

GENERAL NOTES:

- BERTHA H.V. ACCORDION SHUTTER SYSTEM WITH H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3 SHOWN ON THIS PRODUCT EVALUATION DOCUMENT (P.E.D.) HAS BEEN VERIFIED FOR COMPLIANCE IN ACCORDANCE WITH THE 2010 EDITION OF THE FLORIDA BUILDING CODE. THIS ACCORDION SHUTTER SYSTEM SHALL NOT BE INSTALLED AT HIGH VELOCITY HURRICANE ZONES.
- DESIGN WIND LOADS SHALL BE DETERMINED AS PER SECTION 1609 OF THE ABOVE MENTIONED CODE, FOR A BASIC WIND SPEED REQUIRED BY THE JURISDICTION WHERE SHUTTER WILL BE INSTALLED WITH A DIRECTIONALITY FACTOR $K_d=0.85$, USING ASCE 7-10 FOR INSTALLATIONS UNDER 2010 FBC AND SHALL NOT EXCEED THE MAXIMUM (A.S.D.) WILL DESIGN PRESSURE RATINGS INDICATED ON SHEETS 5, 6, 7, 8 & 18.
- IN ORDER TO VERIFY THE ABOVE CONDITION, ULTIMATE DESIGN WIND LOADS DETERMINED PER ASCE 7-10 SHALL BE FIRST REDUCED TO A.S.D. DESIGN WIND LOADS BY MULTIPLYING THEM BY 0.6 IN ORDER TO COMPARE THESE W/ MAX. (A.S.D.) DESIGN PRESSURE RATINGS INDICATED ON SHEETS 5, 6, 7, 8 & 18.

IN ORDER TO VERIFY THAT ANCHORS ON THIS P.E.D., AS TESTED, WERE NOT OVER STRESSED, A 33% INCREASE IN ALLOWABLE STRESS FOR WIND LOADS WAS NOT USED IN THEIR ANALYSIS. HOWEVER, A WIND LOAD DURATION FACTOR $CD=1.60$ WAS USED FOR VERIFICATION OF FASTENERS SPACING IN WOOD.

BERTHA H.V. ACCORDION SHUTTER SYSTEM WITH H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3 ADEQUACY FOR WIND AND IMPACT LOADS HAS BEEN VERIFIED IN ACCORDANCE WITH SECTION 1609.1.2 OF THE ABOVE MENTIONED CODE AS PER AMERICAN TEST LAB OF SOUTH FLORIDA REPORTS:

- H.V. BLADE #3 #0403.01-08 AS PER PROTOCOLS TAS 201, 202 & 203 AND ASTM E-330, ASTM E-1886 AND E-1996 STANDARDS (MISSILE LEVEL D, WIND ZONES 1, 2, 3 & 4), 0825.01-10 (ADDENDUM TO 0403.01-08), 1220.01-10 and 1209.01-10, AS PER PROTOCOLS TAS-201, TAS 202 & TAS-203, LARGE MISSILE.
- H.V. WINDOW BLADE #3 WORKING IN UNISON WITH H.V. WINDOW BLADE #3 #0829.01-08 AS PER PROTOCOLS TAS-201, TAS 202 & TAS-203 AND ASTM E-330, ASTM E-1886 AND E-1996 STANDARDS (MISSILE LEVEL D, WIND ZONES 1, 2, 3 & 4).
- H.V. BLADE #3 AND H.V. WINDOW BLADE #3 ARE ENGINEERED TO WORK IN UNISON WITH EACH OTHER UNDER THE GENERAL LIMITATIONS AND CONDITIONS OF USE INDICATED ON SHEET 18.

- BERTHA H.V. ACCORDION PINS (HV SCREWS), USED AT BLADES KNUCKLE SHALL BE #10 X 2 3/4", BERTHA H.V. ACCORDION PINS USED AT HV CENTERMATE SHALL BE #14 X 2 3/4", 410-HT MINIMUM SERIES STAINLESS STEEL SCREWS WITH 135.0 KSI YIELD STRENGTH AND 180 KSI TENSILE STRENGTH. PINS SHALL BE COATED WITH BERTHA HV DACROSHIELD COATING SYSTEM AS MANUFACTURED BY APPROVED COATING APPLICATORS, REGISTERED WITH AMERICAN SHUTTER SYSTEMS ASSOCIATION. PINS MUST BEAR THE HV MARKING ON THEIR HEAD.
- ALL ALUMINIUM EXTRUSIONS SHALL BE ALUMINIUM ASSOCIATION 6063-T6 ALLOY AND TEMPER, WITH $F_y = 29.8$ KSI MINIMUM (UNLESS OTHERWISE NOTED).
- ALL SCREWS TO BE STAINLESS STEEL 304 OR 316 AISI SERIES OR CORROSION RESISTANT COATED CARBON STEEL AS PER DIN 50018 AND SECTION 2411.3.3.4 OF THE FLORIDA BUILDING CODE 2007 WITH 50 KSI YIELD STRENGTH AND 90 KSI TENSILE STRENGTH.
- BOLTS TO BE ASTM A-307 GALVANIZED STEEL, OR AISI-304 SERIES STAINLESS STEEL WITH 35 KSI MINIMUM YIELD STRENGTH.
- SEE SHEETS 6 & 8 FOR ANCHORS SPECIFICATIONS ON DIFFERENT SUBSTRATES.
- THIS BERTHA H.V. ACCORDION SHUTTER SYSTEM BEARS A U.S. PATENT #6779582. COMPONENTS OF THIS APPROVAL ARE COVERED, IN WHOLE OR IN PART BY U.S. PATENT #5458179 ISSUED TO EASTERN METAL SUPPLY, INC.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE SOUNDNESS OF THE STRUCTURE WHERE SHUTTER IS TO BE ATTACHED TO INSURE PROPER ANCHORAGE. CONTRACTOR TO SEAL/CAULK ALL SHUTTER COMPONENT EDGES WHICH REMAIN, THRU FASTENING IN CONTINUOUS CONTACT WITH THE BUILDING TO PREVENT WIND/RAIN INTRUSION.
- EACH UNIT MUST BEAR PERMANENT LABEL IN A VISIBLE PLACE WITH WARNING NOTE; DURING PERIODS OF HURRICANE WARNINGS HOME OWNER, TENANT, OR OTHERS, MUST PROPERLY CLOSE ALL CENTERMATES AND ENGAGE OR LOCK ALL LOCKS.
- SHUTTER MANUFACTURER'S LABEL SHALL BE LOCATED ON A READILY VISIBLE LOCATION AT ACCORDION SHUTTER IN ACCORDANCE WITH SECTION 1715.8.3 OF FLORIDA BUILDING CODE. ONE LABEL SHALL BE PLACED FOR EVERY OPENING, LABELING TO COMPLY WITH SECTION 1715.8.2 OF THE FLORIDA BUILDING CODE.
- BERTHA H.V. ACCORDION SHUTTER SYSTEM WITH H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3 INSTALLATION SHALL COMPLY WITH SPECS INDICATED IN THIS DRAWING PLUS ANY BUILDING AND ZONING REGULATIONS PROVIDED BY THE JURISDICTION WHERE PERMIT IS APPLIED TO.
- THIS P.E.D. PREPARED BY THIS ENGINEER IS GENERIC AND DOES NOT PROVIDE INFORMATION FOR A SITE SPECIFIC PROJECT; I.E. WHERE THE SITE CONDITIONS DEVIATE FROM THE P.E.D.
- CONTRACTOR TO BE RESPONSIBLE FOR THE SELECTION, PURCHASE AND INSTALLATION INCLUDING LIFE SAFETY OF THIS PRODUCT, BASED ON THIS P.E.D., PROVIDED HE/SHE DOES NOT DEVIATE FROM THE CONDITIONS DETAILED ON THIS DOCUMENT. CONSTRUCTION SAFETY AT SITE IS THE CONTRACTOR'S RESPONSIBILITY.
- THIS P.E.D. WILL BE CONSIDERED INVALID IF ALTERED BY ANY MEANS.
- SITE SPECIFIC PROJECTS SHALL BE PREPARED BY A FLORIDA REGISTERED ENGINEER OR ARCHITECT WHICH WILL BECOME THE ENGINEER OF RECORD (E.O.R.) FOR THE PROJECT AND WHO WILL BE RESPONSIBLE FOR THE PROPER USE OF THE P.E.D. ENGINEER AS A DELEGATED ENGINEER TO THE P.E.D. ENGINEER SHALL SUBMIT TO THIS LATTER THE SITE SPECIFIC DRAWINGS FOR REVIEW.
- THIS P.E.D. SHALL BEAR THE DATE AND ORIGINAL SEAL AND SIGNATURE OF THE PROFESSIONAL ENGINEER OF RECORD THAT PREPARED IT.

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	OLD 11-073	11/28/11	
2			
3			
4			
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6			

DATE: 11/28/11
DRAWING No 11-190
SHEET 1 OF 18

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BERTHA HV™

Accordion Shutter System

H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

A.S.S.A.

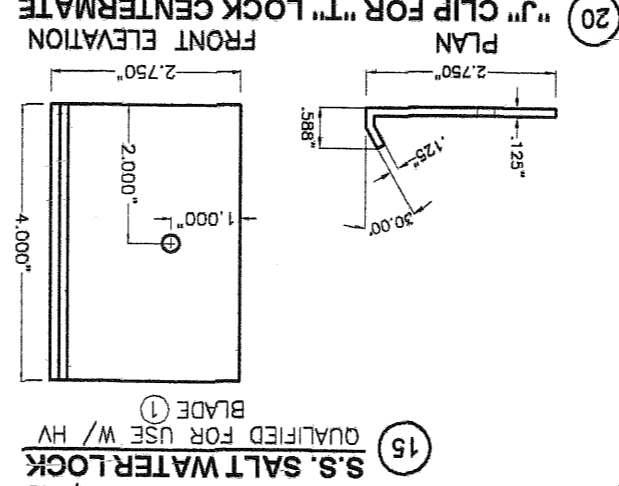
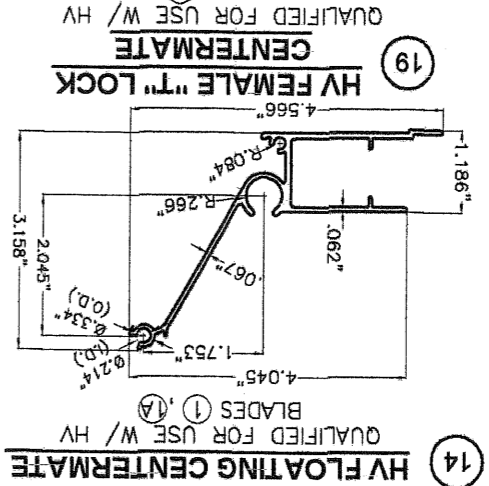
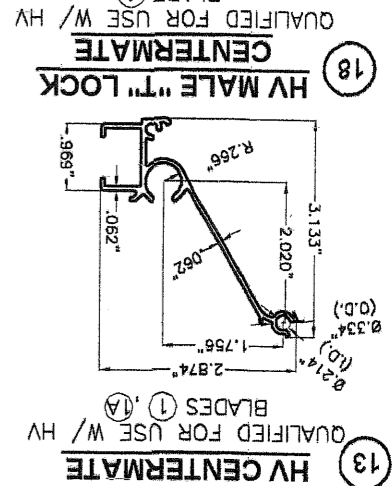
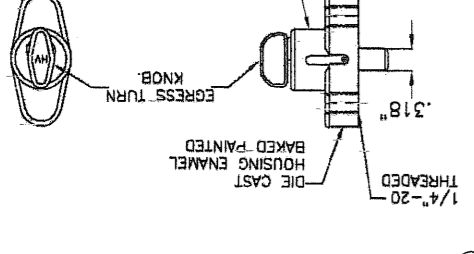
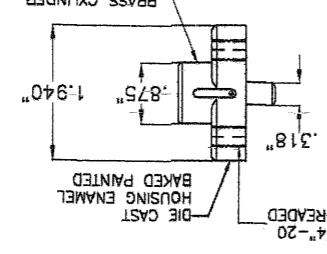
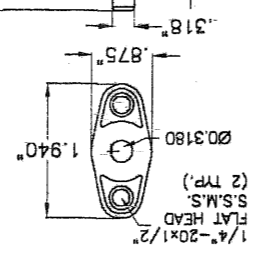
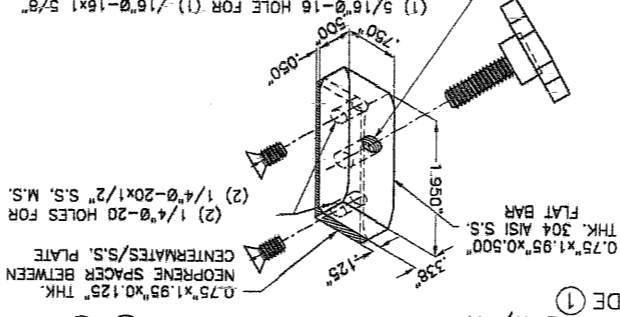
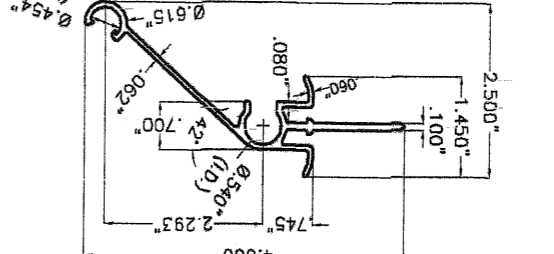
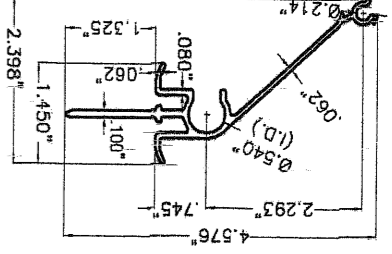
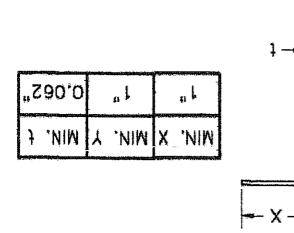
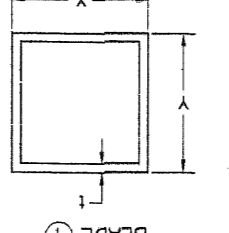
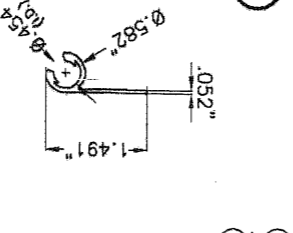
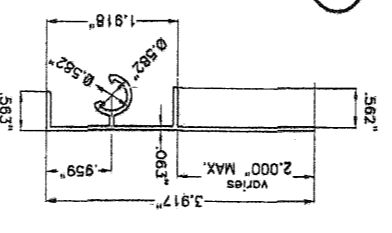
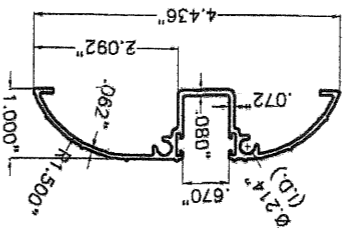
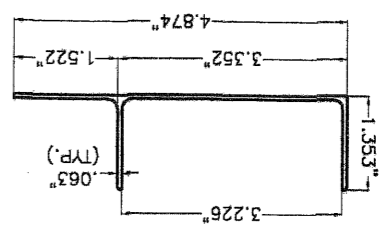
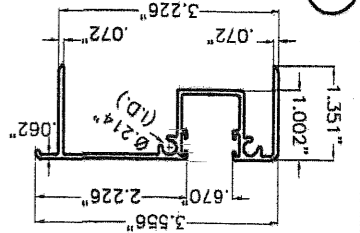
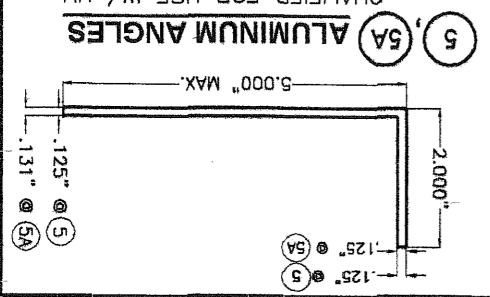
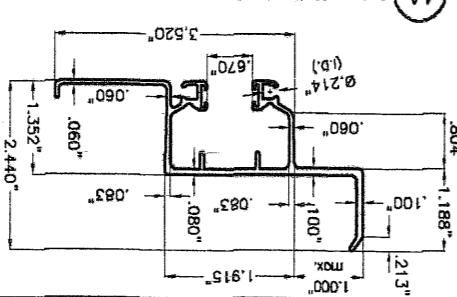
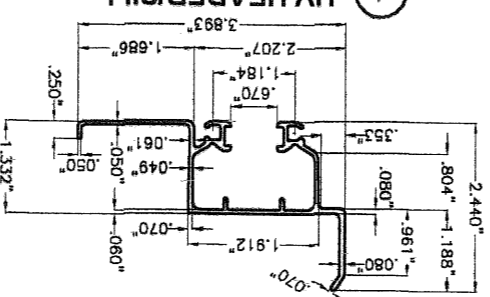
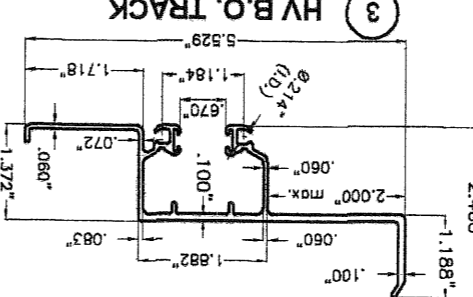
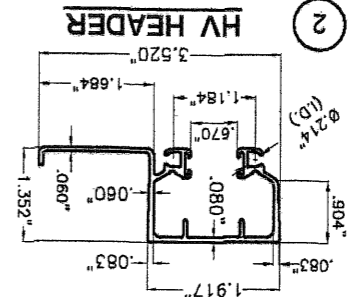
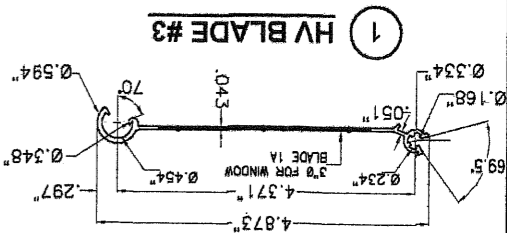
American Shutter Systems Association, Inc.

4268 Westroads Drive
West Palm Beach, FL 33407



TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 38th. St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1530 . Fax : (305)871-1531
e-mail: tillitce@tillitce.com
EB-0006719
WALTER A. TILLIT JR. P.E.
FLORIDA Lic. # 44167





COMPONENTS
 6063-T6 ALLOY AND TEMPER
 SCALE 3/8"=1"

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

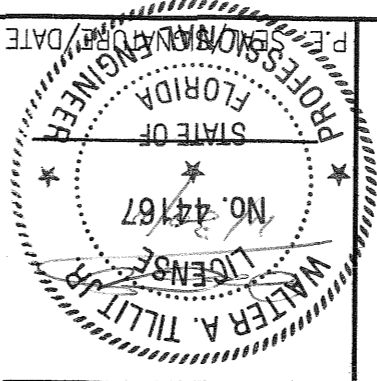
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1	OLD 11-073	11/28/11	
2			
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6			

2 OF 18 SHEET

A.S.S.A.
 American Shutter Systems
 Association, Inc.
 4268 Westroads Drive
 West Palm Beach, FL 33407

TILTECO INC.

