

GENERAL NOTES:

1. BERTHA H.V. ACCORDION SHUTTER SYSTEM 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 MAY 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.) DESIGN PRESSURE RATINGS INDICATED ON SHEETS 12 THRU 17, 25, 26, 28 & 28A.

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 12 THRU 17, 25, 26, 28 & 28A.

IN ORDER TO VERIFY THAT ANCHORS ON THIS P.E.D., AS TESTED, WERE NOT OVERSTRESSED, A 33 % INCREASE IN ALLOWABLE LOADS FOR WIND LOADS WAS NOT USED IN THEIR ANALYSIS. BERTHA H.V. ACCORDION SHUTTER SYSTEM'S ADEQUACY FOR WIND AND LARGE MISSILE IMPACT LOAD HAS BEEN VERIFIED IN ACCORDANCE WITH SECTION 1626 OF THE ABOVE MENTIONED CODE AS PER ATL REPORTS:

-HV BLADE ① #0214.01-03, #0715.01-03, #1004.01-05, #1214.01-05, #0317.02-06, #0609.01-10 AND #0210.01-11 AS PER TAS 201, TAS 202 AND TAS 203 PROTOCOLS.

-HV WINDOW BLADE ①A #0505.01-08 AS TAS 201, 202 & 203 PROTOCOLS AND 0725.01-08 AS PER TAS 202 PROTOCOL.

-HV BLADE ② #0422.01-05 AS PER TAS 201, TAS 202 AND TAS 203 PROTOCOLS.

2. HV-BLADE ① AND HV BLADE ② ARE ENGINEERED TO WORK IN UNISON WITH EACH OTHER IN AREAS WHERE THE DESIGN PRESSURES TRANSITION FROM END ZONE 5 TO INTERIOR ZONE 4. EACH WIND ZONE MUST BE CLEARLY IDENTIFIED IN ACCORDANCE WITH CHAPTER 30, OF ASCE 7-10 STANDARD. ALL MOUNTING CONDITIONS AND FASTENER TYPES SCHEDULES MUST BE APPLIED TO THE CORRESPONDING WIND ZONE. THIS SHALL INCLUDE REQUIREMENTS FOR MIN. SEPARATION TO GLASS. DELIMITATION OF WIND ZONES 4 AND 5 AS WELL AS VALIDITY OF COMPONENTS FOR HV BLADE 1 & 2 ACCORDION SHUTTERS SYSTEMS FOR EITHER WIND ZONE SHALL BE PREPARED AND CERTIFIED BY A FLORIDA REGISTERED ENGINEER OR ARCHITECT BASED ON BUILDING CONFIGURATION AND ASCE 7-10 STANDARD, AND SHALL BE SUBMITTED TO THE BUILDING OFFICIAL AT THE TIME PERMIT IS APPLIED FOR.

HV BLADE ① AND HV WINDOW BLADE ①A ARE ENGINEERED TO WORK IN UNISON WITH EACH OTHER UNDER THE GENERAL LIMITATIONS AND CONDITIONS OF USE INDICATED ON SHEET 28.

3. BERTHA H.V. ACCORDION PINS (HV SCREWS), USED AT BLADES KNUCKLE AND FOR DIRECT MOUNT CONNECTION TO TRACKS SHALL BE # 14X2.75 AND # 14X1.75 RESPECTIVELY, 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.

4. ALL ALUMINUM EXTRUSIONS SHALL BE ALUMINUM ASSOCIATION ALLOY AND TEMPER AS INDICATED ON SHEETS 2 AND 3. MINIMUM YIELD STRENGTH FOR 6063-T6 ALLOY IS 31.7 ksi AND 35.7 ksi FOR 6005-T5 ALLOY.

5. ALL SCREWS TO BE STAINLESS STEEL 304 OR 316 AISI SERIES OR CORROSION RESISTANT COATED CARBON STEEL AS PER DIN 50018 WITH 50 ksi MIN. YIELD STRENGTH AND 90 ksi MIN. TENSILE STRENGTH & SHALL COMPLY W/ FLORIDA-BUILDING CODE SECTION 2411.3.3.4.

6. BOLTS TO BE ASTM A-307 GALVANIZED STEEL, OR AISI 304 OR 316 SERIES STAINLESS STEEL WITH 35 ksi MINIMUM YIELD STRENGTH.

7. SEE THE FOLLOWING SHEETS FOR ANCHOR SPECIFICATIONS: HV BLADE ①: 13,14,15,16,17 & 28A
 HV BLADE ② : 26.
 HV BLADE ③ & ①A WORKING IN UNISON: 13, 14 & 16

8. THIS BERTHA H.V. ACCORDION SHUTTER SYSTEM BEARS A U.S. PATENT #6'779,582. COMPONENTS OF THIS APPROVAL ARE COVERED, IN WHOLE OR IN PART BY U.S. PATENT #5'458,179 ISSUED TO EASTERN METAL SUPPLY, INC.

9. 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.

10. 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 HV AND HD CENTERMATES AND ENGAGE OR LOCK ALL HV AND HD LOCKS.

11. 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.

12. BERTHA H.V. ACCORDION SHUTTER SYSTEM'S INSTALLATION SHALL COMPLY WITH SPECS INDICATED IN THIS DRAWING PLUS ANY BUILDING AND ZONING REGULATIONS PROVIDED BY THE JURISDICTION WHERE PERMIT IS APPLIED TO.

13. (a) 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.

(b) 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.

(c) THIS P.E.D. WILL BE CONSIDERED INVALID IF ALTERED BY ANY MEANS.

(d) 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 OF RECORD, ACTING AS A DELEGATED ENGINEER TO THE P.E.D. ENGINEER SHALL SUBMIT TO THIS LATTER THE SITE SPECIFIC DRAWINGS FOR REVIEW.

(e) THIS P.E.D. SHALL BEAR THE DATE AND ORIGINAL SEAL AND SIGNATURE OF THE PROFESSIONAL ENGINEER OF RECORD THAT PREPARED IT.

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FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

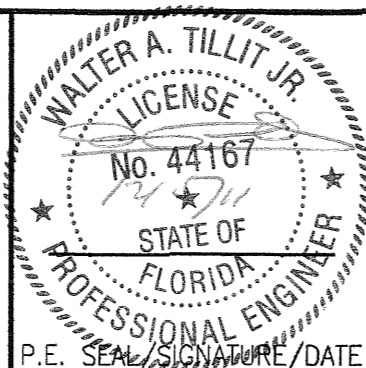
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BERTHA HV™
Accordion Shutter System

H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

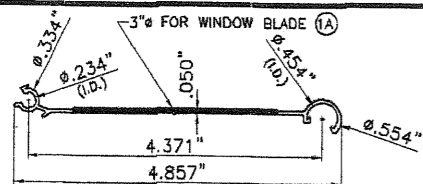
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1	OLD 08-152	12/02/11	DATE: 12/02/11
2			
3			
4			
5			
6			

DRAWING No
11-194
 SHEET
1 OF 28



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 EB-0006719
 WALTER A. TILLIT Jr. P.E.
 FLORIDA Lic. # 44167

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

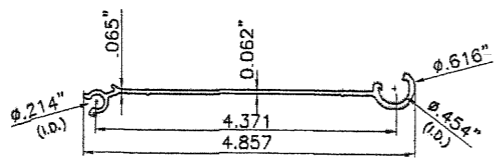


1 HV SOLID BLADE

COVERED UNDER US PATENT # 5458179

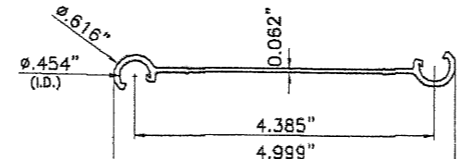
1A HV WINDOW BLADE*

*SEE LIMITATIONS OF USE OF BLADE (1A) ON SHEET 28
6063-T6 ALLOY AND TEMPER



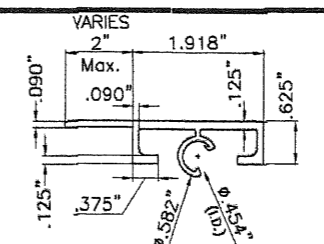
2 HV BLADE

COVERED UNDER US PATENT # 5458179
6005-T5 ALLOY AND TEMPER



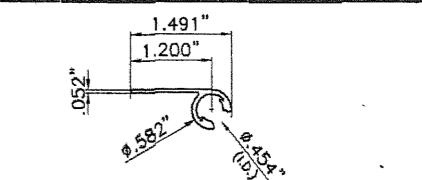
3 HV UNIVERSAL FLOATER

QUALIFIED FOR USE W/ HV BLADE (1) & (2)
6005-T5 ALLOY AND TEMPER



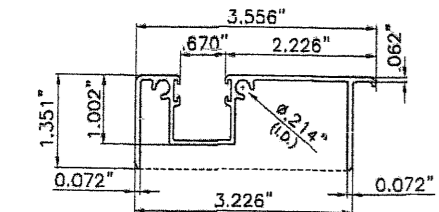
4 HV DIRECT MOUNT

QUALIFIED FOR USE W/ HV
BLADE (1) & (2)
6063-T6 ALLOY AND TEMPER



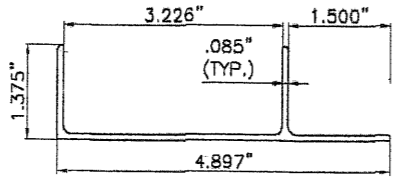
5 HV 90°/180° STARTER

QUALIFIED FOR USE W/
HV BLADE (1) & (2)
6063-T6 ALLOY AND TEMPER



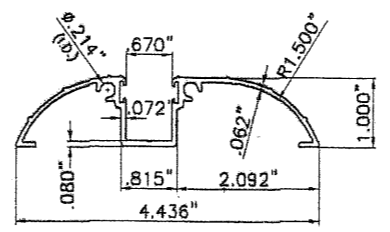
6 HV ADJ. FLOOR TRACK

QUALIFIED FOR USE W/ HV
BLADE (1) & (2)
6063-T6 ALLOY AND TEMPER



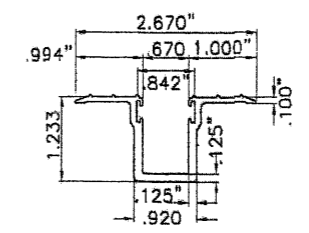
7 HV ADJ. ADAPTER W/LIP

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6063-T6 ALLOY AND TEMPER



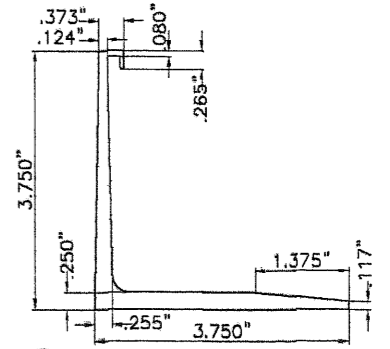
8 HV WALK-OVER TRACK

QUALIFIED FOR USE W/ HV
BLADE (1) & (2)
6063-T6 ALLOY AND TEMPER



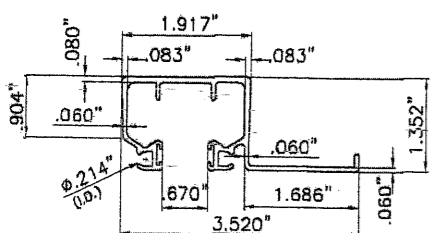
9 HV TRENCH TRACK

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BLADE (1) & (2) ONLY.
6063-T6 ALLOY AND TEMPER



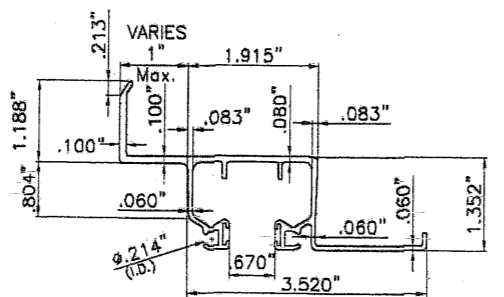
10 HV RAINGUARD

QUALIFIED FOR USE W/ HV
BLADE 1 & 2.
6063-T6 ALLOY AND TEMPER



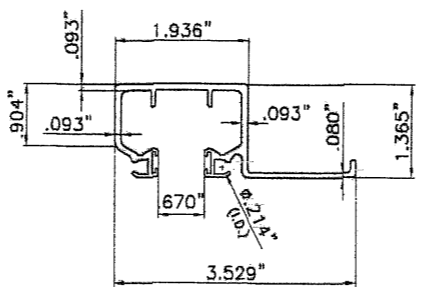
11 HV CEILING HEADER

QUALIFIED FOR USE W/ HV BLADE (1) ONLY.
SEE SECTIONS FOR VALIDITY.
6063-T6 ALLOY AND TEMPER



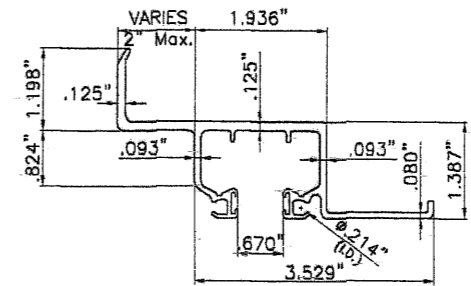
12 HV HEADER/SILL

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6063-T6 ALLOY AND TEMPER



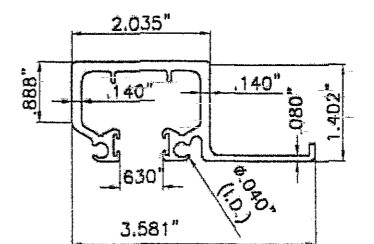
13 HD CEILING HEADER/SILL

QUALIFIED FOR USE W/ HV BLADE (1)
SEE SECTIONS FOR VALIDITY.
6063-T6 ALLOY AND TEMPER



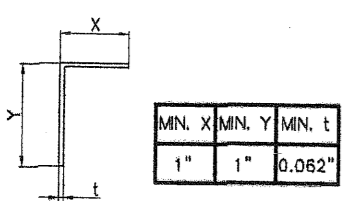
14 HD WALL HEADER/SILL

QUALIFIED FOR USE W/ HV
BLADE (1) ONLY.
6063-T6 ALLOY AND TEMPER



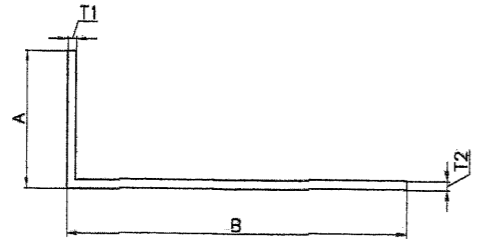
15 SHD CEILING HEADER/SILL

QUALIFIED FOR USE W/ HV BLADE (1) & (2)
6063-T6 ALLOY AND TEMPER



16 SIDE ANGLES

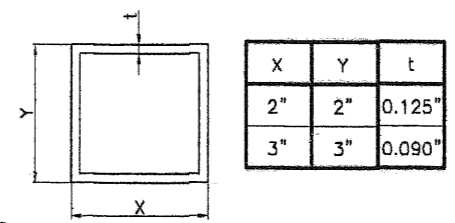
QUALIFIED FOR USE W/ HV
BLADE (1) & (2)
6063-T6 ALLOY AND TEMPER



ALUMINUM ANGLES

QUALIFIED FOR USE W/ HV
BLADE (SEE SCHEDULE)
6063-T6 ALLOY AND TEMPER

COMPONENT	A	B	T1	T2	BLADE QUALIFIED
(17)	2"	5" MAX.	1/8"	1/8"	HV (1)
(18)	2"	5" MAX.	0.192"	0.192"	HV (2)
(19)	2.5"	7" MAX.	0.190"	0.190"	HV (1)



20 CORNER POSTS

QUALIFIED FOR USE W/ HV
BLADE (1) & (2)
6063-T6 ALLOY AND TEMPER

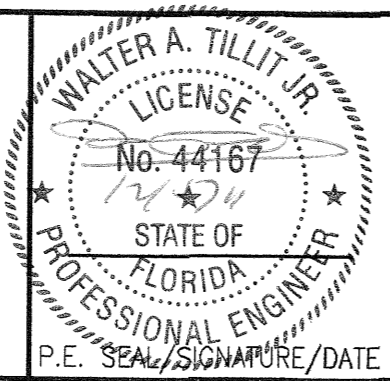
FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

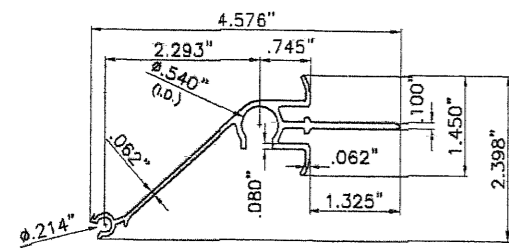
REV. No	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			DRAWING No
3			11-194
4			SHEET
5			2 OF 28
6			



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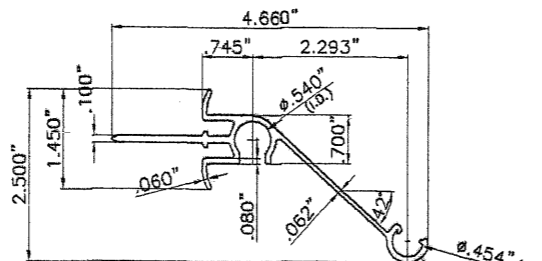
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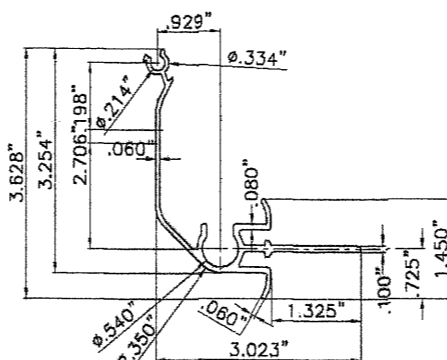
21 HV CENTERMATE

QUALIFIED FOR USE W/ HV BLADE ① & ①A ONLY
6063-T6 ALLOY AND TEMPER



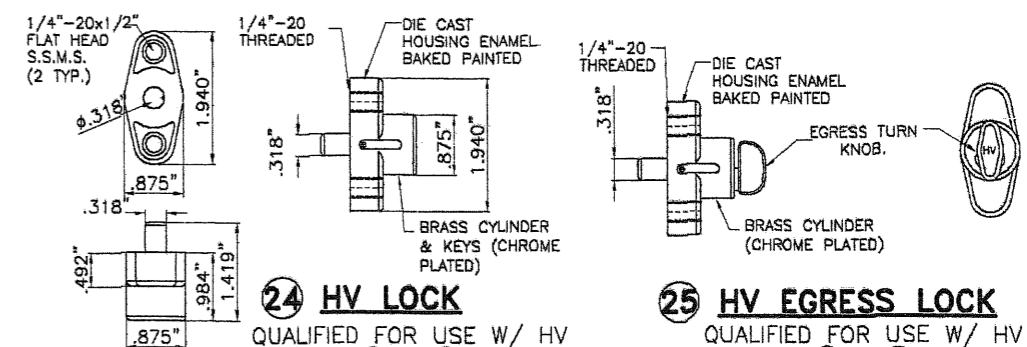
22 HV FLOATING CENTERMATE

QUALIFIED FOR USE W/ HV BLADE ① & ①A ONLY
6063-T6 ALLOY AND TEMPER



23 HV CORNER CENTERMATE

QUALIFIED FOR USE W/ HV BLADE ① ONLY
6063-T6 ALLOY AND TEMPER

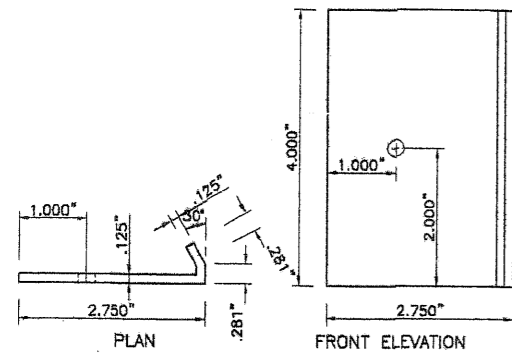


24 HV LOCK

QUALIFIED FOR USE W/ HV BLADE ① & ①A ONLY.

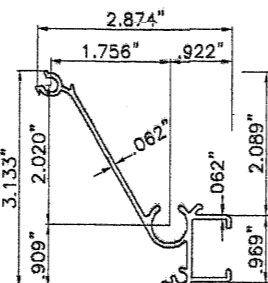
25 HV EGRESS LOCK

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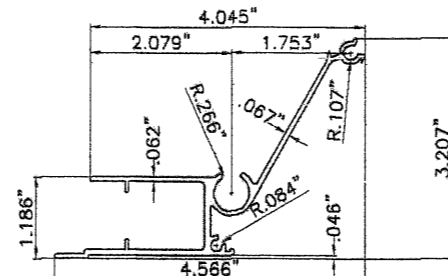
27 LOCKER FOR "T" LOCK CENTERMATE

QUALIFIED FOR USE W/ HV BLADE ① ONLY
6063-T6 ALLOY AND TEMPER



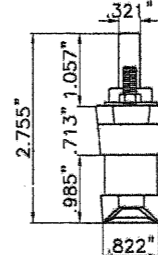
28 HV MALE "T" LOCK CENTERMATE

QUALIFIED FOR USE W/ HV BLADE ① ONLY
6063-T6 ALLOY AND TEMPER



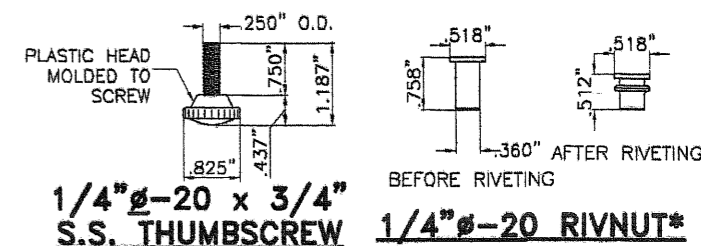
29 HV FEMALE "T" LOCK CENTERMATE

QUALIFIED FOR USE W/ HV BLADE ① ONLY
6063-T6 ALLOY AND TEMPER



30 HV "T" LOCK

QUALIFIED FOR USE W/ HV BLADE ① ONLY.

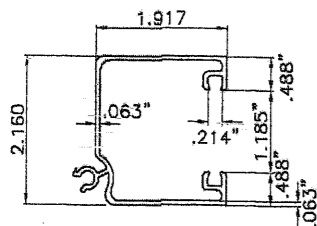


26 HV ALTERNATIVE LOCK

QUALIFIED FOR USE W/ HV BLADE ① ONLY.

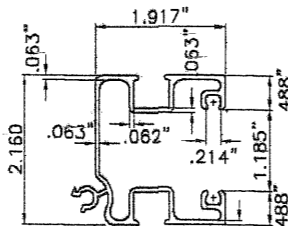
1/4"Ø-20 x 3/4" S.S. THUMBSCREW **1/4"Ø-20 RIVNUT***

*SERIES 9444 ALUMINUM (2024-T3 ALLOY) LARGE FLANGE THIN SHEET NUTSERT, PART # 0820, AS MANUFACTURED BY AVDEL CHERRY TEXTORN, PARSIPPENY, NEW JERSEY 07054 OR EQUAL.



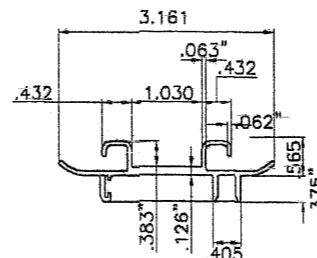
31 HD CENTERMATE W/ NO LOCKING ROD

QUALIFIED FOR USE W/ HV BLADE ①, ①A & ②
6063-T6 ALLOY AND TEMPER
VARIES, 12" MIN.



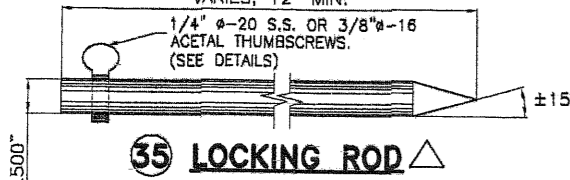
32 HD CENTERMATE W/ LOCKING ROD

QUALIFIED FOR USE W/ HV BLADE ①, ①A & ②
6063-T6 ALLOY AND TEMPER



33 HD CENTERMATE'S INSERT

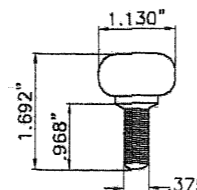
QUALIFIED FOR USE W/ HV BLADE ①, ①A & ②
6063-T6 ALLOY AND TEMPER



35 LOCKING ROD

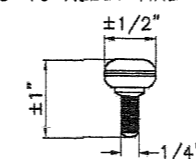
QUALIFIED FOR USE W/ HV BLADE ① & ②
6063-T6 ALLOY AND TEMPER

△ 35 INSTALLATION WILL REQUIRE A 7/16" HOLE DRILLED AT TRACKS FOR PROPER EMBEDMENT



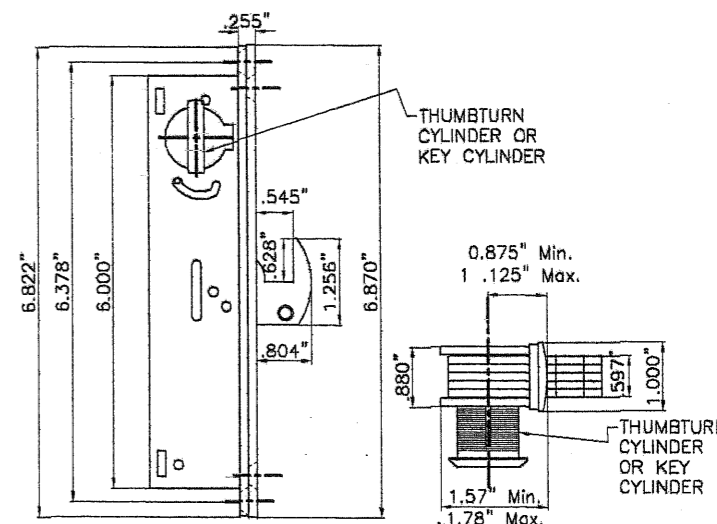
36 HV 3/8"Ø-16 ACETAL THUMBSCREWS

QUALIFIED FOR USE W/ HV BLADE ① & ②



37 HV 1/4"Ø-20 AISI 304 SERIES S.S. THUMBSCREWS

QUALIFIED FOR USE W/ HV BLADE ① & ②



34 HD LOCK

BY REGENT HARDWARE MORTISE LOCKS SERIES 2333 HOOK BOLT LOCK.
QUALIFIED FOR USE W/ HV BLADE ①, ①A & ②

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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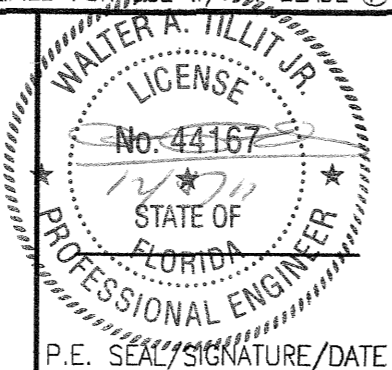
BERTHA HV™
Accordion Shutter System

H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

REV. No	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			
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DRAWING No
11-194

SHEET
3 OF 28



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e-mail: tilteco@aol.com
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WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

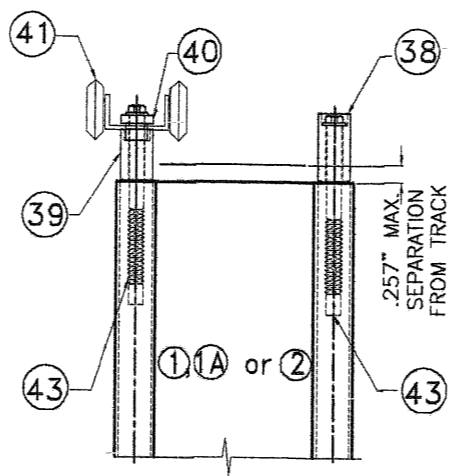
A.S.S.A.
American Shutter Systems
Association, Inc.
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West Palm Beach, FL 33407

SHUTTER ASSEMBLY SCHEDULE FOR HV ①, HV ①A AND HV ② BLADES.

