

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 2020 (7th 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 1620 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 7-16 AND SHALL NOT EXCEED THE MAXIMUM (A.S.D.) DESIGN PRESSURE RATINGS INDICATED ON SHEETS 11 THRU 15, 19 & 20.

IN ORDER TO VERIFY THE ABOVE CONDITION, ULTIMATE DESIGN WIND LOADS DETERMINED PER ASCE 7-16 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 11 THRU 15, 19 & 20.

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 & #1220.01-10 AS PER TAS 201, TAS 202 & TAS 203 PROTOCOLS LARGE MISSILE.

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

2. 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 19.

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. ALL ALUMINUM EXTRUSIONS IN CONTACT WITH DISSIMILAR MATERIALS SHALL COMPLY WITH SECTION III-6 OF THE 2015 ALUMINUM DESIGN MANUAL.

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 AND 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 : 12,13,14,14A,15 AND 20

HV BLADE ① & ①A WORKING IN UNISON: 12, 13 & 15

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 1709.9.3 OF FLORIDA BUILDING CODE. ONE LABEL SHALL BE PLACED FOR EVERY OPENING. LABELING TO COMPLY WITH SECTION 1709.9.2 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) ORIGINAL 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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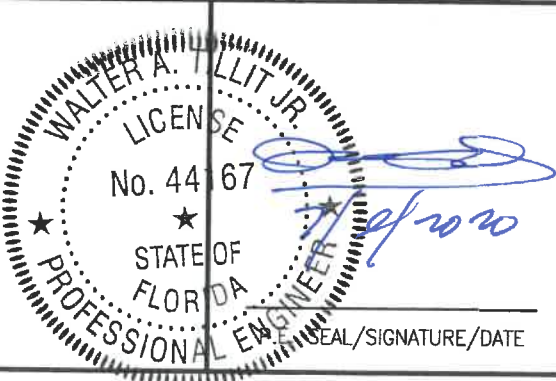
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THIS DRAWING SHALL ONLY BE USED TO OBTAIN PERMITS IN THE STATE OF FLORIDA

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



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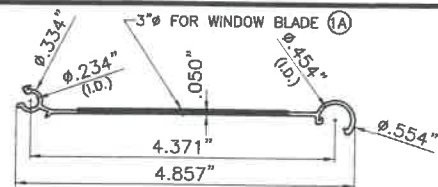
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BERTHA HV™
Accordion Shutter System
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE

REV.No	DESCRIPTION	DATE	DRAWN BY:	M.P
1	OLD 17-122	7/6/2020	DATE:	7/6/2020
2				
3				
4				
5				
6				

DRAWING No
20-169
SHEET
1 OF 20

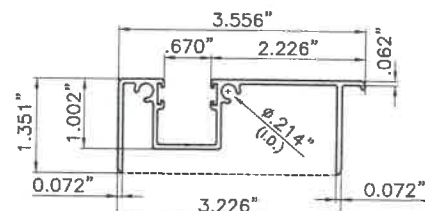


1 HV SOLID BLADE

COVERED UNDER US PATENT # 5458179

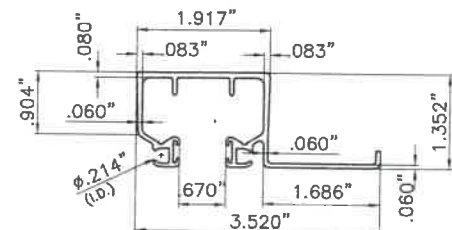
1A HV WINDOW BLADE*

*SEE LIMITATIONS OF USE OF BLADE 1A ON SHEET 19
6063-T6 ALLOY AND TEMPER



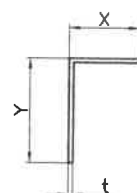
6 HV ADJ. FLOOR TRACK

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



11 HV CEILING HEADER

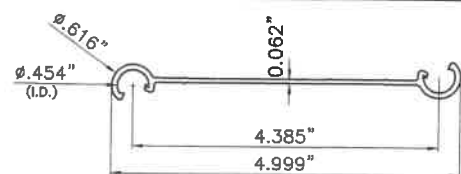
QUALIFIED FOR USE W/ HV BLADE 1 ONLY,
SEE SECTIONS FOR VALIDITY.
6063-T6 ALLOY AND TEMPER



MIN. X	MIN. Y	MIN. t
1"	1"	0.062"

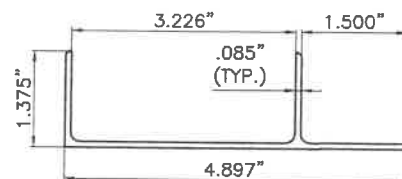
16 SIDE ANGLES

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



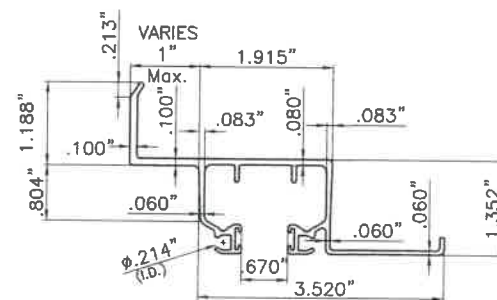
3 HV UNIVERSAL FLOATER

QUALIFIED FOR USE W/ HV BLADE 1
6005-T5 ALLOY AND TEMPER



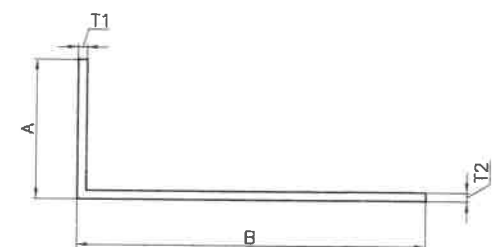
7 HV ADJ. ADAPTER W/LIP

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



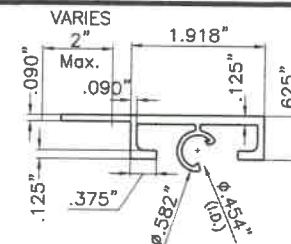
12 HV HEADER/SILL

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



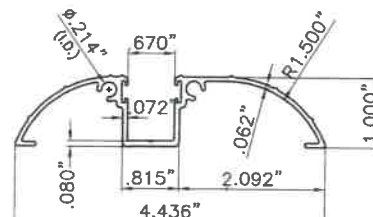
ALUMINUM ANGLES

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



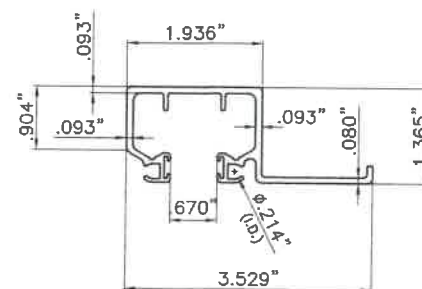
4 HV DIRECT MOUNT

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



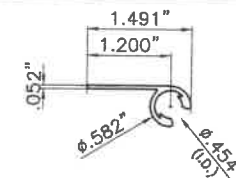
8 HV WALK-OVER TRACK

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



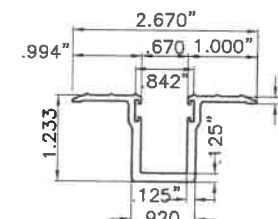
13 HD CEILING HEADER/SILL

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



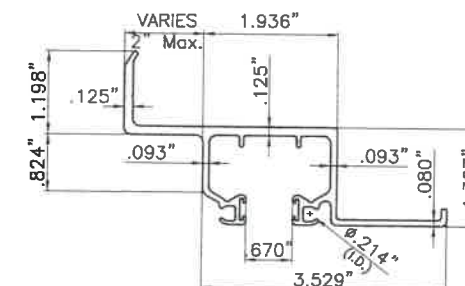
5 HV 90°/180° STARTER

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



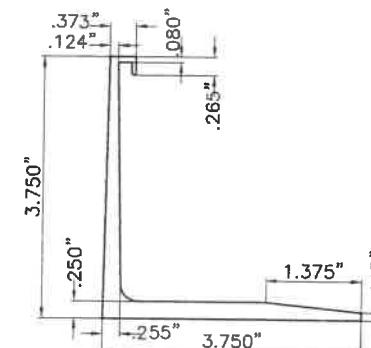
9 HV TRENCH TRACK

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



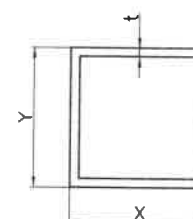
14 HD WALL HEADER/SILL

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



10 HV RAINGUARD

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



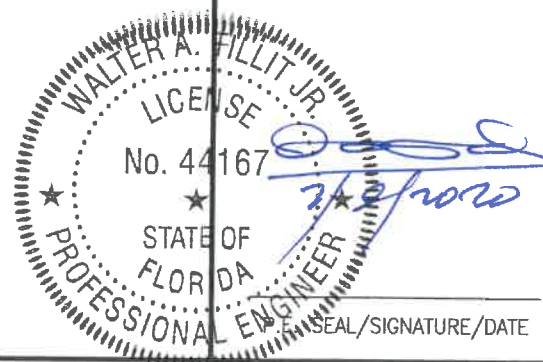
X	Y	t
2"	2"	0.125"
3"	3"	0.090"