TILLIT TESTING & ENGINEERING COMPANY
 6355 N.W. 36th St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
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 EB-0006719
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 FLORIDA Lic. # 44167



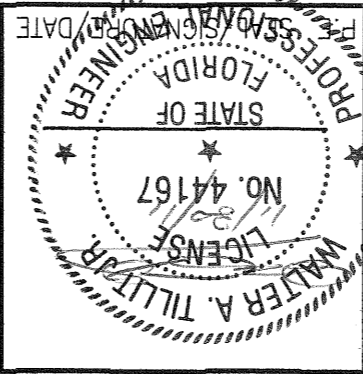
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BERTHA HV™
 Accordion Shutter System
 H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3
 DRAWN BY: R.E./A.G. DATE: 11/28/11

REV. No.		DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	11-073	H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3	11/28/11	
2				
3				
4				
5				
6				
SHEET		3 OF 18		
DRAWING No		11-190		

A.S.S.A.
American Shutter Systems
Association, Inc.
4268 Westroads Drive
West Palm Beach, FL 33407

TILECO INC.
TILIT TESTING & ENGINEERING COMPANY
6356 N.W. 36th, St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone: (305) 871-1530, Fax: (305) 871-1531
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EB-0006719
WALTER A. TILLIT JR. P.E.
FLORIDA Lic. # 44167



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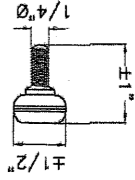
FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

COMPONENTS (CONTINUED)

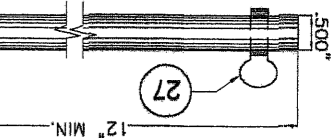
6063-T6 ALLOY AND TEMPER
SCALE 3/8"=1"

26, 26A ∇ 7/16" HOLE DRILLED AT TRACKS FOR PROPER EMBEDMENT
INSTALLATION WILL REQUIRE A

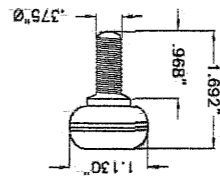
27 HV 1/4" \emptyset -20 AISI 304 SERIES S.S. THUMBSCREWS
QUALIFIED FOR USE W/ HV BLADE 1



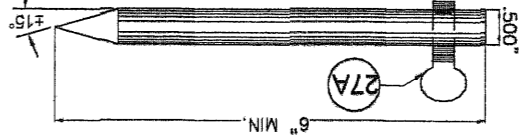
26 1/2" LOCKING ROD
QUALIFIED FOR USE W/ HV BLADE 1



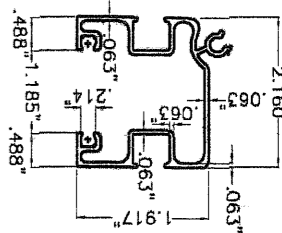
27A HV 3/8" \emptyset -16 ACETAL THUMBSCREWS
QUALIFIED FOR USE W/ HV BLADE 1



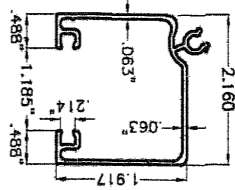
26A 6" LOCKING ROD
QUALIFIED FOR USE W/ HV BLADE 1



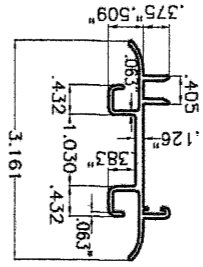
22 HD CENTERMATE W/ LOCKING ROD
QUALIFIED FOR USE W/ HV BLADE 1



23 HD CENTERMATE W/ NO LOCKING ROD
QUALIFIED FOR USE W/ HV BLADE 1

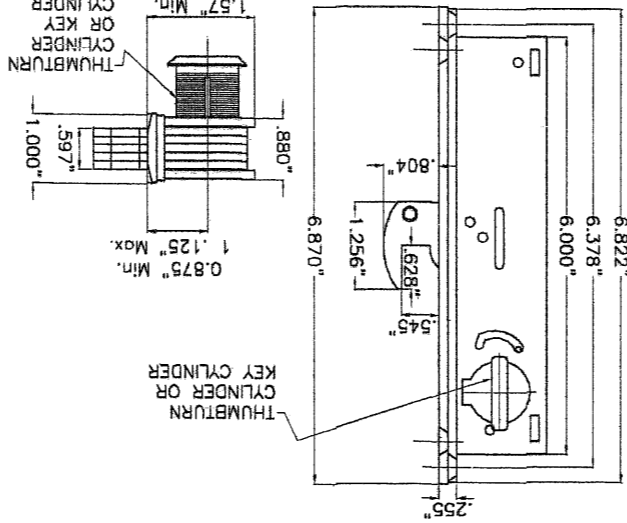


24 HD CENTERMATE INSERT
QUALIFIED FOR USE W/ HV BLADE 1



1	HV BLADE #3
1A	HV WINDOW BLADE #3
28	HV LONG RECESSED NYLON BUSHING
29	HV SHORT RECESSED NYLON BUSHING
30	HV NYLON HAT WASHER
31	HV WHEEL CARRIAGE AISI 302-303 SERIES 0.870"x3/16" THICK NYLON WHEEL 0.188" AISI 302 SERIES S.S. RIVETS
32	H.V. # 14 x 1 3/4" ACCORDION H.V. DIRECT MOUNT PIN W/ #8 HEAD *
33	H.V. # 10 x 2 3/4" ACCORDION H.V. BLADE PIN W/ #8 HEAD *
33A	H.V. # 14 x 2 3/4" ACCORDION H.V. CENTERMATE PIN W/ #8 HEAD *

25 HD LOCK
BY REGENT HARDWARE MORTISE LOCKS SERIES 2333 HOOK BOLT LOCK.
QUALIFIED FOR USE W/ HV BLADE 1



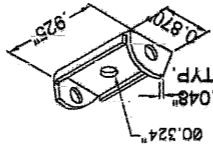
* HV PIN REQUIREMENTS FOR 1 HV BLADE #3 & 1A HV WINDOW BLADE #3.

(1) HV PIN SHALL ALWAYS BE USED AT ALL EXTERIOR AND INTERIOR TOP AND BOTTOM KNUCKLES OF HV ACCORDION SYSTEM W/ 1 HV BLADE #3 & 1A HV WINDOW BLADE #3.

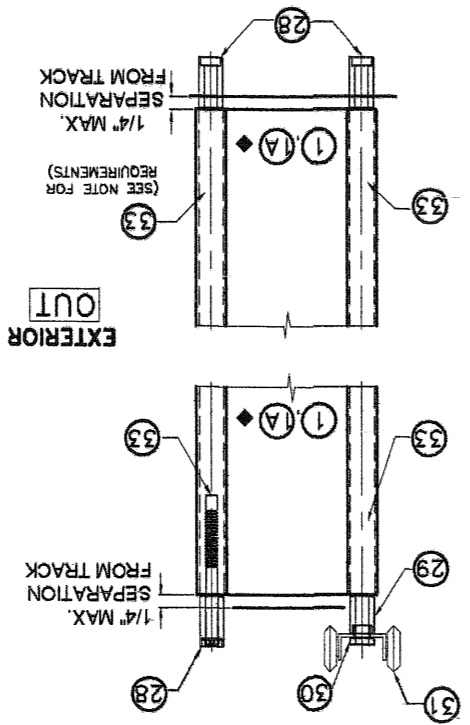
(2) HV PIN W/ 1/2" O.D. 1/16" THICK S.S. WASHER SHALL BE USED FOR DIRECT MOUNT INSTALLATION PER DETAIL X, SHEETS 13 & 16.

(3) HV PIN 33A SHALL ALWAYS BE USED AT H.V., H.V., "T" LOCK AND H.D. CENTERMATES.

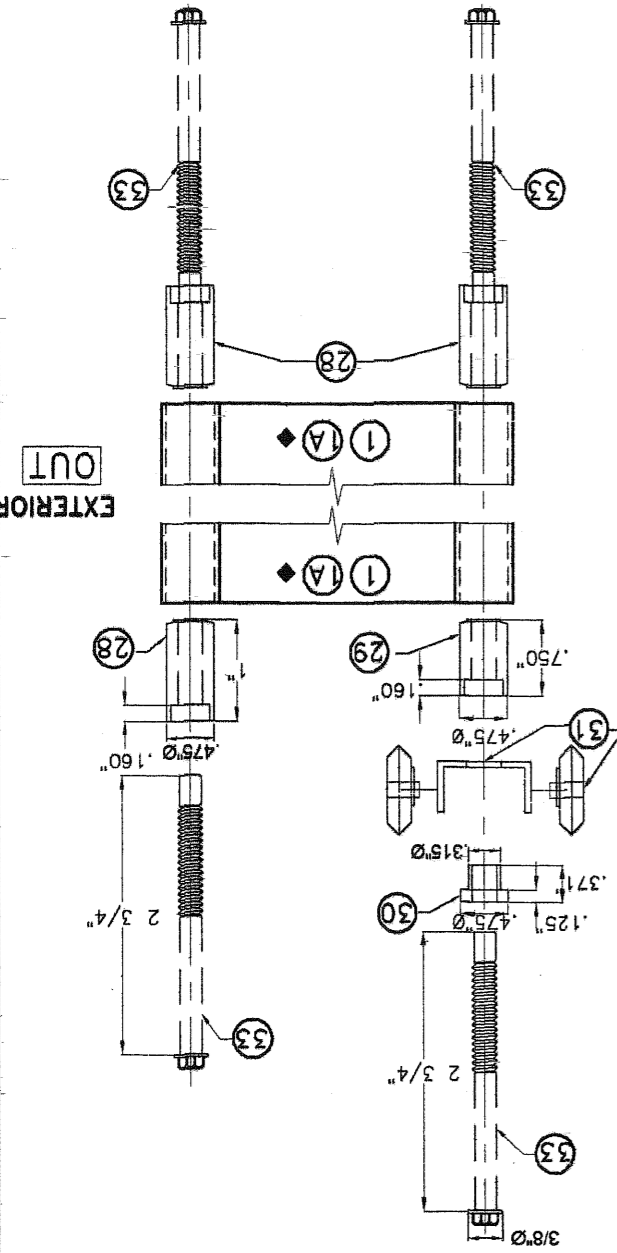
WHEEL CARRIAGE DETAIL
N.T.S.



TYPICAL SHUTTER ASSEMBLY
SCALE: 1/4" = 1"



ASSEMBLY LAYOUT
N.T.S.



SEE LIMITATIONS OF USE FOR BLADE 1A ON SHEET 18.

NOTES ON HV, HV "T" AND HD LOCKS AND CENTERMATES:
VALID ONLY FOR INSTALLATIONS W/ HV ① BLADE

*** APPLICATION W/ HV LOCKS AND CENTERMATES:**
1. MANDATORY CONDITION #1: ONE HV LOCK ⑮ OR ⑰ OR ⑱ SHALL BE USED AT 1/2 OF SHUTTER SPAN FOR ANY SPAN OR BELOW 12" ABOVE OR BELOW 1/2 OF SHUTTER SPAN UP TO 156", AND FOR INSTALLATIONS AT ANY ELEVATION EXCEPT FOR INSTALLATIONS INTO METAL STUDS. HV LOCK ⑮ OR ⑰ OR ⑱ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK, ATTACHED TO ⑬ OR ⑭ CENTERMATES W/ (2) 1/4"-20 x 1/2" LONG FLAT HEAD S.S. M.S. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION. USE OF LOCKING RODS ⑳ W/ ⑲ AND ⑳ IS COMPLETELY OPTIONAL.

2. MANDATORY CONDITION #2 FOR INSTALLATIONS INTO METAL STUDS: ONE HV LOCK ⑮ OR ⑰ OR ⑱ SHALL BE USED AT 1/2 OF SHUTTER SPAN FOR ANY SPAN OR BELOW 12" ABOVE OR BELOW 1/2 OF SHUTTER SPAN UP TO 156", AND FOR INSTALLATIONS INTO METAL STUD. HV LOCK ⑮ OR ⑰ OR ⑱ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK, ATTACHED TO ⑬ OR ⑭ CENTERMATES W/ (2) 1/4"-20 x 1/2" LONG FLAT HEAD S.S. M.S. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION. USE OF LOCKING RODS ⑳ W/ ⑲ OR ⑳ IS COMPLETELY MANDATORY.

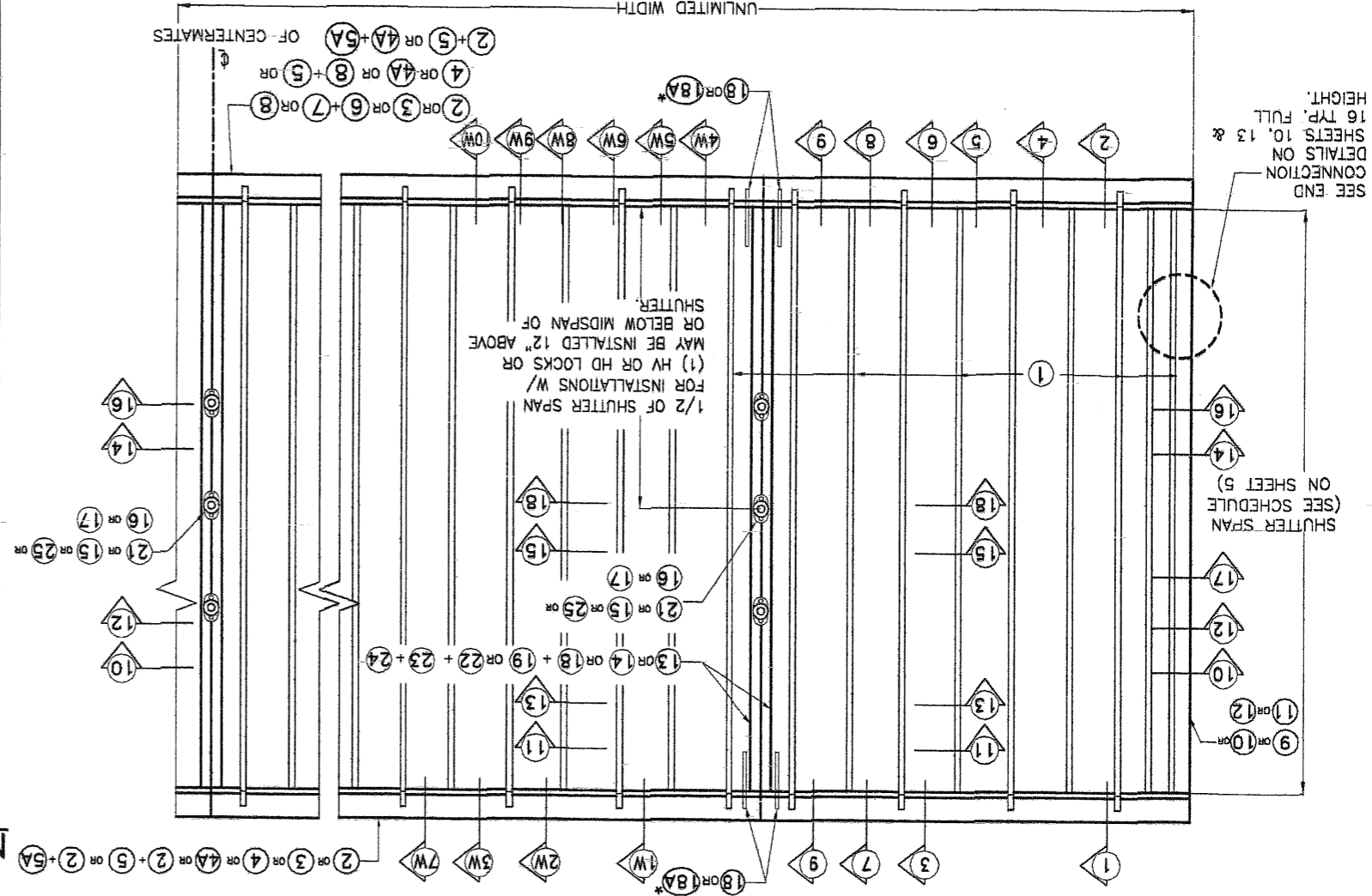
3. MANDATORY CONDITION #3 FOR KEYSTONE MOUNTING INSTALLATIONS: ONE HV LOCK ⑮ OR ⑰ OR ⑱ SHALL BE USED AT 1/2 OF SHUTTER SPAN FOR ANY SPAN OR 12" ABOVE OR BELOW 1/2 OF SHUTTER SPAN FOR SPANS UP TO 96", AND FOR INSTALLATIONS AT ANY ELEVATION. HV LOCK ⑮ OR ⑰ OR ⑱ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK, ATTACHED TO ⑬ OR ⑭ SYMMETRICAL CENTERMATES W/ (2) 1/4"-20 x 1/2" LONG FLAT HEAD S.S. M.S. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION. USE OF LOCKING RODS 26A W/ 27 OR 27A TOP AND BOTTOM IS COMPLETELY MANDATORY.

4. OPTIONAL CONDITION #1: IF DESIRED, FOR BETTER PERFORMANCE OR FOR SECURITY PURPOSES, UP TO TWO HV LOCKS ⑮, ⑰ OR ⑱ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. CONNECTION OF LOCKS TO CENTERMATES ⑬ OR ⑭ SHALL BE AS INDICATED ON NOTE (1) ABOVE.

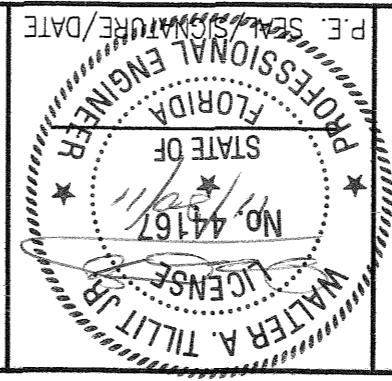
LOCATION OF LOCKS SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION.

*** APPLICATION W/ HV "T" LOCKS AND CENTERMATES:**
1. SECOND ALTERNATE TO MANDATORY CONDITION #1 VALID ONLY FOR HV "T" LOCK ⑲, AND CENTERMATES ⑮ AND ⑰:
 ONE ALTERNATE HV "T" LOCK ⑲ MAY BE INSTALLED IN LIEU OF OTHER LOCKS FOR ANY SPAN AND INSTALLATION AT ANY ELEVATION. ALTERNATE LOCK ⑲ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. ATTACHMENT OF LOCK ⑲ INCLUDES USING "J" CLIP ⑳, AS SHOWN ON SECTION 15, SHEET 12, WHICH MUST BE CONNECTED TO CENTERMATES ⑮ AND ⑰ W/ 1/4" Ø-20x1" S.S.M.S. INTO A 1/4" Ø x 5/8" RIVNUT. LOCK MAY BE INSTALLED AT MIDSPAN OR 12" MAXIMUM ABOVE AND BELOW MIDSPAN. USE OF TWO LOCKING RODS ⑳ OR ⑳ TOP AND BOTTOM IS MANDATORY.

*** APPLICATION W/ HD LOCKS & CENTERMATES:**
1. THIRD ALTERNATE TO MANDATORY CONDITION #1 VALID FOR HD LOCK ㉔ W/ (2) HD CENTERMATES ㉒ OR ㉓ OR (㉔ + ㉕) W/ ㉖:
 ONE ALTERNATE HD LOCK ㉔ MAY BE USED IN LIEU OF OTHER LOCKS FOR ANY SPAN AND INSTALLATIONS AT ANY ELEVATION. ALTERNATE HD LOCK ㉔ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. ATTACHMENT OF HD LOCK ㉔ IS W/ (3) #8 x 3/8" F.H. S.S.M.S., AND INCLUDES REINFORCEMENT INSERT ㉗ AS SHOWN ON SECTION 18, SHEET 12. LOCK MAY BE INSTALLED AT MIDSPAN OR 12" MAXIMUM BELOW OR ABOVE MIDSPAN. USE OF LOCKING RODS ㉘ OR ㉘ IS COMPLETELY OPTIONAL.



TYPICAL ① H.V. BLADE #3 SHUTTER ELEVATION
 N.T.S.
 SEE LIMITATIONS OF USE FOR BLADE ① ON SHEET 18.



TILTECO INC.