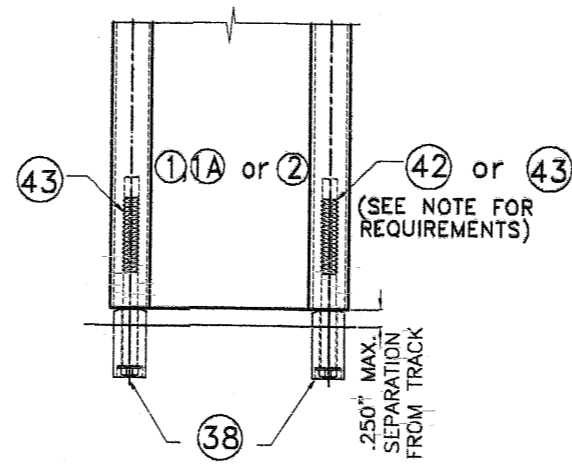
①	HV BLADE 1
①A	HV BLADE 1A
②	HV BLADE 2
③8	HV LONG RECESSED NYLON BUSHING
③9	HV SHORT RECESSED NYLON BUSHING
④0	HV NYLON HAT WASHER
④1	HV WHEEL CARRIAGE AISI 302-303 SERIES ø.870"x3/16" THICK NYLON WHEEL. 0.188"ø AISI 302 SERIES S.S. RIVETS
④2	HV 1 3/4" ACCORDION PIN W/ #8 HEAD *
④3	HV 2 3/4" ACCORDION PIN W/ #8 HEAD *
④4	POLYCARBONATE IMPACT RESISTANT HV WINDOW (SEE SHEET 27)

*** HV PIN REQUIREMENTS AT EXTERIOR BLADE KNUCKLE FOR HV ①, HV ①A & HV ② BLADES.**

- (1) HV PIN ④3 SHALL ALWAYS BE USED AT ALL EXTERIOR BOTTOM KNUCKLES OF HV ACCORDION SYSTEM W/ HV ① OR HV ①A BLADE.
- (2) HV PIN ④2 MAY BE USED IN LIEU OF ④3 AND ONLY AT EXTERIOR BOTTOM KNUCKLES OF HV ACCORDION SYSTEM W/ HV ② BLADE WHEN CORRESPONDING TO INSTALLATIONS "CC" AND "DD", SHEET 22.
- (3) HV PIN ④2 OR ④3 W/ 1/2" O.D. 1/16" THICK S.S. WASHER SHALL BE USED FOR DIRECT MOUNT INSTALLATION PER DETAIL X, SHEETS 11 & 24.

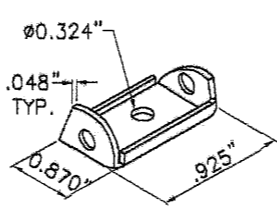


EXTERIOR



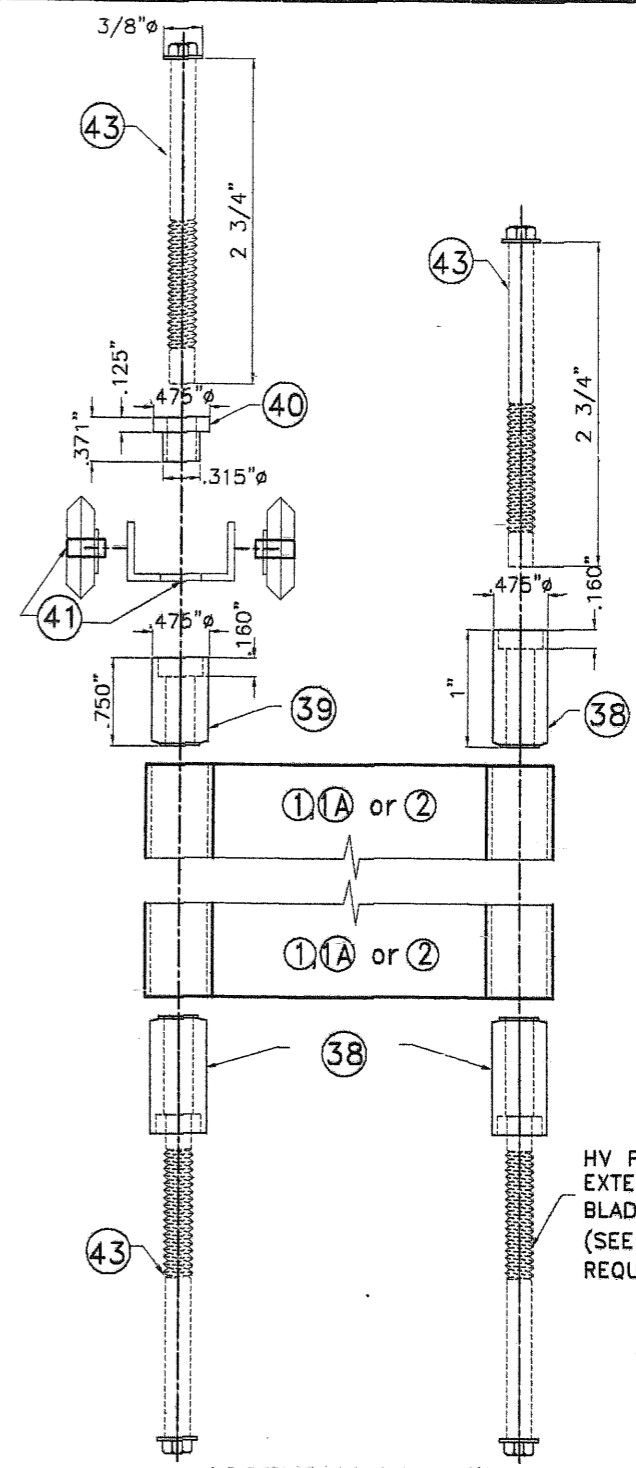
TYPICAL SHUTTER ASSEMBLY

SCALE: 3/8" = 1"



WHEEL CARRIAGE DETAIL

N.T.S.



EXTERIOR

ASSEMBLY LAYOUT

N.T.S.

HV PIN ④2 OR ④3 AT EXTERIOR BLADE'S KNUCKLE. (SEE NOTE * FOR REQUIREMENTS)

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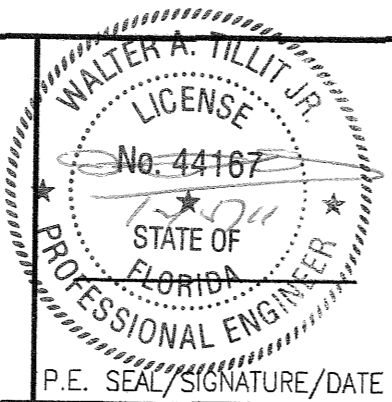
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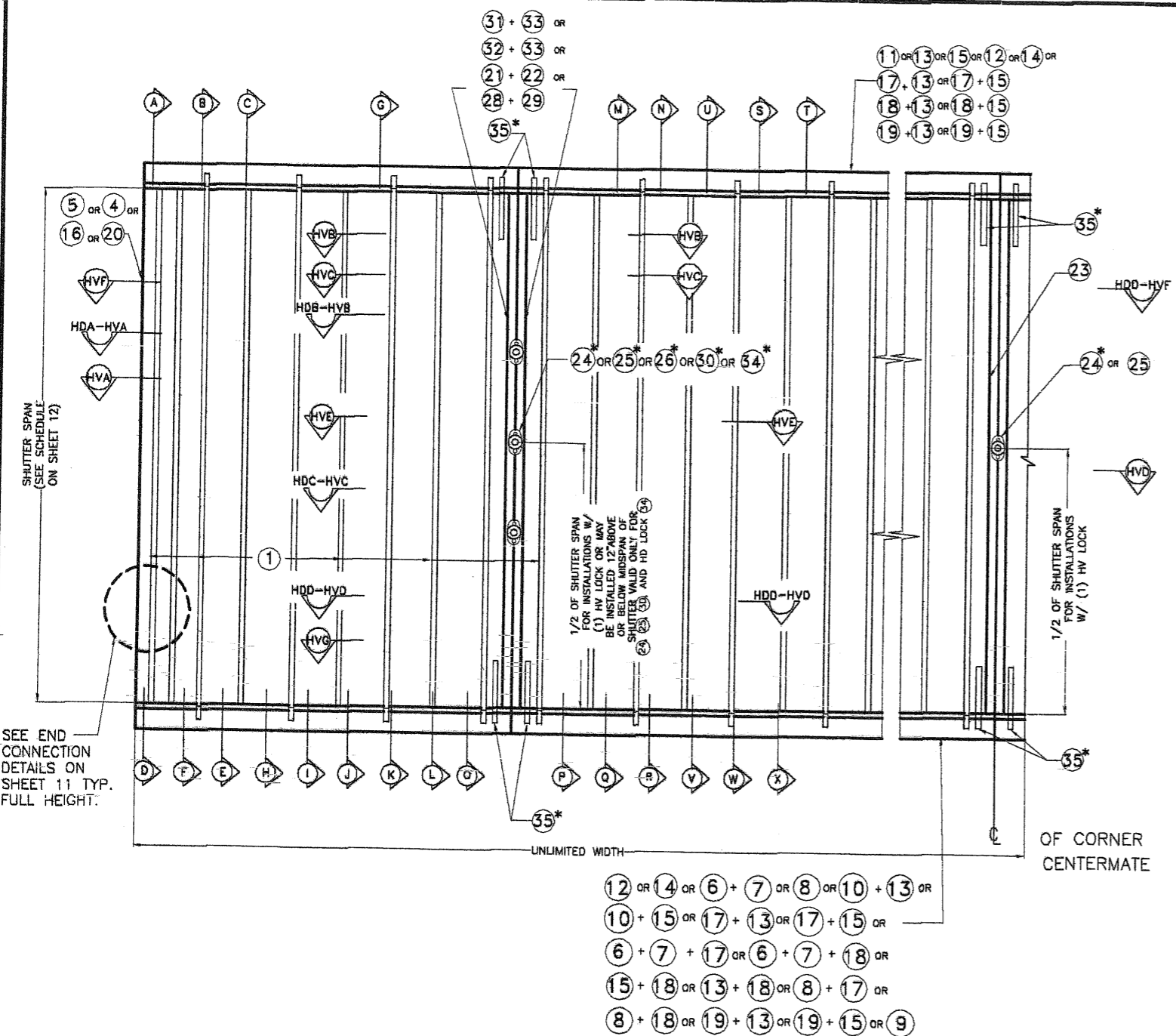
SHEET
4 OF 28



TILLIT TESTING & ENGINEERING COMPANY
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e-mail: tilteco@aol.com
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WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167



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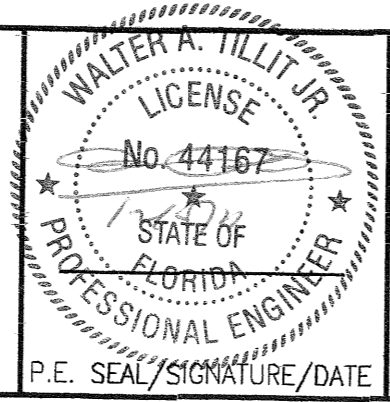


TYPICAL ① HV BLADE SHUTTER ELEVATION
N.T.S.

- * NOTES ON HV LOCKS AND CENTERMATES:**
- MANDATORY CONDITION #1:** ONE HV LOCK (24) or (25) 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 105", AND FOR INSTALLATIONS AT ANY ELEVATION. HV LOCK (24) or (25) MAY BE USED AS AN INSIDE OR OUTSIDE LOCK, ATTACHED TO (21) OR (22) CENTERMATES W/(2) 1/4"φ-20 x 1/2" LONG FLAT HEAD S.S. M.S. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION.
 - OPTIONAL CONDITION #1:** IF DESIRED, FOR BETTER PERFORMANCE OR FOR SECURITY PURPOSES, UP TO TWO HV LOCKS (24), (25) OR (26) MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. CONNECTION OF LOCKS TO CENTERMATES (21) OR (22) SHALL BE AS INDICATED ON NOTE (1) ABOVE. LOCATION OF LOCKS SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION.
 - OPTIONAL CONDITION #2 (VALID ONLY WHEN MANDATORY CONDITION #1 OR LIMITED MANDATORY CONDITION #2 IS USED W/TWO H.V. LOCKS):** LOCKING RODS (35) ARE NOT REQUIRED AT HURRICANE POSITION, BUT MAY BE USED IF DESIRED TO ENHANCE SHUTTER PERFORMANCE. LOCKING RODS (35) OR AN ALTERNATIVE DEVICE MAY ALSO BE USED AT STACKING POSITION (NON HURRICANE POSITION).
 - MANDATORY CONDITION #2:** ONE HV LOCK (24) or (25) SHALL BE USED AT CORNER CENTERMATES FOR ANY SPAN AND INSTALLATIONS AT ANY ELEVATION. HV LOCK (24) or (25) SHALL BE USED AS AN OUTSIDE OR INSIDE LOCK, ATTACHED TO (23) CORNER CENTERMATE W/(2) 1/4"φ-20 x 1/2" LONG FLAT HEAD S.S. M.S. TWO LOCKING RODS (35) AT TOP & BOTTOM SHALL BE USED. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION. MAXIMUM SHUTTER SPAN SHALL BE DETERMINED AS PER SCHEDULES SHOWN ON SHEET 12.
 - FIRST ALTERNATE TO MANDATORY CONDITION #1 VALID ONLY FOR HV LOCK (26) W/ SYMMETRICAL CENTERMATES (21) OR (22):** ONE ALTERNATE HV LOCK (26) MAY BE USED IN LIEU OF HV LOCK (24) or (25) FOR ANY SPAN AND INSTALLATIONS AT ANY ELEVATION. ALTERNATE LOCK (26) MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. ATTACHMENT OF 1/4"φ-20x3/4" S.S. THUMBSCREW TO (21) OR (22) CENTERMATES SHALL BE MADE W/ 1/4"φ-20x3/4" ALUM. RIVNUT AS SHOWN ON SECTION HVE, SHEET 8. ONE LOCK SHALL BE USED AT 1/2 OF SHUTTER SPAN OR TWO LOCKS AT 1/3 OF SHUTTER SPAN.

- *NOTES ON HV "T" LOCKS AND CENTERMATES:**
- SECOND ALTERNATE TO MANDATORY CONDITION #1 VALID ONLY FOR HV "T" LOCK (30) AND CENTERMATES (28) AND (29):** ONE ALTERNATE HV "T" LOCK (30) MAY BE INSTALLED IN LIEU OF HV LOCKS (24) OR (25) FOR ANY SPAN AND INSTALLATION AT ANY ELEVATION. ALTERNATE LOCK (30) MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. ATTACHMENT OF LOCK (30) INCLUDES USING REINFORCING LOCKER (27), AS SHOWN ON SECTION HVG, SHEET 9, WHICH MUST BE CONNECTED TO CENTERMATES (28) AND (29) W/ 1/4"φ-20 x 1 1/2" LONG S.S. THREADED BOLT W/ 7/8"φ x 3/32" WINGNUT OR W/ 1/4"φ-20x1" S.S.M.S. INTO A 1/4"φx 5/8" RIVNUT. LOCK MAY BE INSTALLED AT MIDSPAN OR 12" MAXIMUM ABOVE AND BELOW MIDSPAN. USE OF TWO LOCKING RODS (35) TOP AND BOTOM IS MANDATORY.

- *NOTES ON HD LOCKS & CENTERMATES:**
- HD LOCK (34) W/ HD CENTERMATES (31) OR (32) W/ (33):** ONE ALTERNATE HD LOCK (34) MAYBE USED IN LIEU OF HV LOCKS (24) OR (25) FOR ANY SPAN AND INSTALLATIONS AT ANY ELEVATION. ALTERNATE HD LOCK (34) MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. ATTACHMENT OF HD LOCK (34) TO (33) IS W/ 3 #8 x 3/8" F.H. S.S.M.S., AND INCLUDES REINFORCEMENT INSERT (33) AS SHOWN ON SECTIONS HDB-HVB AND HDC-HVC, SHEET 10. LOCK MAY BE INSTALLED AT MIDSPAN OR 12" MAXIMUM BELOW OR ABOVE MIDSPAN. USE OF LOCKING RODS (35) IS COMPLETELY OPTIONAL.



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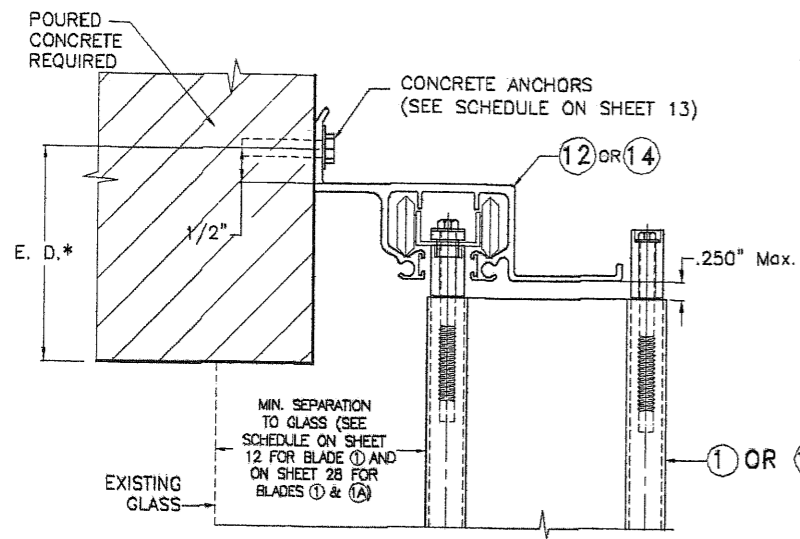
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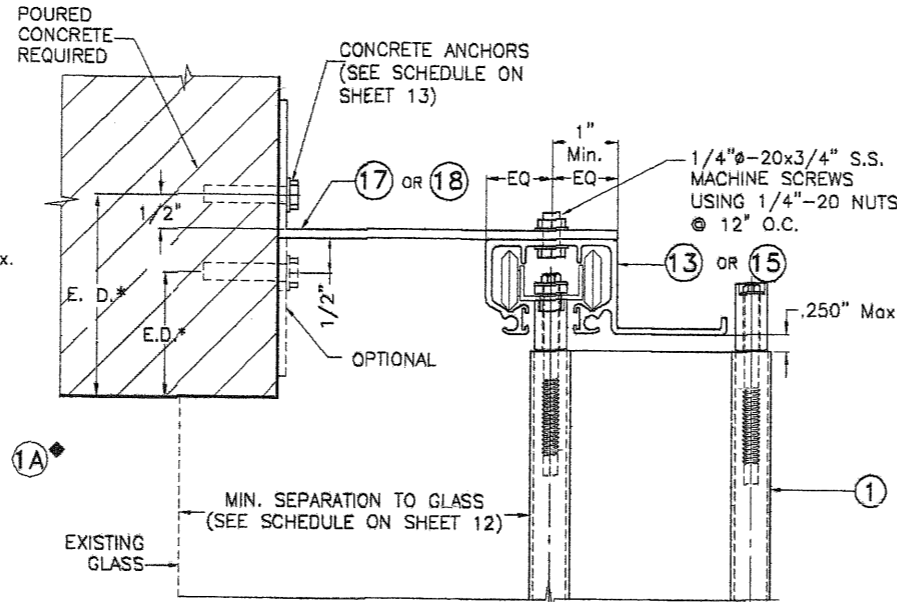
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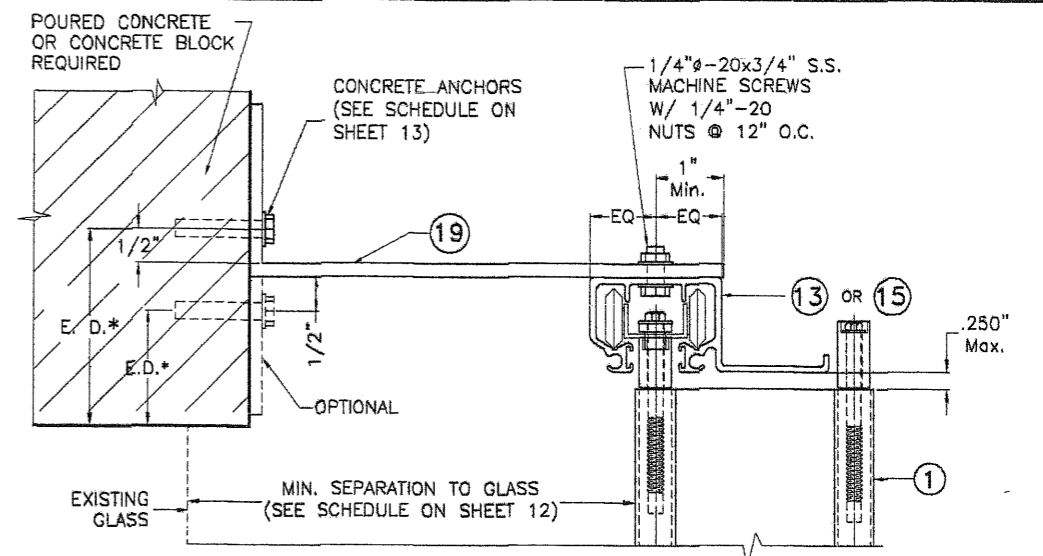
SHEET
5 OF 28



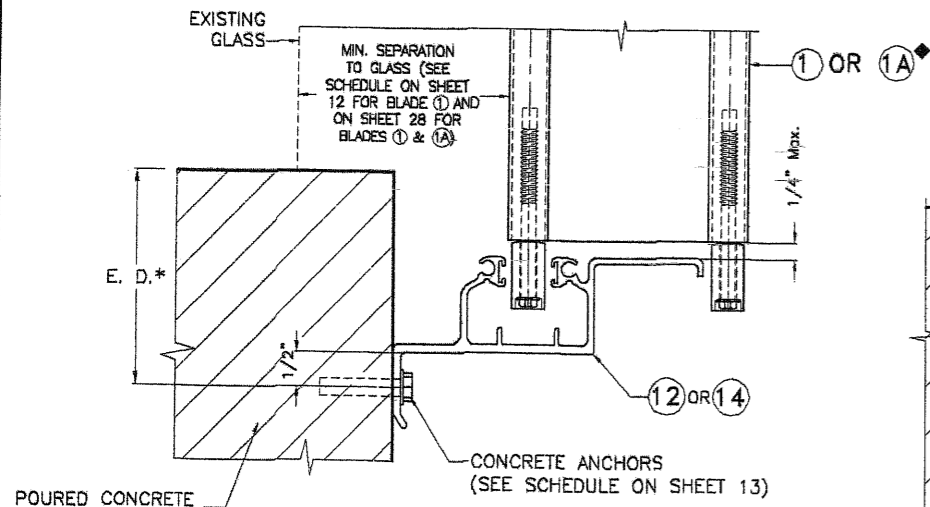
A HV WALL HEADER INSTALLATION



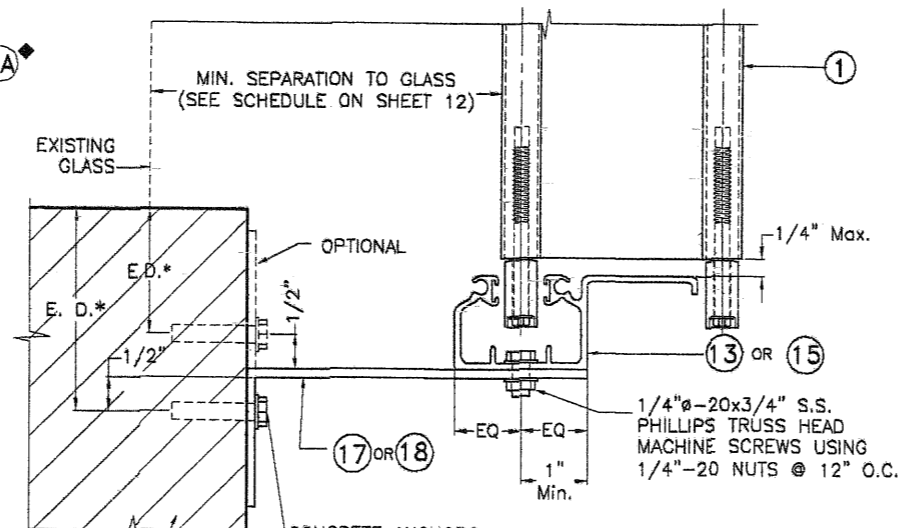
B HV WALL HEADER INSTALLATION



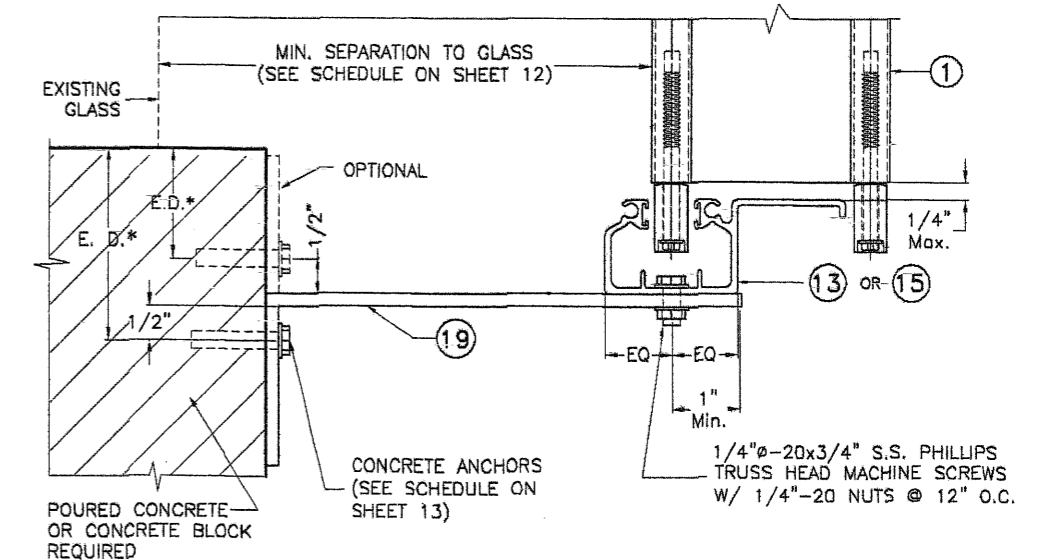
C HV WALL HEADER INSTALLATION



D HV WALL SILL INSTALLATION



E HV WALL SILL INSTALLATION



F HV WALL SILL INSTALLATION

NOTE FOR COMBINATION OF SECTIONS:
 1- SEE SHEET 4 FOR TYPICAL SHUTTER ASSEMBLY
 2- MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.