20 CORNER POSTS

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

COMPONENT	A	B	T1	T2
17	2"	5" MAX.	1/8"	1/8"
18	2"	5" MAX.	0.192"	0.192"
19	2.5"	7" MAX.	0.190"	0.190"
5A	2"	5" MAX.	0.139"	0.131"

FLORIDA BUILDING CODE (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			
REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			
3			
4			
5			
6			

DRAWING No
20-169
SHEET
2 OF 20



Technical drawing of a rectangular metal part with dimensions: 1.917, 2.160, .063, .214, 1.185, .488, .063.

VARIES, 12" MIN.

1/4" Ø-20 S.S. OR 3/8" Ø-16
ACETAL THUMBSCREWS.
(SEE DETAILS)

500"

±15"

35 LOCKING ROD △

②② HV FLOATING CENTERMATE

Technical drawing of a mechanical part with dimensions:

- Overall width: 2.874"
- Distance from left edge to center of hole: 1.756"
- Distance from center of hole to right edge: .922"
- Overall height: 3.133"
- Distance from top edge to center of hole: 2.020"
- Distance from bottom edge to center of hole: .909"
- Angle of the hole: 062°
- Distance from center of hole to right edge of the part: .062"
- Distance from bottom edge to right edge of the part: 2.089"
- Distance from bottom edge to center of hole: .969"

Technical drawing of a mechanical part with the following dimensions:

- Overall height: 3.628"
- Height to top of first bend: 3.254"
- Height to top of second bend: 2.706" ± .188"
- Radius of first bend: R.214"
- Radius of second bend: R.350"
- Top horizontal width: .929"
- Top hole diameter: $\phi .334"$
- Horizontal distance from top hole to second bend: .060"
- Horizontal distance from second bend to third bend: .080"
- Horizontal distance from third bend to end: 1.325"
- Horizontal distance from second bend to end: 3.023"
- Horizontal distance from third bend to end: .100"
- Horizontal distance from end to last bend: .725"
- Radius of last bend: R.350"
- Horizontal distance from second bend to last bend: .060"

23 HV CORNER CENTERMATE

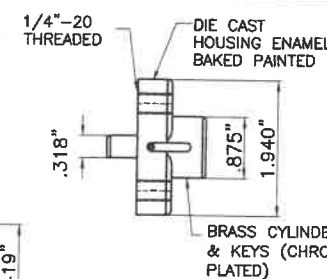
Technical drawing of a mechanical part with dimensions:

- Overall width: 4.045"
- Top left width: 2.079"
- Top right width: 1.753"
- Left height: 1.186"
- Bottom left width: 4.566"
- Bottom right width: .046"
- Internal width: .062"
- Internal radius: R.266"
- Internal radius: R.084"
- Internal radius: .06"
- Internal radius: R.107"

Technical drawing of a mechanical part with dimensions in inches and millimeters. The drawing shows a cross-section of a component with a central slot and two side flanges. The dimensions are as follows:

- Overall width: 3.161
- Overall height: .432
- Slot width: 1.030
- Slot depth: .063"
- Side flange width: .432
- Side flange height: .062"
- Bottom flange width: .583"
- Bottom flange height: .126"
- Bottom flange thickness: .405
- Bottom flange depth: .565
- Bottom flange width (inner): .775"

24 HV LOCK



25 HV EGRESS LOCK

Technical drawings of two types of fasteners:

- S.S. THUMBSCREW:** A side view of a screw with a plastic head molded to the screw. Dimensions include: 250" O.D. (outer diameter of the head), 750" (height of the head), 1.187" (total height), .825" (height of the threaded section), and .437" (height of the base). A label points to the head: "PLASTIC HEAD MOLDED TO SCREW".
- 1/4" Ø-20 RIVNUT*:** Two views of a rivnut. The left view is labeled "BEFORE RIVETING" and shows dimensions: 518" (width), 758" (height), and .360" (width after riveting). The right view is labeled "AFTER RIVETING" and shows dimensions: 518" (width), 512" (height), and .360" (width after riveting).

26 HV ALTERNATIVE LOCK

26 HV ALTERNATIVE LOCK

Technical drawing of a rectangular plate with the following dimensions and features:

- Overall width: 6.822"
- Overall height: 6.378"
- Inner width: 6.000"
- Top edge detail: 0.255" (width of a small rectangular feature)
- Right edge detail: 0.545" (width of a small rectangular feature)
- Bottom right corner detail: 0.804" (width of a rectangular feature) and 1.256" (height of a semi-circular feature with a radius of 0.628")
- Internal features: A central circular hole with a crosshair, a small rectangular slot, and two small circular holes.

34 HD LOCK

WALTER A. ALLITT JR.

LICENSE

No. 44167

STATE OF FLORIDA

PROFESSIONAL ENGINEER

SEAL/SIGNATURE/DATE



TILTECO INC.

A.S.S.A.

BERTHA HV™
Accordion Shutter System
 H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE

REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			DRAWING No 20-169
3			
4			
5			
6			SHEET 3 OF 20

SHUTTER ASSEMBLY SCHEDULE FOR HV 1, HV 1A

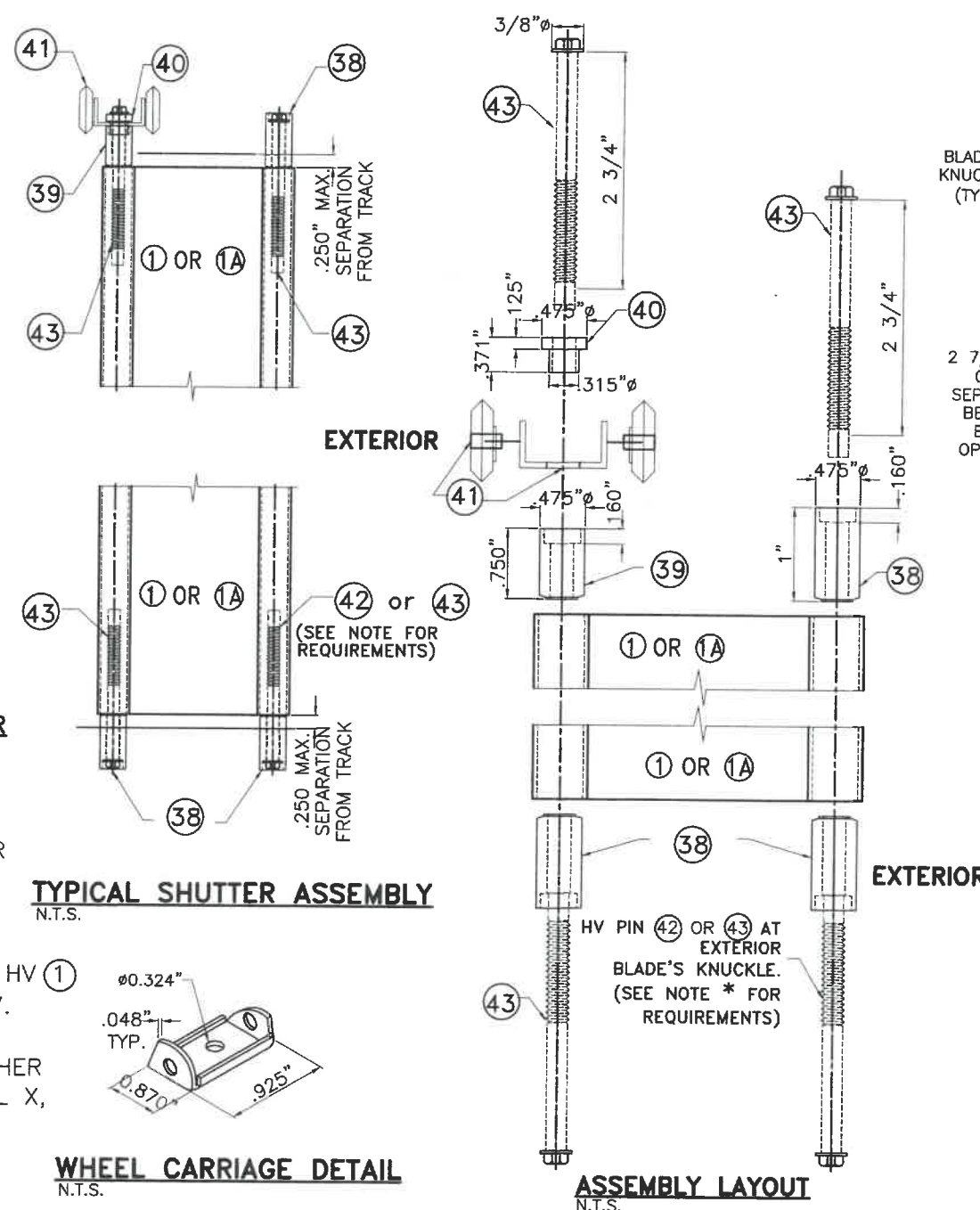
①	HV BLADE 1
1A	HV BLADE 1A
38	HV LONG RECESSED NYLON BUSHING
39	HV SHORT RECESSED NYLON BUSHING
40	HV NYLON HAT WASHER
41	HV WHEEL CARRIAGE AISI 302-303 SERIES Ø.870"x3/16" THICK NYLON WHEEL. 0.188"Ø AISI 302 SERIES S.S. RIVETS
42	HV 1 3/4" ACCORDION PIN W/ #8 HEAD *
43	HV 2 3/4" ACCORDION PIN W/ #8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