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 FLORIDA Lic. # 44167

A.S.S.A.
 Association, Inc.
 4268 Westroads Drive
 West Palm Beach, FL 33407

REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	OLD 11-073	11/28/11	
2			
3			
4			
5			
6			

DATE: 11/28/11
 DRAWING No. 11-190
 SHEET 4 OF 18

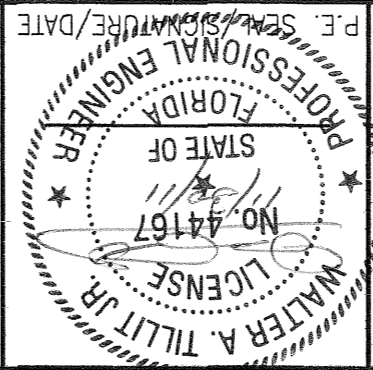
FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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BERTHA HV™
 Accordion Shutter System
 H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

REV. No		DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	11-073	OLD 11-073	11/28/11	
2				
3				
4				
5				
6				
DRAWING No		11-190		
SHEET		5 OF 18		

A.S.S.A.
American Shutter Systems
Association, Inc.
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✦ EXCEPT THAT MAXIMUM SHUTTER SPAN "L+" OR "L-" AND MAXIMUM A.S.D. DESIGN PRESSURE RATING FOR INSTALLATIONS INTO WOOD SHALL BE LIMITED AS FOLLOWS:
 1 - CONNECTIONS TO PLYWOOD LIMITED TO ±62 p.s.f. AND 9'-6" SPAN, SEE SECTION 5W ON SHEET 14.
 2 - CONNECTIONS TO HOLLOW CEILING LIMITED TO ±62 p.s.f. AND 8'-6" SPAN, SEE SECTION 2W ON SHEET 14.

† EXCEPT THAT MAXIMUM SHUTTER SPAN "L+" OR "L-" AND MAXIMUM A.S.D. DESIGN PRESSURE RATING FOR INSTALLATIONS INTO CONCRETE OR CONCRETE BLOCK SHALL BE LIMITED AS FOLLOWS:
 1 - CONNECTIONS TO KEYSTONE MOUNTING LIMITED TO ±64,-72 p.s.f. AND 8'-0" SPAN, SEE SECTION 9 ON SHEET 10.

INSTALLATION LEGEND APPLICABLE FOR (1) HV AND (A) HV BLADES	WOOD	MOUNTINGS	CONCRETE & MASONRY	METAL STUD	WALL	FLOOR/CEILING
					1, 2, 3, 4, 5 & 9	6, 7 & 8
					1W, 3W, 4W, 7W, 9W & 10W	2W, 3W, 6W & 8W

SEE LIMITATIONS OF USE FOR BLADE (A) ON SHEET 18.

MAXIMUM	A.S.D.	DESIGN PRESSURE	WALL MOUNTING		FLOOR/CEILING MOUNTING		MIN. SEPARATION TO GLASS		
			WIND ZONES	RATING (psf) (+ or -)	WIND ZONES	RATING (psf) (+ or -)	WIND ZONES	LOCK/CENTERMATE	
62	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	4.3/8"	4/4"

POURED CONCRETE, CONCRETE BLOCK AND WOOD INSTALLATIONS

MAXIMUM SHUTTER SPAN "L+" OR "L-"* (ft.) FOR INSTALLATIONS W/ (1) & (A) HV BLADES. Δ

MAXIMUM	A.S.D.	DESIGN PRESSURE	WALL MOUNTING		FLOOR/CEILING MOUNTING		MIN. SEPARATION TO GLASS		
			WIND ZONES	RATING (psf) (+ or -)	WIND ZONES	RATING (psf) (+ or -)	WIND ZONES	LOCK/CENTERMATE	
40	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	3/16"	5/12"
45	12'-8"	12'-8"	12'-8"	12'-8"	12'-8"	12'-8"	12'-8"	3/16"	5/12"
50	12'-3"	12'-3"	12'-3"	12'-3"	12'-3"	12'-3"	12'-3"	3/16"	5/12"
55	12'-1"	12'-1"	12'-1"	12'-1"	12'-1"	12'-1"	12'-1"	3/16"	5/12"
60	11'-2"	11'-2"	11'-2"	11'-2"	11'-2"	11'-2"	11'-2"	3/16"	5/12"
65	9'-3"	9'-3"	9'-3"	9'-3"	9'-3"	9'-3"	9'-3"	3/16"	5/12"
70	8'-10"	8'-10"	8'-10"	8'-10"	8'-10"	8'-10"	8'-10"	3/16"	5/12"
75	8'-3"	8'-3"	8'-3"	8'-3"	8'-3"	8'-3"	8'-3"	3/16"	5/12"
80	7'-9"	7'-9"	7'-9"	7'-9"	7'-9"	7'-9"	7'-9"	3/16"	5/12"
85	7'-3"	7'-3"	7'-3"	7'-3"	7'-3"	7'-3"	7'-3"	3/16"	5/12"
90	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	3/16"	5/12"
95	5'-11"	5'-11"	5'-11"	5'-11"	5'-11"	5'-11"	5'-11"	3/16"	5/12"
100	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	5'-9"	3/16"	5/12"
105	5'-7"	5'-7"	5'-7"	5'-7"	5'-7"	5'-7"	5'-7"	3/16"	5/12"
110	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	3/16"	5/12"

SEE SECTION (10) ON SHEET 10A.

MAXIMUM	A.S.D.	DESIGN PRESSURE	WALL MOUNTING		FLOOR/CEILING MOUNTING		MIN. SEPARATION TO GLASS		
			WIND ZONES	RATING (psf) (+ or -)	WIND ZONES	RATING (psf) (+ or -)	WIND ZONES	LOCK/CENTERMATE	
72	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	3/16"	5/12"

FOR METAL STUD INSTALLATIONS

MAXIMUM SHUTTER SPAN "L+" OR "L-"* (ft.) FOR INSTALLATIONS W/ (1) HV BLADE. Δ

*** NOTES:**

(1) L+: MAXIMUM ALLOWABLE SPAN FOR A GIVEN POSITIVE A.S.D. DESIGN PRESSURE RATING.
 L-: MAXIMUM ALLOWABLE SPAN FOR A GIVEN NEGATIVE A.S.D. DESIGN PRESSURE RATING.
 FROM SCHEDULES.
 GIVEN A POSITIVE A.S.D. DESIGN PRESSURE RATING, DETERMINE MAXIMUM SPAN "L+" FROM SCHEDULES.
 GIVEN A NEGATIVE A.S.D. DESIGN PRESSURE RATING, DETERMINE MAXIMUM SPAN "L-" FROM SCHEDULES.
 FINAL MAXIMUM ALLOWABLE SPAN IS EQUAL TO THE MINIMUM DETERMINED SPAN BETWEEN "L+" AND "L-".

(2) PROCEDURE TO DETERMINE MAXIMUM SPAN FOR WALL MOUNTINGS (TOP/BOTTOM) OR FLOOR/CEILING:
 RATING:
 L-: MAXIMUM ALLOWABLE SPAN FOR A GIVEN NEGATIVE A.S.D. DESIGN PRESSURE RATING.
 L+: MAXIMUM ALLOWABLE SPAN FOR A GIVEN POSITIVE A.S.D. DESIGN PRESSURE RATING.

(3) PROCEDURE TO DETERMINE MAXIMUM SPAN FOR COMBINATIONS IN BETWEEN WALL MOUNTINGS W/ FLOOR/CEILING MOUNTINGS:
 FOR A GIVEN POSITIVE A.S.D. DESIGN PRESSURE RATING:
 DETERMINE:
 L+= MAX. SPAN FOR WALL MOUNTING INSTALLATIONS.
 L2+= MAX. SPAN FOR FLOOR/CEILING MOUNTING INSTALLATIONS.
 FINAL MAXIMUM ALLOWABLE SPAN IS EQUAL TO THE MINIMUM BETWEEN "L+", "L2+", "L1-" AND "L2-".
 GO TO ANCHOR SCHEDULE ON SHEETS 6 & 7 FOR CONCRETE AND BLOCK, SHEET 8 FOR WOOD AND TO SECTION ON SHEET 10 FOR KEYSTONE MOUNTINGS AND SHEET 10A FOR METAL STUDS WITH FINAL MAXIMUM ALLOWABLE SPAN AND NEGATIVE DESIGN LOAD TO DETERMINE MAXIMUM ANCHOR SPACING.

(4) GO TO ANCHOR SCHEDULE ON SHEETS 6 & 7 FOR CONCRETE AND BLOCK, SHEET 8 FOR WOOD AND TO SECTION ON SHEET 10 FOR KEYSTONE MOUNTINGS AND SHEET 10A FOR METAL STUDS WITH FINAL MAXIMUM ALLOWABLE SPAN AND NEGATIVE DESIGN LOAD TO DETERMINE MAXIMUM ANCHOR SPACING.

(5) MINIMUM SEPARATION TO GLASS SHALL BE THE GREATEST MEASURED FROM EITHER REAR OF KNUCKLES OR REAR OF LOCKS/CENTERMATES (AS APPLICABLE) TO GLASS.

MAXIMUM ANCHOR * SPACING (in.) SCHEDULE FOR A GIVEN MAX. SHUTTER SPAN. A.S.D. DESIGN NEGATIVE PRESSURE RATING AND A CORRESPONDING MOUNTING TYPE FOR CONCRETE OR CONCRETE BLOCK INSTALLATIONS

(SEE MOUNTINGS 1, 2, 3, 4 & 5 ON SHEET 9)

MAXIMUM SPAN (ft)	POURED CONCRETE		
	① & ② WALL MOUNTINGS W/ ③, ④ OR ⑤	③ & ④ WALL MOUNTING W/ ② + ⑤	⑤ WALL SILL MOUNTING W/ ③ + ⑤
30	40 50 60 70 80 90 100 110	40 50 60 70 80 90 100 110	40 50 60 70 80 90 100 110
40	50 60 70 80 90 100 110	50 60 70 80 90 100 110	50 60 70 80 90 100 110
50	60 70 80 90 100 110	60 70 80 90 100 110	60 70 80 90 100 110
60	70 80 90 100 110	70 80 90 100 110	70 80 90 100 110
70	80 90 100 110	80 90 100 110	80 90 100 110
80	90 100 110	90 100 110	90 100 110
90	100 110	100 110	100 110
100	110	110	110

MAXIMUM SPAN (ft)	POURED CONCRETE		
	① & ② WALL MOUNTINGS W/ ③, ④ OR ⑤	③ & ④ WALL MOUNTING W/ ② + ⑤	⑤ WALL SILL MOUNTING W/ ③ + ⑤
3'-0"	9	9	9
4'-0"	9	9	9
5'-0"	9	9	9
6'-0"	9	9	9
7'-0"	9	9	9
8'-0"	9	9	9
9'-0"	9	9	9
10'-0"	9	9	9
11'-0"	9	9	9
12'-0"	9	9	9
13'-0"	9	9	9

***SPECIFICATIONS ON ANCHOR REQUIREMENTS: POURED CONCRETE OR CONCRETE BLOCK SUBSTRATES**

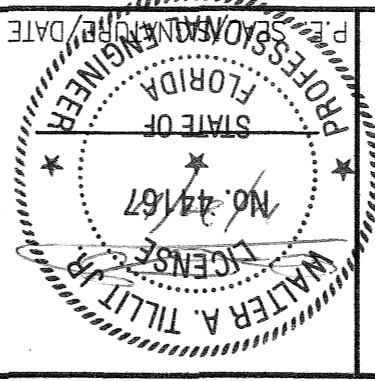
1. ANCHORS TO WALL SHALL BE AS FOLLOWS:
 (A) TO EXISTING POURED CONCRETE:
 - 1/4" TAPCON OR TAPCON W/ ADVANCED THREADFORM TECHNOLOGY, AS MANUFACTURED BY L.T.W. BUILDEX. (Min. f'c = 3 ksi).
 - 1/4" x 3/4" ALL POINTS SOLID-SET ANCHORS AS DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY. (Min. f'c = 3 ksi).
 - 1/4" BLUE TAP CONCRETE ANCHORS WITH CAP, AS MANUFACTURED BY FLORIDA FASTENERS DIRECT, INC. (Min. f'c = 2 ksi).
 - 1/4" TAPPER+ ANCHORS AS MANUFACTURED BY POWERS FASTENERS, INC. (Min. f'c = 3 ksi), AND DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY OR ANY OTHER APPROVED LICENSED OR AUTHORIZED VENDOR REGISTERED W/ THE AMERICAN SHUTTER SYSTEMS ASSOCIATION, INC.
- NOTES:
 A.1) MINIMUM EMBEDMENT INTO POURED CONCRETE OF TAPCON OR TAPCON W/ ADVANCED THREADFORM TECHNOLOGY AND TAPPER+ ANCHORS IS 3/4", AND 1 1/2" FOR BLUE TAP WITH CAP ANCHORS.
 A.2) MINIMUM EMBEDMENT OF 1/4" x 3/4" ALL POINTS SOLID-SET ANCHORS SHALL BE 7/8" INTO THE POURED CONCRETE. NO EMBEDMENT INTO STUCCO SHALL BE PERMITTED. 1/4" x 20 S.S. MACHINE SCREW USED SHALL BE 1 1/2" LONG MINIMUM SHOULD STUCCO EXIST, AND 1" MINIMUM FOR WALLS WITH NO STUCCO.
- A.3) IN CASE THAT PRECAST STONE, PRECAST CONCRETE PANELS, PAVERS OR ANY VENEER BE FOUND ON THE EXISTING WALL, ANCHORS SHALL BE LONG ENOUGH TO REACH THE MAIN STRUCTURE BEHIND SAID WALL FINISHES. ANCHORAGE SHALL BE AS INDICATED ON NOTES A.1) & A.2) ABOVE. FOR INSTALLATIONS ON VINYL SIDING WITH OR WITHOUT METAL STUDS OR ERS WITH WOOD STUDS CONSULT THIS ENGINEER. FOR INSTALLATIONS INTO EIFS WITH METAL STUDS SEE SHEET 10.
- (B) TO EXISTING ASTM C-90 CONCRETE BLOCK WALL:
 - 1/4" TAPCON OR TAPCON W/ ADVANCED THREADFORM TECHNOLOGY ANCHORS, AS MANUFACTURED BY L.T.W. BUILDEX.
 - 1/4" x 3/4" ALL POINTS SOLID-SET ANCHORS AS DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY.
 - 1/4" BLUE TAP CONCRETE ANCHORS WITH CAP, AS MANUFACTURED BY FLORIDA FASTENERS DIRECT, INC.
 - 1/4" TAPPER+ ANCHORS AS MANUFACTURED BY POWERS FASTENERS, INC., AND DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY OR ANY OTHER APPROVED LICENSED OR AUTHORIZED VENDOR REGISTERED W/ THE AMERICAN SHUTTER SYSTEMS ASSOCIATION, INC.
- NOTES:
 B.1) MINIMUM EMBEDMENT INTO CONCRETE BLOCK OF TAPCON ANCHOR IS 1 1/4" AND 1" FOR TAPCON W/ ADVANCED THREADFORM TECHNOLOGY ANCHOR, AND 1 1/4" FOR TAPPER+ AND BLUE TAP WITH CAP ANCHORS.
 B.2) MINIMUM EMBEDMENT OF 1/4" x 3/4" ALL POINTS SOLID-SET ANCHORS SHALL BE ENTIRELY EMBEDDED INTO THE CONCRETE BLOCK. NO EMBEDMENT INTO STUCCO SHALL BE PERMITTED. 1/4" x 20 S.S. MACHINE SCREW USED SHALL BE 1 1/2" LONG MINIMUM SHOULD STUCCO EXIST, AND 1" MINIMUM FOR WALLS WITH NO STUCCO.
- B.3) IN CASE THAT PRECAST STONE, PRECAST CONCRETE PANELS, PAVERS OR ANY VENEER BE FOUND ON THE EXISTING WALL OR FLOOR, ANCHORS SHALL BE LONG ENOUGH TO REACH THE MAIN STRUCTURE BEHIND SAID WALL FINISHES. ANCHORAGE SHALL BE AS INDICATED ON NOTES B.1) & B.2) ABOVE. FOR INSTALLATIONS ON VINYL SIDING WITH OR WITHOUT METAL STUDS OR ERS WITH WOOD STUDS CONSULT THIS ENGINEER. FOR INSTALLATIONS INTO EIFS WITH METAL STUDS SEE SHEET 10.
- (C) ANCHORS SHALL BE INSTALLED FOLLOWING ALL OF THE RECOMMENDATIONS AND SPECIFICATIONS OF THE ANCHOR'S MANUFACTURER.
 (D) SEE SCHEDULE BELOW FOR EDGE DISTANCE (E.D.) VERSUS SPACING RELATIONSHIP FOR ANCHORS.

EDGE DISTANCE VERSUS SPACING SCHEDULE FOR ANCHORS:

ACTUAL EDGE DISTANCE	TAPCON			TAPCON WITH ADVANCED THREADFORM TECHNOLOGY			ALL POINTS SOLID SET			BLUE TAP WITH CAP		
	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3"	
3"	1.0	0.90	1.0	1.0	0.78	1.0	1.0	0.84	1.0	0.84	1.0	
2 1/2"	-	-	1.0	-	-	1.0	-	-	-	-	-	
2"	-	-	0.81	-	-	0.67	-	-	-	-	-	
1 3/4"	-	-	0.91	-	-	0.43	-	-	-	-	-	
1 1/2"	-	-	0.35	-	-	0.35	-	-	-	-	-	

① HV BLADE #3 OR ① HV BLADE #3 W/ ① HV WINDOW BLADE WORKING IN UNISON

◆ SEE LIMITATIONS OF USE FOR BLADE ①A ON SHEET 18.



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 SHEET 6 OF 18

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

BERTHA HV
 Accordion Shutter System
 H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

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ANCHORS, SPACING, LEGEND

TAPCON OR ALL POINTS SOLID-SET
BLUE TAP WITH CAP
TAPPER +

MAXIMUM ANCHOR * SPACING (in.) SCHEDULE FOR A GIVEN MAX. SHUTTER SPAN, A.S.D. DESIGN NEGATIVE PRESSURE RATING AND A CORRESPONDING MOUNTING TYPE FOR CONCRETE OR CONCRETE BLOCK INSTALLATIONS

(SEE MOUNTINGS 1 THRU 8, SEE SHEETS 9 & 10)

CONCRETE BLOCK

MAXIMUM SPAN (ft)	① & ② WALL MOUNTINGS		③ & ④ WALL MOUNTINGS		⑤ WALL SILL MOUNTING		⑥ FLOOR MOUNTING		⑦ CEILING MOUNTING		⑧ FLOOR MOUNTING	
	W/④ OR ④A	W/④	W/② + ⑤	W/② + ⑤	W/③ + ⑤	W/③ + ⑤	W/③	W/③	W/②	W/②	W/②	W/②
30	40	50	40	50	40	50	40	50	40	50	40	50
40	50	60	50	60	50	60	50	60	50	60	50	60
50	60	70	60	70	60	70	60	70	60	70	60	70
60	70	80	70	80	70	80	70	80	70	80	70	80
70	80	90	80	90	80	90	80	90	80	90	80	90
80	90	100	90	100	90	100	90	100	90	100	90	100
90	100	110	100	110	100	110	100	110	100	110	100	110

MAXIMUM SPAN (ft)	① & ② WALL MOUNTINGS		③ & ④ WALL MOUNTINGS		⑤ WALL SILL MOUNTING		⑥ FLOOR MOUNTING		⑦ CEILING MOUNTING		⑧ FLOOR MOUNTING	
	W/④ OR ④A	W/④	W/② + ⑤	W/② + ⑤	W/③ + ⑤	W/③ + ⑤	W/③	W/③	W/②	W/②	W/②	W/②
30	40	50	40	50	40	50	40	50	40	50	40	50
40	50	60	50	60	50	60	50	60	50	60	50	60
50	60	70	60	70	60	70	60	70	60	70	60	70
60	70	80	70	80	70	80	70	80	70	80	70	80
70	80	90	80	90	80	90	80	90	80	90	80	90
80	90	100	90	100	90	100	90	100	90	100	90	100
90	100	110	100	110	100	110	100	110	100	110	100	110
100	110	120	110	120	110	120	110	120	110	120	110	120
110	120	130	120	130	120	130	120	130	120	130	120	130
120	130	140	130	140	130	140	130	140	130	140	130	140
130	140	150	140	150	140	150	140	150	140	150	140	150

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

BERTHA HV™
Accordion Shutter System
 H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

REV. No. DESCRIPTION DATE DRAWN BY: R.E./A.G.