* E. D. = EDGE DISTANCE
 (SEE SPECIFICATIONS ON SHEET 14)

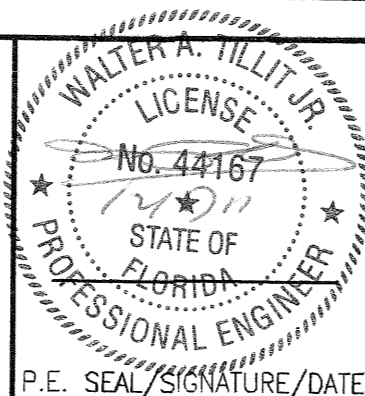
◆ SEE LIMITATIONS OF USE FOR BLADE 1A ON SHEET 28

**INSTALLATION DETAILS W/
 1 HV BLADE**

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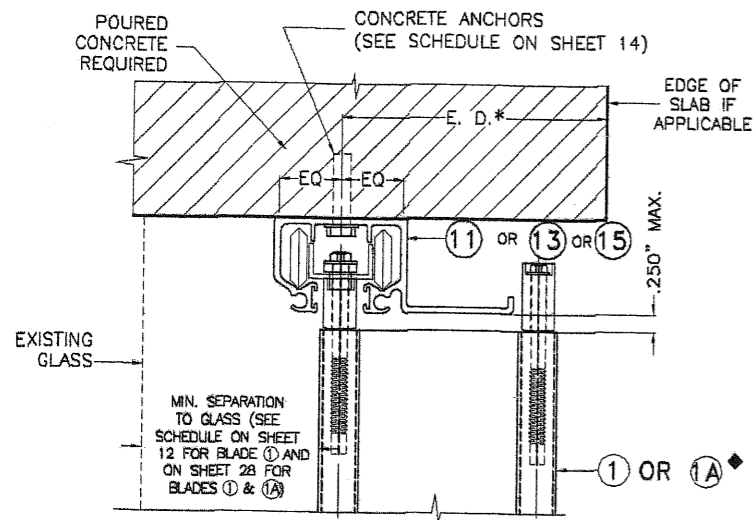
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2			DRAWING No
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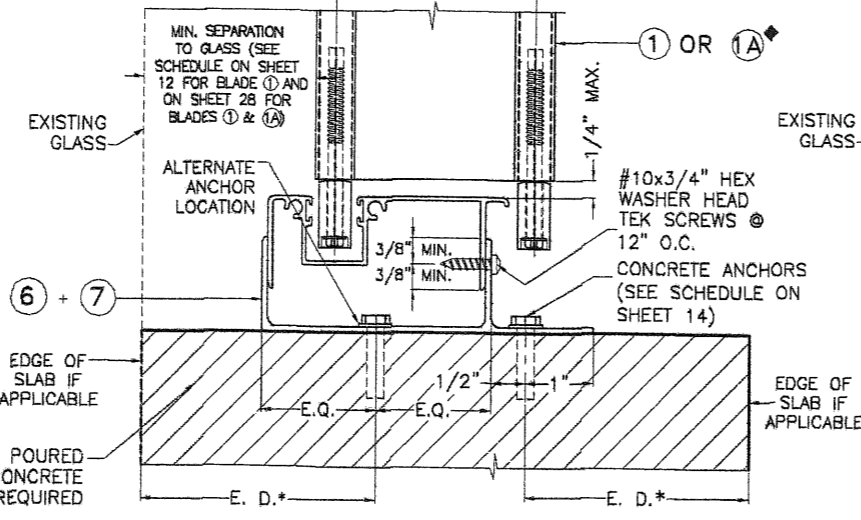


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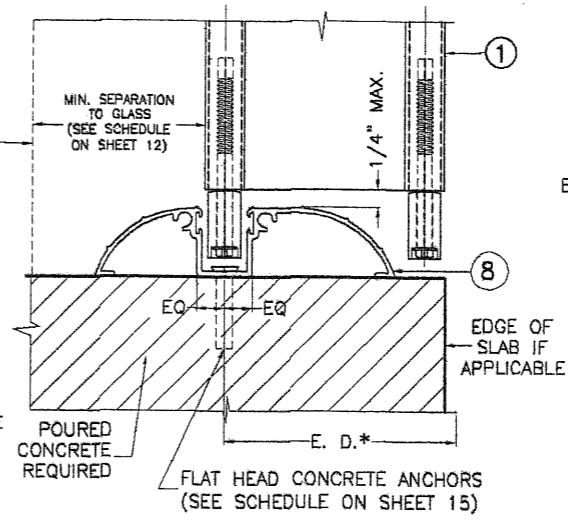
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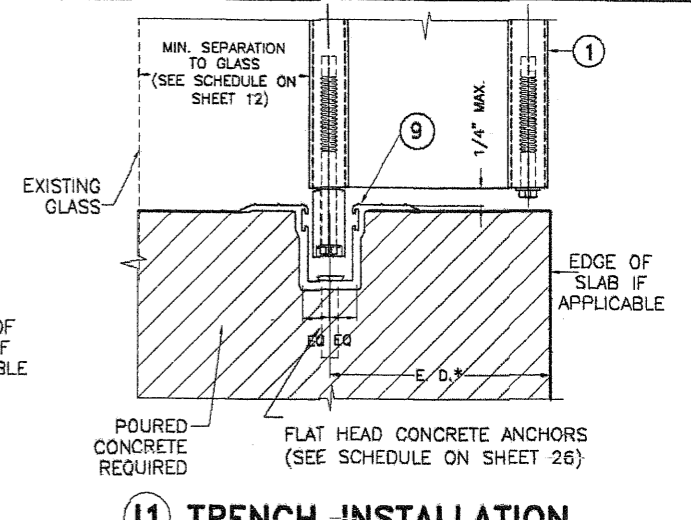
G HV CEILING INSTALLATION



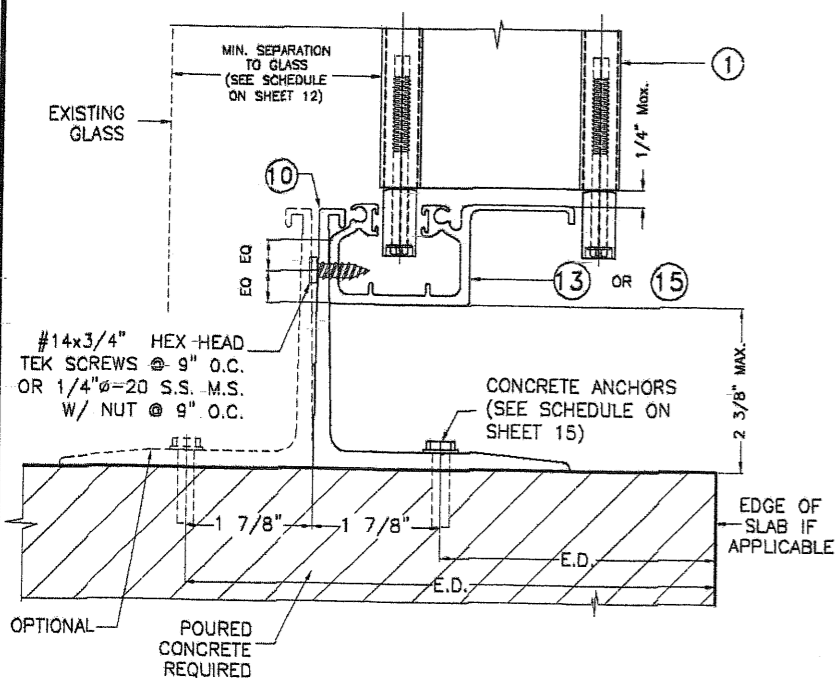
H HV FLOOR INSTALLATION †



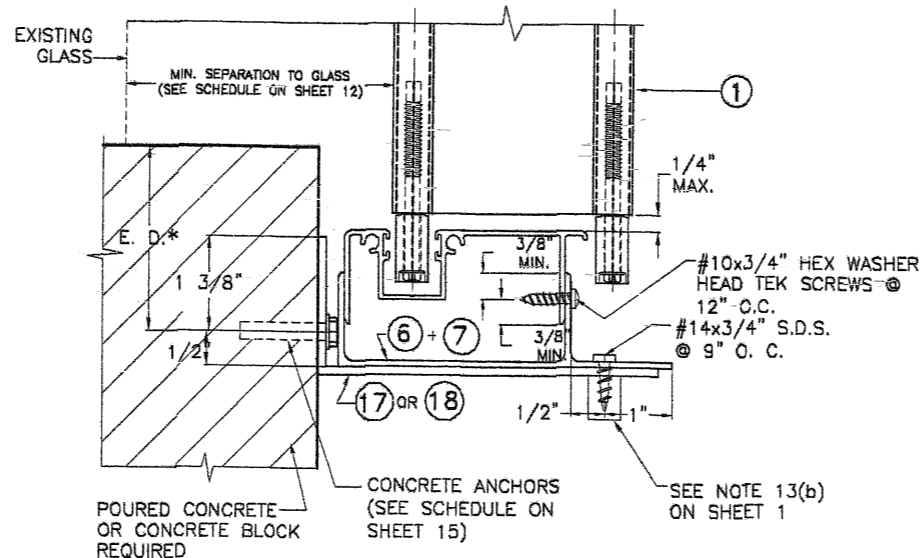
I HV WALK-OVER INSTALLATION



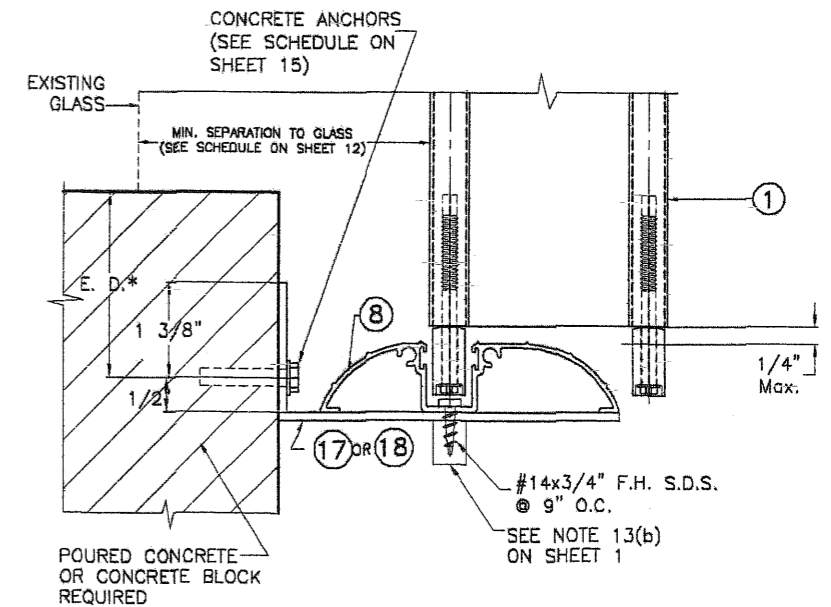
11 TRENCH INSTALLATION
VALID ONLY FOR UP TO +70, -75 PSF PRESSURE RATING & FOR SPANS PER SCHEDULE #3, SHEET 12



J HV RAINGUARD INSTALLATION †



K HV WALL FLOOR INSTALLATION



L HV WALL WALK-OVER INSTALLATION

NOTE FOR COMBINATION OF SECTIONS:
1- SEE SHEET 4 FOR TYPICAL SHUTTER ASSEMBLY
2- MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.

* E. D. = EDGE DISTANCE
(SEE SPECIFICATIONS ON SHEET 14)

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

◆ SEE LIMITATIONS OF USE FOR BLADE (1A) ON SHEET 28

**INSTALLATION DETAILS W/
1 HV BLADE**

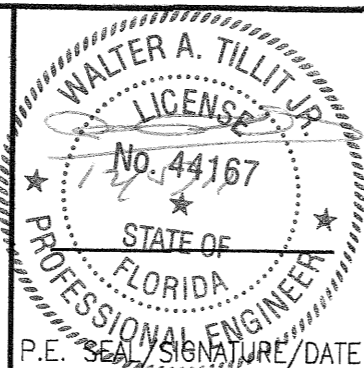
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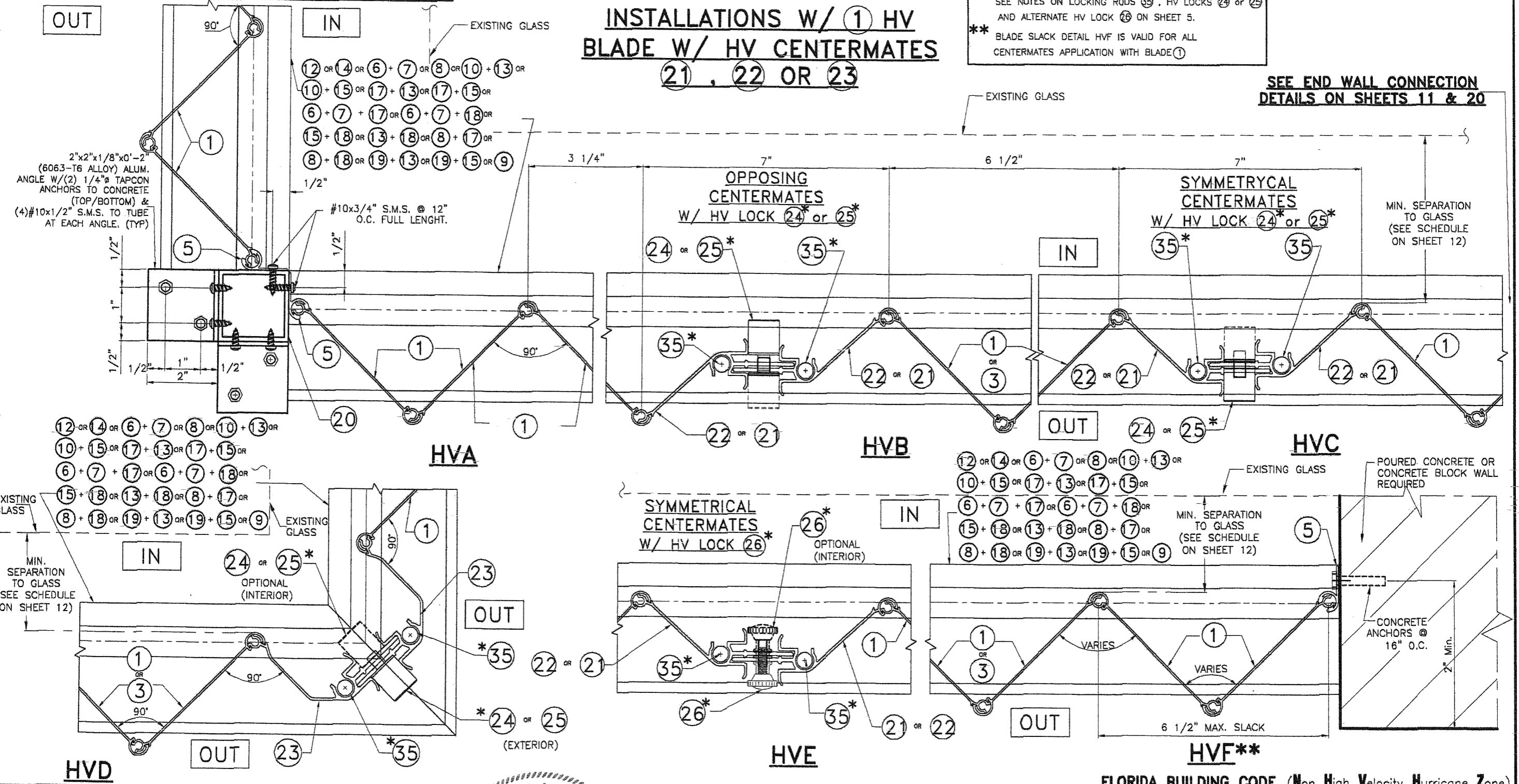
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SEE END WALL CONNECTION DETAILS ON SHEETS 11 & 20

INSTALLATIONS W/ ① HV BLADE W/ HV CENTERMATES ②①, ②② OR ②③

* SEE NOTES ON LOCKING RODS ③⑤, HV LOCKS ②④ OR ②⑤ AND ALTERNATE HV LOCK ②⑥ ON SHEET 5.
 ** BLADE SLACK DETAIL HVF IS VALID FOR ALL CENTERMATES APPLICATION WITH BLADE ①

SEE END WALL CONNECTION DETAILS ON SHEETS 11 & 20



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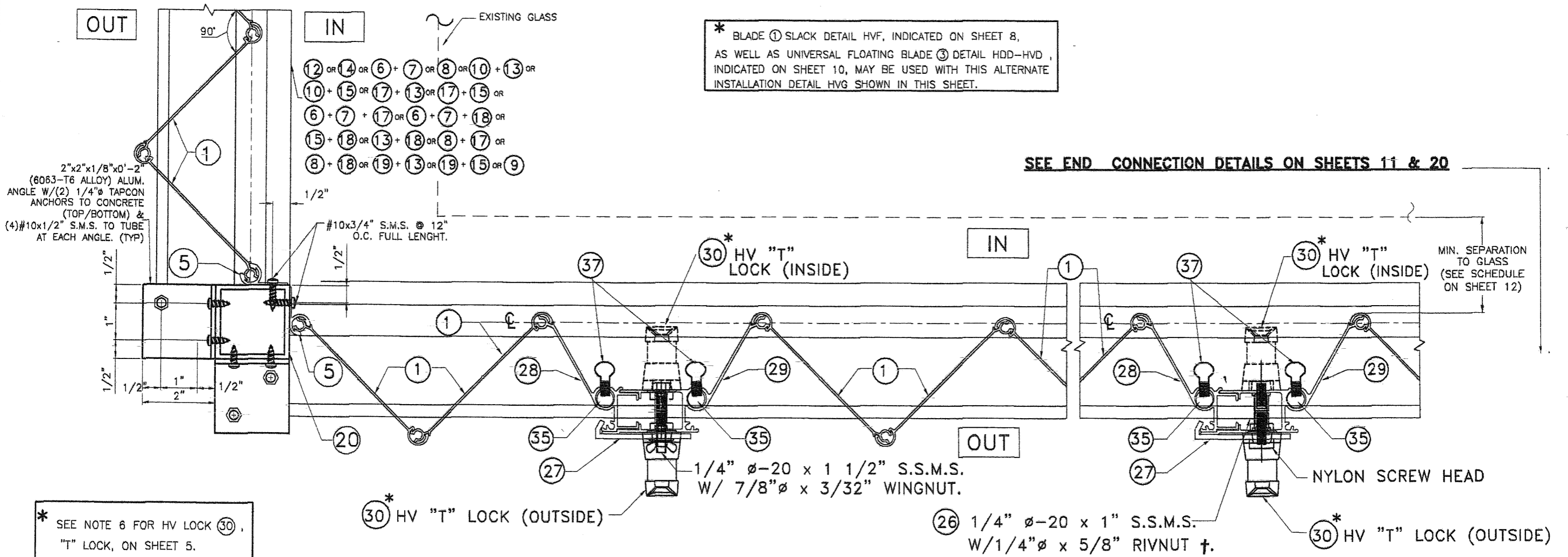
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11-194
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8 OF 28

ALTERNATE INSTALLATION W/HV "T" LOCK 30, HV MALE/FEMALE "T" LOCKS CENTERMATES 28, 29 & LOCKERS 27 W/ 1 HV BLADE *

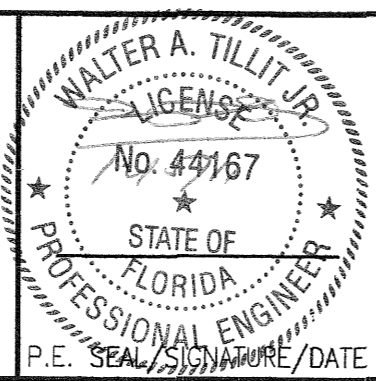
SEE END CONNECTION DETAILS ON SHEETS 11 & 20



*** SEE NOTE 6 FOR HV LOCK 30, "T" LOCK, ON SHEET 5.**

† SERIES 9444 ALUMINUM (2024-T3 ALLOY) LARGE FLANGE THIN SHEET NUTSERT, PART # 0820, AS MANUFACTURED BY AVDEL CHERRY TEXTORN, PARSIPPENY, NEW JERSEY 07054 OR EQUAL.

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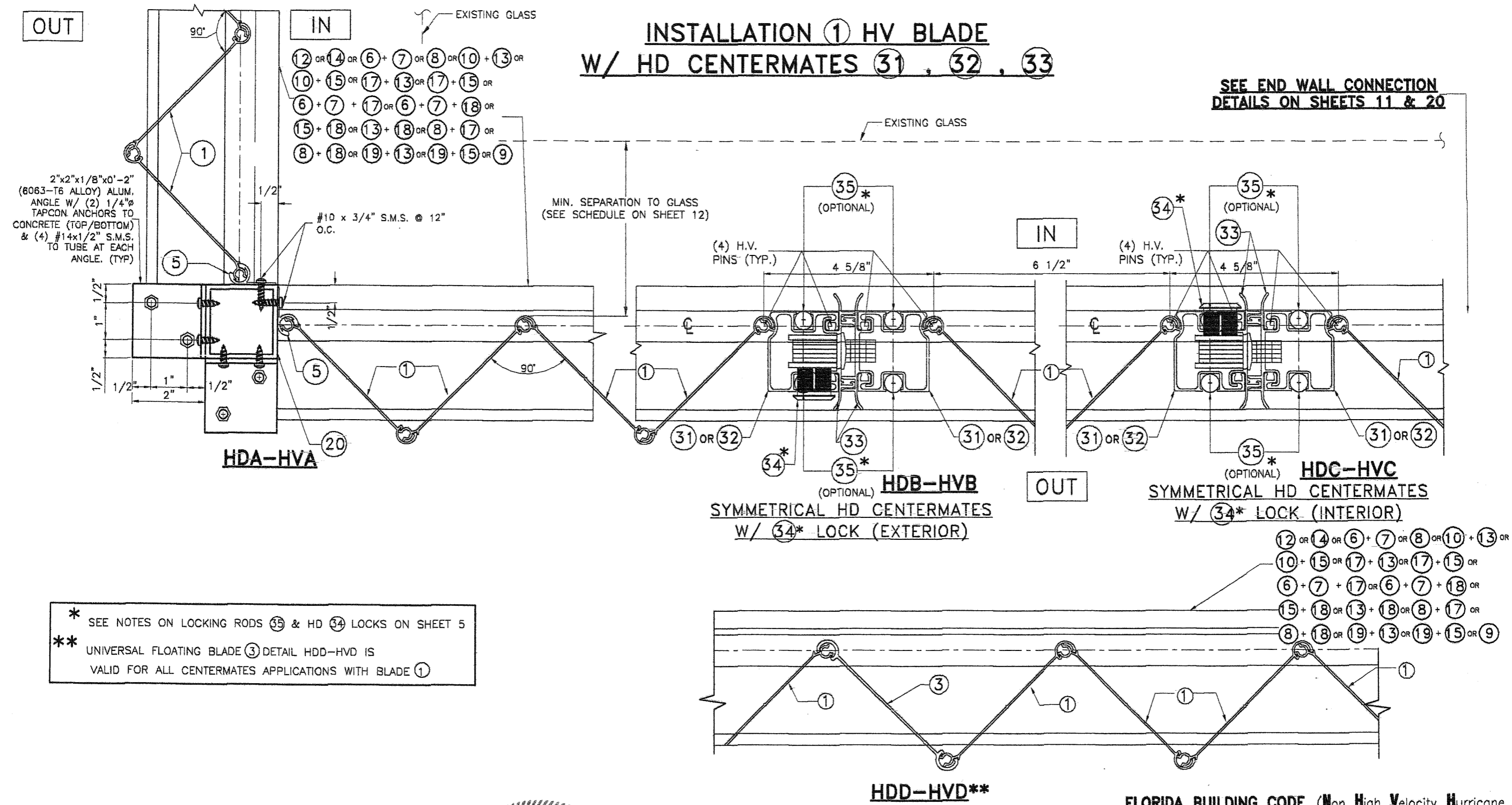
SEE END WALL CONNECTION DETAILS ON SHEETS 11 & 20