* HV PIN REQUIREMENTS AT EXTERIOR BLADE KNUCKLE FOR HV 1, HV 1A

(1) HV PIN ④ SHALL ALWAYS BE USED AT ALL EXTERIOR
BOTTOM KNUCKLES OF HV ACCORDION SYSTEM W/ HV ① OR
HV 1A BLADE.

(2) HV PIN ④ MAY BE USED IN LIEU OF ④ AND ONLY AT
EXTERIOR BOTTOM KNUCKLES OF HV ACCORDION SYSTEM W/ HV ①
BLADE WHEN CORRESPONDING TO INSTALLATION "11", SHEET 7.

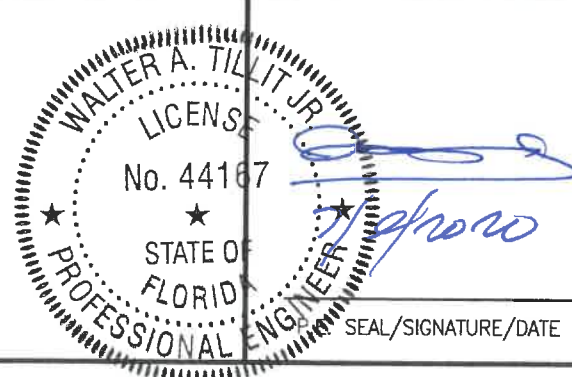
(3) HV PIN ④ OR ④ W/ 1/2" O.D. 1/16" THICK S.S. WASHER
SHALL BE USED FOR DIRECT MOUNT INSTALLATION PER DETAIL X,
SHEET ⑩



① HV BLADE SOLID & 1A HV WINDOW BLADE DETAILS N.T.S.

POLYCARBONATE SOURCES FOR ④			
TYPICAL PROPERTIES	APPLICABLE STANDARD REFERENCE	RESULT	
		BAYER MATERIAL / SCIENCE LLC-MAKROLON 3103	SABIC INNOVATIVE PLASTIC LEXAN 103 RESIN
PHYSICAL:			
SPECIFIC GRAVITY	ASTM D792	0.043 lb/in ³	0.043 lb/in ³
MECHANICAL:			
TENSILE YIELD STRENGTH	ASTM D638	9,400 p.s.i.	9,500 p.s.i.
FLEXURAL STRENGTH AT YIELD	ASTM D790	12,500 p.s.i.	13,400 p.s.i.
FLEXURAL MODULUS	ASTM D790	340,000 p.s.i.	345,000 p.s.i.
IMPACT:			
NOTCHED IZOD	ASTM D256	18 FT-lb/in	17 FT-lb/in
FIRE BURNING CHARACTERISTICS:			
SMOKE DENSITY	ASTM D2843	47.2 %	64.5 % MAX
RATE OF BURNING	ASTM D635	C-1 CLASS	C-1 CLASS
SELF IGNITION	ASTM D1929	1040 °F	980 °F
WEATHERING:			
TENSILE STRENGTH AFTER WEATHERING	ASTM G155		
TENSILE STRESS BEFORE WEATHERING	ASTM 638	9302 p.s.i.	8840 p.s.i.
	ASTM 638	8461 p.s.i.	8880 p.s.i.

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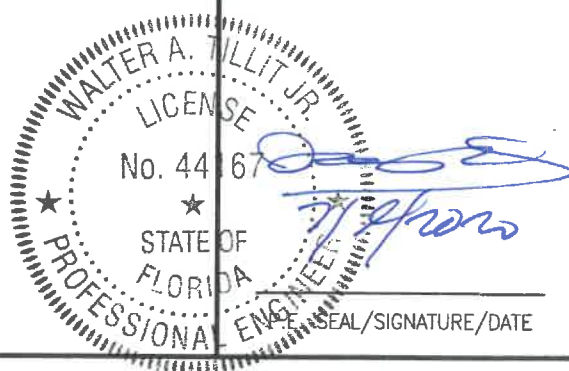
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American Shutter Systems
Association, Inc.
4268 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

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BERTHA HV™ Accordion Shutter System H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE			
REV.No	DESCRIPTION	DATE	DRAWN BY: M.P.
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			
3			
4			
5			
6			

DRAWING No
20-169
SHEET
4 OF 20



REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			DRAWING No 20-169
3			
4			
5			
6			SHEET 5 OF 20

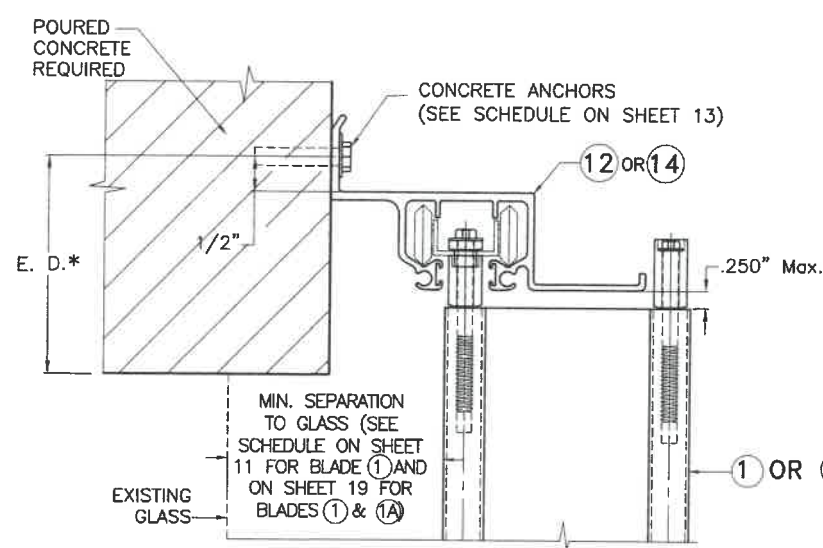


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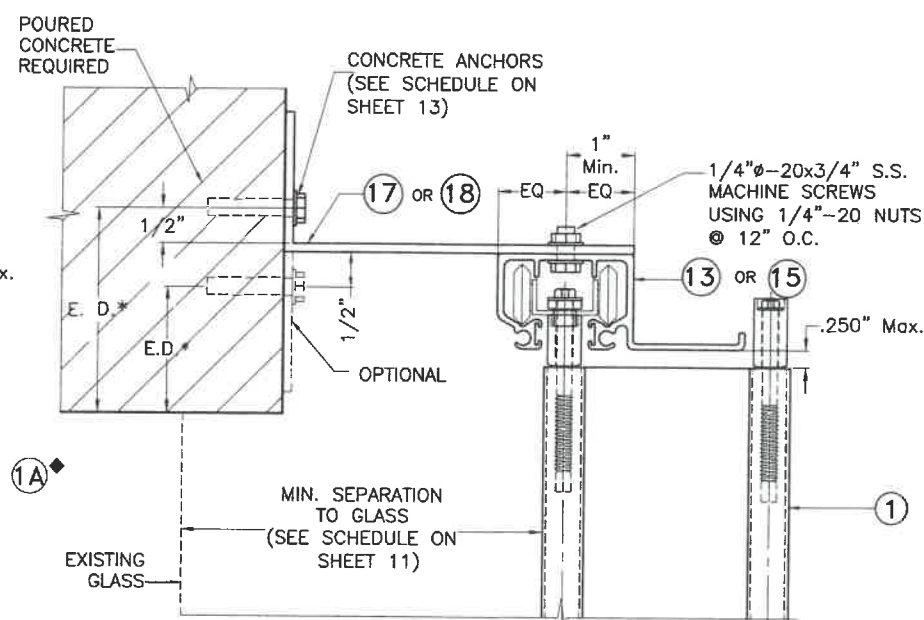
BERTHA HV™