1	OLD 11-073	11/28/11
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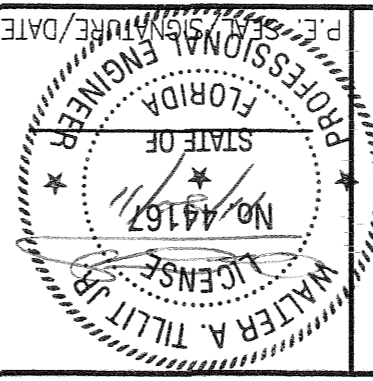
DATE: 11/28/11
 DRAWING No. 11-190
 SHEET 7 OF 18

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American Shutter Systems Association, Inc.
 4268 Westroads Drive
 West Palm Beach, FL 33407

TILECO INC.

TILLIT TESTING & ENGINEERING COMPANY
 6355 N.W. 36th St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
 Phone: (305)871-1530, Fax: (305)871-1531
 e-mail: tileco@aol.com
 EB-0006719
 WALTER A. TILLIT JR. P.E.
 FLORIDA Lic. # 44167



MAXIMUM ANCHOR SPACING (in.) SCHEDULE FOR A GIVEN MAX. SHUTTER NEGATIVE PRESSURE RATING AND A CORRESPONDING

MOUNTING TYPE (SEE MOUNTINGS ON SHEETS 14 & 15)

SUBSTRATE

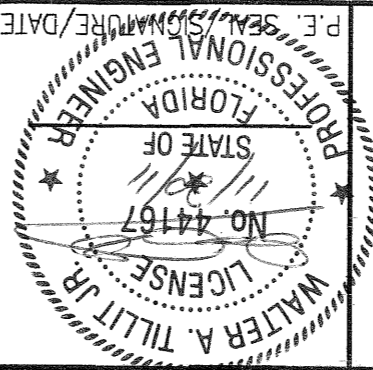
MAXIMUM SPAN (ft)	SOUTHERN PINE No. 2 W/ MIN. G=0.55,		SPRUCE PINE FIR NORTH		SPRUCE PINE FIR SOUTH		1/2" MIN. CDX PLYWOOD
	CEILING MOUNT-3W	FLOOR MOUNTINGS 6W & 8W	WALL MOUNTINGS 1W, 4W, 7W, 9W & 10W	CEILING MOUNT 3W	FLOOR MOUNTINGS 6W & 8W	WALL MOUNTINGS 1W, 4W, 7W, 9W & 10W	
30	9	9	9	9	9	9	9
40	9	9	9	9	9	9	9
50	9	9	9	9	9	9	9
60	9	9	9	9	9	9	9
70	9	9	9	9	9	9	9
80	9	9	9	9	9	9	9
90	9	9	9	9	9	9	9
100	9	9	9	9	9	9	9
110	9	9	9	9	9	9	9
120	9	9	9	9	9	9	9
130	9	9	9	9	9	9	9
140	9	9	9	9	9	9	9
150	9	9	9	9	9	9	9
160	9	9	9	9	9	9	9
170	9	9	9	9	9	9	9
180	9	9	9	9	9	9	9
190	9	9	9	9	9	9	9
200	9	9	9	9	9	9	9
210	9	9	9	9	9	9	9
220	9	9	9	9	9	9	9
230	9	9	9	9	9	9	9
240	9	9	9	9	9	9	9
250	9	9	9	9	9	9	9
260	9	9	9	9	9	9	9
270	9	9	9	9	9	9	9
280	9	9	9	9	9	9	9
290	9	9	9	9	9	9	9
300	9	9	9	9	9	9	9

NOTES ON ANCHORS REQUIREMENTS: WOOD SUBSTRATES.

- ANCHORS TO WALL, FLOOR OR SOLID WOOD SOFFIT SHALL BE AS FOLLOWS:
 - 1/4" TAPCON OR TAPCON W/ ADVANCED THREADFORM TECHNOLOGY ANCHORS, AS MANUFACTURED BY I.T.W. BUILDEX W/ MINIMUM PENETRATION OF THREADED AREA AS INDICATED AT EACH SECTION ON SHEETS 14 & 15.
 - EXCEPTION: SEE NOTE 2 BELOW.
- ANCHORS TO HOLLOW CEILING SHALL BE AS PER MOUNTING TYPE 2W, SHEET 14 AND SHALL CONSIST OF LAG SCREWS AS PER NDS 2005 SPECIFICATIONS.
- SUBSTRATE SHALL CONSIST OF THE FOLLOWING:
 - SOUTHERN PINE No. 2 W/ G=0.55 (N.D.S.)
 - DOUGLAS FIR W/ G=0.50 (N.D.S.)
 - SPRUCE PINE FIR NORTH W/ G=0.43 (N.D.S.)
 - SPRUCE PINE FIR SOUTH W/ G=0.36 (N.D.S.)
 - MIN. 1/2" CDX PLYWOOD (1986 APA)
- ANCHORS SHALL BE INSTALLED FOLLOWING ALL OF THE RECOMMENDATIONS AND SPECIFICATIONS PER NDS 2005

1 HV BLADE #3 OR 1 HV BLADE #3 W/ 1A HV WINDOW BLADE #3 WORKING IN UNISON

◆ SEE LIMITATIONS OF USE FOR BLADE (A) ON SHEET 18.



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 FLORIDA LIC. # 44167

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 4268 Westroads Drive
 West Palm Beach, FL 33407

REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	OLD 11-073	11/28/11	
2	H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3		
<p>BERTHA HV™ Accordion Shutter System Accordion Shutter System</p>			
DRAWING No. 11-190			
SHEET 8 OF 18			

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

NOTE FOR COMBINATION OF SECTIONS:
 1 - SEE SHEET 3 FOR TYPICAL SHUTTER ASSEMBLY
 2 - MOUNTING SECTIONS CAN BE COMBINED
 IN ANY WAY TO SUIT ANY INSTALLATION.

* E.D. = EDGE DISTANCE
 (SEE NOTES & SCHEDULE ON SHEET 7)

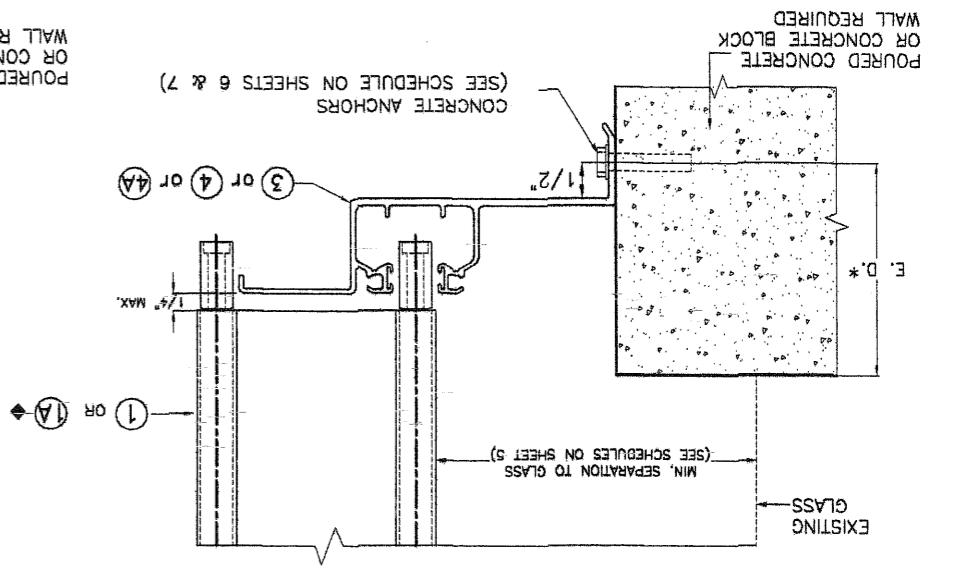
◆ SEE LIMITATIONS OF USE FOR
 BLADE (A) ON SHEET 18.

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

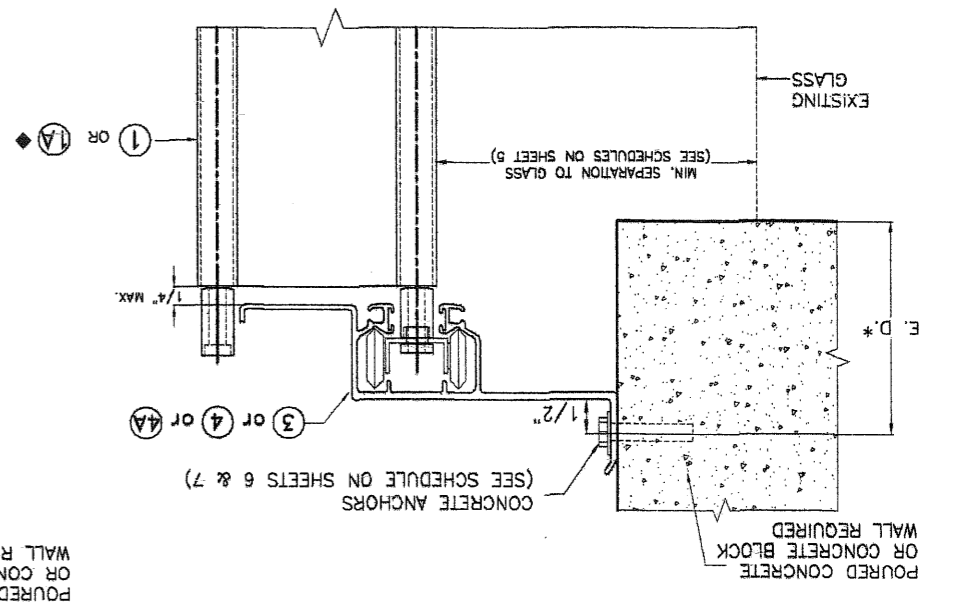
SCALE 3/8"=1"

INSTALLATION DETAILS

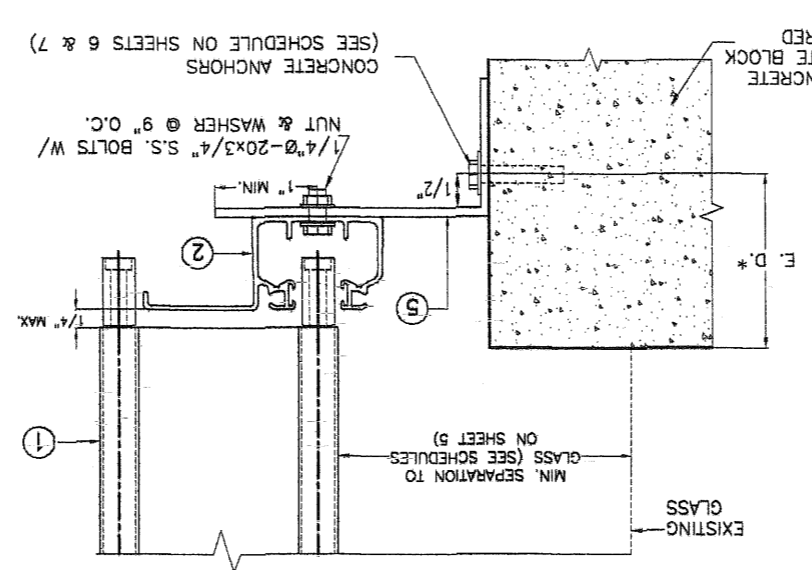
2 WALL MOUNTING INSTALLATION



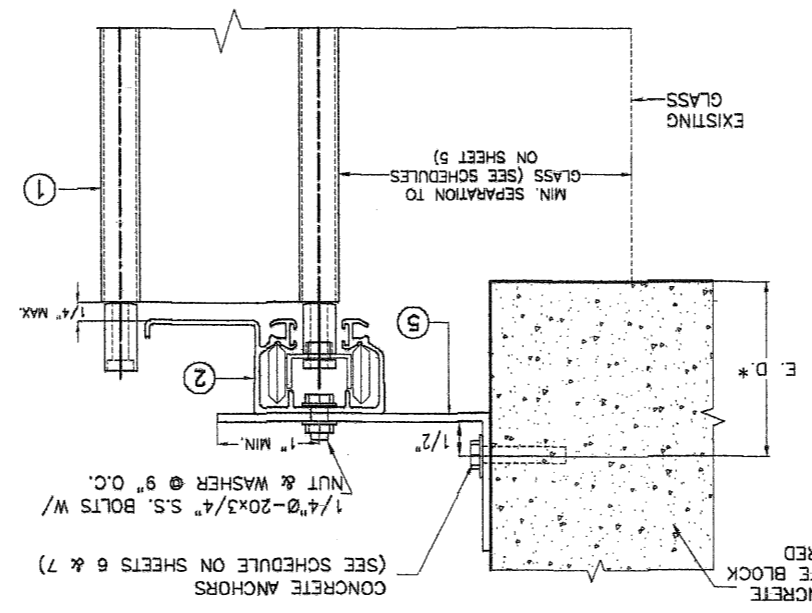
1 WALL MOUNTING INSTALLATION



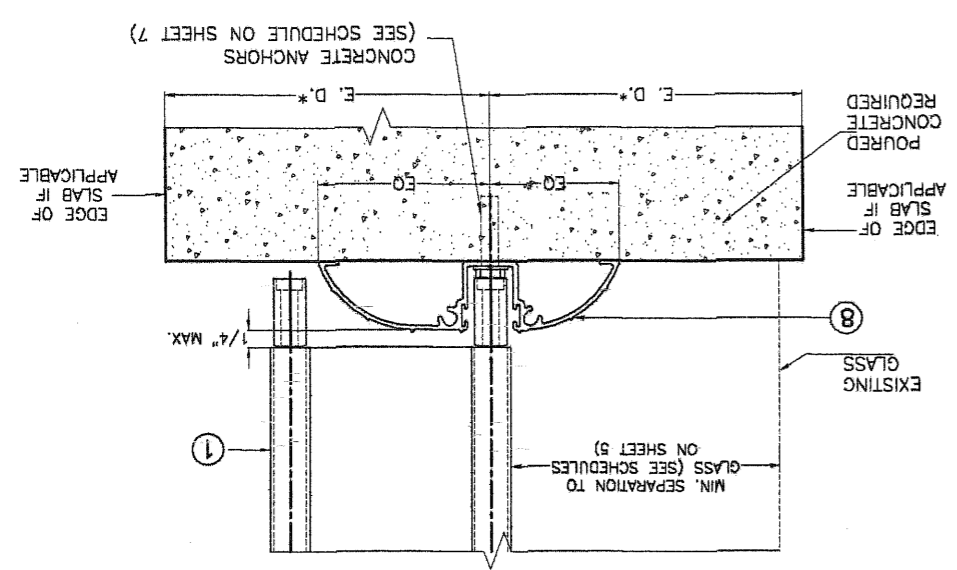
4 WALL MOUNTING INSTALLATION



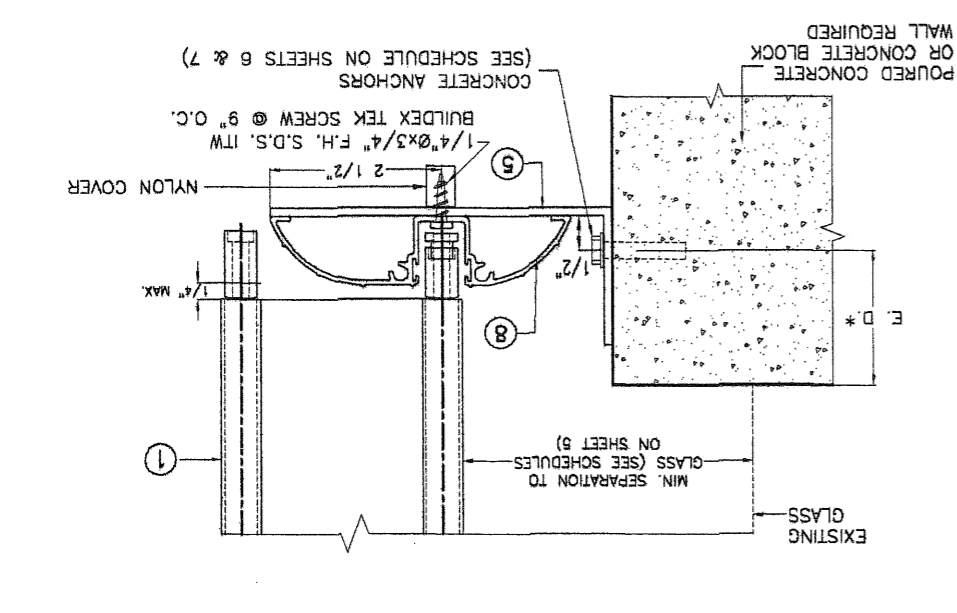
3 WALL MOUNTING INSTALLATION



6 FLOOR MOUNTING INSTALLATION



5 WALL MOUNTING INSTALLATION



REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	OLD 11-073	11/28/11	
2			
3			
4			
5			
6			

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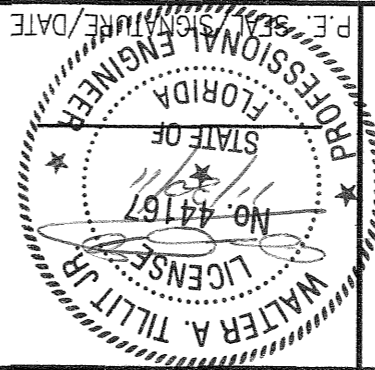
DRAWING No 11-190
 SHEET 9 OF 18

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 WALTER A. TILLIT JR. P.E.
 FLORIDA Lic. # 44167

PROFESSIONAL ENGINEER
 STATE OF FLORIDA
 No. 44167
 LICENSE
 WALTER A. TILLIT JR.
 P.E. SIGNATURE/DATE



WALTER A. TILLITT JR.
 LICENSED PROFESSIONAL ENGINEER
 STATE OF FLORIDA
 No. 44167
 P.E. SEAL/SIGNATURE/DATE



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REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
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3			
4			
5			
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DATE: 11/28/11
 DRAWING No. 11-190
 SHEET 10 OF 18

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)
 SCALE 3/8"=1"
INSTALLATION DETAILS (CONTINUED)

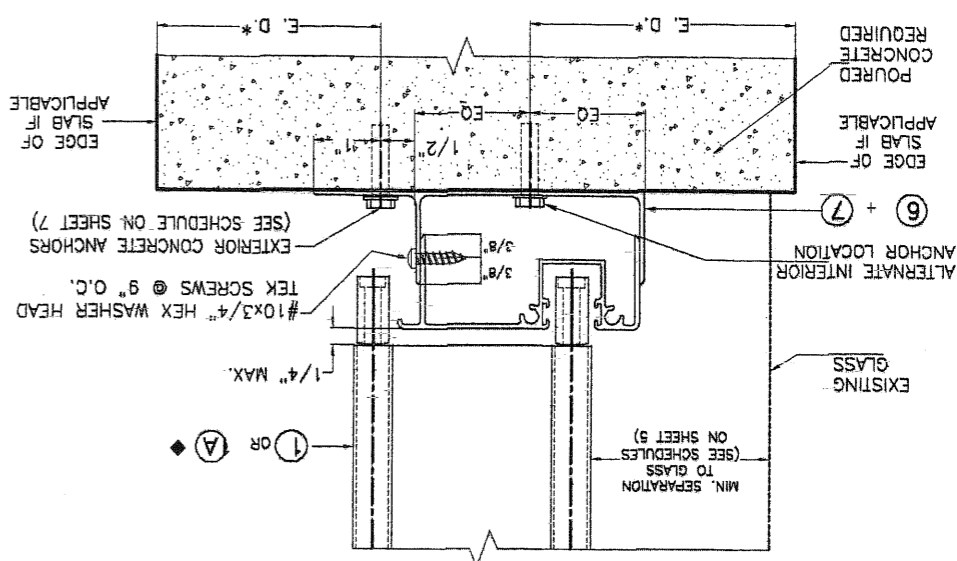
NOTE: THIS INSTALLATION SHALL BE REMOVABLE WHEN PERFORMED ADJACENT TO AN OPERABLE EXIT OR ENTRANCE

NOTE FOR COMBINATION OF SECTIONS:
 1- SEE SHEET 3 FOR TYPICAL SHUTTER ASSEMBLY
 2- MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.