OUT

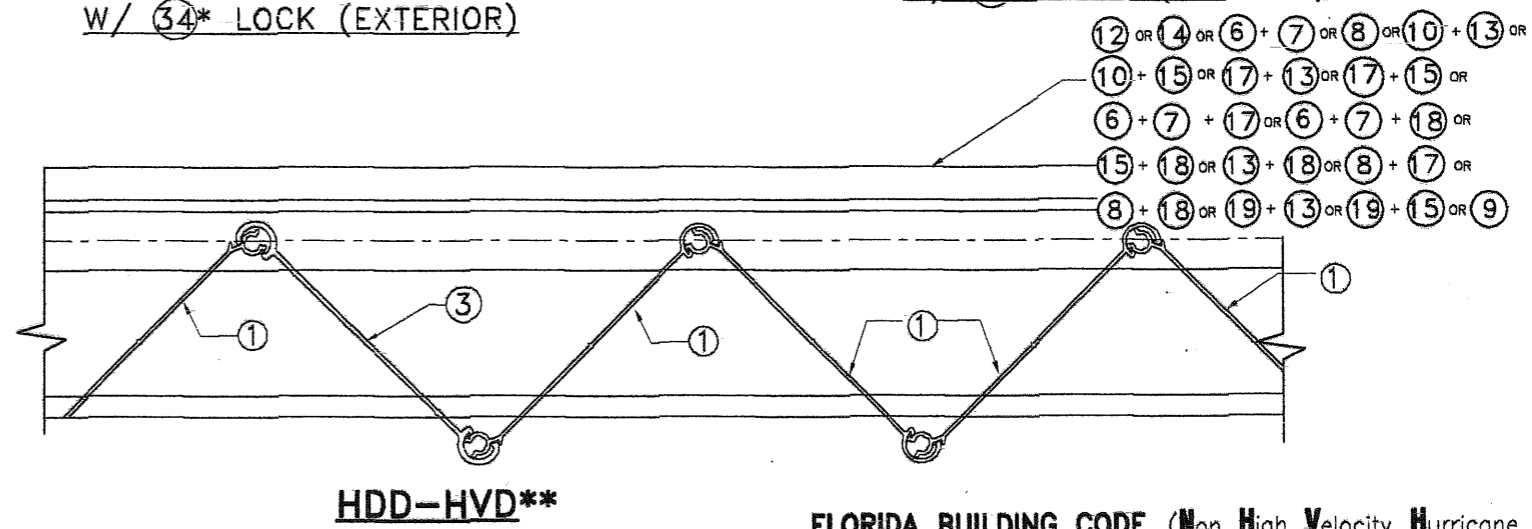
IN

INSTALLATION ① HV BLADE W/ HD CENTERMATES ③①, ③②, ③③

SEE END WALL CONNECTION
DETAILS ON SHEETS 11 & 20



* SEE NOTES ON LOCKING RODS ③⑤ & HD ③④ LOCKS ON SHEET 5
 ** UNIVERSAL FLOATING BLADE ③ DETAIL HDD-HVD IS VALID FOR ALL CENTERMATES APPLICATIONS WITH BLADE ①



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 West Palm Beach, FL 33407

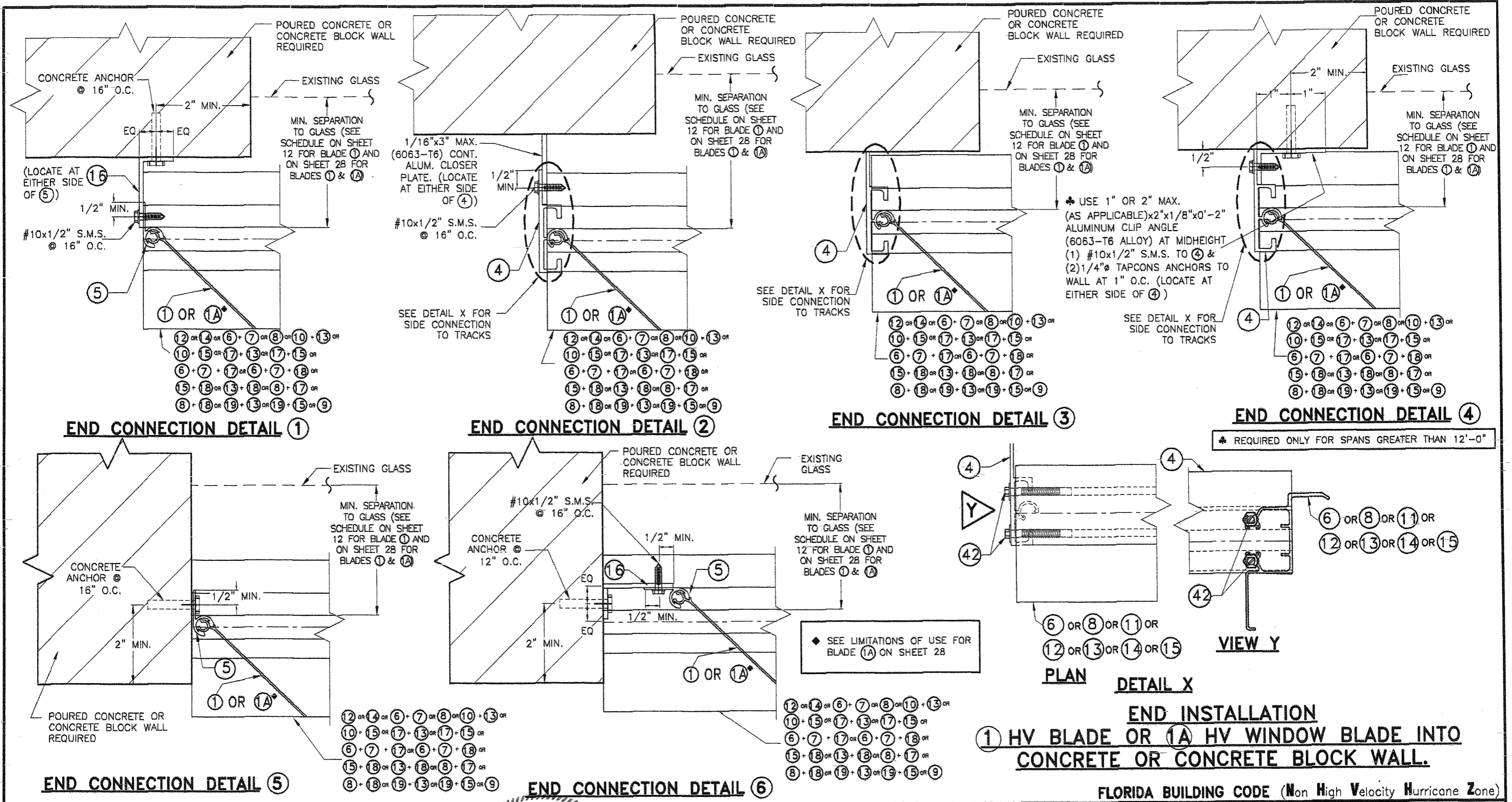
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BERTHA HV™
 Accordion Shutter System

H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

REV. No	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			
3			
4			
5			
6			

DRAWING No
11-194
 SHEET
10 OF 28



FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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

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 TILLIT TESTING & ENGINEERING COMPANY
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 American Shutter Systems
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 4268 Westroads Drive
 West Palm Beach, FL 33407

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1	OLD 08-152	12/02/11	DATE: 12/02/11
2			
3			
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5			
6			

DRAWING No
11-194

SHEET
11 OF 28

SCHEDULE #1

MAXIMUM SHUTTER SPAN* "L+" OR "L-" (ft.) FOR INSTALLATIONS W/ SYMMETRICAL CENTERMATES, ②1 & ②2 OR ③1 OR ③2 W/ ONE H.V. LOCK ④24 OR ④25 OR ④26 OR HD LOCK ④34 W/ NO LOCKING RODS ④35 OR CENTERMATES ④28 & ④29 W/ ONE HV "T" LOCK ④30 W/TWO LOCKING RODS ④35 TOP & BOTTOM (SEE NOTE †)

MAX. A.S.D. DESIGN PRESSURE RATING (p.s.f.) (+ OR -)	CONCRETE & WOOD INSTALLATIONS ①			
	WALL MOUNTING		FLOOR/CEILING MOUNTING	
	L+ (ft)	L- (ft)	L+ (ft)	L- (ft)
30 OR LESS	16'-0"	16'-0"	16'-0"	16'-0"
35	14'-10"	14'-10"	15'-2"	16'-0"
40	13'-10"	13'-10"	14'-2"	15'-2"
45	13'-1"	13'-1"	13'-4"	14'-3"
50	12'-5"	12'-5"	12'-8"	13'-7"
55	11'-10"	11'-10"	12'-1"	12'-11"
60	11'-4"	11'-4"	11'-7"	12'-4"
65	10'-10"	10'-10"	11'-1"	11'-11"
70	10'-6"	10'-6"	10'-9"	11'-5"
75	10'-1"	10'-1"	10'-4"	11'-1"
80	9'-10"	9'-10"	10'-0"	10'-9"
85	9'-6"	9'-6"	9'-9"	10'-5"
90	9'-3"	9'-3"	9'-5"	10'-1"
95	9'-0"	8'-9"	9'-2"	9'-10"
100	8'-9"	8'-4"	9'-0"	9'-7"
105	8'-7"	7'-11"	8'-9"	9'-4"
110	8'-4"	7'-7"	8'-7"	9'-2"
115	8'-2"	7'-3"	8'-4"	8'-11"
120	8'-0"	6'-11"	8'-2"	8'-9"
125	7'-10"	6'-8"	8'-0"	8'-5"
130	7'-8"	6'-5"	7'-10"	8'-1"
135	7'-7"	6'-2"	7'-9"	7'-9"
140	7'-5"	5'-11"	7'-7"	7'-6"
145	7'-3"	5'-9"	7'-5"	7'-3"
150	7'-2"	5'-7"	7'-4"	7'-0"
155	7'-0"	5'-5"	7'-2"	6'-9"
160	6'-11"	5'-2"	7'-1"	6'-7"
165	6'-10"	5'-1"	7'-0"	6'-4"
170	6'-9"	4'-11"	6'-11"	6'-2"
175	6'-7"	4'-9"	6'-9"	6'-0"
180	6'-6"	4'-8"	6'-8"	5'-10"
185	6'-5"	4'-6"	6'-7"	5'-8"
190	6'-4"	4'-5"	6'-6"	5'-6"
195	6'-3"	4'-3"	6'-5"	5'-5"
200	6'-2"	4'-2"	6'-4"	5'-3"
205	6'-1"	4'-1"	6'-3"	5'-1"

SCHEDULE #2

MAXIMUM SHUTTER SPAN* "L+" OR "L-" (ft.) FOR INSTALLATIONS W/ OPPOSING CENTERMATES, ②1 & ②2 OR ONE HV LOCK ④24 OR ④25 OR ④26 W/ NO LOCKING RODS ④35 (SEE NOTE †)

MAX. A.S.D. DESIGN PRESSURE RATING (p.s.f.) (+ OR -)	CONCRETE & WOOD INSTALLATIONS ①	
	WALL MOUNTING & FLOOR/CEILING MOUNTING	
	L+ (ft)	L- (ft)
30	16'-0"	16'-0"
35	14'-10"	14'-10"
40	13'-10"	13'-10"
45	13'-1"	13'-1"
50	12'-5"	12'-5"
55	11'-10"	11'-10"
60	11'-4"	11'-4"
65	10'-10"	10'-10"
70	10'-6"	10'-6"
75	10'-1"	10'-1"
80	9'-10"	9'-10"
85	9'-6"	9'-6"
90	9'-3"	9'-3"
95	9'-0"	8'-9"
100	8'-9"	8'-4"
105	8'-7"	7'-11"
110	8'-4"	7'-7"
115	8'-2"	7'-3"
120	8'-0"	6'-11"
125	7'-10"	6'-8"
130	7'-8"	6'-5"
135	7'-7"	6'-2"
140	7'-5"	5'-11"
145	7'-3"	5'-9"
150	7'-2"	5'-7"
155	7'-0"	5'-5"
160	6'-11"	5'-2"
165	6'-10"	5'-1"
170	6'-9"	4'-11"
175	6'-7"	4'-9"
180	6'-6"	4'-8"
185	6'-5"	4'-6"
190	6'-4"	4'-5"
195	6'-3"	4'-3"
200	6'-2"	4'-2"
205	6'-1"	4'-1"

SCHEDULE #3

MAXIMUM SHUTTER SPAN* "L+" OR "L-" (ft.) INSTALLATIONS W/ SYMMETRICAL CENTERMATES ②1 & ②2 W/ ONE HV LOCKS ④24 OR ④25 W/ NO LOCKING RODS ④35

MAX. A.S.D. DESIGN PRESSURE RATING (p.s.f.) (+ OR -)	CONCRETE INSTALLATIONS	
	FLOOR/CEILING MOUNTING OR FLOOR/WALL MOUNTING	
	L+ (ft)	L- (ft)
30	16'-0"	16'-0"
35	15'-2"	16'-10"
40	14'-2"	15'-2"
45	13'-4"	14'-3"
50	12'-3"	13'-1"
55	11'-1"	11'-11"
60	10'-2"	10'-11"
65	9'-5"	10'-1"
70	8'-9"	9'-4"
75	-	8'-9"

INSTALLATION LEGEND

	CONCRETE & MANSORY	WOOD
WALL MOUNTING	A, B, C, D, E, F, K & L	M, N, O, P, Q, R, S, & V.
FLOOR/CEILING MOUNTING	G, H, I, J & K	T, U, W & X

① MAXIMUM SHUTTER SPAN "L+" OR "L-" FOR INSTALLATIONS INTO WOOD SHALL BE LIMITED TO 105 psf. A.S.D. DESIGN PRESSURE RATING.

† HV CORNER CENTERMATE #3 MAY BE USED AT ALL MOUNTING INSTALLATIONS. LOCKING SPECIFICATIONS SHALL BE AS INDICATED ON MANDATORY CONDITION #2 NOTE #5, SHEET 5.

*** NOTES:**

(1) L+: MAXIMUM ALLOWABLE SPAN FOR A GIVEN A.S.D. POSITIVE DESIGN PRESSURE RATING.
L-: MAX. ALLOWABLE SPAN FOR A GIVEN NEGATIVE A.S.D. DESIGN PRESSURE RATING.

(2) PROCEDURE TO DETERMINE MAXIMUM SPAN FOR WALL MOUNTINGS (TOP/BOTTOM) OR FLOOR/CEILING:

GIVEN A POSITIVE A.S.D. DESIGN PRESSURE RATING, DETERMINE MAXIMUM SPAN "L+" FROM SCHEDULE. GIVEN A NEGATIVE A.S.D. DESIGN PRESSURE RATING, DETERMINE MAXIMUM SPAN "L-" FROM SCHEDULE.

FINAL MAXIMUM ALLOWABLE SPAN IS EQUAL TO THE MINIMUM DETERMINED SPAN BETWEEN "L+" AND "L-".

(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:
L1+ = MAX. SPAN FOR WALL MOUNTING INSTALLATIONS.
L2+ = MAX. SPAN FOR FLOOR/CEILING MOUNTING INSTALLATIONS.

FOR A GIVEN NEGATIVE A.S.D. DESIGN PRESSURE RATING:
DETERMINE:
L1- = MAX. SPAN FOR WALL MOUNTING INSTALLATIONS.
L2- = MAX. SPAN FOR FLOOR/CEILING MOUNTING INSTALLATIONS.

FINAL MAXIMUM ALLOWABLE SPAN IS EQUAL TO THE MINIMUM BETWEEN "L1+", "L2+", "L1-" AND "L2-"

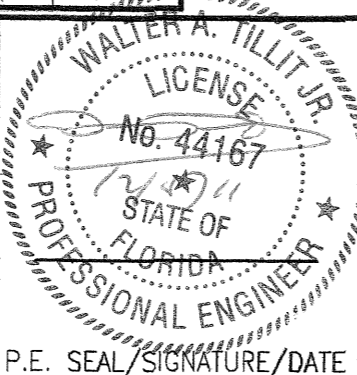
(4) GO TO ANCHOR SCHEDULE WITH FINAL MAXIMUM ALLOWABLE SPAN AND NEGATIVE A.S.D. DESIGN PRESSURE RATING TO DETERMINE MAXIMUM ANCHOR SPACING.

SEPARATION TO GLASS SCHEDULE

WIND ZONE ASTM E-1996	MINIMUM SEPARATION TO GLASS
1 THRU 3	1"

① HV BLADE

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)



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BERTHA HV™
Accordion Shutter System
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2
REV. NO. DESCRIPTION DATE DRAWN BY: M.C.V./A.G.
1 OLD 08-152 12/02/11 DATE: 12/02/11
2
3 DRAWING No
4 **11-194**
5 SHEET
6 **12 OF 28**

MAXIMUM ANCHOR* SPACING (in.) SCHEDULE FOR A GIVEN MAX. SHUTTER SPAN, A.S.D.
DESIGN NEGATIVE LOAD AND A CORRESPONDING MOUNTING TYPE FOR CONCRETE OR CONCRETE BLOCK INSTALLATIONS
 (SEE MOUNTINGS I, J, K & L ON SHEET 7)

MAXIMUM SPAN (ft)	POURED CONCRETE														POURED CONCRETE/CONCRETE BLOCK																	
	① WALK OVER & ② TRENCH MOUNTINGS ◊							④ RAINGUARD MOUNTING							⑤ WALL/FLOOR MOUNTING							⑥ WALL/WALK OVER MOUNTING										
	A.S.D. DESIGN NEGATIVE LOAD (psf)							A.S.D. DESIGN NEGATIVE LOAD (psf)							A.S.D. DESIGN NEGATIVE LOAD (psf)							A.S.D. DESIGN NEGATIVE LOAD (psf)										
	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205
3'-0" OR LESS	14	12	10	9	8	8	6	6	12	12	12	12	12	11.5	8.5	6.5	7	7	7	7	7	7	7	5.5	5	5	5	5	5	5		
4'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	10.5	8	6	4.5	7	7	7	7	7	7	6.5	5	5	5	5	5	5		
5'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	9.5	7	5.5	7	7	7	7	7	7	7	5.5	4	5	5	5	5	5		
6'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	8.5	6	4.5	7	7	7	7	7	7	6.5	5	5	5	5	5	5	5		
7'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	7.5	5.5	4	7	7	7	7	7	7	5.5	4	5	5	5	5	5	5		
8'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	6.5	5	3.5	7	7	7	7	7	7	4.5	3	5	5	5	5	5	5		
9'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	5.5	4	3	7	7	7	7	7	7	3.5	3	5	5	5	5	5	5		
10'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	4.5	3	3	7	7	7	7	7	7	2.5	2	5	5	5	5	5	5		
11'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	3.5	2	2	7	7	7	7	7	7	1.5	1	5	5	5	5	5	5		
12'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	2.5	1	1	7	7	7	7	7	7	0.5	0	5	5	5	5	5	5		
13'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	1.5	0	0	7	7	7	7	7	7	0	0	5	5	5	5	5	5		
14'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	0.5	0	0	7	7	7	7	7	7	0	0	5	5	5	5	5	5		
15'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	0	0	0	7	7	7	7	7	7	0	0	5	5	5	5	5	5		
16'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	0	0	0	7	7	7	7	7	7	0	0	5	5	5	5	5	5		

ANCHORS SPACING LEGEND

TAPCON OR TAPCON WITH ADVANCED THREADFORM TECHNOLOGY
ALL POINTS SOLID-SET
BLUE TAP
TAPPER+

* SEE ANCHOR SPECIFICATIONS ON SHEET 14

◊ VALID ONLY FOR UP TO +70, -75 PSF A.S.D. DESIGN PRESSURE RATING & FOR SPANS PER SCHEDULE #3, SHEET 12

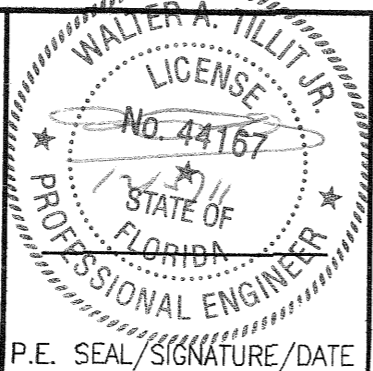
① HV BLADE ONLY

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H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2		DRAWN BY: M.C.V./A.G.	
REV. No	DESCRIPTION	DATE	DATE: 12/02/11
1	OLD 08-152	12/02/11	
2			
3			DRAWING No
4			11-194
5			SHEET
6			15 OF 28



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**MAXIMUM ANCHOR⁺ SPACING (in.) SCHEDULE FOR A GIVEN MAX. SHUTTER SPAN,
NEGATIVE A.S.D. DESIGN PRESSURE RATING AND A CORRESPONDING MOUNTING TYPE**
(SEE MOUNTINGS ON SHEETS 18 & 19)

MAXIMUM SPAN (ft)	SUBSTRATE																																									
	SOUTHERN PINE No. 2 W/ MIN. G=0.55, DOUGLAS FIR W/ MIN. G=0.50						SPRUCE PINE FIR NORTH W/ MIN. G=0.43						SPRUCE PINE FIR SOUTH W/ MIN. G=0.36						1/2" MIN. CDX PLYWOOD																							
	WALL MOUNTINGS M, N, O & R			CEILING MOUNT T FLOOR MOUNTINGS W & X			WALL MOUNTINGS M, N, O & R			CEILING MOUNT T FLOOR MOUNTINGS W & X			WALL MOUNTINGS M, N, O & R			CEILING MOUNT T FLOOR MOUNTINGS W & X			WALL MOUNTINGS P & Q																							
	A.S.D. NEGATIVE DESIGN LOAD (psf)						A.S.D. NEGATIVE DESIGN LOAD (psf)						A.S.D. NEGATIVE DESIGN LOAD (psf)						A.S.D. NEGATIVE DESIGN LOAD (psf)																							
	30	40	60	75	90	105	30	40	60	75	90	105	30	40	60	75	90	105	30	40	60	75	90	105	30	40	60	75	90	105	30	40	60	75	90	105						
3'-0" OR LESS	12	10	10	9	8	8	6	6	6	6	5	5	12	10	10	9	8	8	6	6	6	6	5	4	12	10	10	9	8	8	6	6	6	4.5	4	3	6	5	4	4	4	3
4'-0"	12	10	10	9	8	8	6	6	6	5	4.5	4	12	10	10	9	8	8	6	6	5.5	4.5	3.5	3	12	10	10	9	8	8	6	6	4.5	3.5	3	2.5	6	5	4	4	4	3
5'-0"	12	10	10	9	8	8	6	6	5	4	3.5	3	12	10	10	9	8	8	6	6	4.5	3.5	3	2.5	12	10	10	9	8	7	6	5.5	3.5	3	2	2	6	5	4	4	4	3
6'-0"	12	10	10	9	8	6.5	6	6	4.5	3.5	3	2.5	12	10	10	9	8	4.5	6	5.5	3.5	3	2.5	2	12	10	10	9	6	3	6	4.5	3	2	2	-	6	5	4	4	3.5	-
7'-0"	12	10	10	9	6.5	4	6	5.5	4	3	2.5	2	12	10	10	9	4.5	3	6	5	3	2.5	2	-	12	10	10	7	3	-	5	4	2.5	2	-	-	6	5	4	4	-	-
8'-0"	12	10	10	7.5	4.5	3	6	5	3	2.5	2	2	12	10	10	5.5	3	-	5.5	4	2.5	2	2	-	12	10	10	4	-	-	4.5	3	2	-	-	-	6	5	4	-	-	-
9'-0"	12	10	10	5	3.5	-	6	4.5	3	2	2	-	12	10	8.5	4	-	-	5	3.5	2.5	2	-	-	12	10	4	2.5	-	-	4	3	2	-	-	-	6	5	3.5	-	-	-
10'-0"	12	10	7.5	4	-	-	5	4	2.5	2	-	-	12	10	5.5	3	-	-	4.5	3	2	-	-	-	12	10	3	-	-	-	3.5	2.5	-	-	-	-	6	5	-	-	-	-
11'-0"	12	10	5.5	-	-	-	5	3.5	2	-	-	-	12	10	4	-	-	-	4	3	2	-	-	-	12	10	-	-	-	-	3	2.5	-	-	-	-	6	5	-	-	-	-
12'-0"	12	10	4.5	-	-	-	4.5	3	2	-	-	-	12	10	3	-	-	-	3.5	2.5	-	-	-	-	12	10	-	-	-	-	3	2	-	-	-	-	6	5	-	-	-	-
13'-0"	12	10	-	-	-	-	4	3	-	-	-	-	12	10	-	-	-	-	3.5	2.5	-	-	-	-	12	7	-	-	-	-	2.5	2	-	-	-	-	6	4	-	-	-	-
14'-0"	12	10	-	-	-	-	4	3	-	-	-	-	12	7	-	-	-	-	3	2	-	-	-	-	12	5	-	-	-	-	2.5	2	-	-	-	-	6	3	-	-	-	-
15'-0"	12	-	-	-	-	-	3.5	-	-	-	-	-	12	-	-	-	-	-	3	-	-	-	-	-	11.5	-	-	-	-	-	2	-	-	-	-	-	6	-	-	-	-	-
16'-0"	12	-	-	-	-	-	3	-	-	-	-	-	12	-	-	-	-	-	2.5	-	-	-	-	-	11	-	-	-	-	-	2	-	-	-	-	-	6	-	-	-	-	-

+ NOTES ON ANCHORS REQUIREMENTS: WOOD SUBSTRATES.

- ANCHORS TO WALL, FLOOR OR SOLID WOOD SOFFIT SHALL BE AS FOLLOWS:
 - 1/4"Ø TAPCON OR TAPCON WITH ADVANCED THREADFORM TECHNOLOGY ANCHORS, AS MANUFACTURED BY I.T.W. BUILDEX W/ MINIMUM THREADED PENETRATION AS INDICATED AT EACH SECTION ON SHEETS 18 & 19. EXCEPTION: SEE NOTE 2 BELOW.
- ANCHORS TO HOLLOW CEILING SHALL BE AS PER MOUNTING TYPE U, SHEET 19 AND SHALL CONSIST OF LAG SCREWS AS PER N.D.S. 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 OF THE ANCHOR'S MANUFACTURER.

**① HV BLADE OR ① HV BLADE W/
①A HV WINDOW BLADE WORKING IN UNISON**

◆ SEE LIMITATIONS OF USE OF
BLADE ①A ON SHEET 28

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

BERTHA HV™ Accordion Shutter System			
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2			
REV. No	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			
3			
4			
5			
6			
			DRAWING No 11-194
			SHEET 16 OF 28

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

(SEE MOUNTINGS ON SHEET 19)

MAXIMUM SPAN (ft)	SUBSTRATE																	
	SOUTHERN PINE No. 2 W/ MIN. G=0.55, DOUGLAS FIR W/ MIN. G=0.50						SPRUCE PINE FIR NORTH W/ MIN. G=0.43						SPRUCE PINE FIR SOUTH W/ MIN. G=0.36					
	B.O. WALL MOUNTINGS S & V						B.O. WALL MOUNTINGS S & V						B.O. WALL MOUNTINGS S & V					
	A.S.D NEGATIVE DESIGN LOAD (psf)						A.S.D. NEGATIVE DESIGN LOAD (psf)						A.S.D. NEGATIVE DESIGN LOAD (psf)					
	30	40	60	75	90	105	30	40	60	75	90	105	30	40	60	75	90	105
3'-0" OR LESS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
4'-0"	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
5'-0"	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11.5	10
6'-0"	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11.5	9.5	8
7'-0"	12	12	12	12	12	12	12	12	12	12	12	10	12	12	12	10	8	8
8'-0"	12	12	12	12	12	12	12	12	12	12	10.5	9	12	12	11	8.5	7	7
9'-0"	12	12	12	12	12	10.5	12	12	12	11	9	8	12	12	9.5	7.5	6.5	6
10'-0"	12	12	12	12	11.5	9.5	12	12	12	10	8	7	12	12	8.5	7	6	5.5
11'-0"	12	12	12	12	10	8.5	12	12	11.5	9	7.5	6.5	12	12	8	6	5	5
12'-0"	12	12	12	11.5	9.5	8	12	12	10.5	8	7	6	12	11	7	6	5	4.5
13'-0"	12	12	12	10.5	8.5	7.5	12	12	9.5	7.5	6	5.5	12	10	6.5	5	4.5	4
14'-0"	12	12	12	9.5	8	6	12	12	9	7	6	4.5	12	9.5	6	5	4	3.5
15'-0"	12	12	11	9	7.5	5	12	12	8	6.5	5.5	3.5	11.5	8.5	6	4.5	4	3
16'-0"	12	12	10.5	8.5	6.5	4	11.5	12	8	6	4.5	3	11	8	5.5	4	3	-

+ NOTES ON ANCHORS REQUIREMENTS: WOOD SUBSTRATES.