Accordian Shutter System

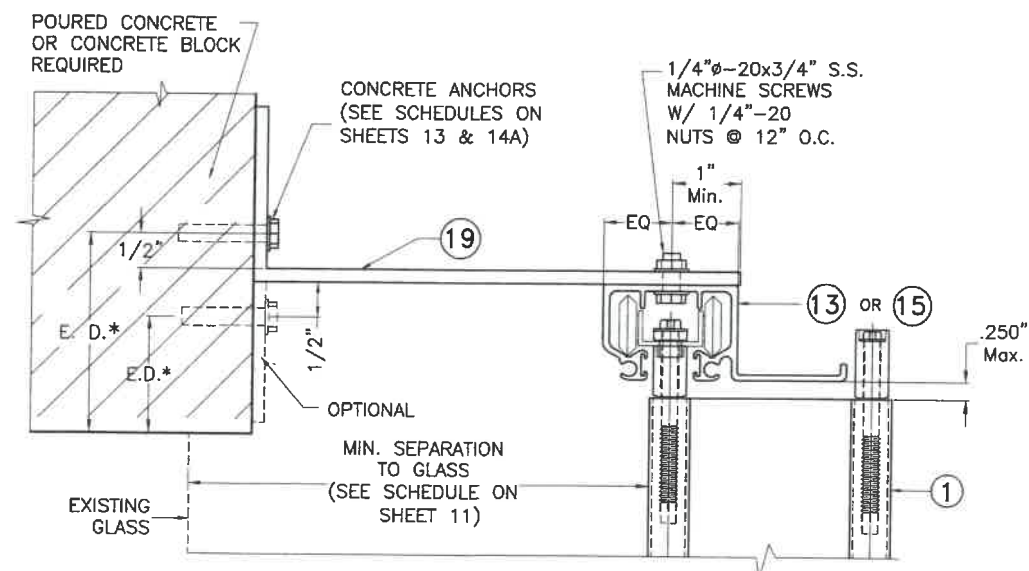
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE



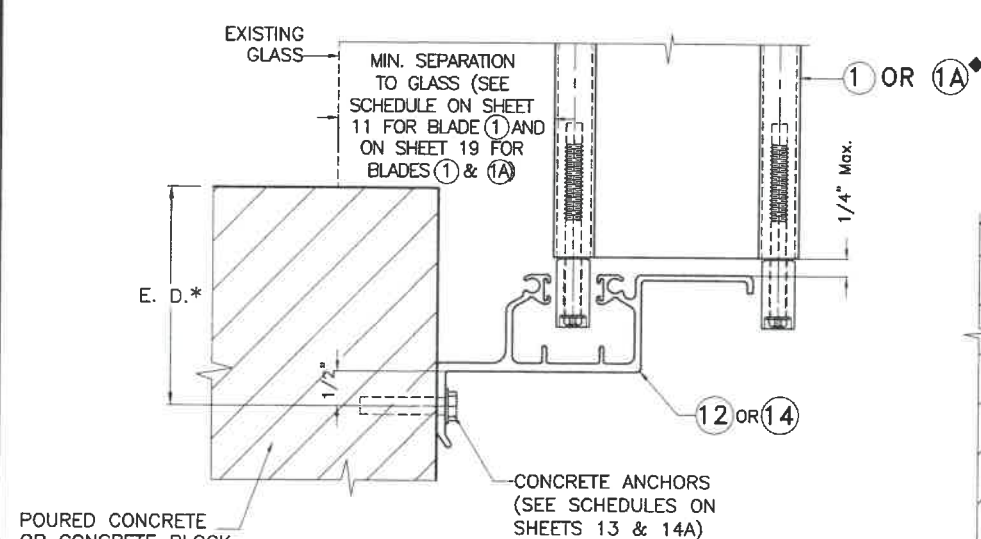
A HV WALL HEADER INSTALLATION



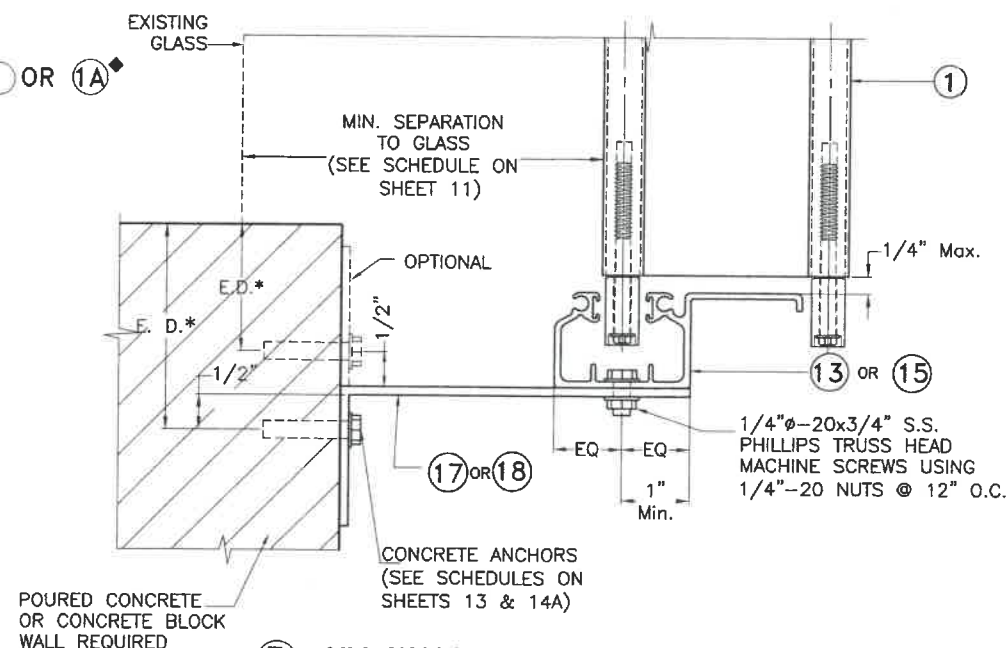
B HV WALL HEADER INSTALLATION



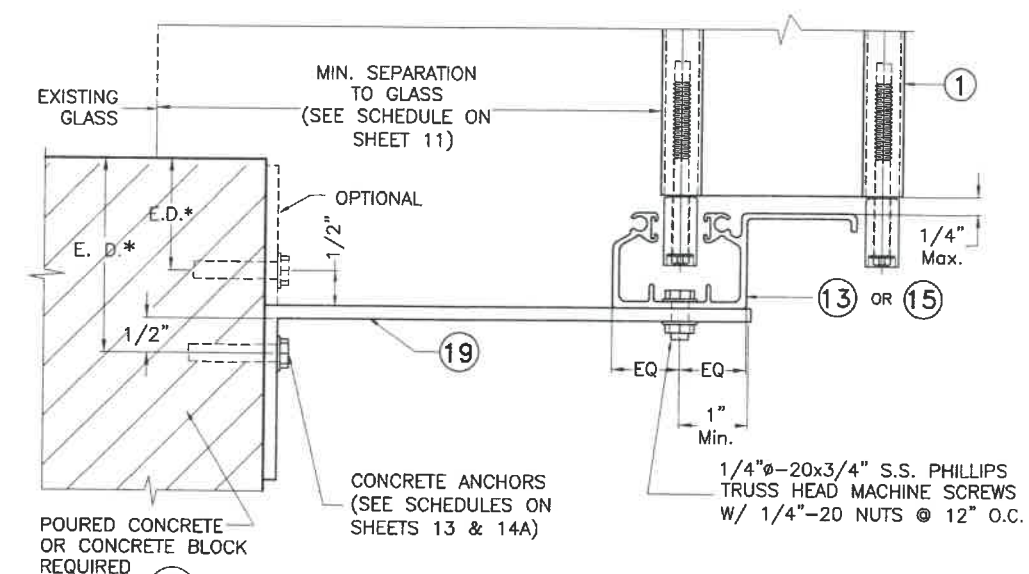
C HV WALL HEADER INSTALLATION



D HV WALL SILL INSTALLATION



E HV WALL SILL INSTALLATION



F HV WALL SILL INSTALLATION

NOTE FOR COMBINATION OF SECTIONS:

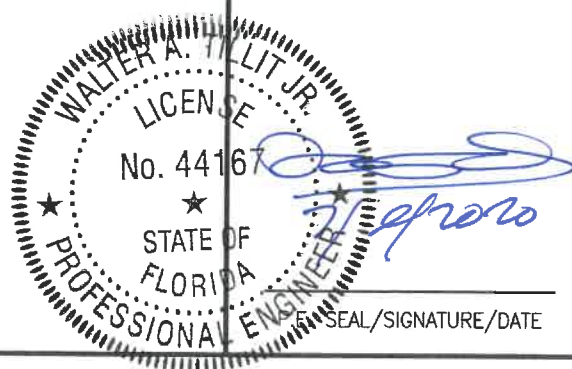
1- SEE SHEET 4 FOR TYPICAL SHUTTER ASSEMBLY
2- MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.

* E. D. = EDGE DISTANCE
(SEE SPECIFICATIONS ON SHEET 13)

◆ SEE LIMITATIONS OF USE FOR
BLADE 1A ON SHEET 19

**INSTALLATION DETAILS W/
1 HV BLADE**

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

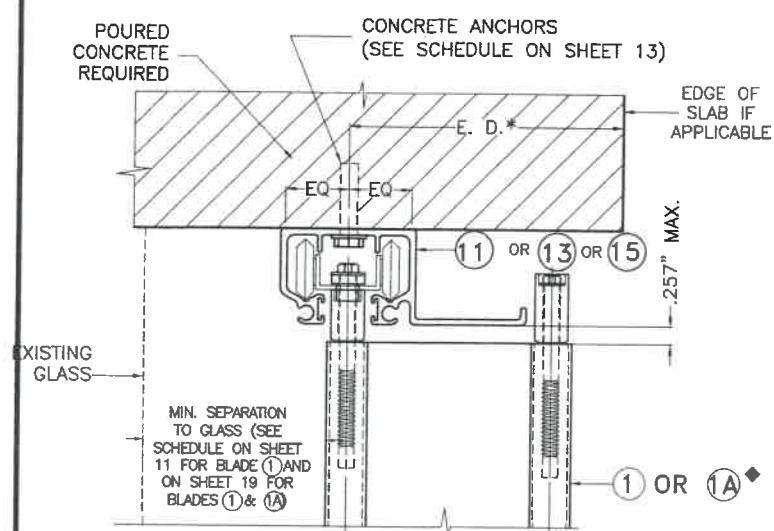


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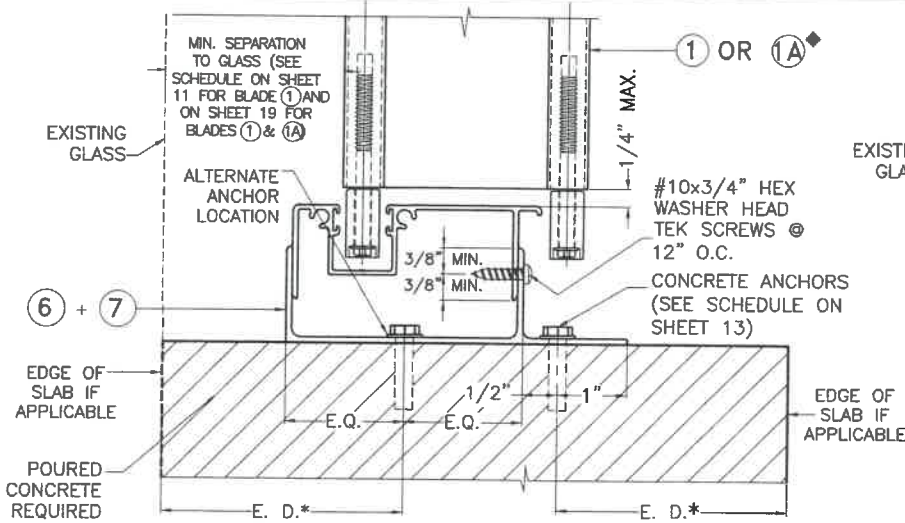
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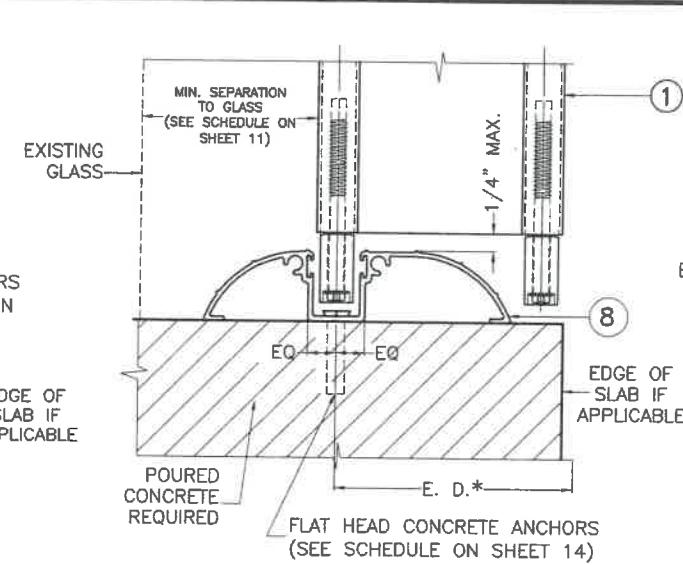
DRAWING No
20-169
SHEET
6 OF 20