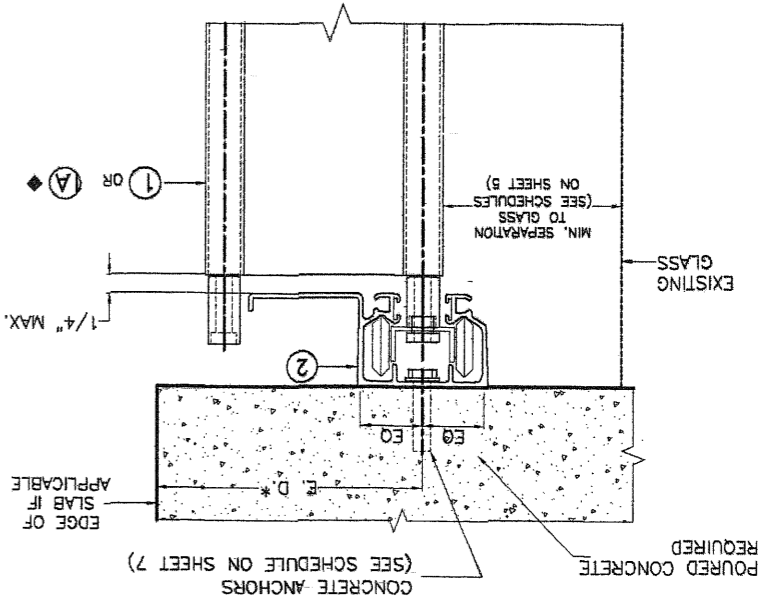
* E.D. = EDGE DISTANCE
 (SEE NOTES & SCHEDULE ON SHEET 7)

SEE LIMITATIONS OF USE FOR BLADE (A) ON SHEET 18.

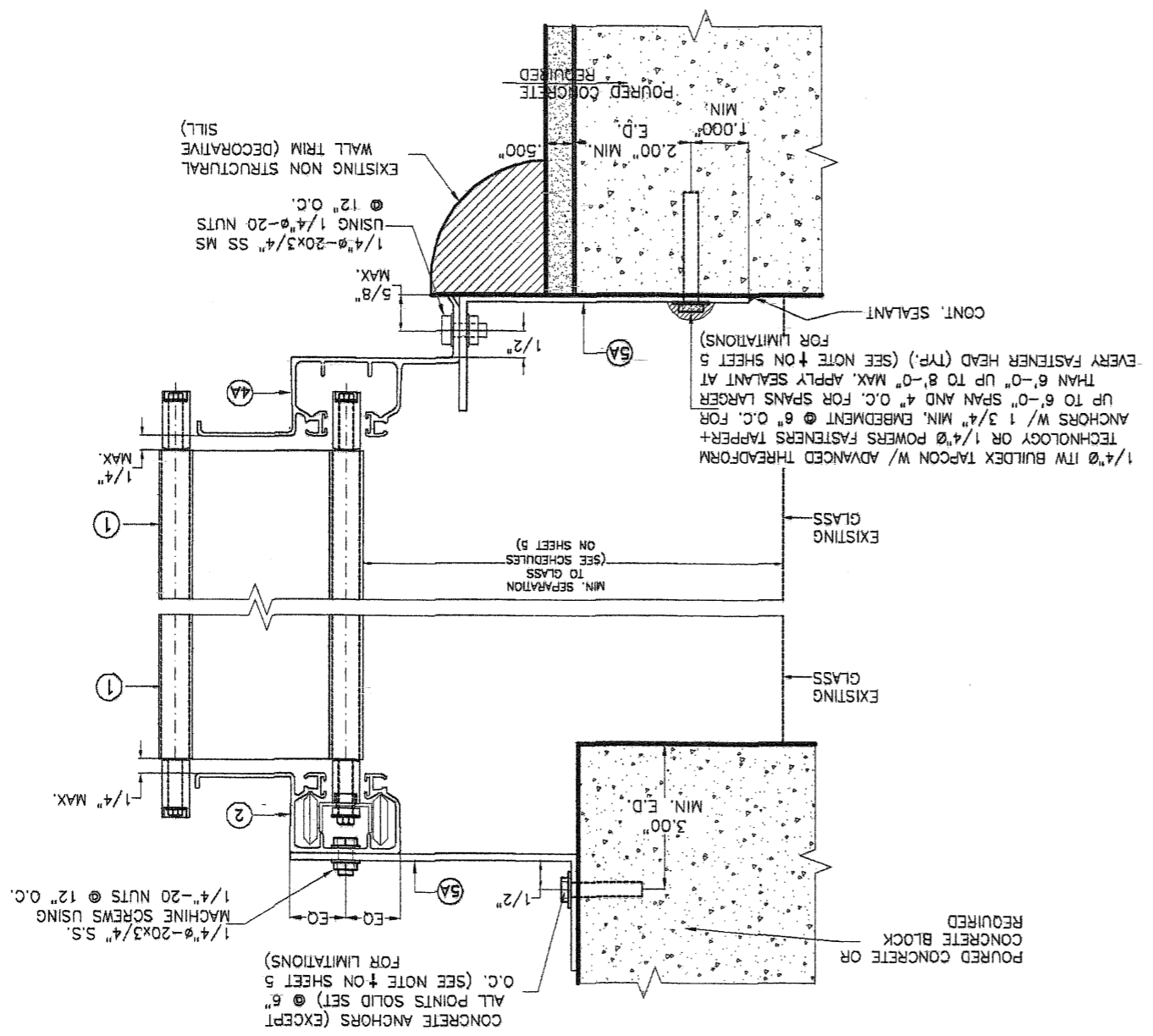
8 FLOOR MOUNTING INSTALLATION



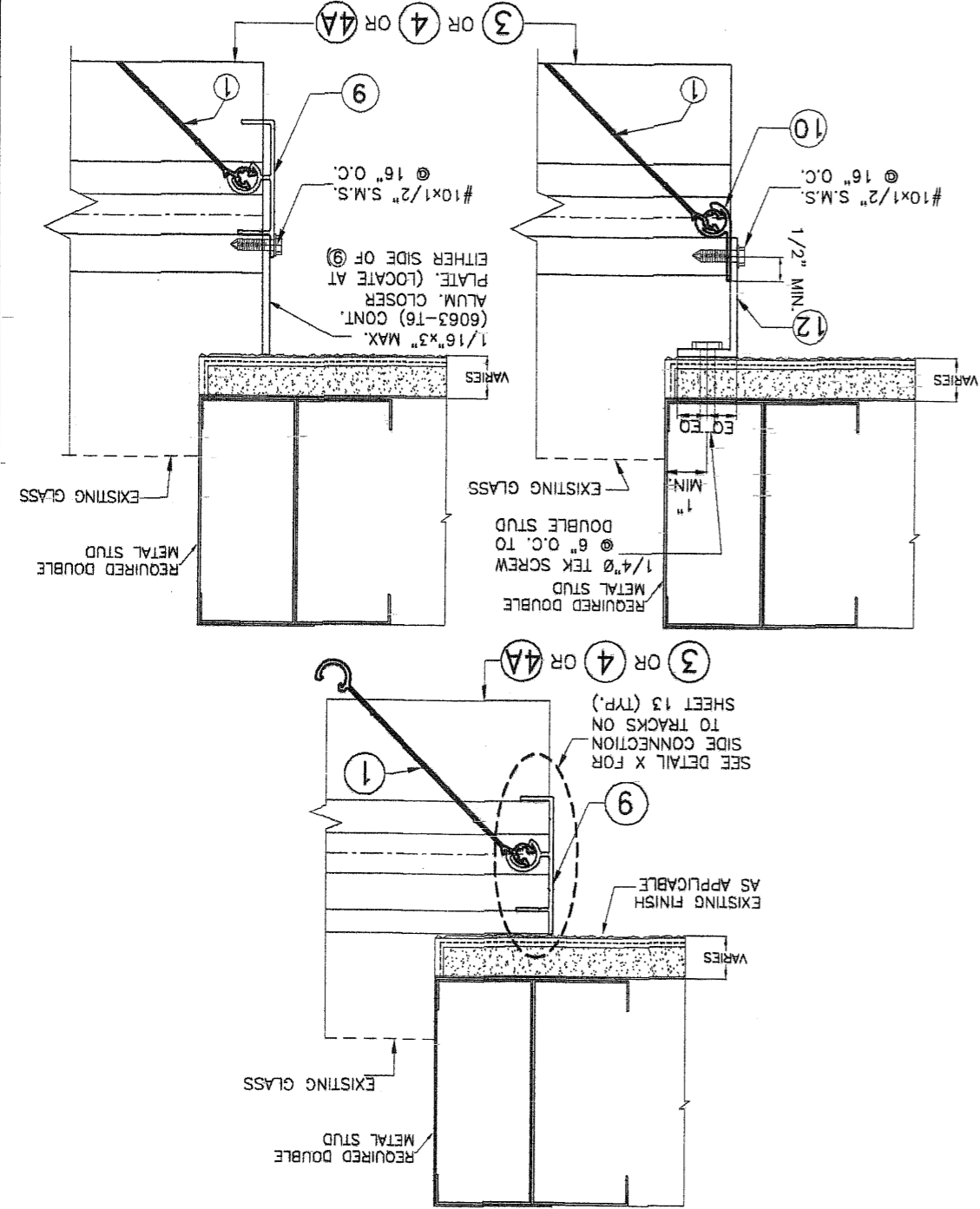
7 CEILING MOUNTING INSTALLATION



9 KEYSTONE MOUNTING INSTALLATION



END INSTALLATION INTO METAL STUD WALL
SCALE 3/8"=1"
FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)



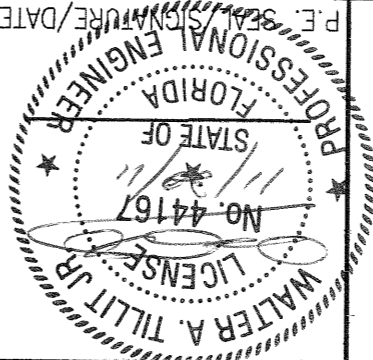
REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	OLD 11-073	11/28/11	
2			
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10A OF 18 SHEET
DRAWING No 11-190
DATE: 11/28/11
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3
Accordion Shutter System
BERTHA HV™
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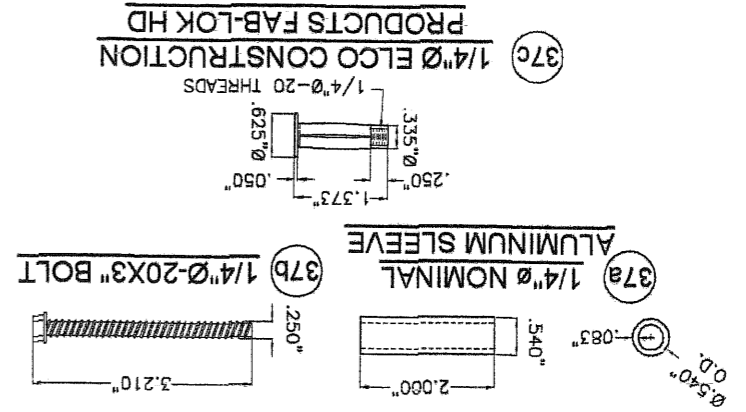
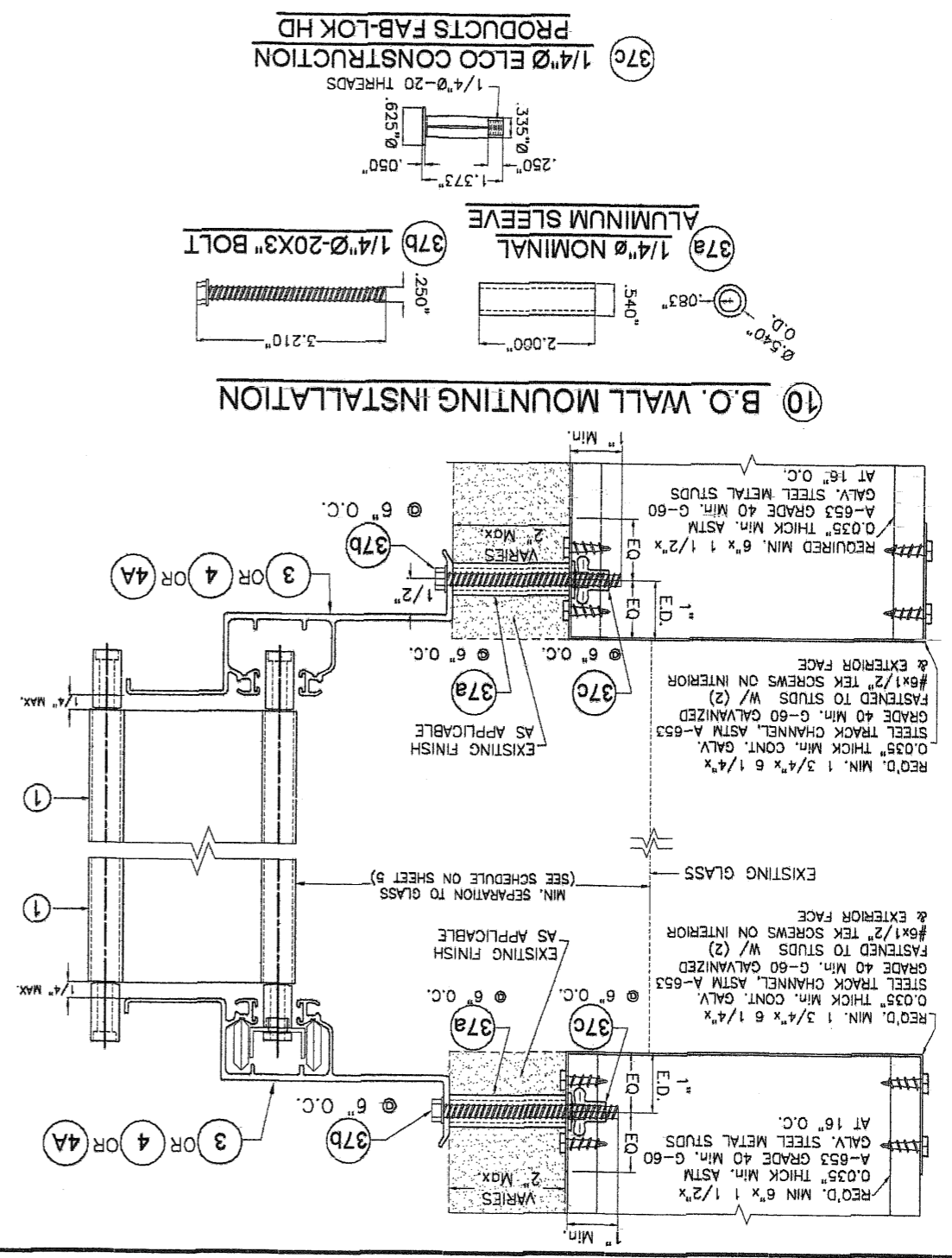
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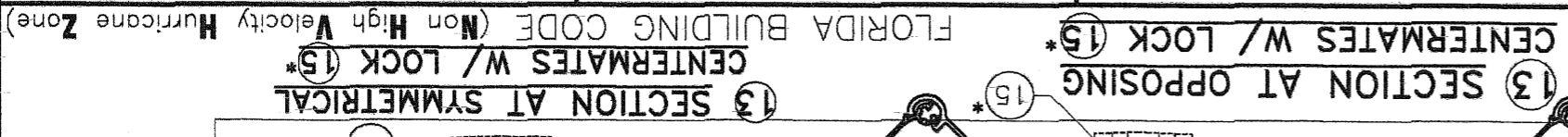
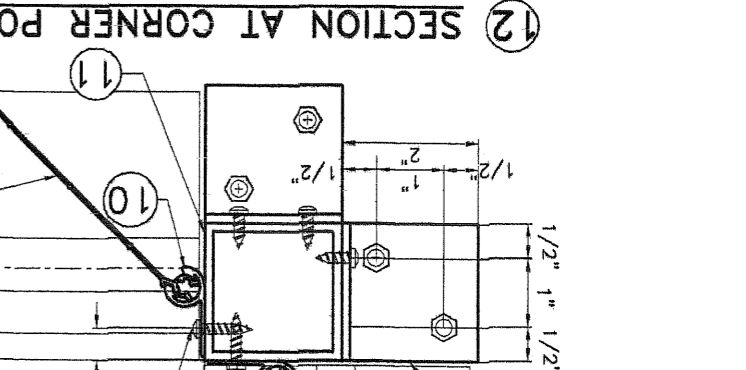
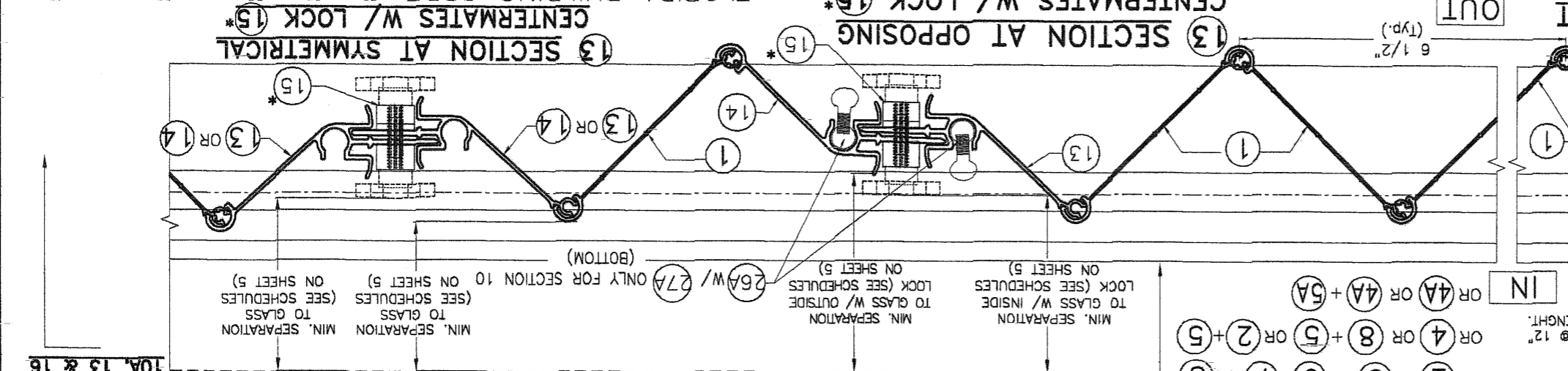
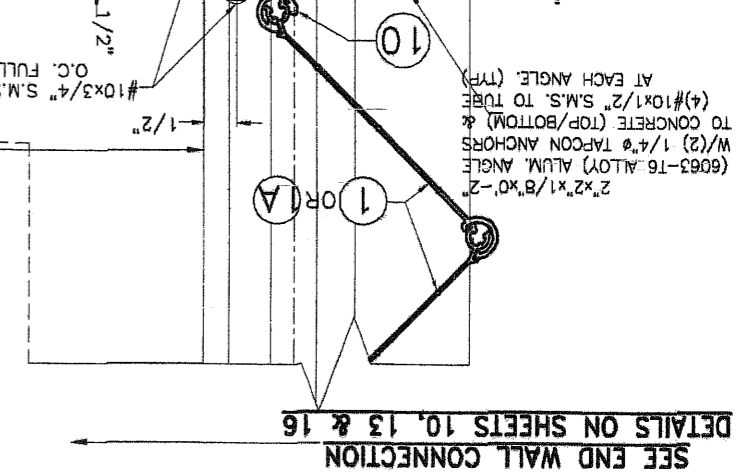
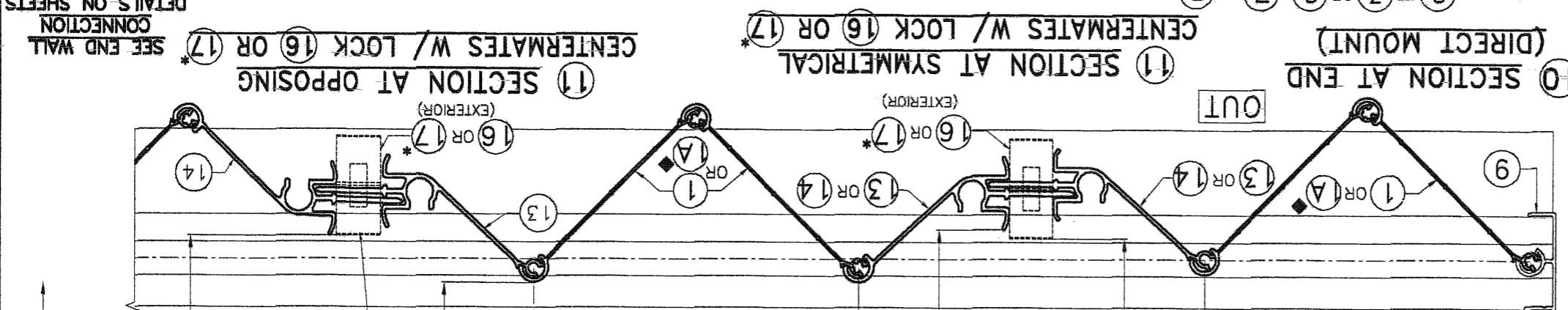
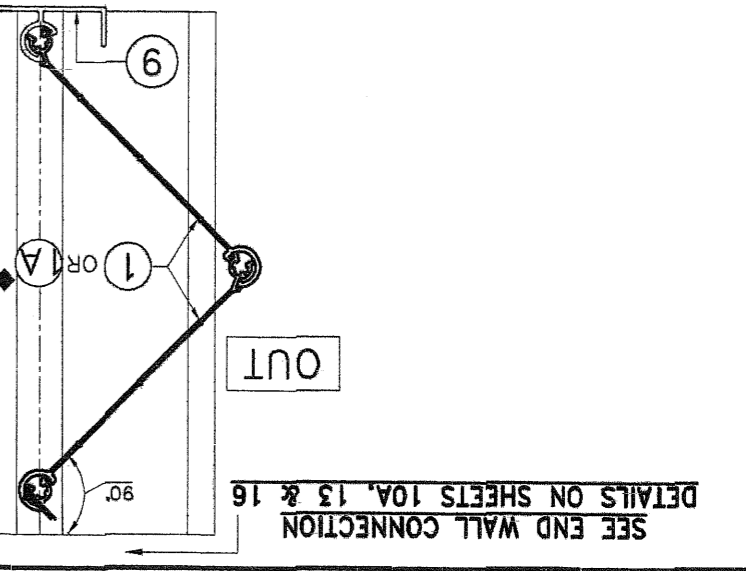
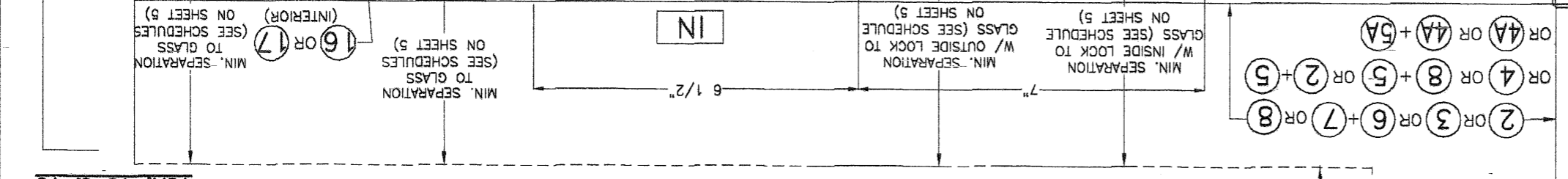
INSTALLATION DETAILS (CONTINUED)
SCALE 3/8"=1"