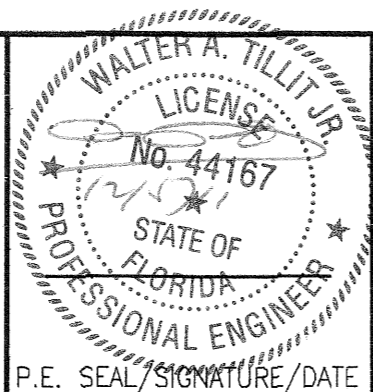
- ANCHORS TO WALL, FLOOR OR SOLID WOOD SOFFIT SHALL BE AS FOLLOWS:
 - 1/4" TAPCON OR TAPCON WITH ADVANCED THREADFORM TECHNOLOGY ANCHORS, AS MANUFACTURED BY I.T.W. BUILDDEX W/ MINIMUM THREADED PENETRATION AS INDICATED AT EACH SECTION ON SHEETS 18 & 19. EXCEPTION: SEE NOTE 2 BELOW.
- ANCHORS TO HOLLOW CEILING SHALL BE AS PER MOUNTING TYPE U, SHEET 19 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 OF THE ANCHOR'S MANUFACTURER.

① HV BLADE ONLY

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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REV. No	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			DRAWING No
3			11-194
4			SHEET
5			17 OF 28
6			

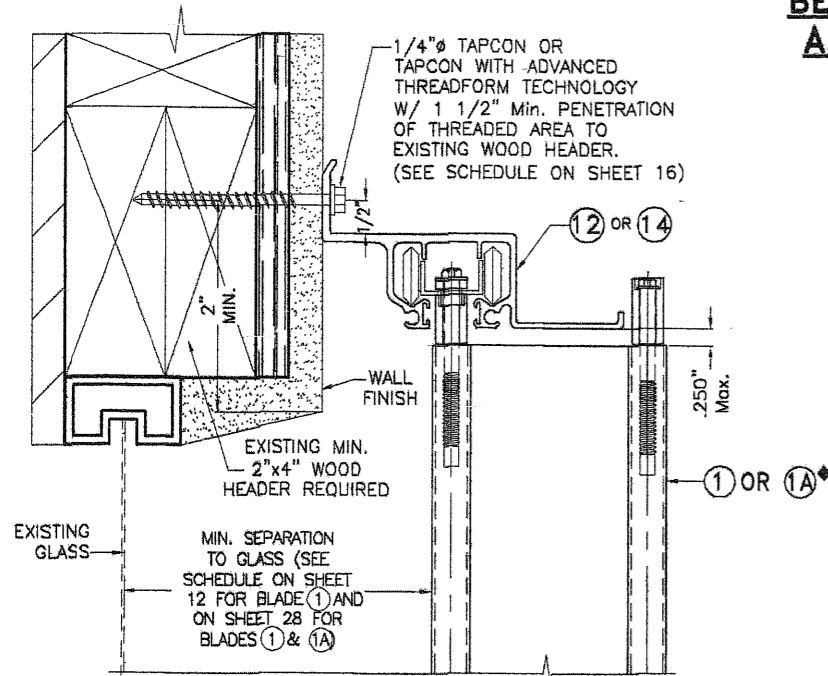


TILTECO INC.
TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th. St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1530 . Fax : (305)871-1531
e-mail: tilteco@aol.com
EB-0006719
WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

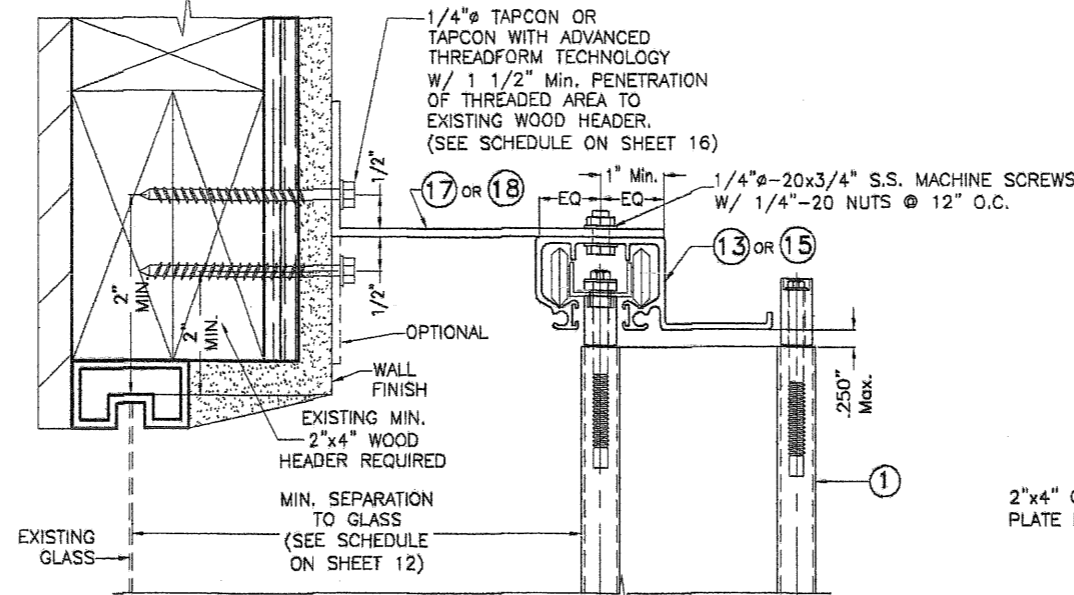
A.S.S.A.
American Shutter Systems
Association, Inc.
4268 Westroads Drive
West Palm Beach, FL 33407

INSTALLATION DETAILS ON EXISTING WOOD BUILDINGS FOR ① HV & ①A HV♦ BLADES (AS APPLICABLE)

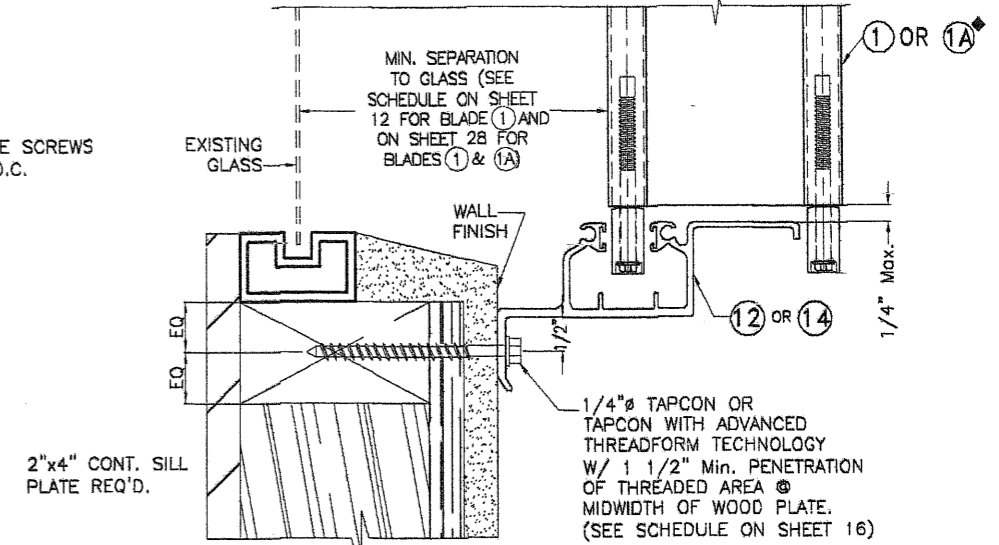
MAX. SHUTTER SPAN L+ OR L- FOR INSTALLATIONS INTO WOOD WITH HV BLADE ① ONLY SHALL BE LIMITED TO 105.0 psf. A.S.D. DESIGN PRESSURE RATING, SEE SHEET 28 FOR MAX SPAN & A.S.D. DESIGN PRESSURE RATING FOR INSTALLATION WITH BLADE ① & ①A WORKING IN UNISON



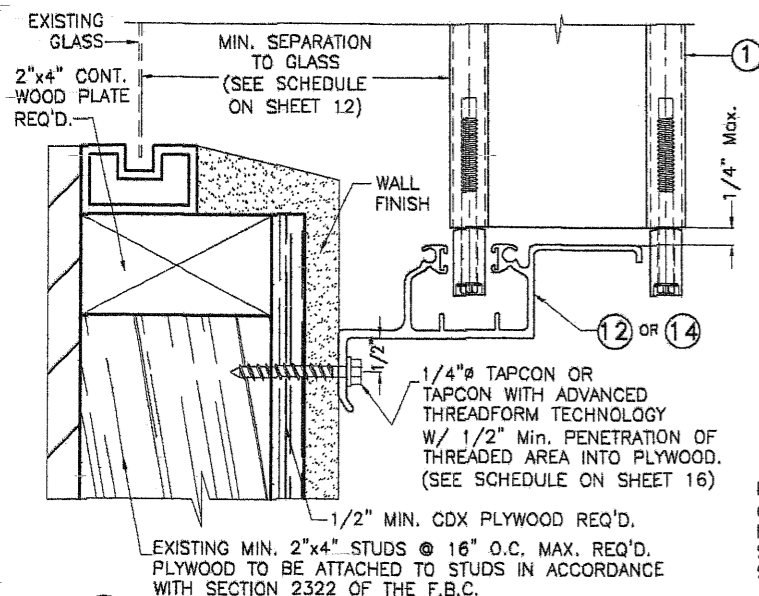
M HV WALL HEADER INSTALLATION



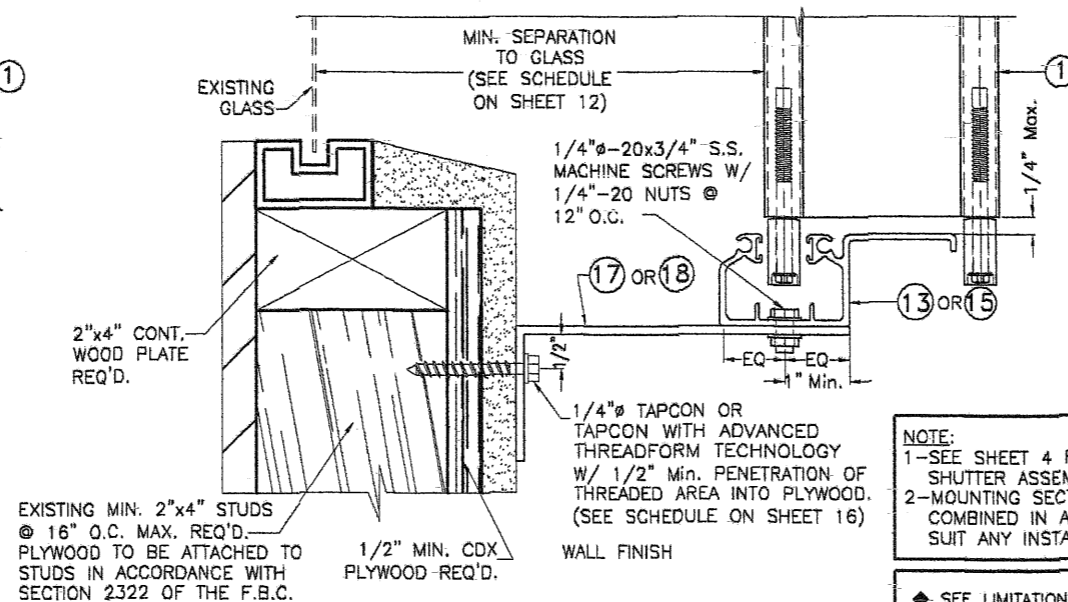
N HV WALL HEADER INSTALLATION



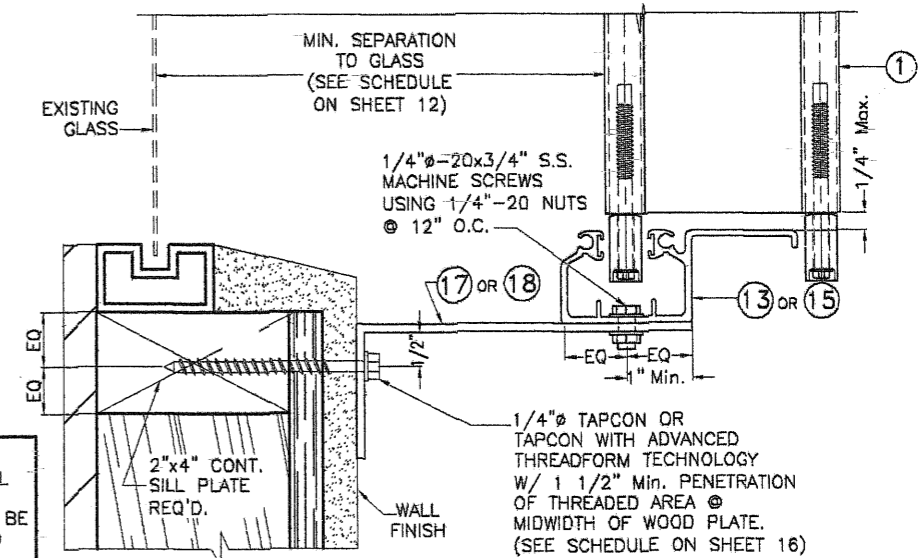
O HV WALL SILL INSTALLATION



P HV WALL SILL INSTALLATION



Q HV WALL SILL INSTALLATION

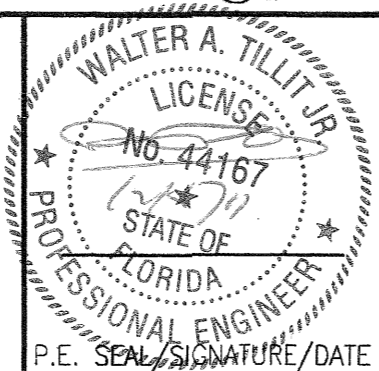


R HV WALL SILL INSTALLATION

NOTE:
1-SEE SHEET 4 FOR TYPICAL SHUTTER ASSEMBLY.
2-MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.

♦ SEE LIMITATIONS OF USE OF BLADE 1A ON SHEET 28

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)



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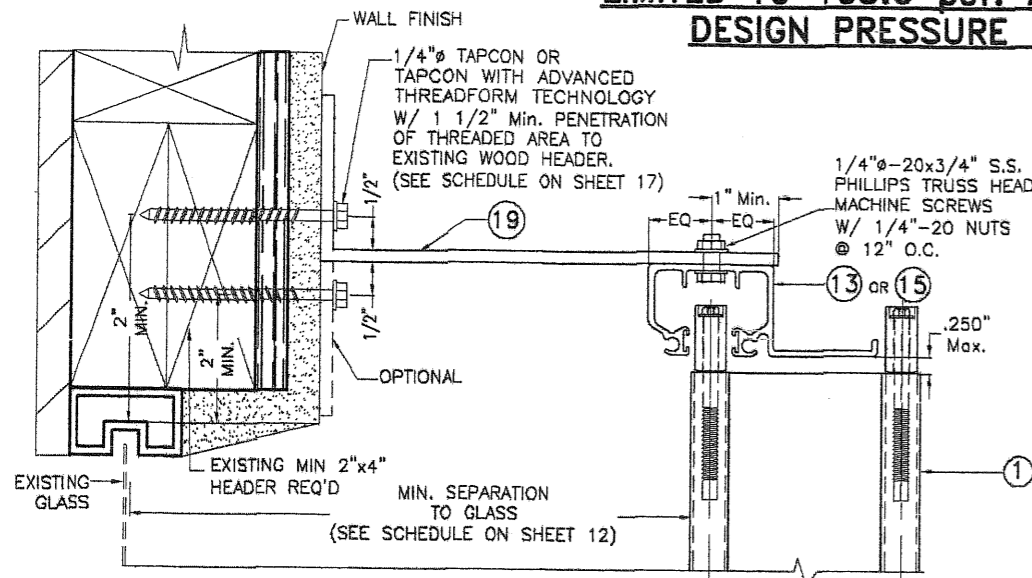
BERTHA HV™
Accordion Shutter System

H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

REV. NO.	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			DRAWING No
3			11-194
4			SHEET
5			18 OF 28
6			

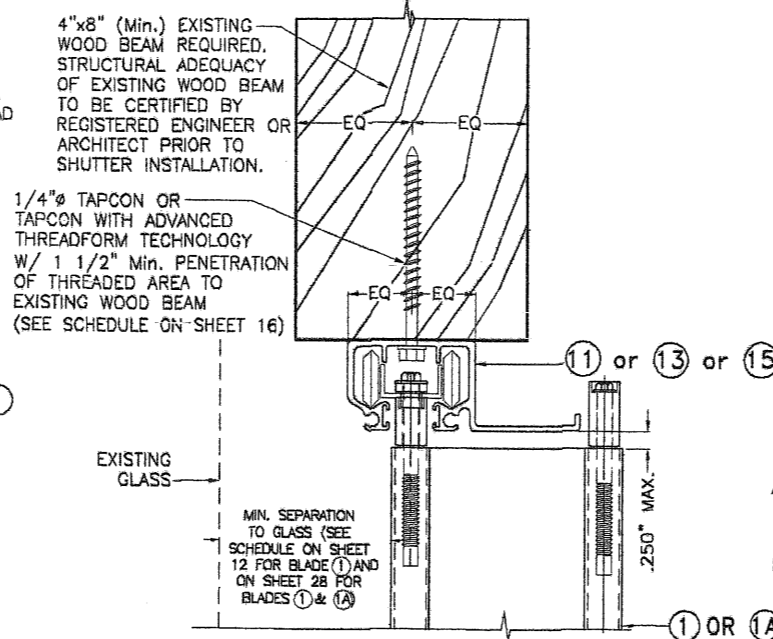
INSTALLATION DETAILS ON EXISTING WOOD BUILDINGS FOR ① HV & ①A HV ♦ BLADES (AS APPLICABLE)

MAX. SHUTTER SPAN L+ OR L- FOR INSTALLATIONS INTO WOOD WITH HV BLADE ① ONLY SHALL BE LIMITED TO 105.0 psf. A.S.D DESIGN PRESSURE RATING. SEE SHEET 28 FOR MAX SPAN & A.S.D DESIGN PRESSURE RATING FOR INSTALLATION WITH BLADE ① & ①A WORKING IN UNISON

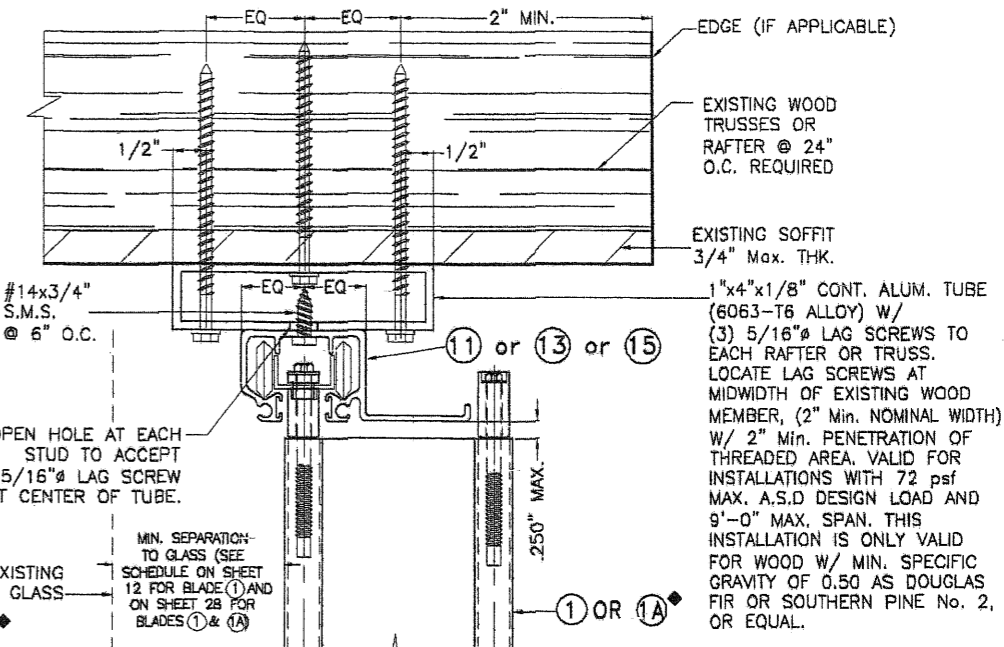


S HV WALL HEADER INSTALLATION

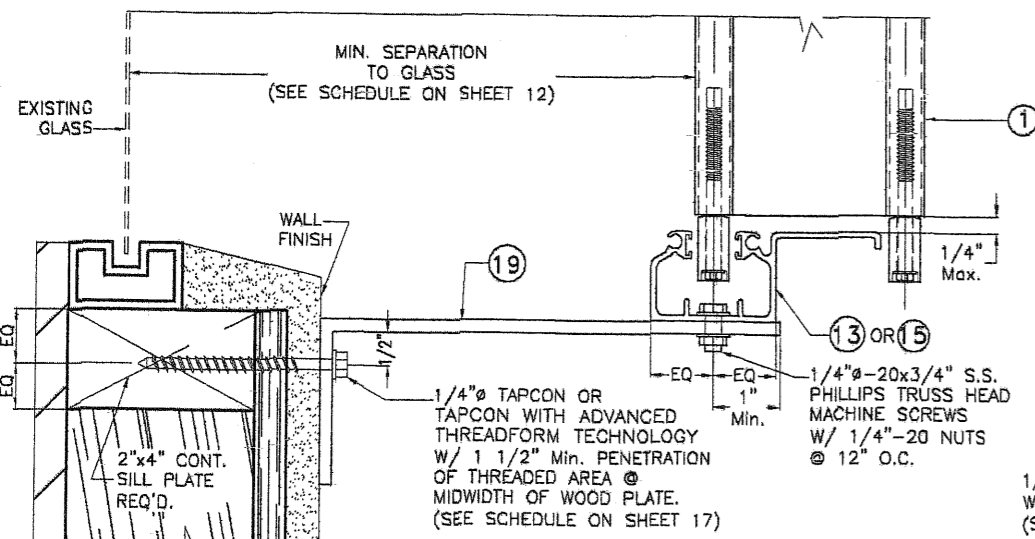
NOTES:
 1-SEE SHEET 4 FOR TYPICAL SHUTTER ASSEMBLY,
 2-MOUNTING SECTIONS CAN BE COMBINED
 IN ANY WAY TO SUIT ANY INSTALLATION.



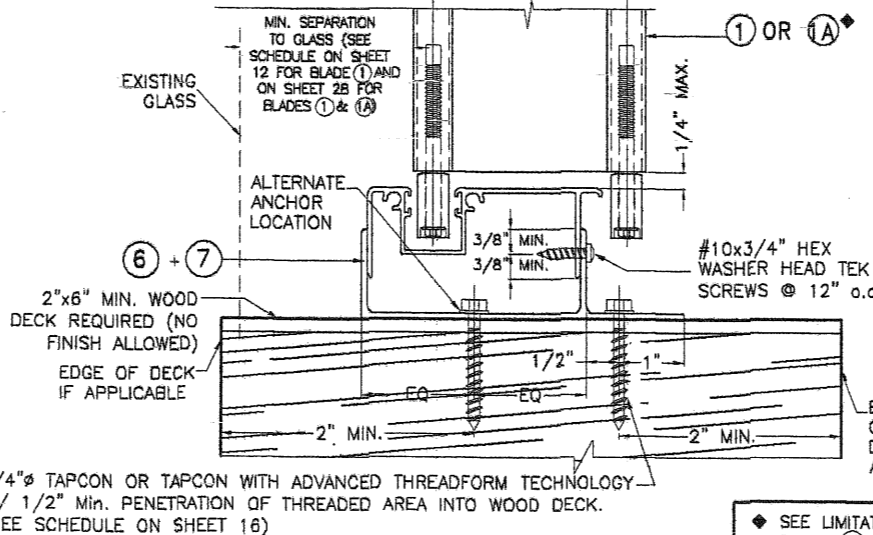
T HV CEILING INSTALLATION



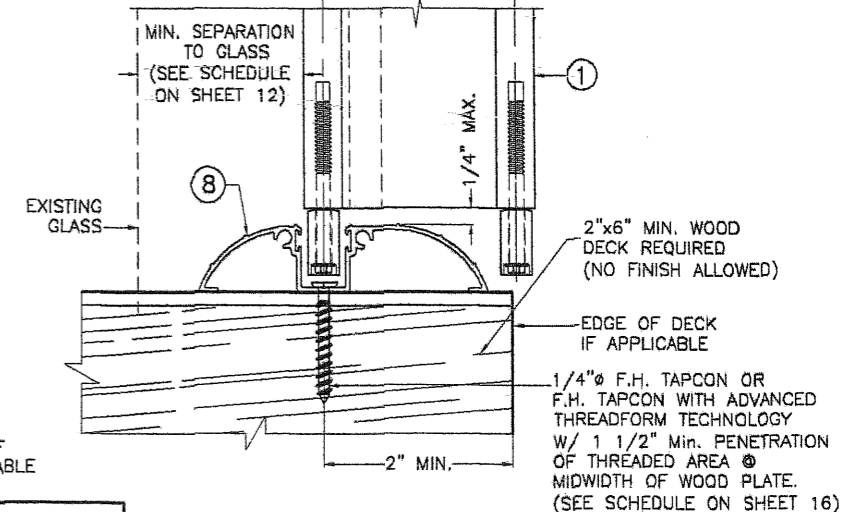
U HV CEILING INSTALLATION



V HV WALL SILL INSTALLATION



W HV FLOOR INSTALLATION



X HV WALK-OVER INSTALLATION

♦ SEE LIMITATIONS OF USE OF BLADE ①A ON SHEET 28

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

WALTER A. TILLIT JR.
 LICENSE
 No. 44167
 12/15/11
 STATE OF FLORIDA
 PROFESSIONAL ENGINEER
 P.E. SEAL/SIGNATURE/DATE

TILTECO INC.