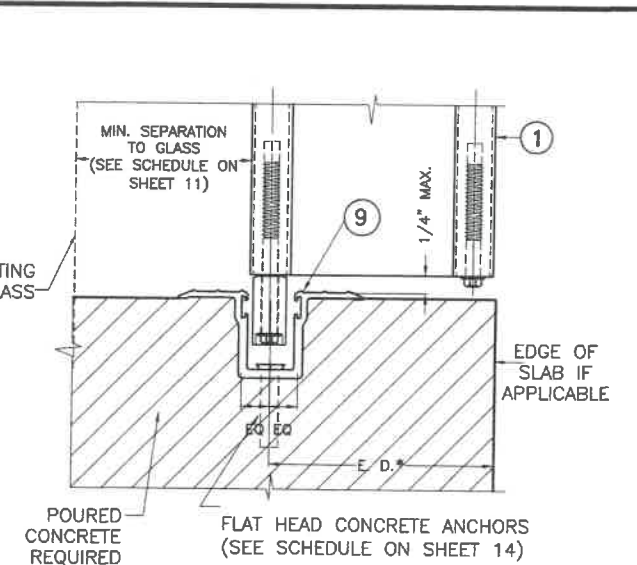
G HV CEILING INSTALLATION



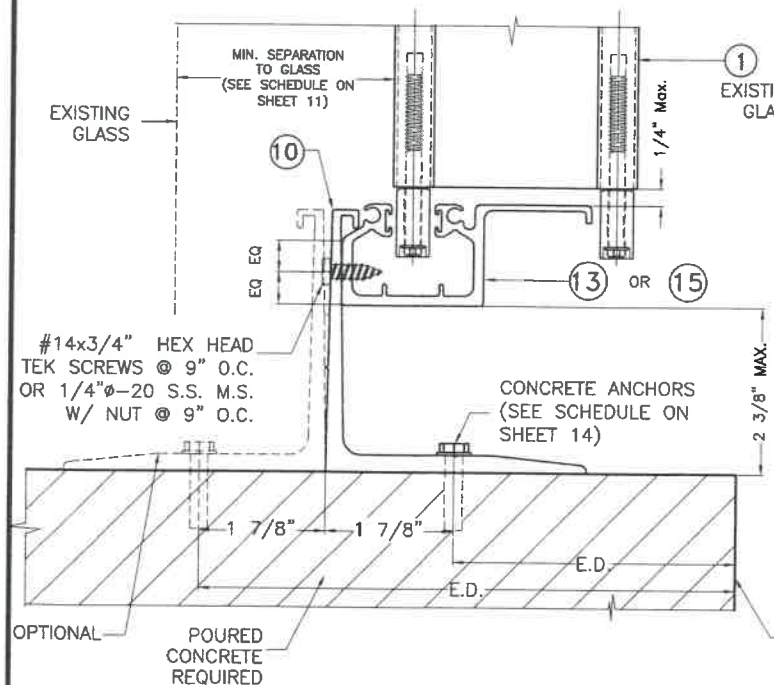
H HV FLOOR INSTALLATION †



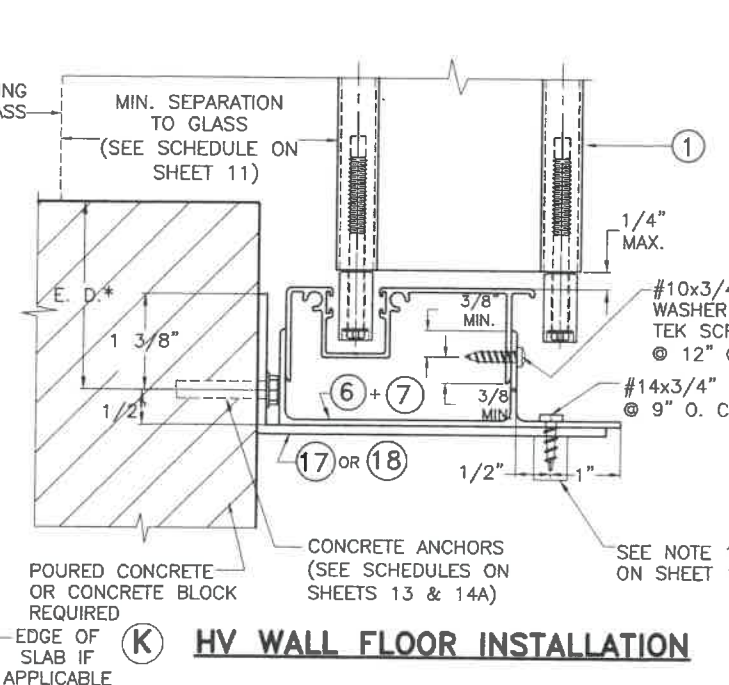
I HV WALK-OVER INSTALLATION



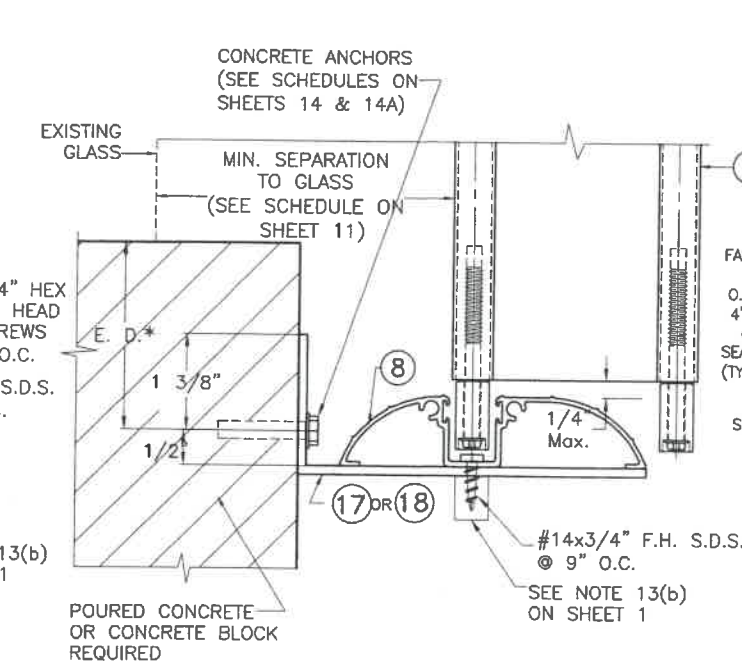
11 TRENCH INSTALLATION
VALID ONLY FOR UP TO +70, -75 PSF A.S.D.
DESIGN PRESSURE RATING & FOR SPANS PER
SCHEDULE #4, SHEET 11



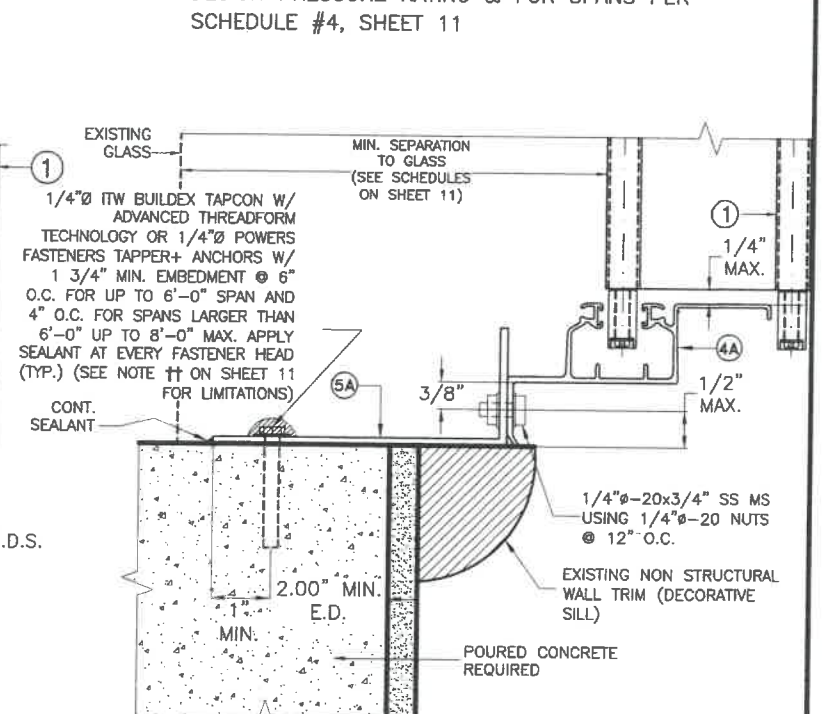
J HV RAINGUARD INSTALLATION †



K HV WALL FLOOR INSTALLATION



L HV WALL WALK-OVER INSTALLATION



M KEYSTONE MOUNTING INSTALLATION
MAXIMUM A.S.D. DESIGN PRESSURE: +64, -72 psf
MAXIMUM SHUTTER SPAN 8'-0"

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 13)

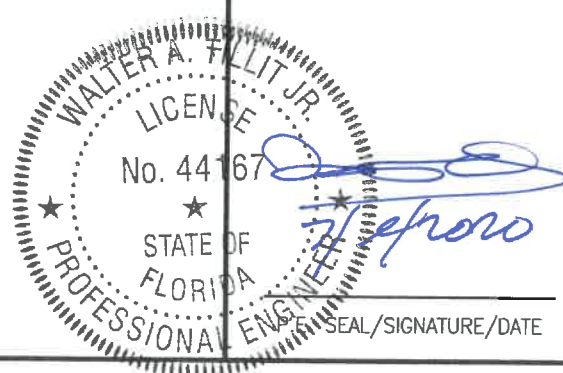
NOTE:

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

♦ SEE LIMITATIONS OF USE FOR BLADE 1A ON SHEET 19

INSTALLATION DETAILS W/ 1 HV BLADE

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REV.No	DESCRIPTION	DATE	DRAWN BY:	M.P
1	OLD 17-122	7/6/2020	DATE:	7/6/2020
2				
3				
4				
5				
6				

