building construction option which is not apparent on the forms, contact either your local building department for a code interpretation, or call the Florida Department of Community Affairs: (850) 487-1824.

AMENDED COMPLIANCE FORMS

If, during the building construction, alterations are made in the design, materials, or equipment, which diminish the energy performance of the building, you must submit an amended copy of the compliance form to the local building department. The amended form must be submitted on or before the final inspection. The permitting process will go more quickly and smoothly if forms are completed correctly and in detail.