TILLIT TESTING & ENGINEERING COMPANY
 355 N.W. 36th St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
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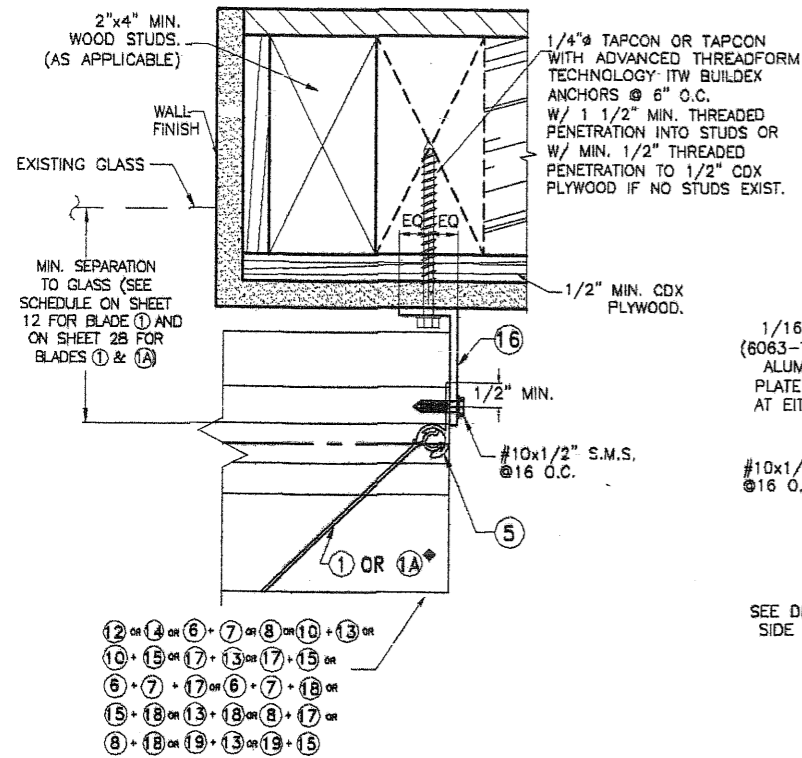
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H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

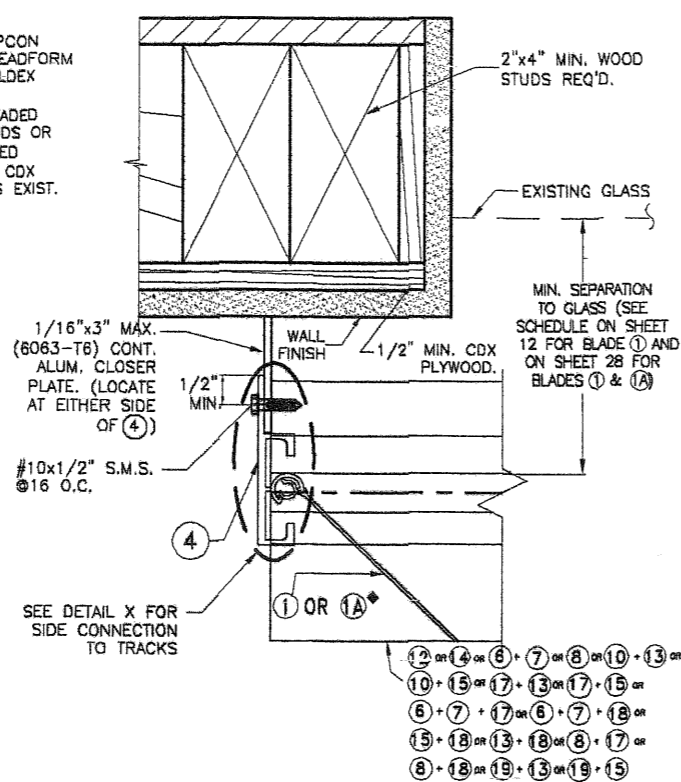
REV. No	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			
3			
4			
5			
6			

DRAWING No
11-194
 SHEET
19 OF 28

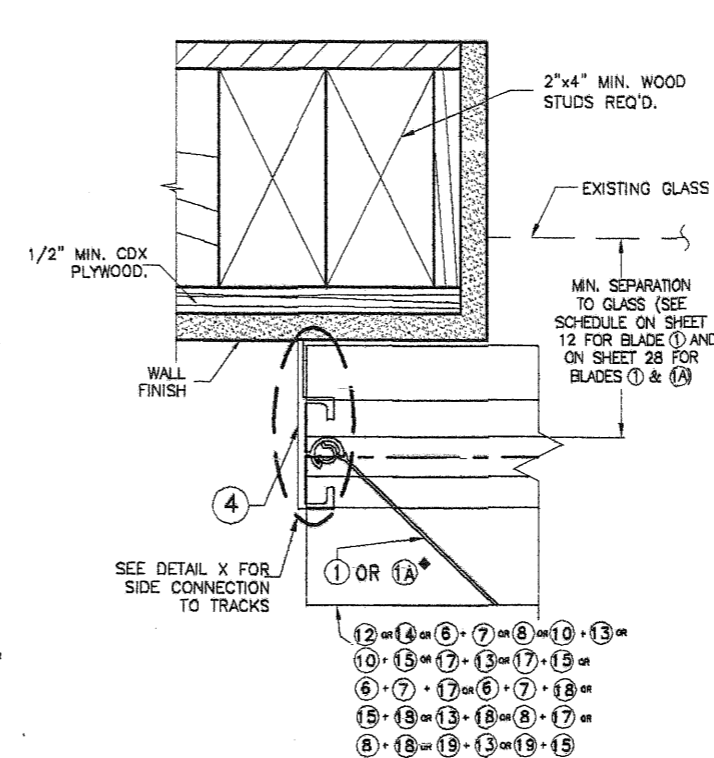
END INSTALLATIONS ① HV & ①A HV ♦ BLADES INTO 2"x4" MIN. WOOD STUDS.



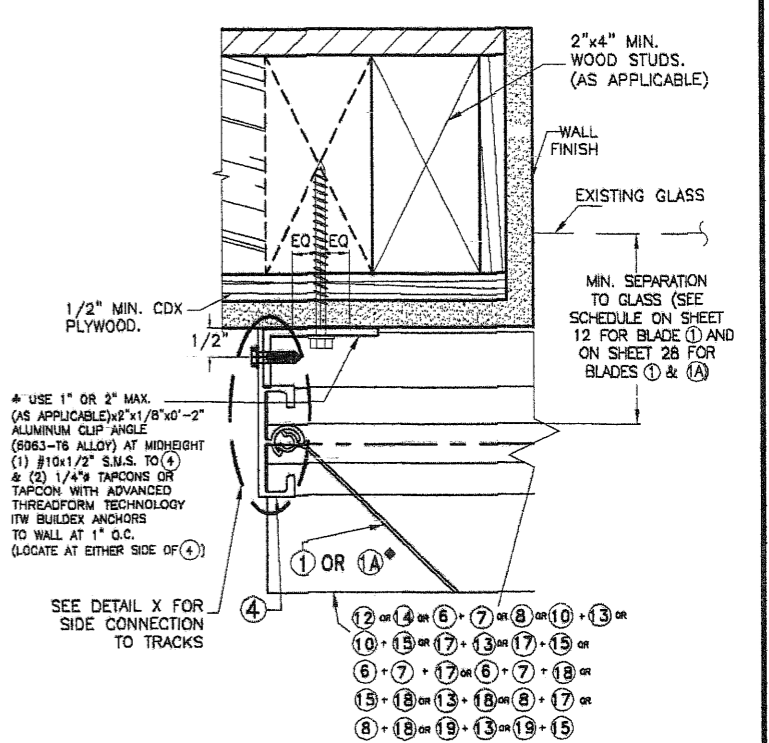
END CONNECTION DETAIL ⑦



END CONNECTION DETAIL ⑧



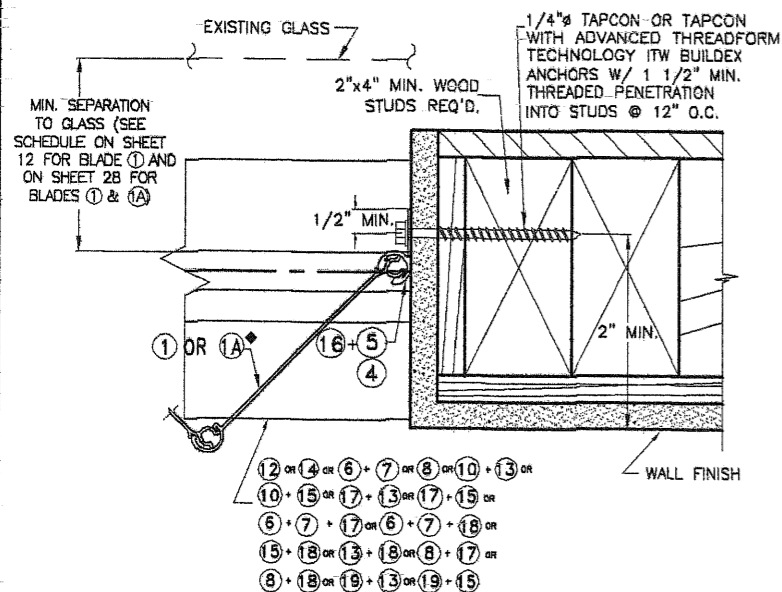
END CONNECTION DETAIL ⑨



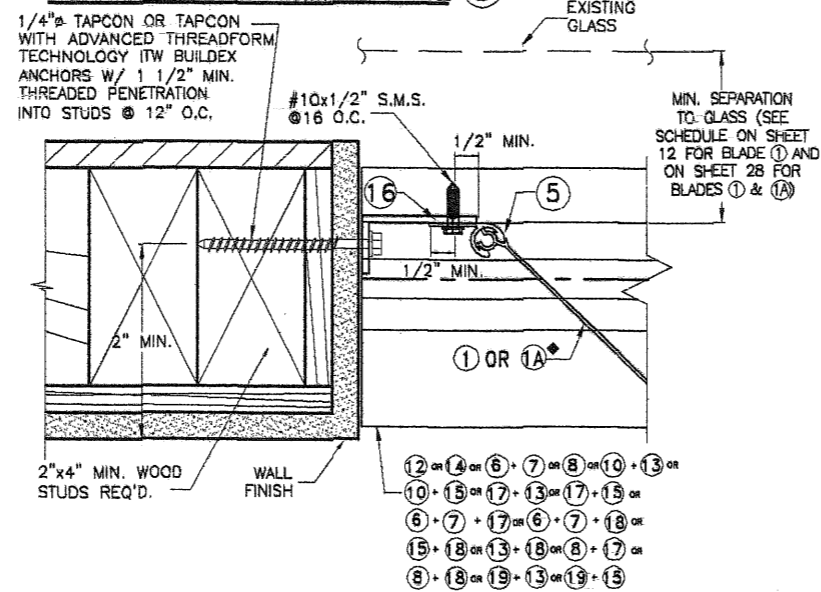
END CONNECTION DETAIL ⑩

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

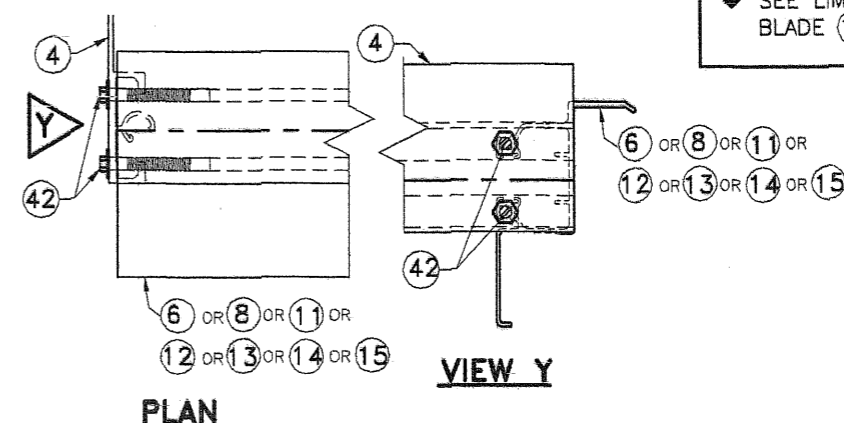
♦ SEE LIMITATIONS OF USE OF BLADE ①A ON SHEET 28



END CONNECTION DETAIL ⑪



END CONNECTION DETAIL ⑫

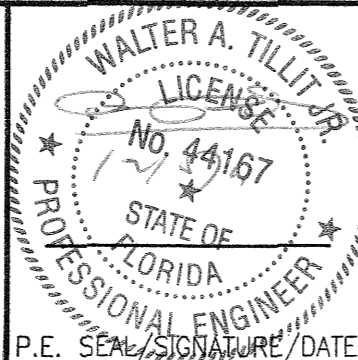


PLAN

VIEW Y

DETAIL X

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)



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 e-mail: tilteco@aol.com
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 FLORIDA Lic. # 44167



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

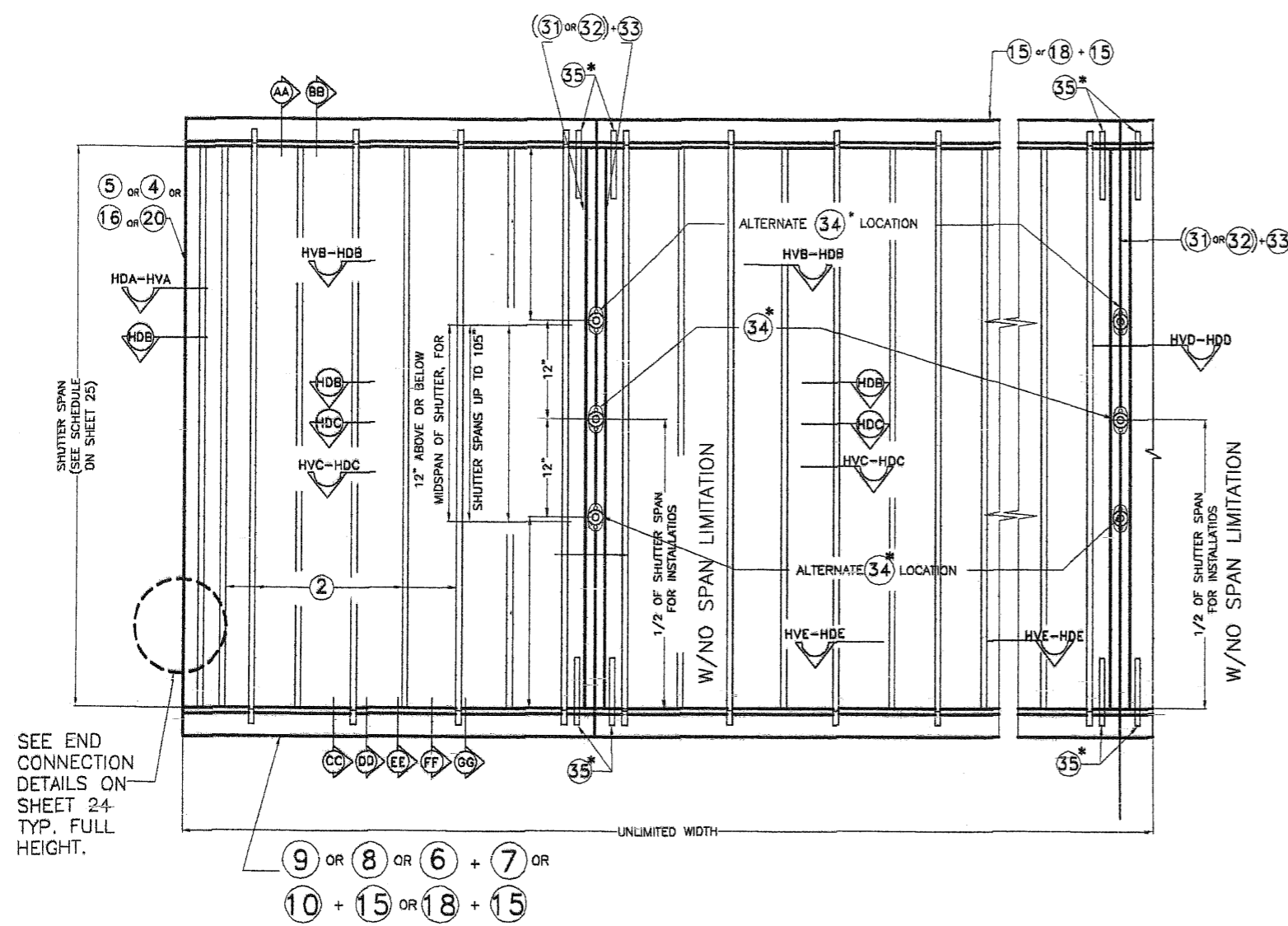
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BERTHA HV™ Accordian Shutter System

H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

REV. No	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			
3			
4			
5			
6			

DRAWING No
11-194
SHEET
20 OF 28



TYPICAL ② HV BLADE SHUTTER ELEVATION
N.T.S.

*** NOTES ON HD LOCKS AND CENTERMATES:**

1. **MANDATORY CONDITION # 1:** ONE (34) H.D. LOCK SHALL BE USED FOR ANY SPAN AND INSTALLATION AT HEAVY DUTY SYMMETRICAL CENTERMATES, (31) OR (32)+(33) AND AT ANY ELEVATION. (34) H.D. LOCK MAY BE USED AS AN INSIDE OR OUTSIDE LOCK, ATTACHED TO (33) HEAVY DUTY SYMMETRICAL CENTERMATES WITH (3) #8 x 3/8" LONG FLAT HEAD S.S. M.S. LOCKING RODS (35) ARE NOT MANDATORY, i.e. THEY ARE COMPLETELY OPTIONAL.

2. **MANDATORY CONDITION # 2:** LOCATION OF (34) H.D. LOCK SHALL BE AS INDICATED ON SHUTTER ELEVATION, i.e., FOR SHUTTER SPANS UP TO 105". (34) H.D. LOCK MAY BE INSTALLED AT MID HEIGHT OF SHUTTER OR AT 12" ABOVE OR BELOW MID HEIGHT OF SHUTTER. FOR SHUTTER SPANS GREATER THAN 105", (34) H.D. LOCK SHALL BE INSTALLED AT MID HEIGHT OF SHUTTER.

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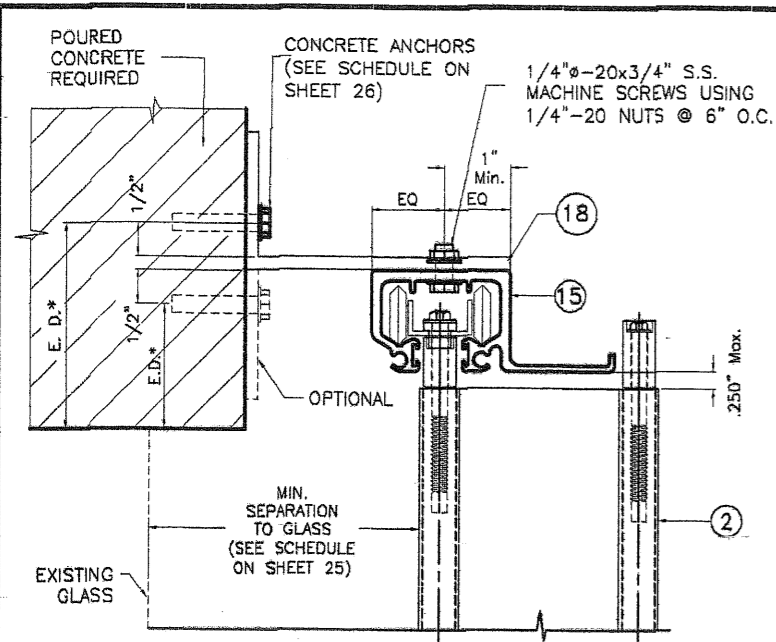
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Accordian Shutter System
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

REV. No	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G.
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			DRAWING No 11-194
3			
4			SHEET 21 OF 28
5			
6			

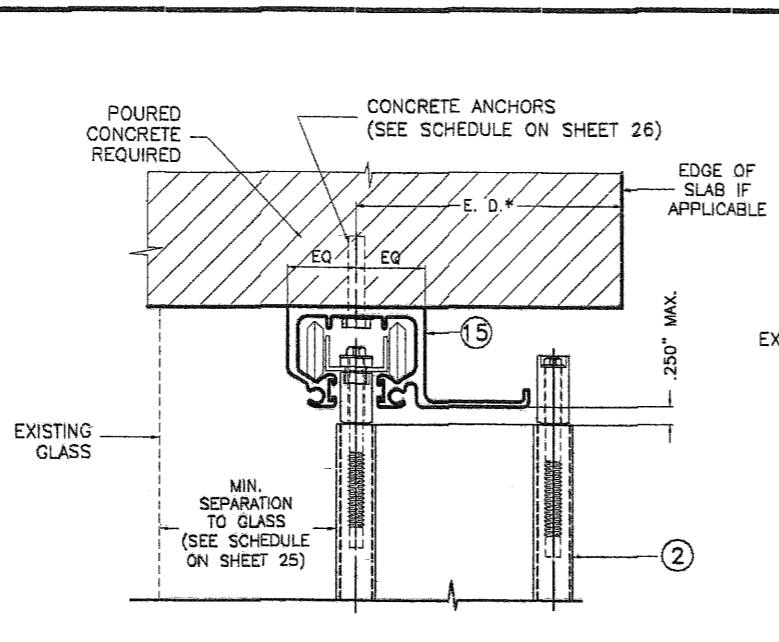
WALTER A. TILLIT JR.
LICENSE
No. 44167
12/3/11
STATE OF FLORIDA
PROFESSIONAL ENGINEER
P.E. SEAL/SIGNATURE/DATE

TILECO INC.
TILLIT TESTING & ENGINEERING COMPANY
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e-mail: tilteco@aol.com
EB-0006719
WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

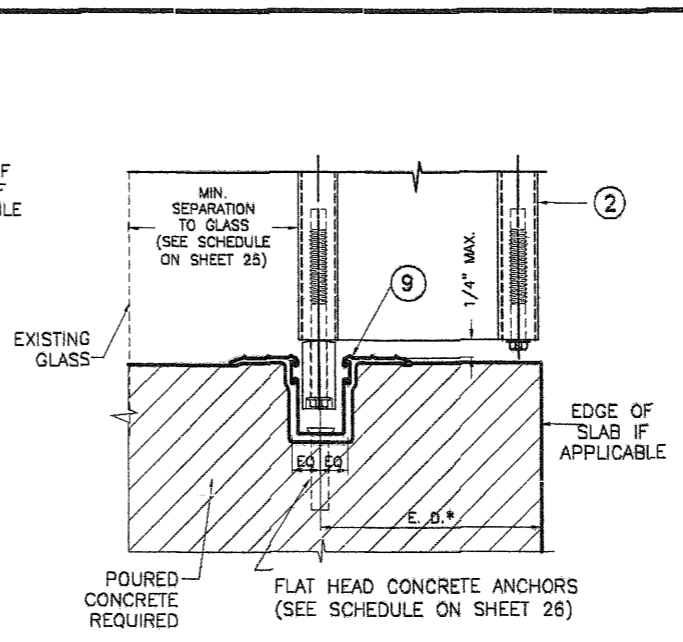
A.S.S.A.
American Shutter Systems Association, Inc.
4268 Westroads Drive
West Palm Beach, FL 33407



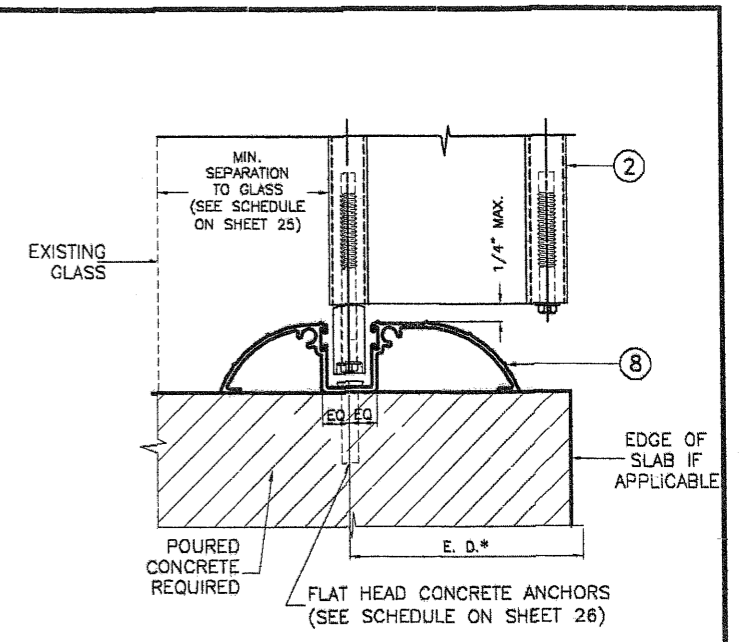
AA HD WALL HEADER INSTALLATION



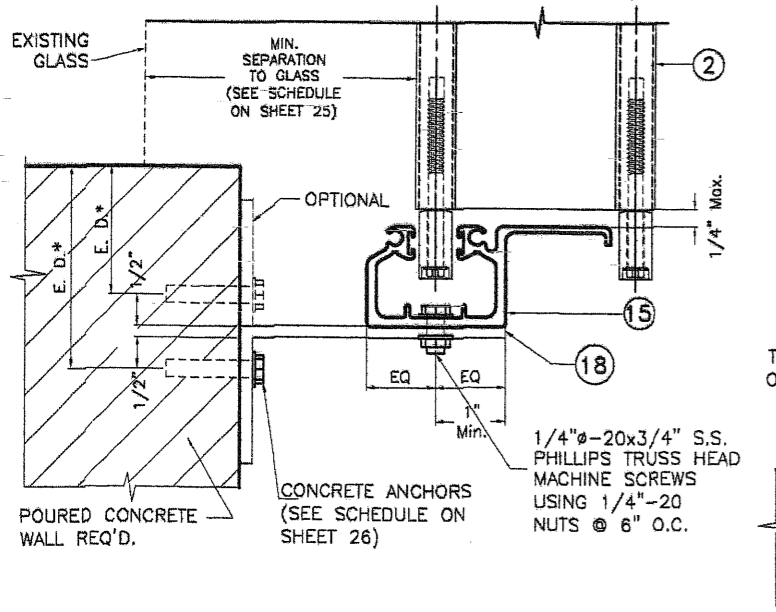
BB HD CEILING INSTALLATION



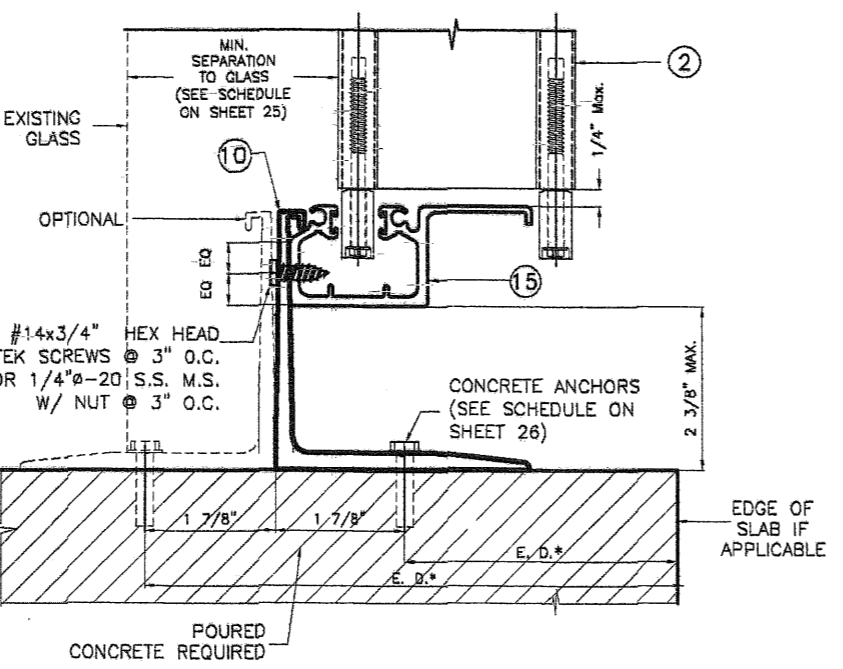
CC HD TRENCH INSTALLATION



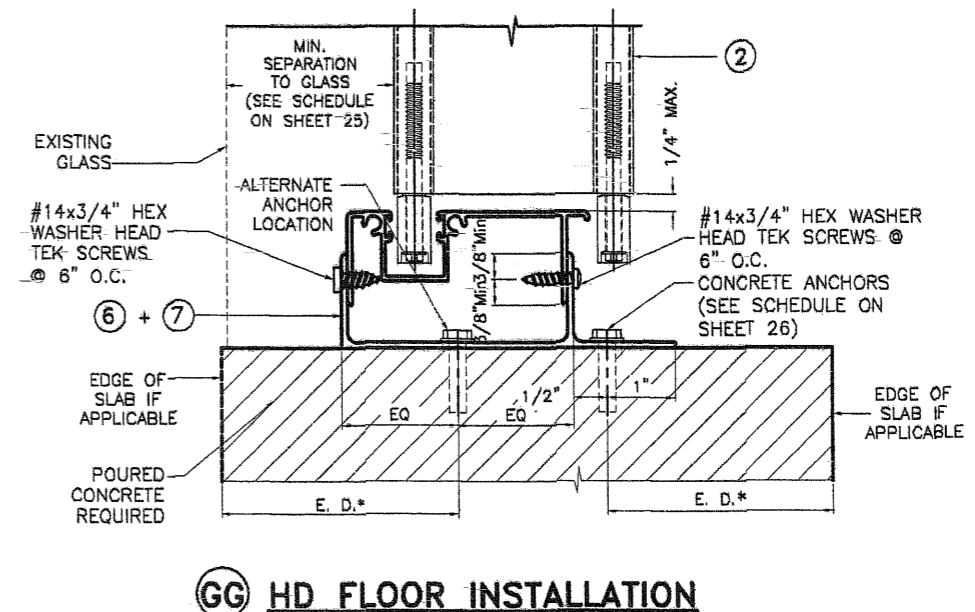
DD HD WALK-OVER INSTALLATION



EE HD WALL SILL INSTALLATION



FF HD RAINGUARD INSTALLATION



GG HD FLOOR INSTALLATION

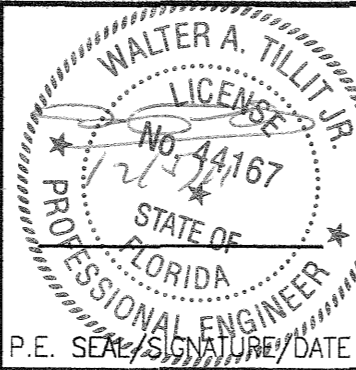
INSTALLATION DETAILS W/ ② HV BLADE

SCALE: 3/8"=1"

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

NOTE FOR COMBINATION OF SECTIONS:
 1- SEE SHEET 21 FOR TYPICAL SHUTTER ASSEMBLY
 2- MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.