DRAWING No

20-169

SHEET

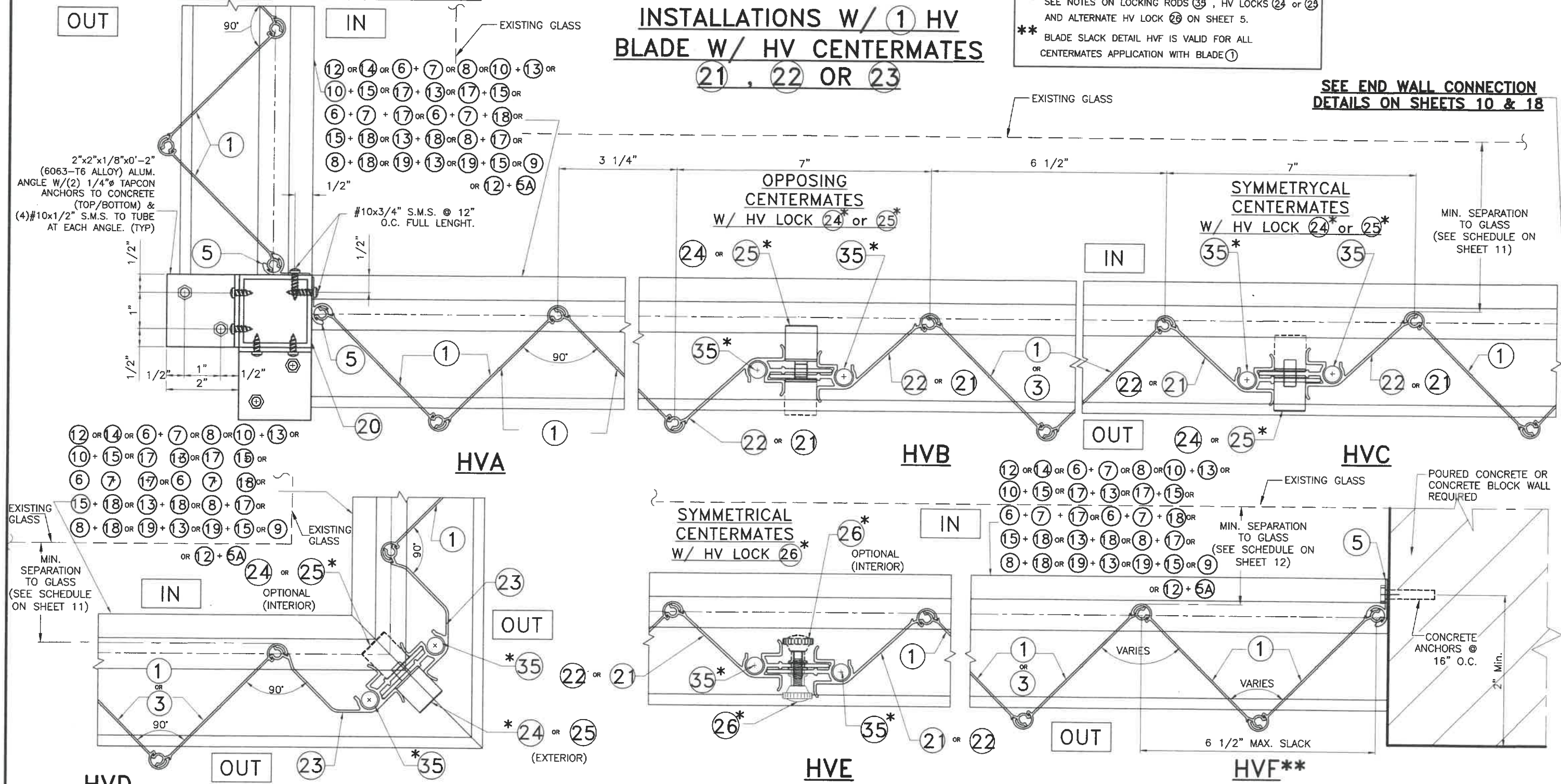
7 OF 20

SEE END WALL CONNECTION DETAILS ON SHEETS 10 & 18

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

* SEE NOTES ON LOCKING RODS ③③ , 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 10 & 18



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WALTER A. TILLIT JR.
LICENSE
No. 44 67
STATE OF
FLORIDA
PROFESSIONAL ENGINEER
SEAL/SIGNATURE/DATE

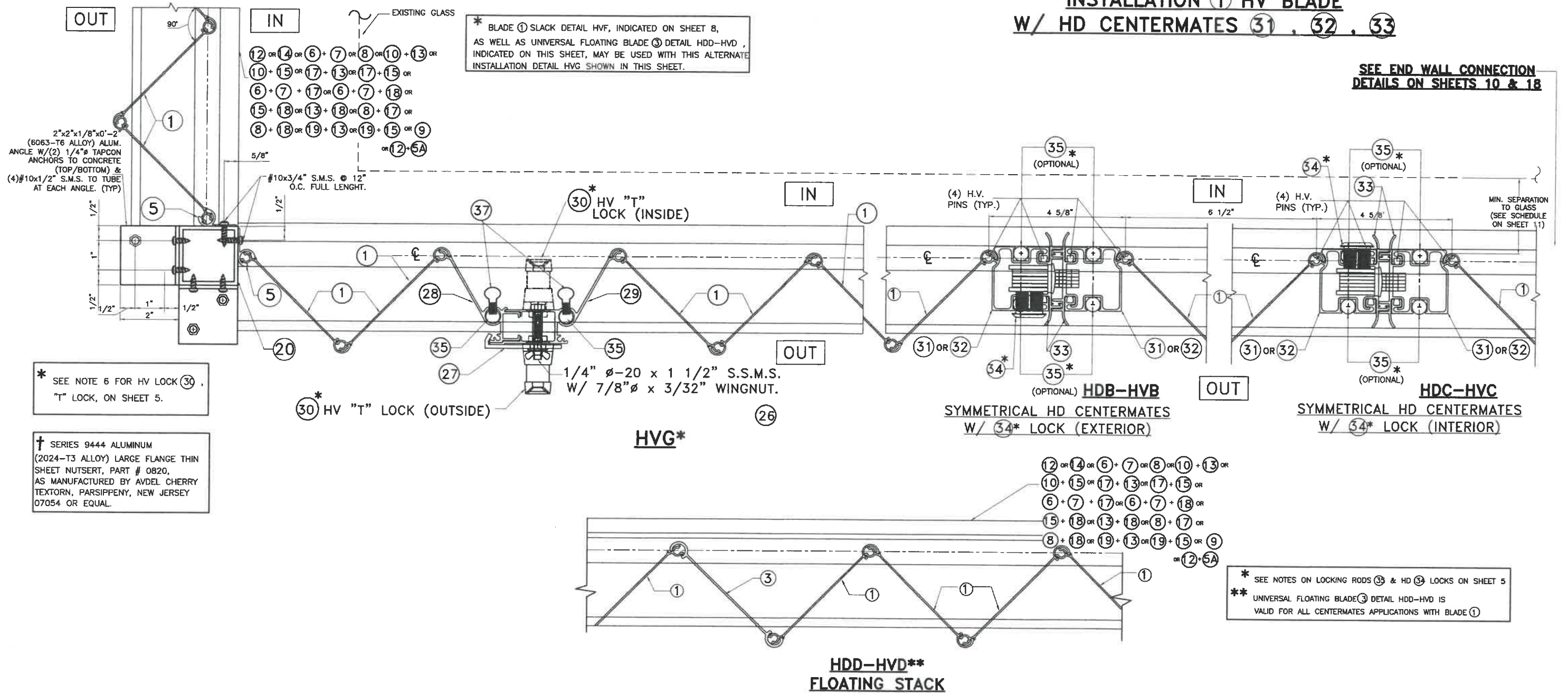
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BERTHA HV™ Accordion Shutter System H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE				
REV.No	DESCRIPTION	DATE	DRAWN BY:	M.P.
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2				
3				
4				
5				
6				
DRAWING No				20-169
SHEET				8 OF 20

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

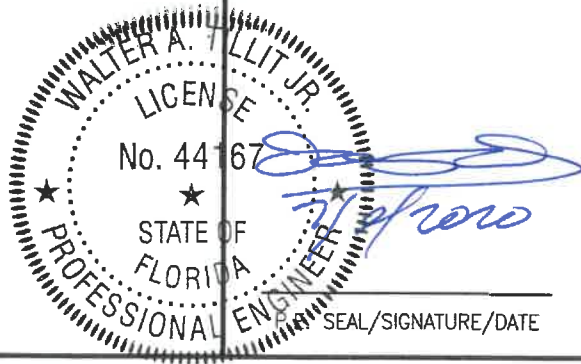
SEE END CONNECTION DETAILS ON SHEETS 10 & 18

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

REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			DRAWING No 20-169
3			
4			
5			
6			SHEET 9 OF 20