10) B.O. WALL MOUNTING INSTALLATION

* SEE NOTES ON HV LOCK 13 AND ALTERNATE LOCKS 16 OR 17 ON SHEET 4.
 ◆ SEE LIMITATIONS OF USE FOR BLADE 1A ON SHEET 18.

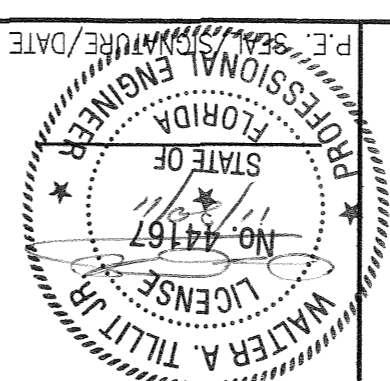
INSTALLATION WITH HV BLADE W/ 1 OR 1A • HV CENTERMATES 13 & 14
 SCALE 3/8"=1"



BERTHA HV™		REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
Accordion Shutter System		1	OLD 11-073	11/28/11	
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3		2			
DRAWING No		3			
11-190		4			
SHEET		5			
11 OF 18		6			

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FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

REV. NO.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3	11/28/11	
2	OLD 11-073	11/28/11	
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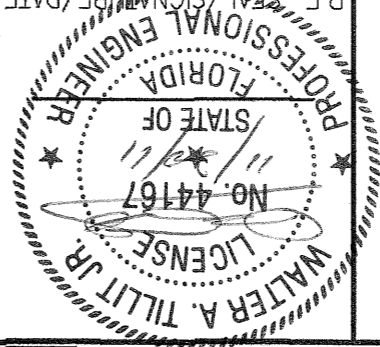
BERTHA HV™
Accordion Shutter System

DRAWING NO **11-190**
 SHEET **12 OF 18**

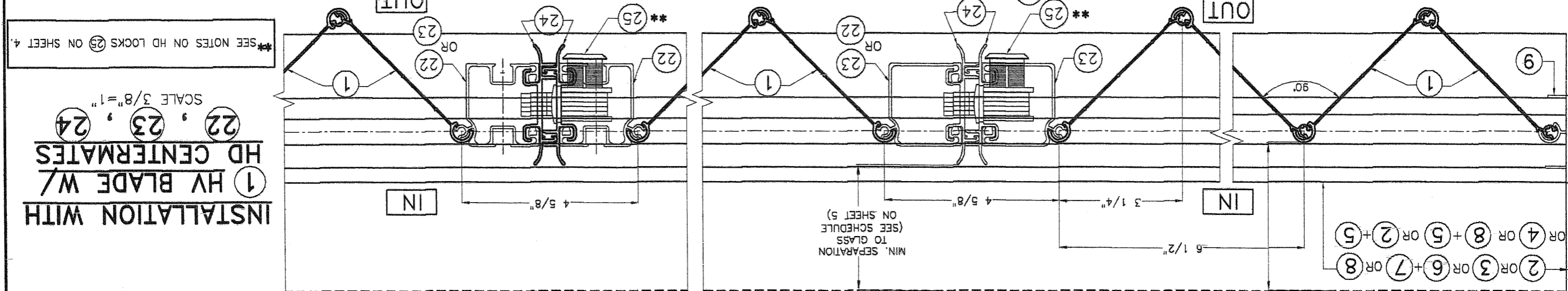
A.S.A.
 American Shutter Systems
 Association, Inc.
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TILTECO INC.

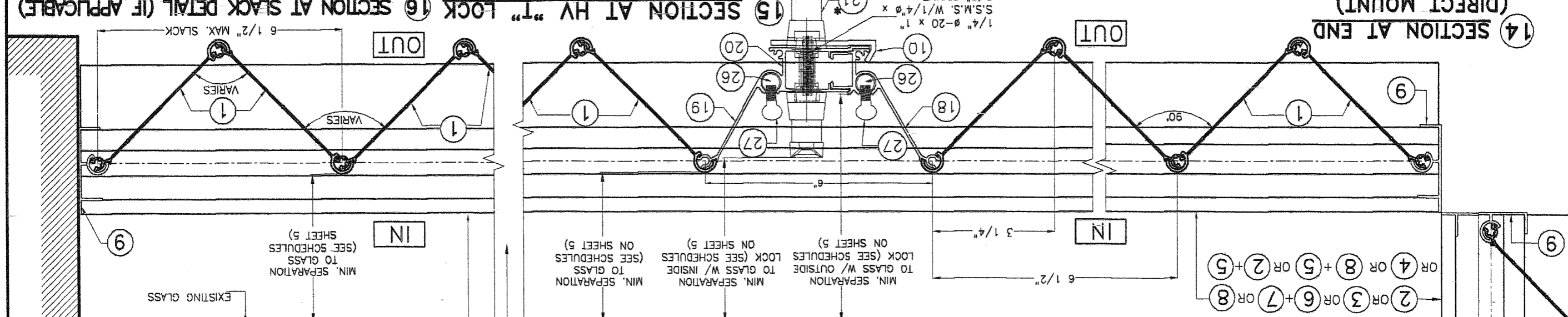
TILIT TESTING & ENGINEERING COMPANY
 6355 N.W. 36th St., Ste. 305, Virginia Gardens, Florida 33166
 Phone: (305)871-1530, Fax: (305)871-1531
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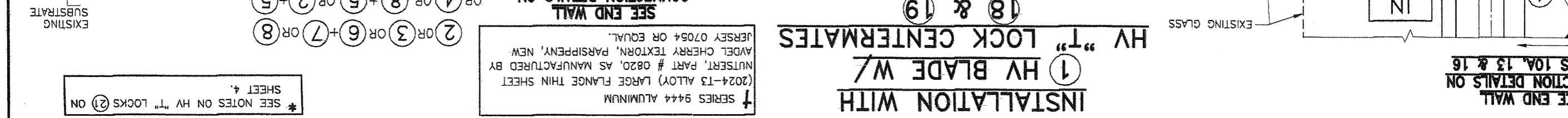
17 SECTION AT END (DIRECT MOUNT)
18 SECTION AT SYMMETRICAL HD LOCK
19 SECTION AT SYMMETRICAL HD LOCK
 FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)



14 SECTION AT END (DIRECT MOUNT)
15 SECTION AT HV "T" LOCK
16 SECTION AT SLACK DETAIL (IF APPLICABLE)
 CENTERMATES W/ LOCK 21



INSTALLATION WITH HV "T" LOCK CENTERMATES
 SCALE 3/8"=1"



SEE END WALL CONNECTION DETAILS ON SHEETS 10A, 13 & 16

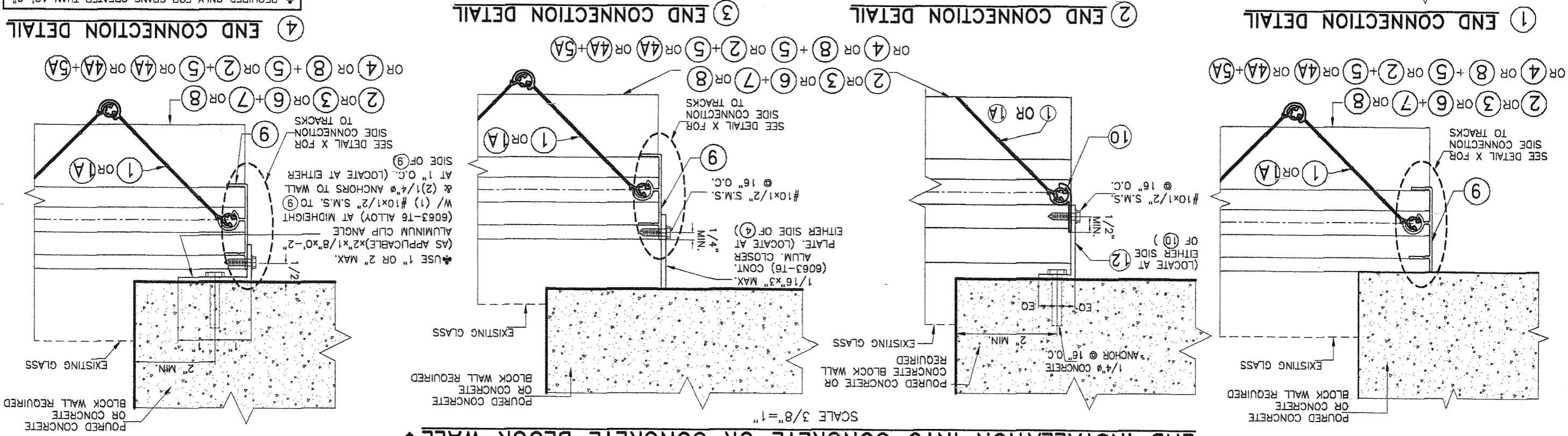
SEE END WALL CONNECTION DETAILS ON SHEETS 10A, 13 & 16

* SEE NOTES ON HV "T" LOCKS (2) ON SHEET 4.

† SERIES 9444 ALUMINUM NUTSERT, PART # 0820, AS MANUFACTURED BY AVDEL CHERRY TEXTORN, PARSIPPANY, NEW JERSEY 07054 OR EQUAL.

END INSTALLATION INTO CONCRETE OR CONCRETE BLOCK WALL

SCALE 3/8"=1"



♦ REQUIRED ONLY FOR SPANS GREATER THAN 12'-0"

♦ SEE LIMITATIONS OF USE FOR BLADE (A) ON SHEET 18.

⑤ END CONNECTION DETAIL

⑥ END CONNECTION DETAIL

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REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	OLD 11-073	11/28/11	
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DRAWING No
11-190

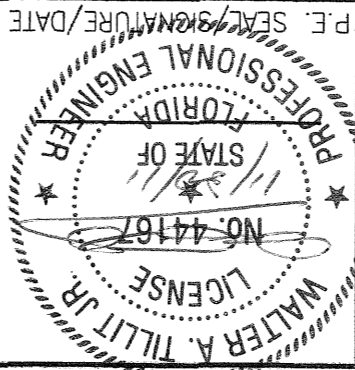
SHEET
13 OF 18

A.S.S.A.

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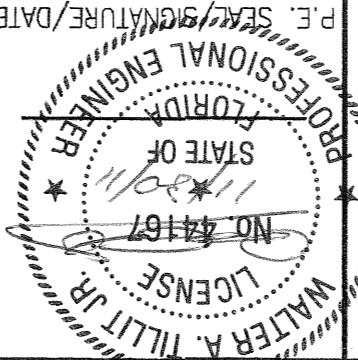
P.E. SEAL/SIGNATURE/DATE

REV. NO.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	OLD 11-073	11/28/11	
2		11/28/11	
3			
4			
5			
5			
14 OF 18	SHEET		

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 e-mail: tiltit@tdol.com
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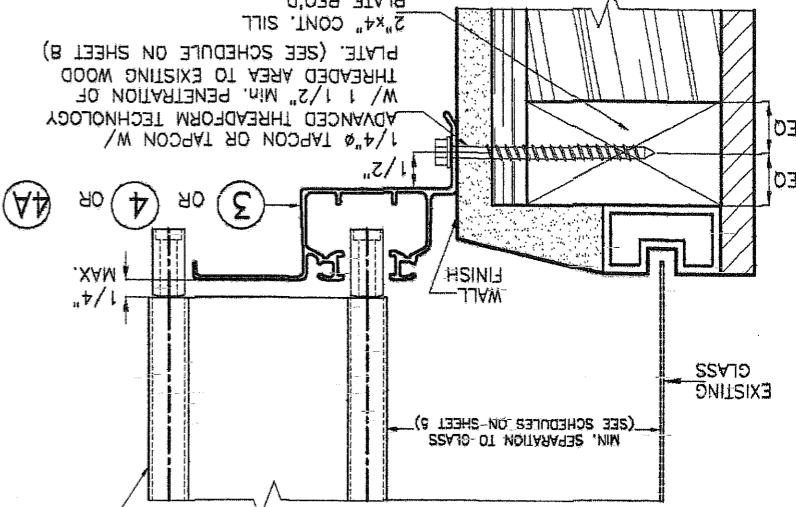
INSTALLATION DETAILS ON EXISTING WOOD BUILDINGS

SCALE 3/8"=1"

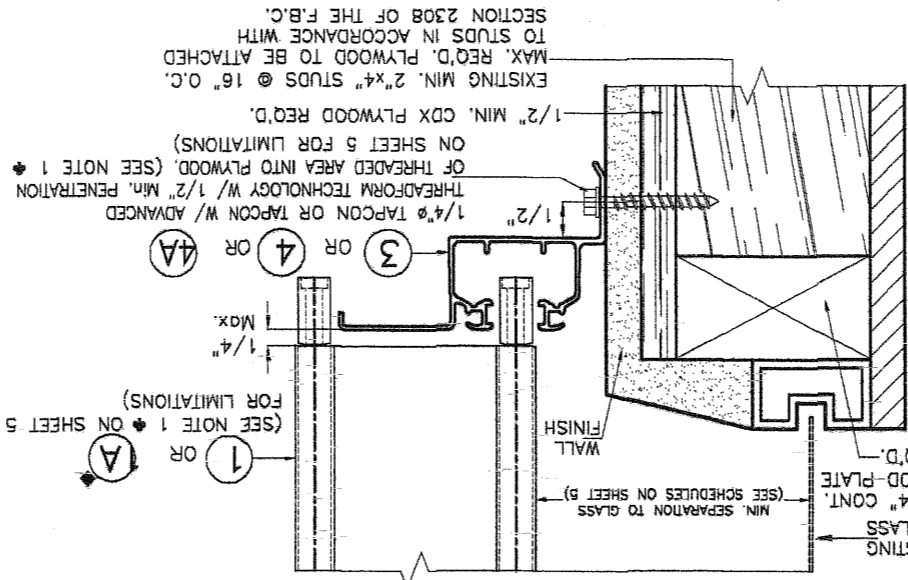
FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

NOTE:
 1-SEE SHEET 3 FOR TYPICAL SHUTTER ASSEMBLY
 2-MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY
 TO SUIT ANY INSTALLATION.
 ◆SEE LIMITATIONS OF USE FOR
 BLADE (A) ON SHEET 18.