* E. D. = EDGE DISTANCE
 (SEE SPECIFICATIONS ON SHEET 26)



TILLIT TESTING & ENGINEERING COMPANY
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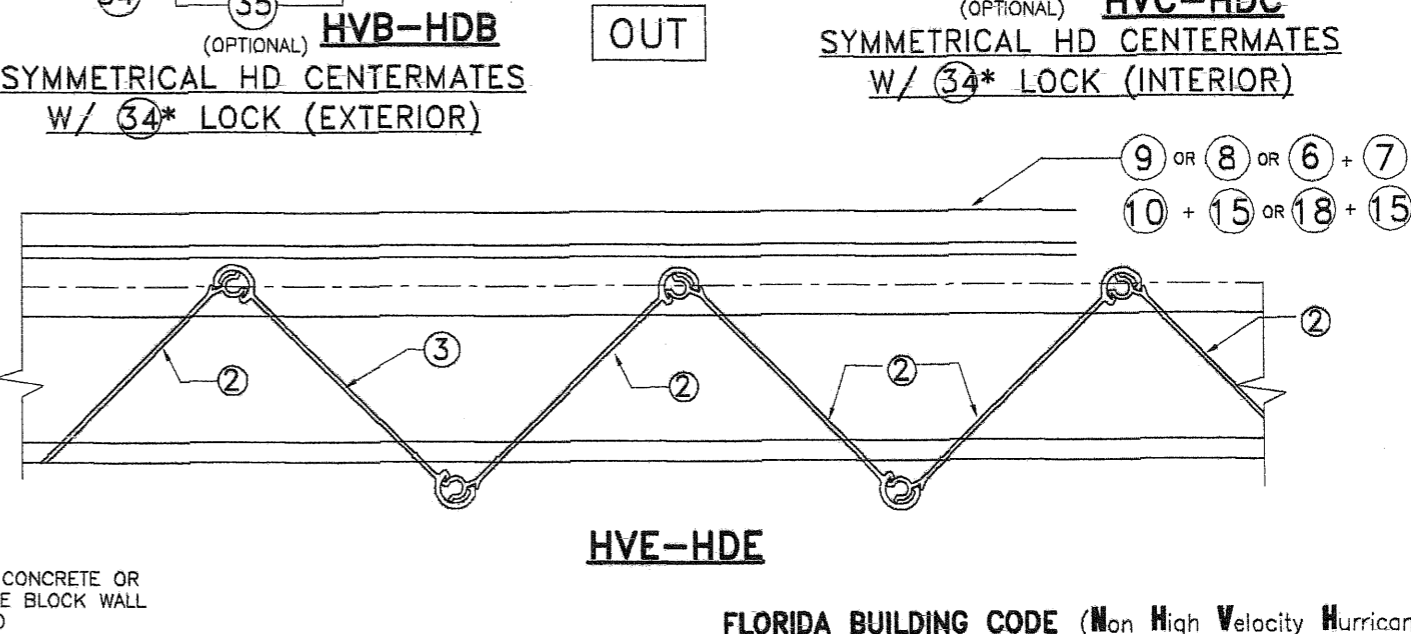
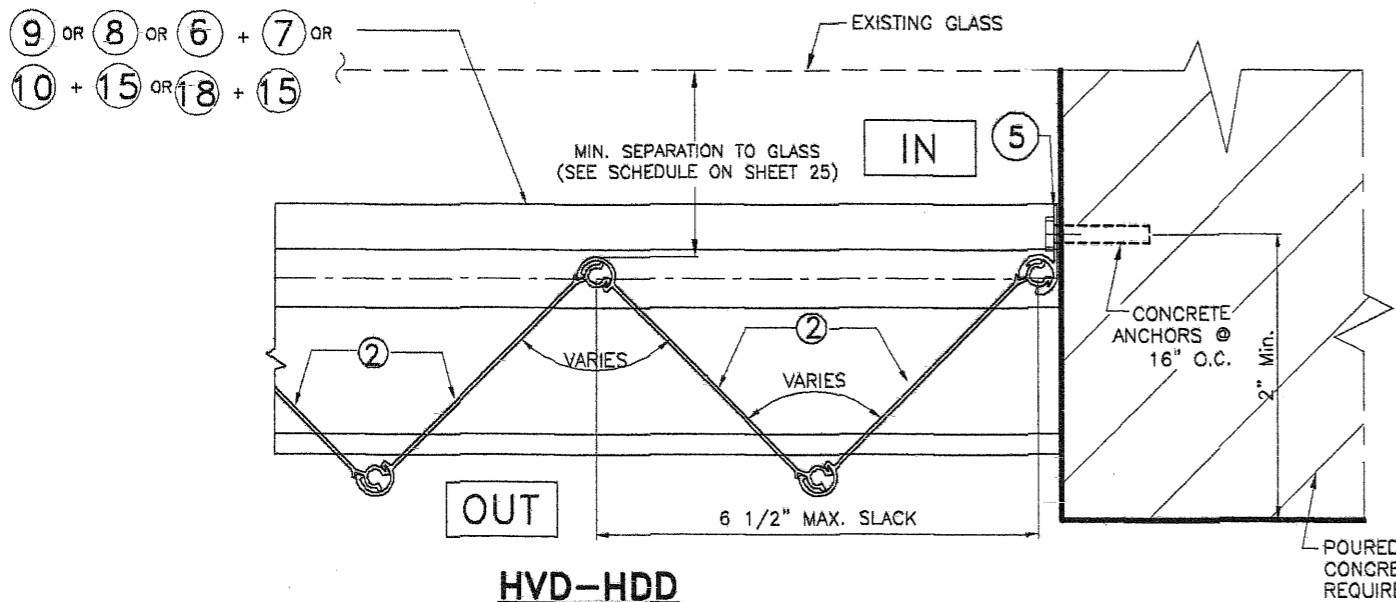
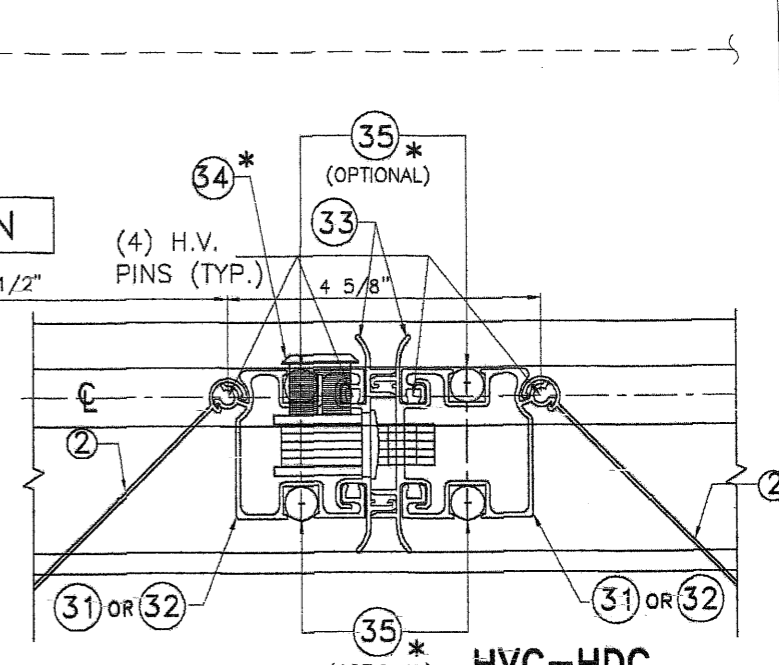
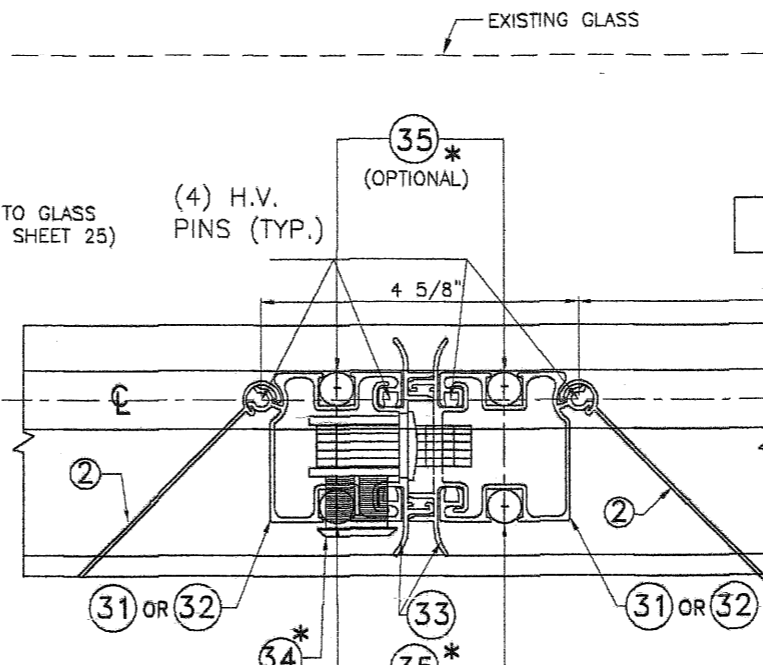
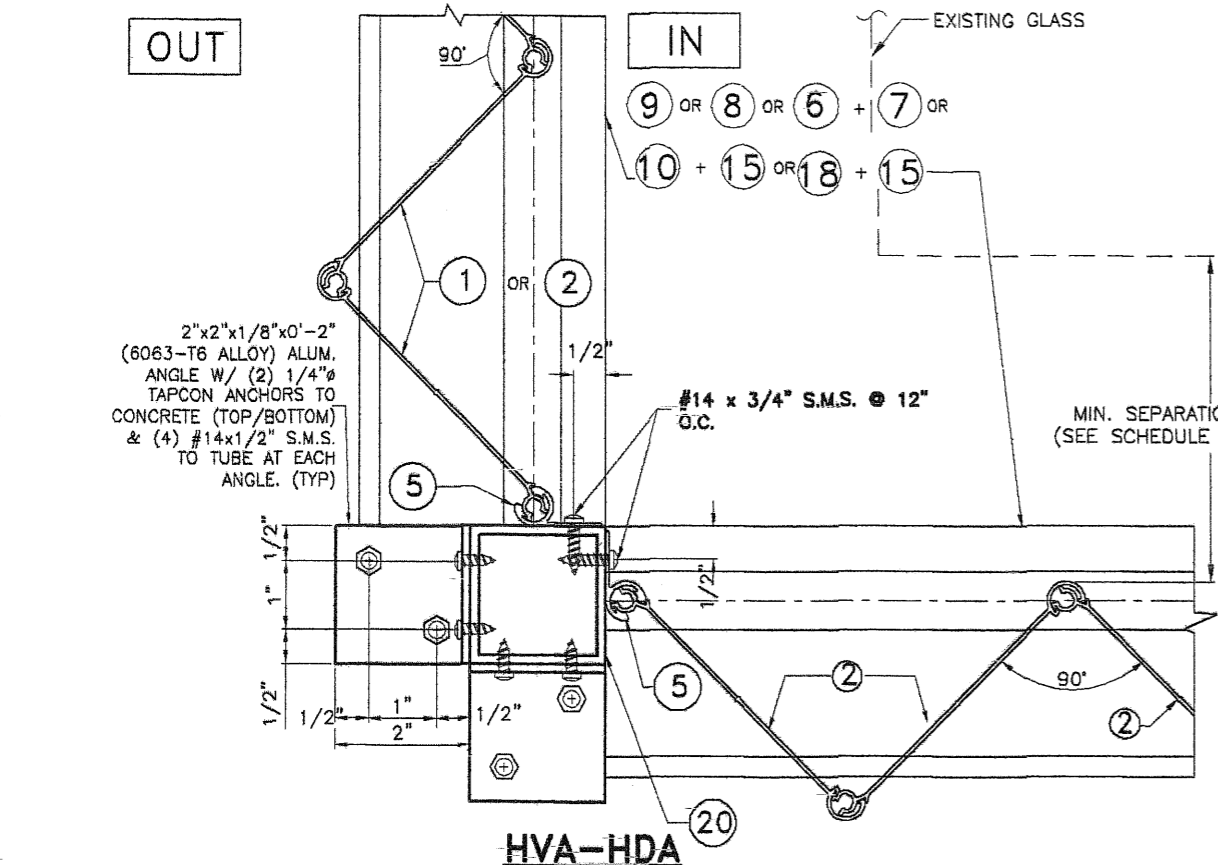
REV. No	DESCRIPTION	DATE	DRAWN BY: M.C.V./A.G
1	OLD 08-152	12/02/11	DATE: 12/02/11
2			DRAWING No
3			11-194
4			SHEET
5			22 OF 28
6			

SEE END WALL CONNECTION DETAILS ON SHEET 24

INSTALLATION
② HV BLADE

SEE END WALL CONNECTION
DETAILS ON SHEET 24

* SEE NOTES ON LOCKING RODS ③⑤ & HD ③④ LOCKS ON SHEETS 21



FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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STATE OF FLORIDA
PROFESSIONAL ENGINEER
P.E. SEAL/SIGNATURE/DATE

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Phone : (305)871-1530 . Fax : (305)871-1531
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WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

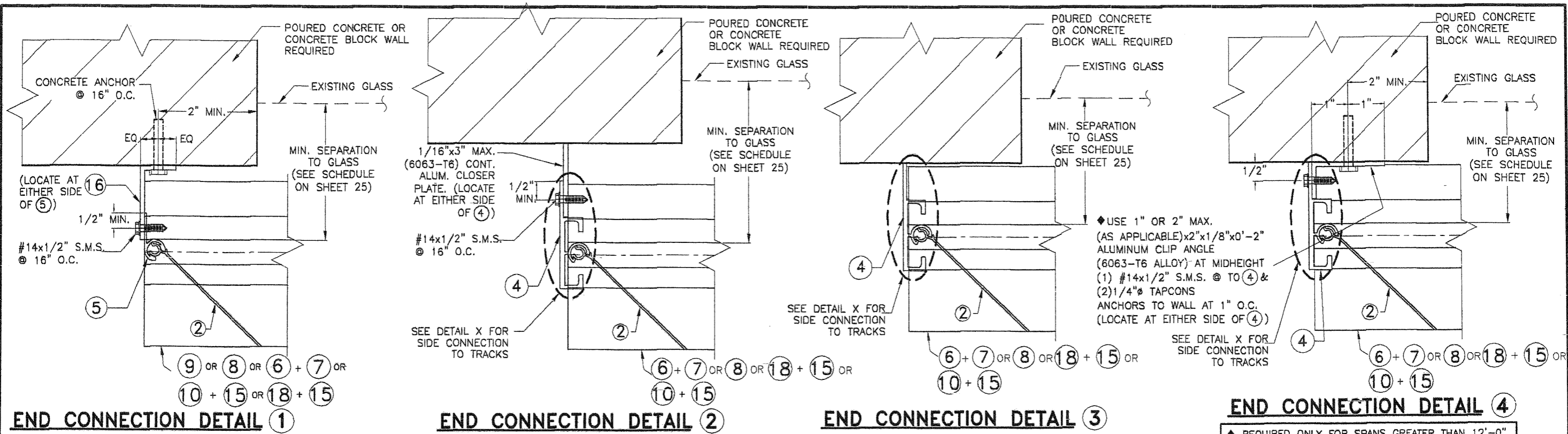
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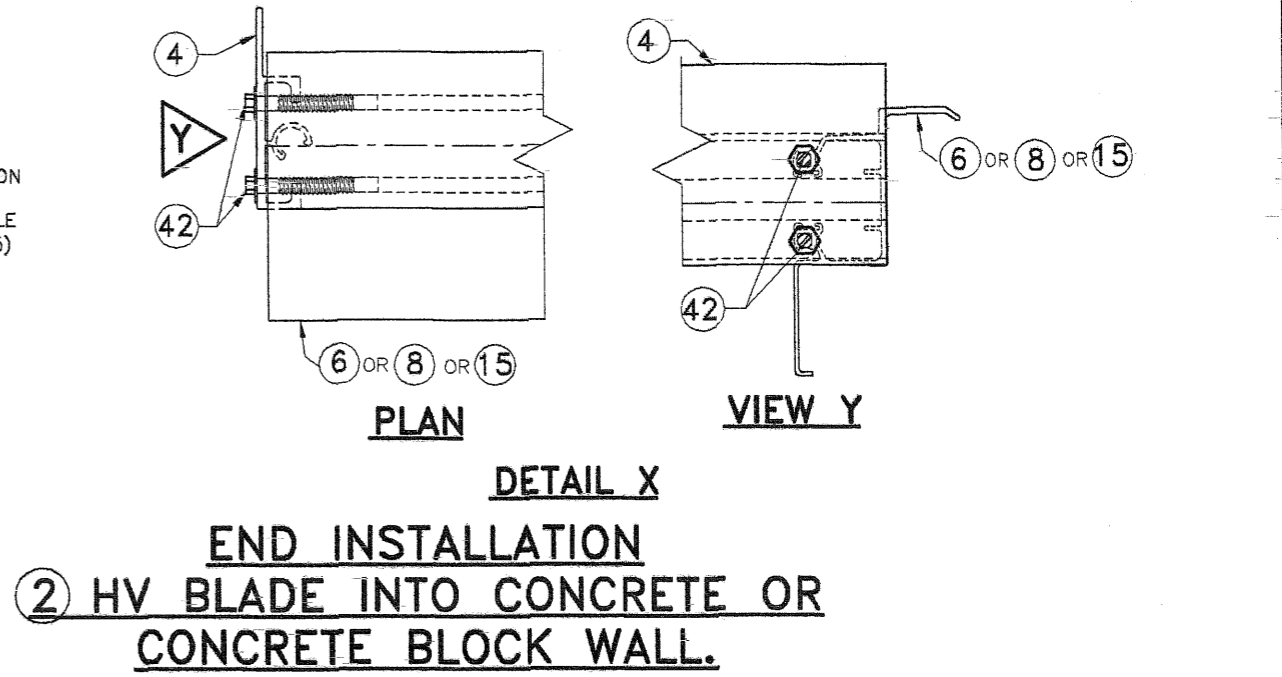
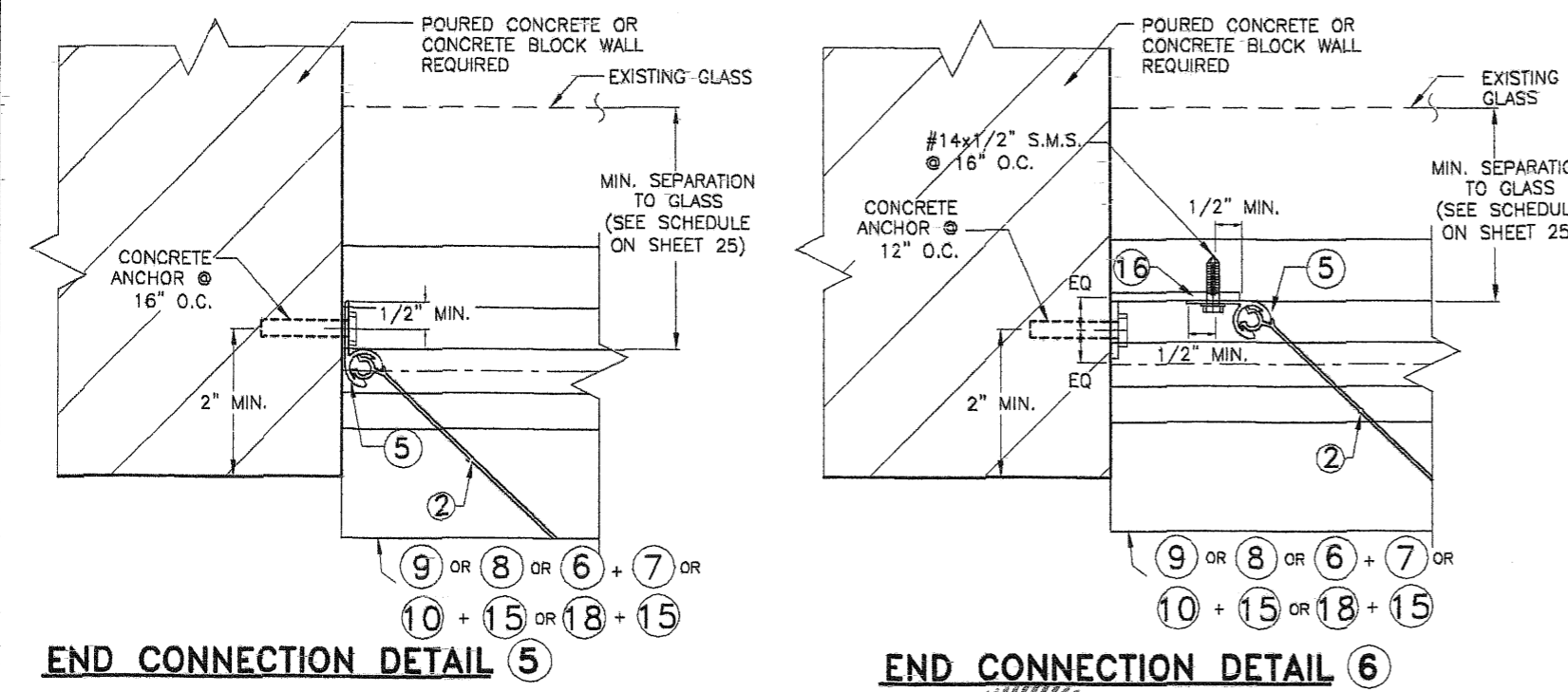
BERTHA HV™
Accordion Shutter System

H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

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END CONNECTION DETAIL 4
 ◆ REQUIRED ONLY FOR SPANS GREATER THAN 12'-0"



FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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

TILECO INC.
 TILLIT TESTING & ENGINEERING COMPANY
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MAXIMUM SHUTTER SPAN*
 "L+" OR "L-" (ft.)
 INSTALLATIONS W/ **SYMMETRICAL**
HD CENTERMATES, ① OR ②,
 W/ ONE H.D. ③ LOCK & NO
 LOCKING RODS ④ ♦

MAXIMUM A.S.D. DESIGN PRESSURE RATING (p.s.f.) (+ OR -)	CONCRETE & CONCRETE BLOCK INSTALLATIONS	
	ALL MOUNTING CONDITIONS	
	L + (ft)	L - (ft)
30 OR LESS	18'-0"	18'-0"
35	18'-0"	18'-0"
40	17'-4"	17'-10"
45	16'-4"	17'-6"
50	15'-6"	17'-0"
55	14'-10"	16'-10"
60	14'-2"	16'-2"
65	13'-8"	15'-6"
70	13'-2"	14'-11"
75	12'-8"	14'-5"
80	12'-3"	14'-0"
85	11'-11"	13'-7"
90	11'-6"	13'-2"
95	11'-3"	12'-10"
100	10'-6"	12'-6"
105	10'-0"	12'-2"
110	9'-6"	11'-11"
115	9'-1"	11'-8"
120	8'-9"	11'-5"
125	-	11'-2"
130	-	10'-11"
135	-	10'-9"
140	-	10'-6"
145	-	10'-4"
150	-	10'-2"
155	-	10'-0"
160	-	9'-10"
165	-	9'-9"
170	-	9'-7"
175	-	9'-5"
180	-	9'-4"
185	-	9'-2"
190	-	9'-0"
195	-	8'-9"

* NOTES:

(1) L+: MAXIMUM ALLOWABLE SPAN FOR A GIVEN POSITIVE A.S.D DESIGN PRESSURE RATING.
 L-: MAX. ALLOWABLE SPAN FOR A GIVEN NEGATIVE A.S.D. DESIGN PRESSURE RATING.