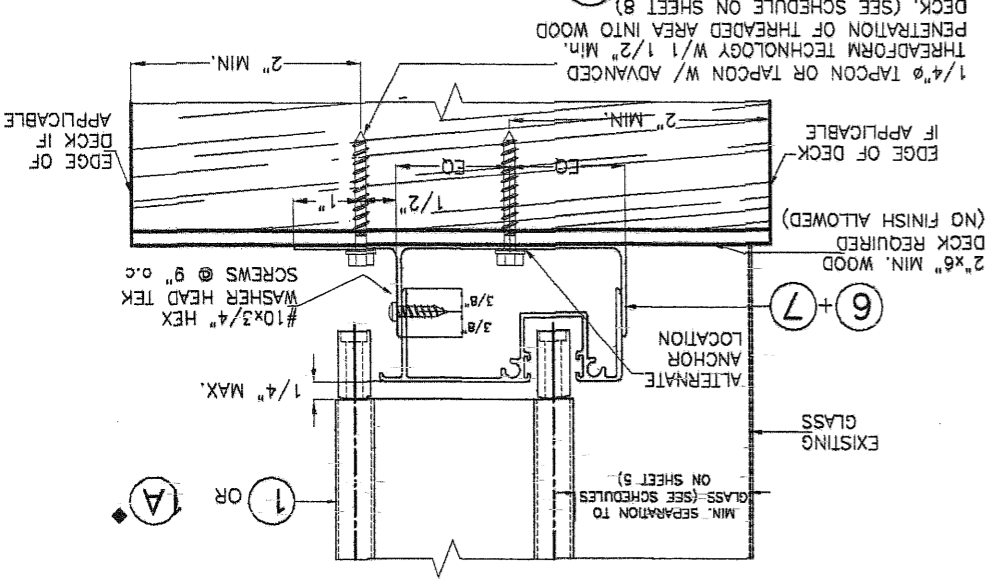
4W WALL CONNECTION AT BOTTOM



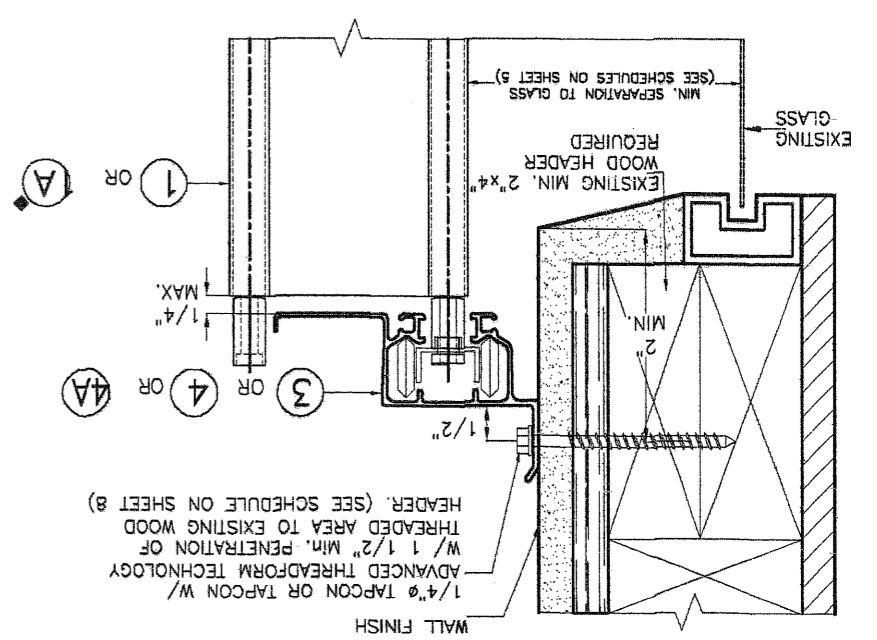
5W WALL CONNECTION AT BOTTOM



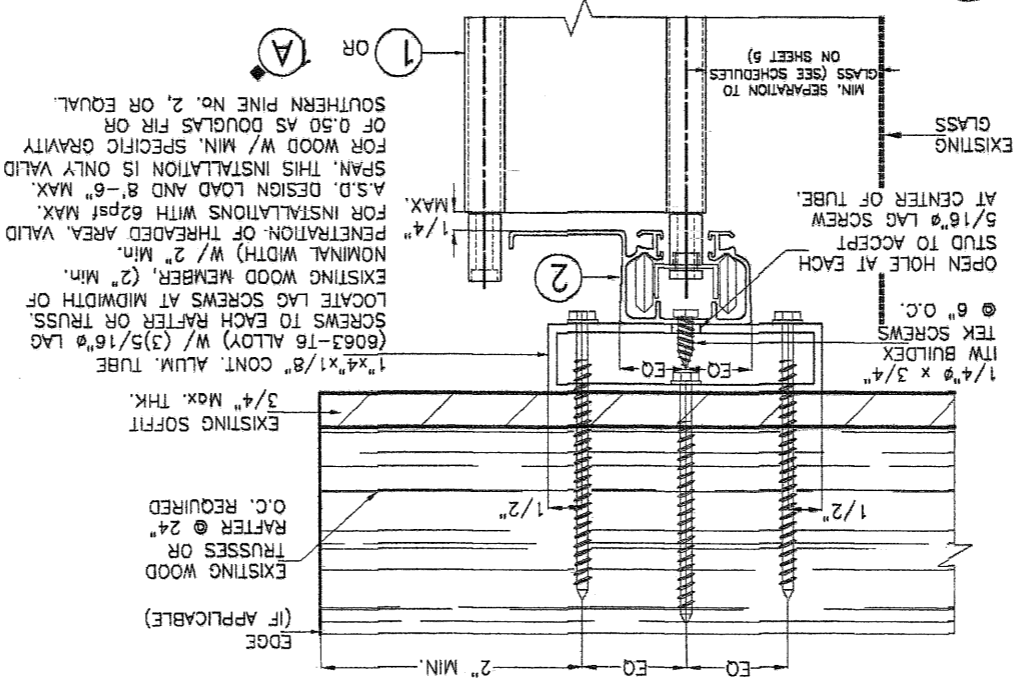
6W FLOOR CONNECTION



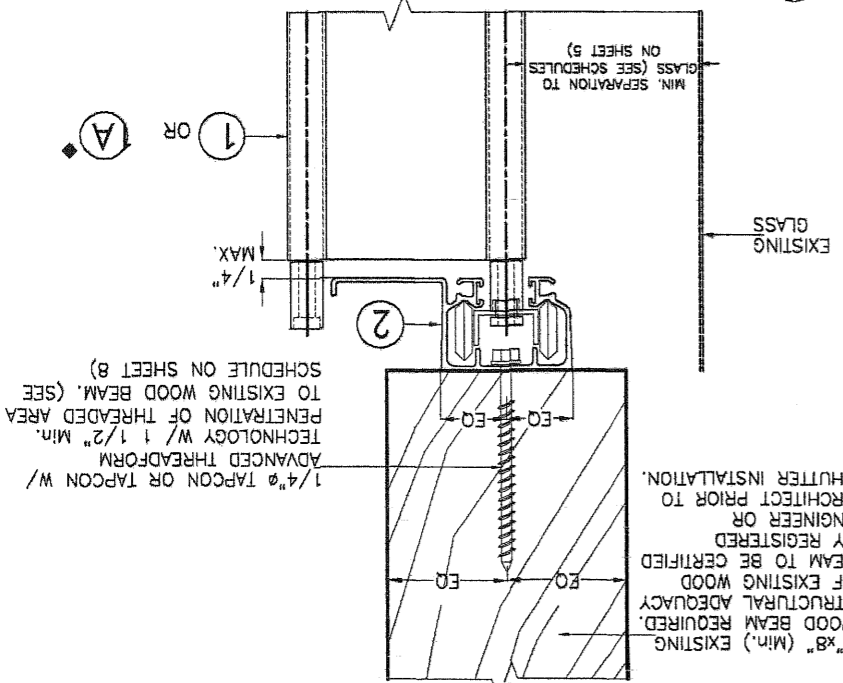
1W WALL CONNECTION AT TOP



2W HOLLOW CEILING MOUNTING INSTALLATION



3W SOFFIT MOUNTING INSTALLATION



WOOD BEAM REQUIRED. STRUCTURAL ADEQUACY OF EXISTING WOOD BEAM TO BE CERTIFIED BY REGISTERED ENGINEER OR ARCHITECT PRIOR TO SHUTTER INSTALLATION.

4"x8" (Min.) EXISTING WOOD BEAM REQUIRED. STRUCTURAL ADEQUACY OF EXISTING WOOD BEAM TO BE CERTIFIED BY REGISTERED ENGINEER OR ARCHITECT PRIOR TO SHUTTER INSTALLATION.

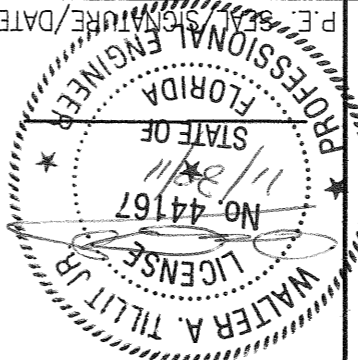
REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
1	OLD 11-073	11/28/11	
2	H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3		
3			
4			
5			
6			

11-190
DRAWING No
15 OF 18
SHEET

A.S.S.A.
American Shutter Systems
Association, Inc.
4268 Westroads Drive
West Palm Beach, FL 33407



TILIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1530 , Fax : (305)871-1531
e-mail: tiliteco@aol.com
EB-0006719
WALTER A. TILIT JR. P.E.
FLORIDA Lic. # 44167

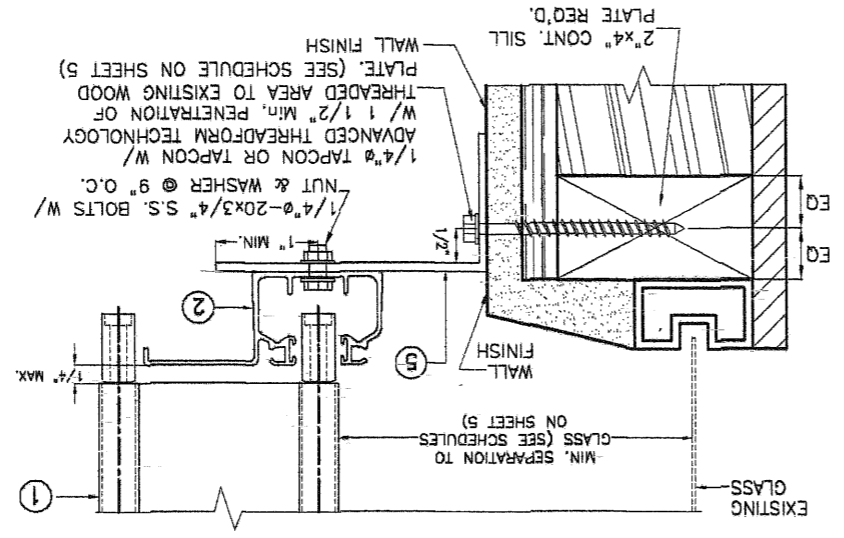


FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone) SCALE 3/8"=1"

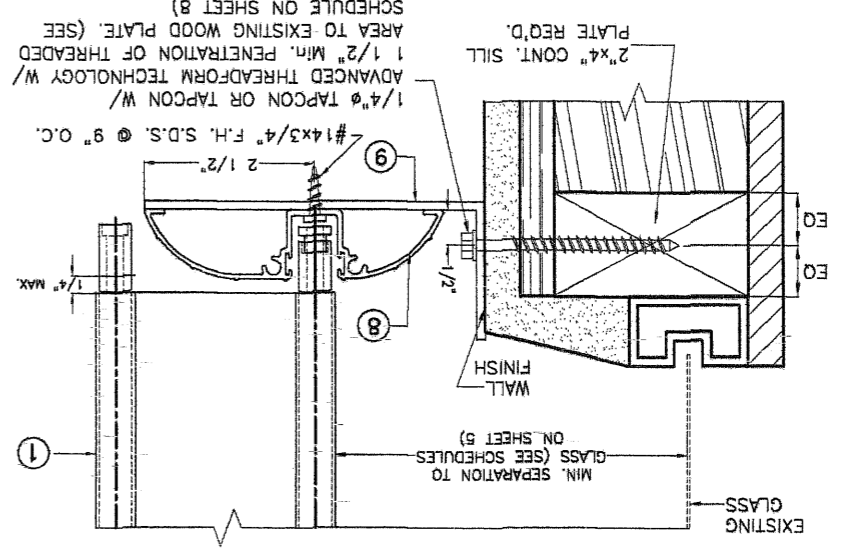
INSTALLATION DETAILS ON EXISTING WOOD BUILDINGS

NOTE:
1-SEE SHEET 3 FOR TYPICAL SHUTTER ASSEMBLY
2-MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY
-TO SUIT ANY INSTALLATION.

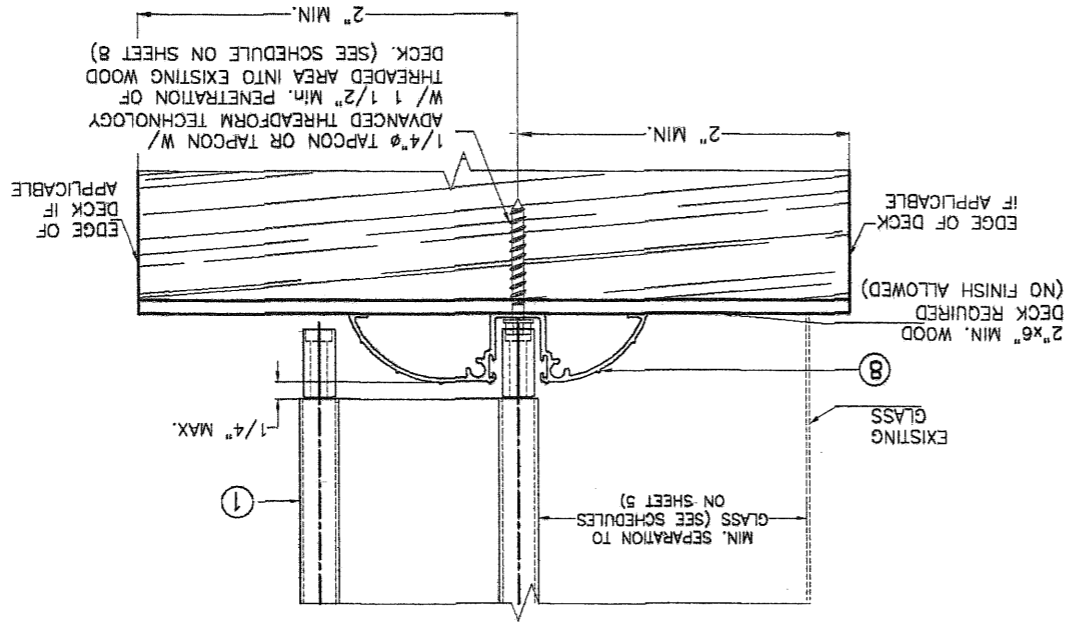
10W WALL MOUNTING INSTALLATION



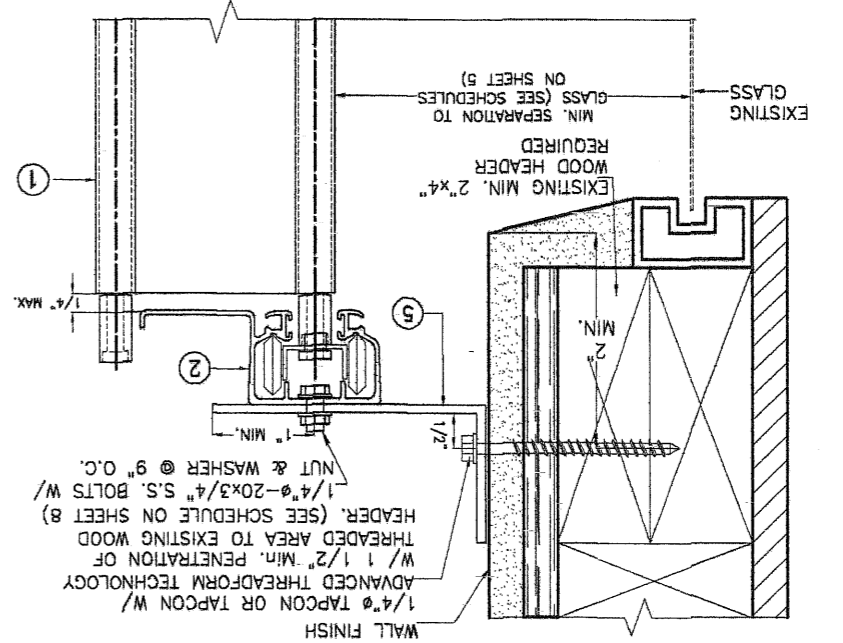
9W WALL MOUNTING INSTALLATION



8W FLOOR CONNECTION

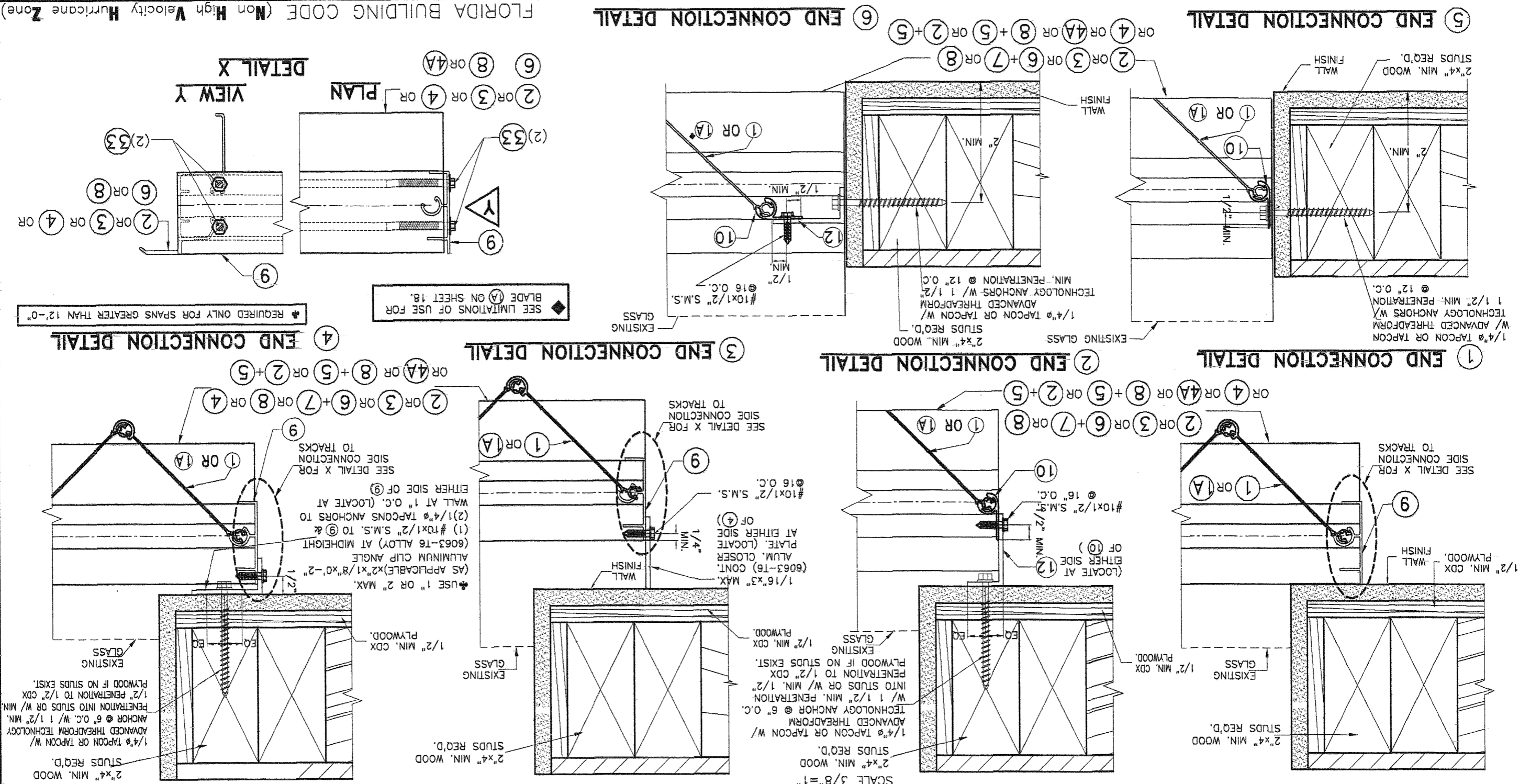


7W WALL MOUNTING INSTALLATION



END INSTALLATION INTO 2"x4" MIN. WOOD STUDS

SCALE 3/8"=1"



1 END CONNECTION DETAIL

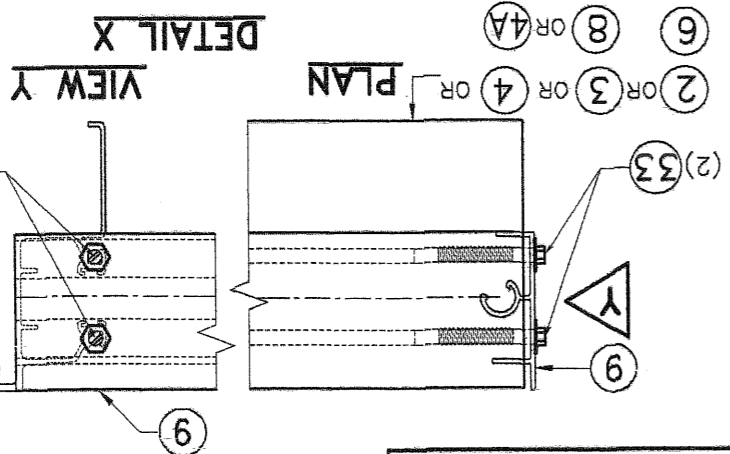
2 END CONNECTION DETAIL

3 END CONNECTION DETAIL

4 END CONNECTION DETAIL

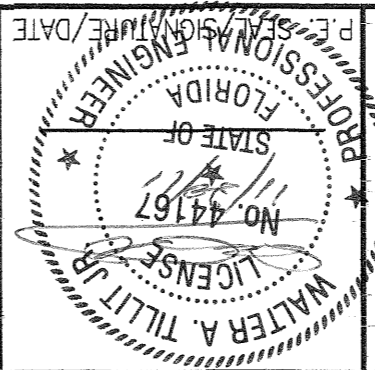
5 END CONNECTION DETAIL

6 END CONNECTION DETAIL



SEE LIMITATIONS OF USE FOR BLADE (A) ON SHEET 18.

* REQUIRED ONLY FOR SPANS GREATER THAN 12'-0"



TILTECO INC.

TILLITT TESTING & ENGINEERING COMPANY
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BERTHA HV™
 Accordion Shutter System
 H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

DRAWING No 11-190
 SHEET 16 OF 18

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REV. No.	DESCRIPTION	DATE	DRAWN BY: R.E./A.G.
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2			
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DRAWING No 11-190
SHEET 17 OF 18

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American Shutter Systems
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TILTECO INC.
TILLIT TESTING & ENGINEERING COMPANY
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WALTER A. TILLIT JR. P.E.
FLORIDA Lic. # 44167

P.E. SEAL/SIGNATURE/DATE
WALTER A. TILLIT JR.
PROFESSIONAL ENGINEER
STATE OF FLORIDA
LICENSE NO. 44167

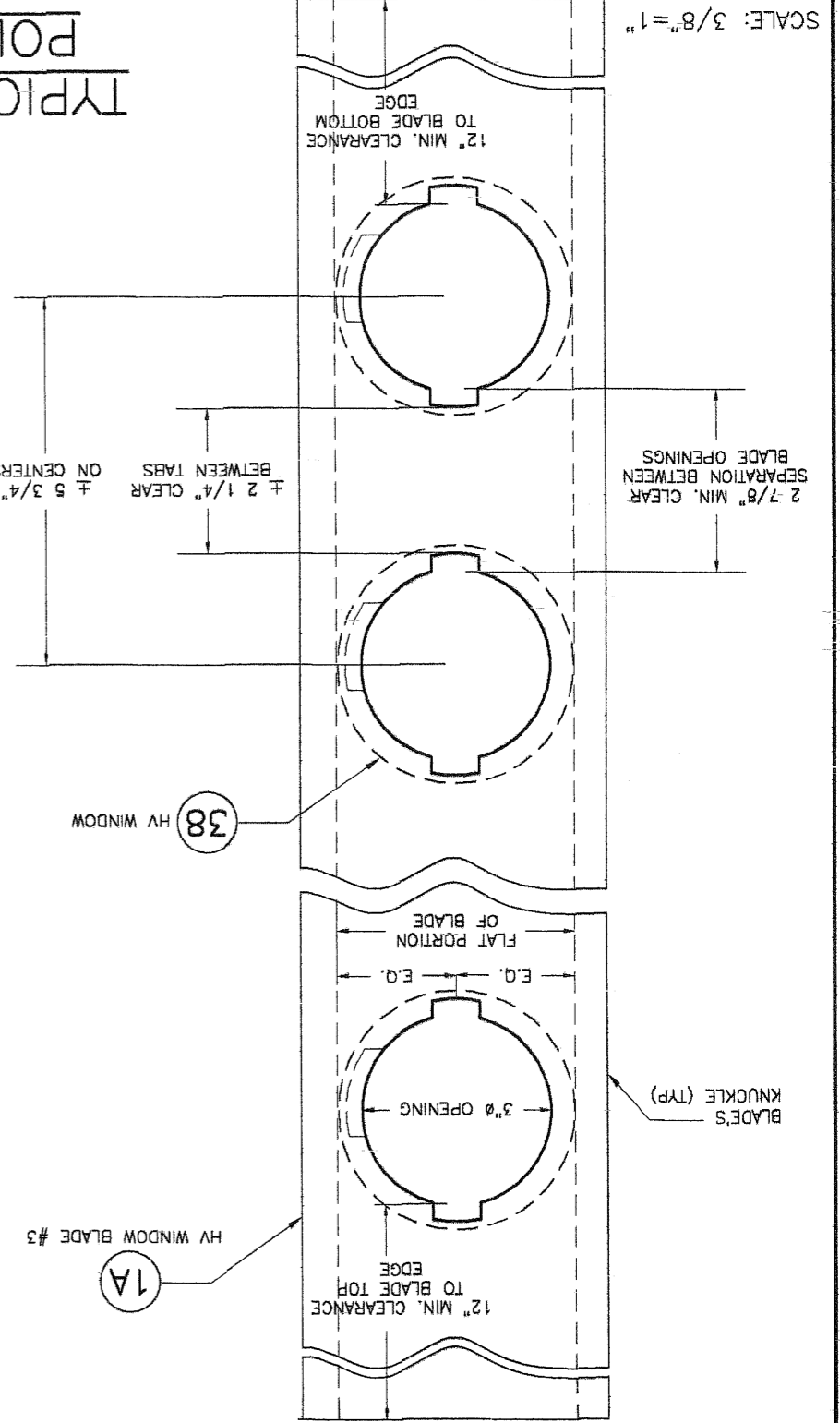
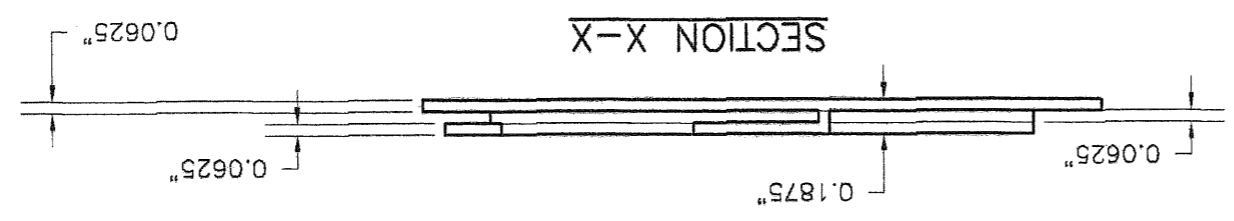
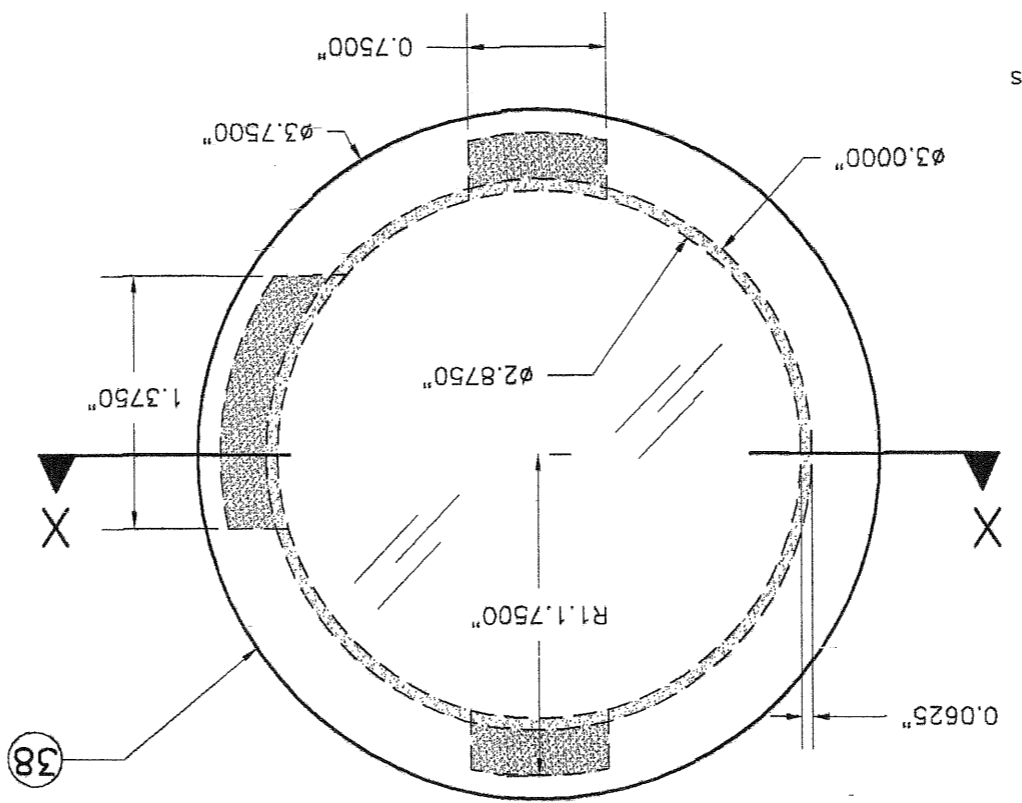
TYPICAL 1A HV WINDOW BLADE #3 AND POLYCARBONATE HV WINDOW DETAIL

38 POLYCARBONATE IMPACT RESISTANT HV WINDOW
BAYER MAKROLON 3103 POLYCARBONATE
RESINS, UV-STABILIZED GRADE
EXTERIOR ELEVATION
SCALE: 1" = 1"

POLYCARBONATE SOURCES FOR 38

APPLICABLE STANDARD	REFERENCE	RESULT
PHYSICAL:		
SPECIFIC GRAVITY	ASTM D792	0.043 lb/in ³
TENSILE YIELD STRENGTH	ASTM D638	9,400 p.s.i.
FLEXURAL STRENGTH AT YIELD	ASTM D790	12,500 p.s.i.
FLEXURAL MODULUS	ASTM D790	345,000 p.s.i.
IMPACT:		
NOTCHED IZOD	ASTM D256	18 FT-lb/in
FIRE BURNING CHARACTERISTICS:		
SMOKE DENSITY	ASTM D2843	47.2 %
RATE OF BURNING	ASTM D635	C-1 CLASS
SELF IGNITION	ASTM D1929	1040 F
WEATHERING:		
TENSILE STRENGTH AFTER WEATHERING	ASTM G38	9302 p.s.i.
TENSILE STRESS BEFORE WEATHERING	ASTM G38	8880 p.s.i.

BAYER MATERIAL SCIENCE LLC. MAKROLON 3103 PLASTIC LEAN SAIG INNOVATIVE

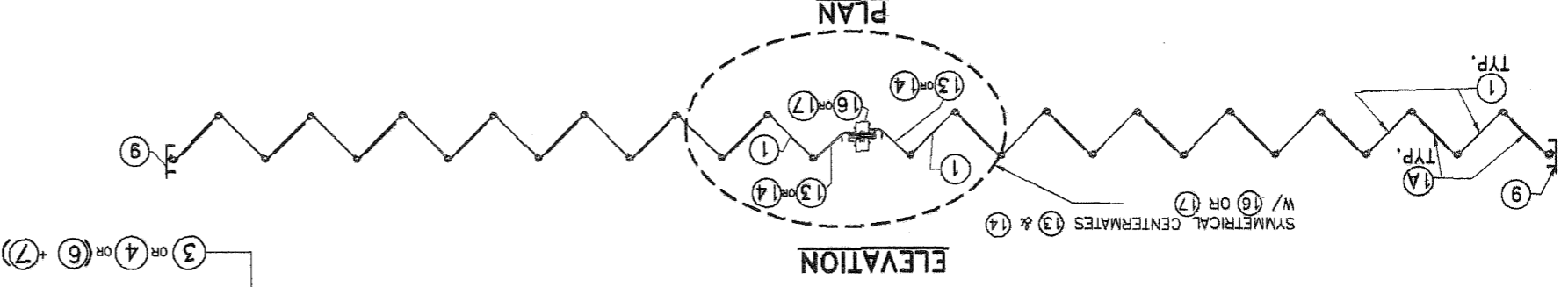
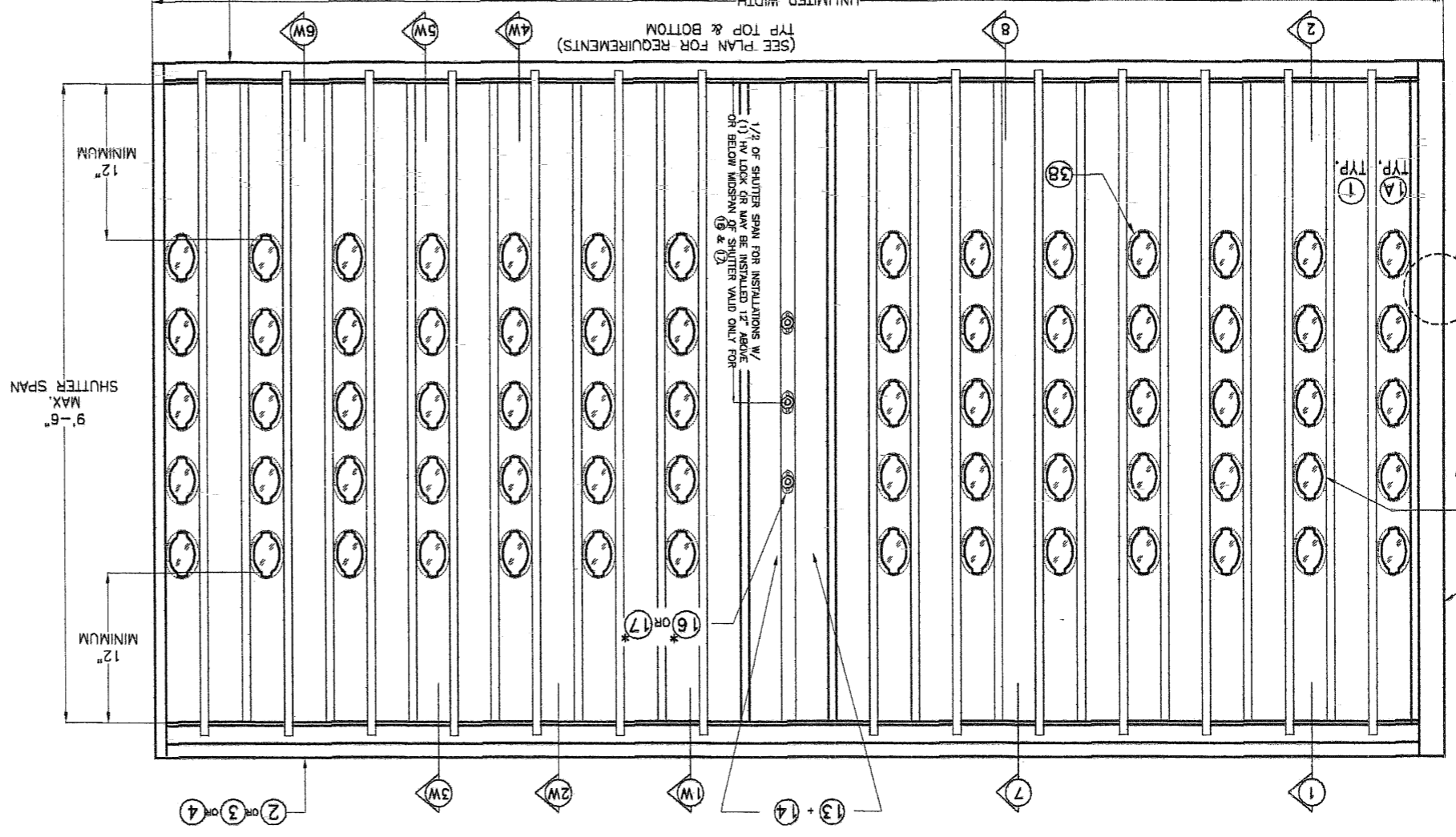


SCALE: 3/8"=1"

*** GENERAL LIMITATIONS AND CONDITIONS OF USE FOR BERTHA**

1 HV BLADE #3 ACCORDION SHUTTER SYSTEM WORKING IN UNISON WITH 1A HV WINDOW BLADE #3

1. MAX. A.S.D. DESIGN PRESSURE RATING: +62, -62 p.s.f.
2. MAX. SHUTTER SPAN: 11'4" = 9'-6"
3. ALLOWED MOUNTINGS: 1, 2, 7 & 8 ON SHEETS 9 & 10; AS WELL AS MOUNTINGS 1W, 2W, 3W, 4W, 5W & 6W ON SHEET 14.
4. ONLY CENTERMATES 13, 14 (BOTH W/ 16 OR 17) ARE ALLOWED WITH 14 ARRANGED IN A SYMMETRICAL LAYOUT.
5. (A) 1A HV WINDOW BLADE #3 SHALL ONLY ALLOW A MAXIMUM OF 5 OPENINGS (3" Ø HOLES) FOR 38 PER BLADE AT SPACINGS SHOWN ON SHEET 17.
- (B) MIN. CLEARANCE FROM TOP OR BOTTOM EDGE OF 1A HV WINDOW BLADE #3 OF ANY 3" Ø HOLE FOR 38 SHALL BE 12".
- (C) FIRST OR LAST BLADE COMING OUT FROM STARTERS AT ENDS MAY BE 1A HV WINDOW BLADE #3.
- (D) 1A HV WINDOW BLADE #3 MUST BE USED ALTERNATE TO A SOLID 1 HV BLADE #3 THROUGHOUT SHUTTER'S WIDTH.
- (E) CENTERMATES SHALL ALWAYS BE INSTALLED ADJACENT TO A SOLID 1 HV BLADE #3 AT EITHER SIDE OF THEM.
- (F) POLYCARBONATE HV WINDOW BLADE #3 SHALL BE INSTALLED SO THAT TABS THE INTERIOR OF THE OPENING BEING PROTECTED. HV WINDOW 38 MUST BE ONLY INSTALLED AND LOCKED USING A HV SETTING TOOL PROVIDED BY ASSA INC.
6. SEE ANCHOR SPACING SCHEDULE FOR INSTALLATIONS INTO WOOD FRAME BUILDINGS ON SHEET 8, AS LIMITED BY SPAN AND DESIGN LOAD (SEE NOTES 1 & 2 ABOVE).
7. SEE ANCHOR SPACING SCHEDULE FOR INSTALLATIONS INTO POURED BY SPAN CONCRETE OR CONCRETE BLOCK WALL ON SHEETS 6 & 7 AS LIMITED BY SPAN AND DESIGN LOAD (SEE NOTES 1 & 2 ABOVE).
8. SEE MINIMUM SEPARATION TO GLASS ON SHEET 5.



1 TYPICAL HV BLADE #3 WORKING IN UNISON WITH 1A HV WINDOW BLADE #3 SHUTTER*

N.T.S.

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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BERTHA HV™	
Accordion Shutter System	
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REV. No.	DESCRIPTION
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DATE	11/28/11
DRAWN BY: R.E./A.G.	
DATE	
11-190	
DRAWING No	
18 OF 18	

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 STATE OF FLORIDA
 No. 44167
 WALTER A. TILIT JR.
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