(2) PROCEDURE TO DETERMINE MAXIMUM SPAN FOR WALL MOUNTINGS OR FLOOR/CEILING:

GIVEN A POSITIVE A.S.D. DESIGN PRESSURE RATING, DETERMINE MAXIMUM SPAN "L+" FROM SCHEDULE. GIVEN A NEGATIVE A.S.D. DESIGN PRESSURE RATING, DETERMINE MAXIMUM SPAN "L-" FROM SCHEDULE.

FINAL MAXIMUM ALLOWABLE SPAN IS EQUAL TO THE MINIMUM DETERMINED SPAN BETWEEN "L+" AND "L-".

(3) PROCEDURE TO DETERMINE MAXIMUM SPAN FOR COMBINATIONS IN BETWEEN WALL W/ FLOOR/CEILING MOUNTINGS:

FOR A GIVEN POSITIVE A.S.D. DESIGN PRESSURE RATING:
 DETERMINE:
 L1+= MAX. SPAN FOR WALL MOUNTING INSTALLATIONS.
 L2+= MAX. SPAN FOR FLOOR/CEILING MOUNTING INSTALLATIONS.

FOR A GIVEN NEGATIVE A.S.D. DESIGN PRESSURE RATING:
 DETERMINE:
 L1-= MAX. SPAN FOR WALL MOUNTING INSTALLATIONS.
 L2-= MAX. SPAN FOR FLOOR/CEILING MOUNTING INSTALLATIONS.

FINAL MAXIMUM ALLOWABLE SPAN IS EQUAL TO THE MINIMUM BETWEEN "L1+", "L2+", "L1-" AND "L2-"

(4) GO TO ANCHOR SCHEDULE WITH FINAL MAXIMUM ALLOWABLE SPAN AND MAXIMUM A.S.D. DESIGN PRESSURE RATING TO DETERMINE MAXIMUM ANCHOR SPACING.

INSTALLATION LEGEND	
SUBSTRATE MOUNTINGS	POURED CONCRETE (SHEET 22)
WALL MOUNTING	AA & EE
FLOOR/CEILING MOUNTING	BB, CC, DD, FF & GG

WIND ZONE ASTM E-1996	MINIMUM SEPARATION TO GLASS
1 THRU 3	1"
4	3"

② HV BLADE

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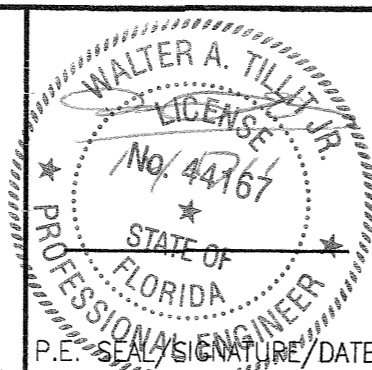
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TILLIT TESTING & ENGINEERING COMPANY
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ANCHORS SPACING LEGEND

1/4" TAPCON
5/16" TAPCON XL

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

MAXIMUM SPAN (ft)	POURED CONCRETE				
	ALL MOUNTINGS AA THRU GG (SHEET 22)				
	USE MAXIMUM VALUES BETWEEN POSITIVE AND NEGATIVE A.S.D. DESIGN LOADS				
	50 OR LESS	>50 TO 90	>90 TO 120	>120 TO 160	>160 TO 195
8'-9" OR LESS	8"	4 1/2"	3 1/2"	-	-
	12"	8"	6"	4"	3 3/4"
>8'-9" UP TO 12'-1"	6"	3 1/2"	3" ‡	-	-
	10"	6"	4"	4"	-
>12'-1" UP TO 18'-0"	4"	3 1/2"	-	-	-
	7 1/2"	5 1/2"	4"	-	-

NOTE:
‡ VALID ONLY FOR UP TO 10'-0" SPAN

***SPECIFICATIONS ON ANCHOR REQUIREMENTS: POURED CONCRETE SUBSTRATE**

(A) ANCHORS TO WALL SHALL BE AS FOLLOWS:

A.1) TO EXISTING POURED CONCRETE: (Min. f'c = 3192 psi)
- 1/4" TAPCON ANCHORS, AS MANUFACTURED BY I.T.W. BUILDEX.
MINIMUM EMBEDMENT INTO POURED CONCRETE OF TAPCON IS 1 3/4".

A.2) TO EXISTING POURED CONCRETE: (Min. f'c = 2899 psi)
- 5/16" TAPCON XL ANCHORS, AS MANUFACTURED BY I.T.W. BUILDEX.
MINIMUM EMBEDMENT INTO POURED CONCRETE OF 5/16" TAPCON XL ANCHORS IS 2 1/4".

A.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 NOTE A.1) ABOVE. FOR INSTALLATIONS ON VINYL SIDING OR EIFS CONSULT THIS ENGINEER.

(B) ANCHORS SHALL BE INSTALLED FOLLOWING ALL OF THE RECOMMENDATIONS AND SPECIFICATIONS OF THE ANCHOR'S MANUFACTURER.

(C) SEE BELOW FOR MINIMUM REQUIRED EDGE DISTANCE FOR ANCHORS.

MINIMUM REQUIRED EDGE DISTANCE FOR ANCHORS
MAXIMUM ANCHOR SPACINGS ARE VALID FOR
3" EDGE DISTANCE FOR 1/4" TAPCON AND
3 5/8" EDGE DISTANCE FOR 5/16" TAPCON XL.

② HV BLADE ONLY

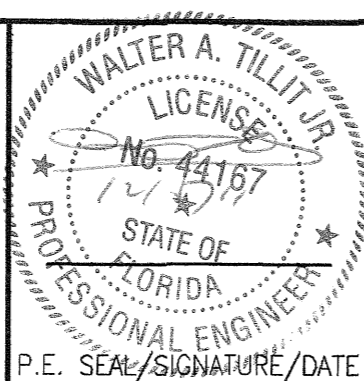
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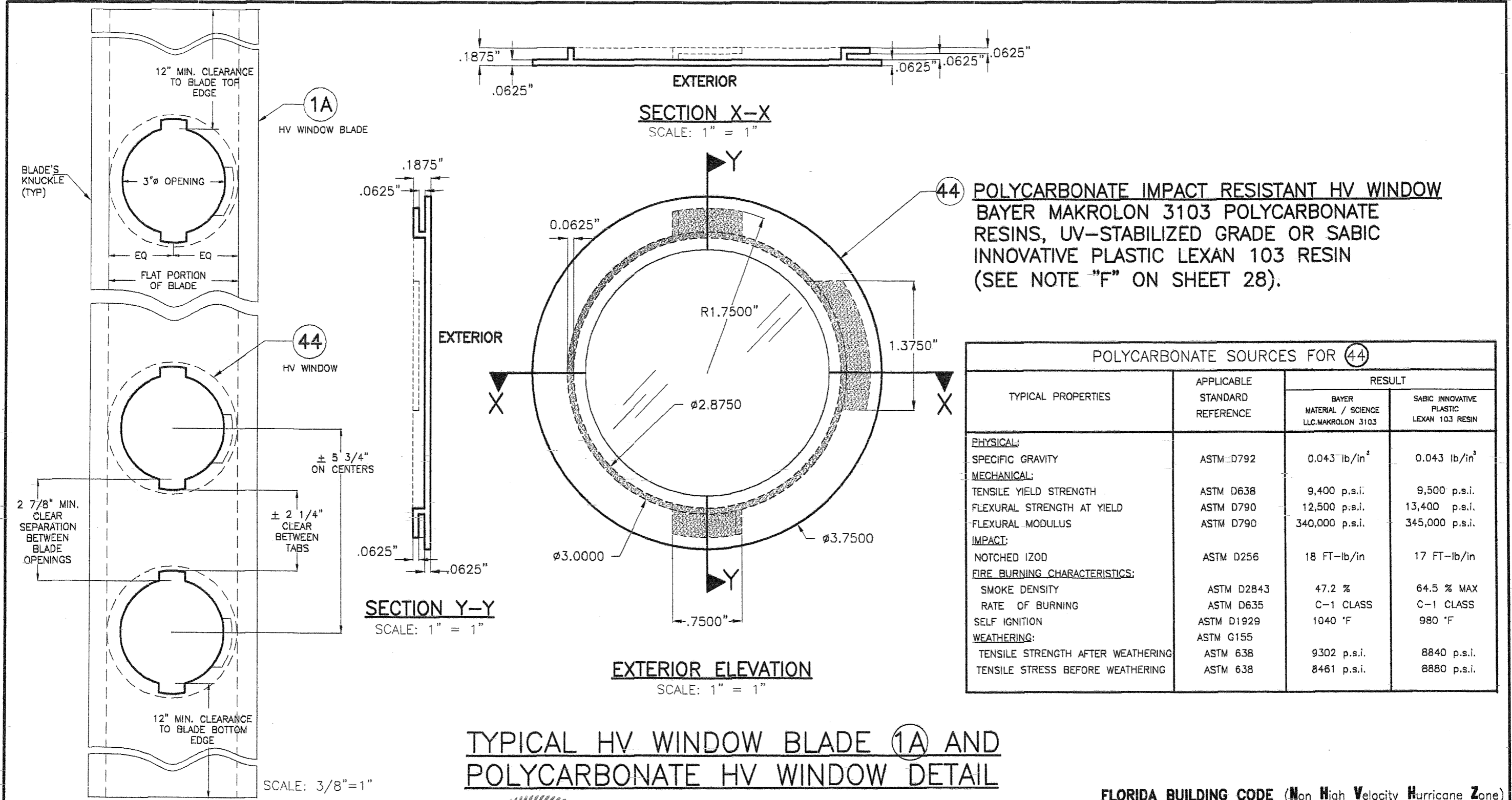
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TYPICAL HV WINDOW BLADE (1A) AND POLYCARBONATE HV WINDOW DETAIL

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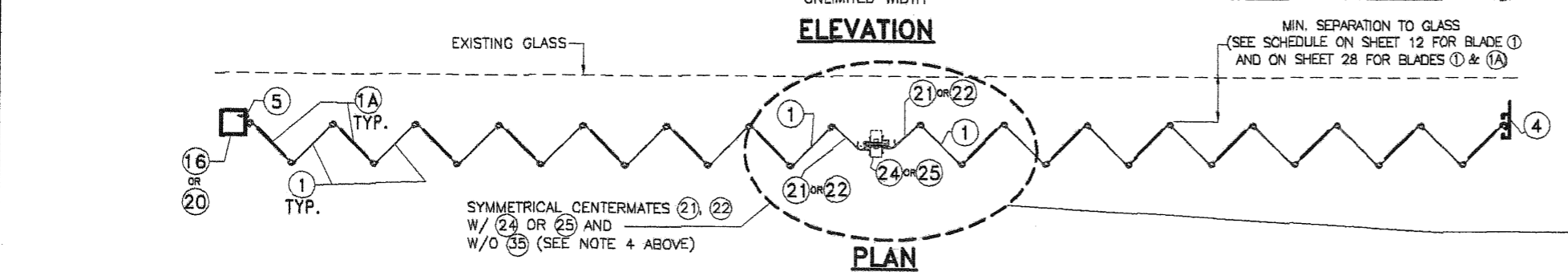
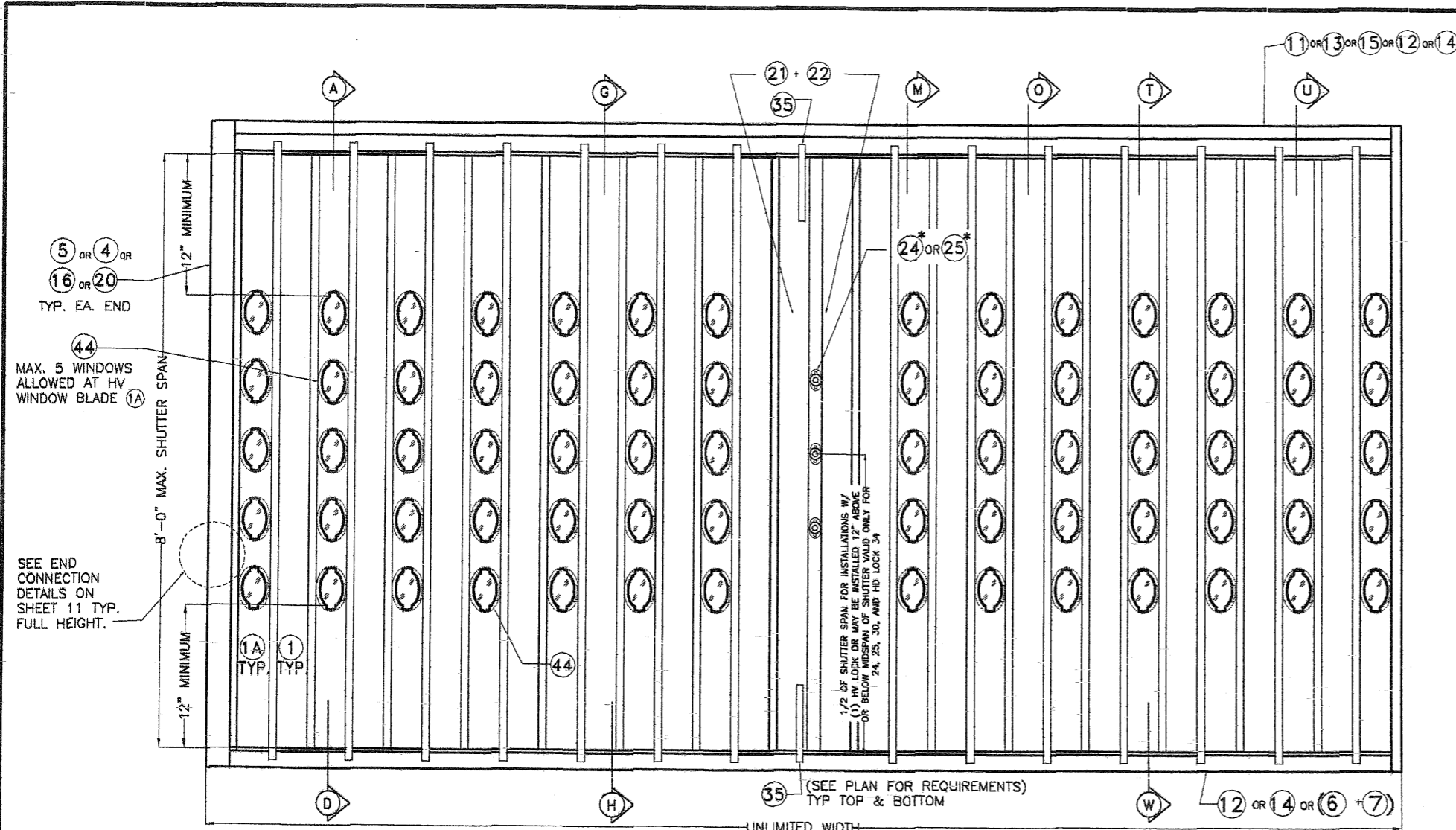
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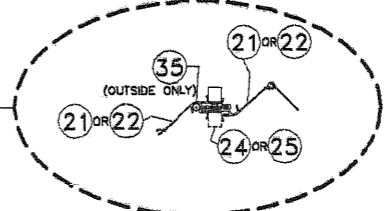


TYPICAL ① HV BLADE WORKING IN UNISON WITH HV WINDOW BLADE ①A SHUTTER*

- * GENERAL LIMITATIONS AND CONDITIONS OF USE FOR BERTHA**
① HV BLADE ACCORDION SHUTTER SYSTEM WORKING IN UNISON WITH HV WINDOW BLADE ①A
1. MAX. A.S.D. DESIGN PRESSURE RATING: +110, - 110 p.s.f.
 2. MAX. SHUTTER SPAN: 96"
 3. ALLOWED MOUNTINGS: A, D, G & H ON SHEETS 6, 7; AS WELL AS MOUNTINGS M, O, T, U & W ON SHEETS 18 & 19.
 4. ONLY CENTERMATES ②①, ②② (BOTH W/ ②④ OR ②⑤) ARE ALLOWED WITH ②①, ②② ARRANGED IN A SYMMETRICAL OR OPPOSING LAYOUT. IN CASE OF OPPOSING LAYOUT, ③⑤ MUST BE INCLUDED ONLY AT EXTERIOR ACCESS SIDE OF CENTERMATE.
 5. (A) HV WINDOW BLADE ①A SHALL ONLY ALLOW A MAXIMUM OF 5 OPENINGS (3"Ø HOLES) FOR ④④ PER BLADE AT SPACINGS SHOWN ON SHEET 27.
 (B) MIN. CLEARANCE FROM TOP OR BOTTOM EDGE OF HV WINDOW BLADE ①A OF ANY 3"Ø HOLE FOR ④④ SHALL BE 12".
 (C) FIRST OR LAST BLADE COMING OUT FROM STARTERS AT ENDS MAY BE HV WINDOW BLADE ①A
 (D) HV WINDOW BLADE ①A MUST BE USED ALTERNATE TO A SOLID HV BLADE ① THROUGHOUT SHUTTER'S WIDTH.
 (E) CENTERMATES SHALL ALWAYS BE INSTALLED ADJACENT TO A SOLID HV BLADE ① AT EITHER SIDE OF THEM.
 (F) POLYCARBONATE HV WINDOW ④④ SHALL BE INSTALLED SO THAT TABS FACE THE INTERIOR OF THE OPENING BEING PROTECTED. HV WINDOW ④④ 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 16, AS LIMITED BY SPAN AND A.S.D DESIGN LOAD. (SEE NOTES 1 & 2 ABOVE).
 7. SEE ANCHOR SPACING SCHEDULE FOR INSTALLATIONS INTO POURED CONCRETE OR CONCRETE BLOCK WALL ON SHEETS 13 & 14 AS LIMITED BY SPAN AND A.S.D DESIGN LOAD (SEE NOTES 1 & 2 ABOVE).
 8. MINIMUM SEPARATION TO GLASS SCHEDULE, PER ASTM E-1996:

WIND ZONE	MINIMUM SEPARATION TO GLASS
1 THRU 3	1"
4	6.25"

ALTERNATE OPPOSING CENTERMATES ②①, ②② W/ ③⑤ (EXTERIOR ONLY) AND W/ ②④ OR ②⑤ (SEE NOTE 4 ABOVE)



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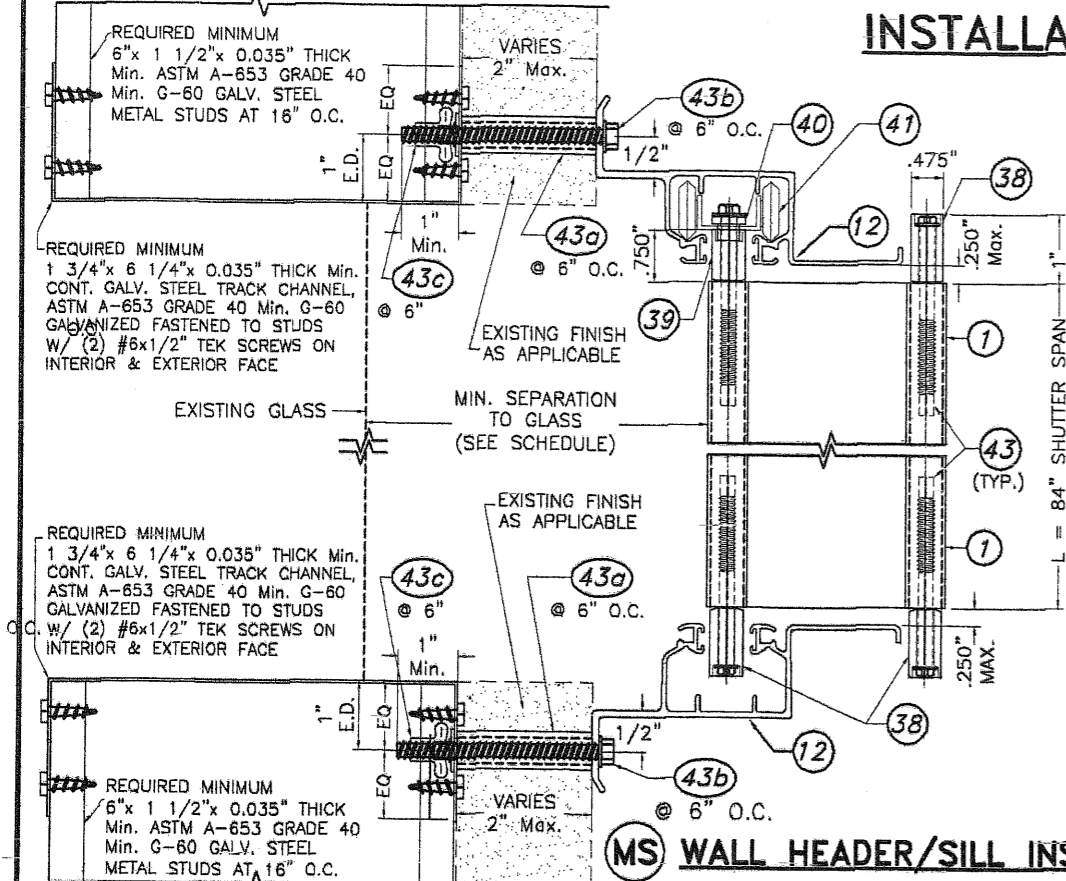
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 H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

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INSTALLATIONS W/ (1) HV BLADE & HV CENTERMATES (21) INTO METAL STUD WALLS *

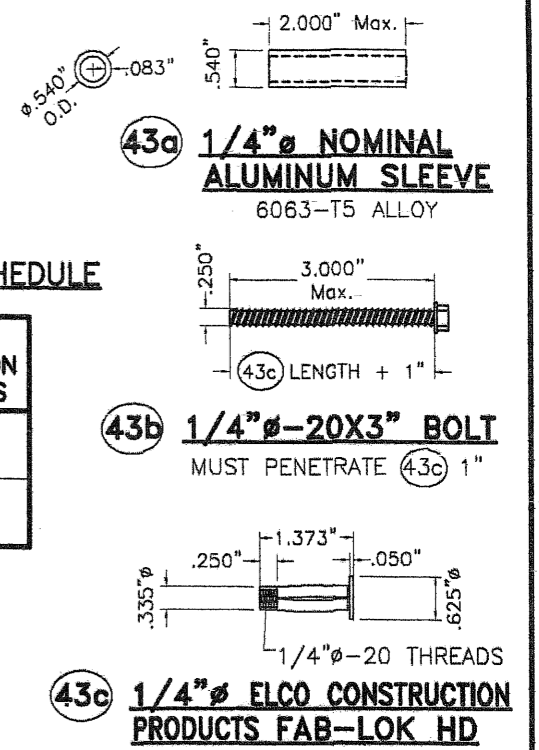


- * GENERAL LIMITATIONS AND CONDITIONS OF USE FOR BERTHA (1) HV BLADE ACCORDION SHUTTER SYSTEM INSTALLATION TO METAL STUD WALLS**
1. MAX. A.S.D. DESIGN PRESSURE RATING: +75, - 75 p.s.f.
 2. MAX. SHUTTER SPAN: 84"
 3. ALLOWED MOUNTING: (MS) ON THIS SHEET.
 4. ONLY CENTERMATE (21) W/ (24) HV LOCK ARE ALLOWED WITH (21) ARRANGED IN A SYMMETRICAL LAYOUT. USE OF (2) (35) (6" LONG, MINIMUM) MUST ALWAYS BE INCLUDED AT EXTERIOR OR INTERIOR ACCESS SIDE OF CENTERMATE.

**** BLADE SLACK DETAIL HVF IS VALID FOR CENTERMATE (21) APPLICATION WITH BLADE (1)**

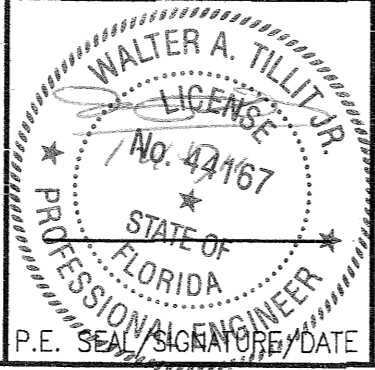
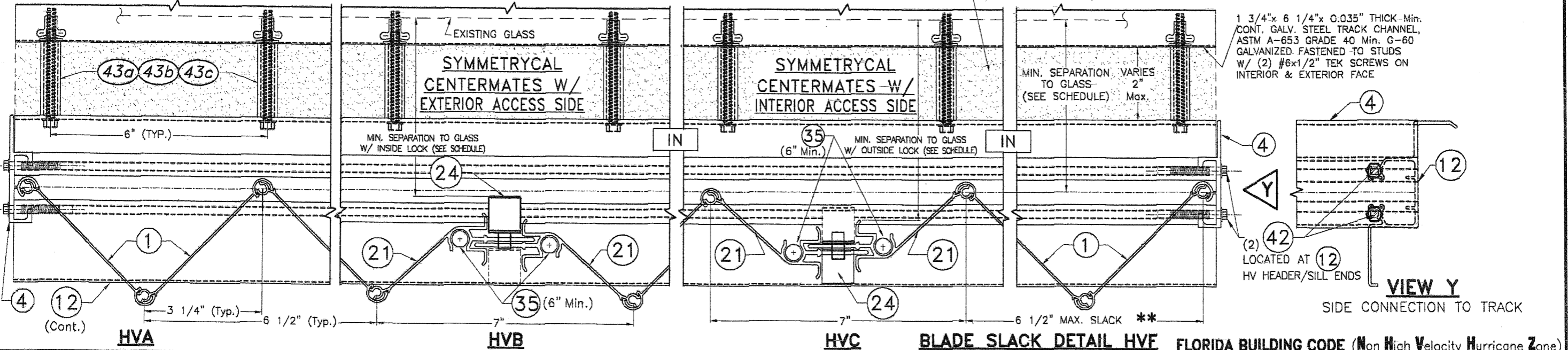
SEPARATION TO GLASS SCHEDULE

WIND ZONE ASTM E-1996	MINIMUM SEPARATION TO GLASS
1 THRU 3	1"
4	4"



COMPONENTS

SCALE: 3/8" = 1"



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