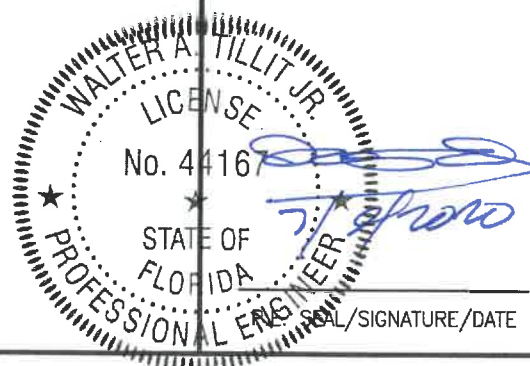
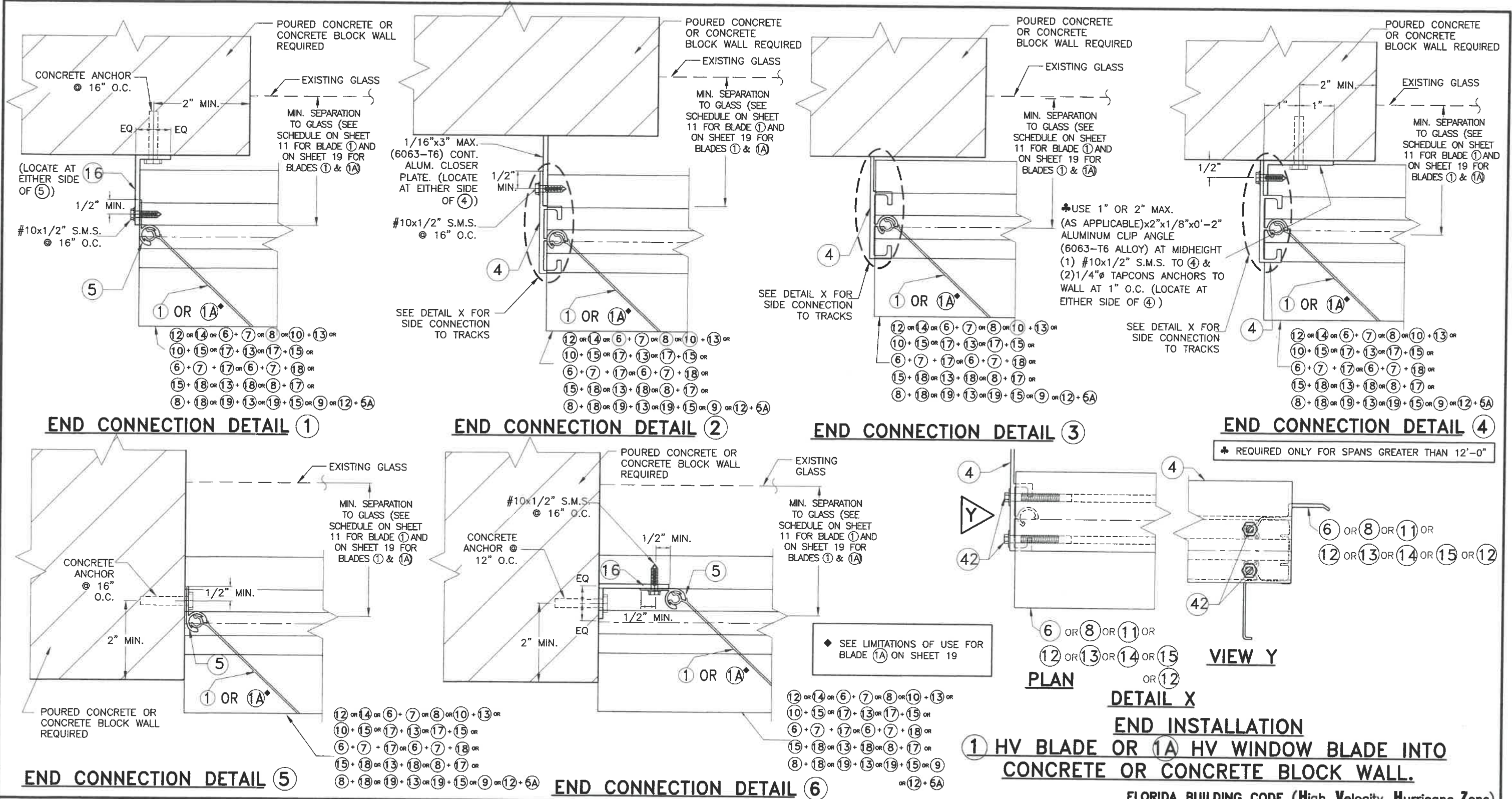
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REV.No	DESCRIPTION	DATE	DRAWN BY: M.P.
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2			
3			
4			
5			
6			

DRAWING No
20-169

SHEET
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SCHEDULE #1

MAXIMUM SHUTTER SPAN* "L+" OR "L-" (ft.)
FOR INSTALLATIONS W/ SYMMETRICAL
CENTERMATES (21) & (22) OR (31) OR (32) W/ ONE
HV LOCK (24) OR (25) OR (26) OR HD LOCK (34) W/
NO LOCKING RODS (35) OR CENTERMATES (28) &
(29) W/ ONE HV LOCK (30) W/ TWO LOCKING RODS
(35) TOP & BOTTOM ♦(SEE NOTES 1, 11)

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

SCHEDULE #2

MAXIMUM SHUTTER SPAN*
"L+" OR "L-" (ft.) FOR
INSTALLATIONS W/ OPPOSING
CENTERMATES (21) & (22)
ONE HV LOCK (24) OR (25)
OR (26) W/ NO LOCKING
RODS (35) ♦(SEE NOTES 1, 11)

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

SCHEDULE #3

MAXIMUM SHUTTER SPAN* "L+"
OR "L-" (ft.) INSTALLATIONS
W/ SYMMETRICAL CENTERMATES
(21) & (22) W/ TWO HV (24) OR
(25) OR (26) LOCKS OR TWO
LOCKING RODS (35) TOP/BOTTOM
W/ ONE HV LOCK (24) OR (25)
OR (26) ♦(SEE NOTES 1, 11)

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

SCHEDULE #4

MAXIMUM SHUTTER SPAN* "L+"
OR "L-" (ft.) INSTALLATIONS
W/ SYMMETRICAL CENTERMATES
(21) & (22) W/ ONE HV LOCKS
(24) OR (25) W/ NO LOCKING
RODS (35)

(VALID FOR MOUNTING (1), SHEET 7)		
MAXIMUM A.S.D. DESIGN PRESSURE RATING (p.s.f.) (+ OR -)	CONCRETE INSTALLATIONS	
	FLOOR/CEILING MOUNTING OR FLOOR/WALL MOUNTING	
	L + (ft)	L - (ft)
30	13'-2"	16'-0"
35	12'-8"	14'-10"
40	12'-3"	13'-10"
45	11'-11"	13'-1"
50	11'-7"	12'-5"
55	11'-2"	11'-10"
60	10'-2"	10'-11"
65	9'-5"	10'-1"
70	8'-9"	9'-4"
75	-	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 NEGATIVE
A.S.D. DESIGN PRESSURE RATING TO
DETERMINE MAXIMUM ANCHOR SPACING.

○ MAXIMUM SHUTTER
SPAN "L+" OR "L-" FOR
INSTALLATIONS INTO WOOD
SHALL BE LIMITED TO 105
psf. DESIGN LOAD.

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

†† 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 MOUNTING (M) ON SHEET 7.

♦ SEPARATION TO GLASS REQUIREMENTS

(1) SEE BELOW FOR MINIMUM SEPARATION TO
GLASS SCHEDULE FOR SHUTTERS INSTALLED WITHIN
THE FIRST 30'-0" ELEVATION OF BUILDING
MEASURED AT BOTTOM OF SHUTTER.

(2) MINIMUM SEPARATION TO GLASS FOR SHUTTERS
INSTALLED ABOVE 30'-0" ELEVATION OF BUILDING,
MEASURED AT BOTTOM OF SHUTTER IS 3".

MINIMUM SEPARATION TO GLASS SCHEDULE: SHUTTER W/ ONE LOCK WITHOUT LOCKING RODS

SHUTTER SPAN	INSTALLATION W/ SYMMETRICAL CENTERMATES	INSTALLATION W/ OPPOSING CENTERMATES
105" OR LESS	3 3/8"s	4"
>105" TO MAX. ALLOWED	3 7/8"s	4"

s USE 2 1/2" FOR HD LOCK (31)+(33) OR (32)+(33).
USE INDICATED VALUES FOR HV CENTERMATES.

MINIMUM SEPARATION TO GLASS SCHEDULE: SHUTTER W/ ONE LOCK & TWO LOCKING RODS OR WITH ONLY TWO LOCKS

SHUTTER SPAN	INSTALLATION W/ SYMMETRICAL CENTERMATES	INSTALLATION W/ OPPOSING CENTERMATES
105" OR LESS	2 3/4" **	3 3/16"
>105" TO MAX. ALLOWED	3 1/4" ***	3 1/4"

** USE 2 15/16" FOR HV "T" LOCK (30) W/ (35)

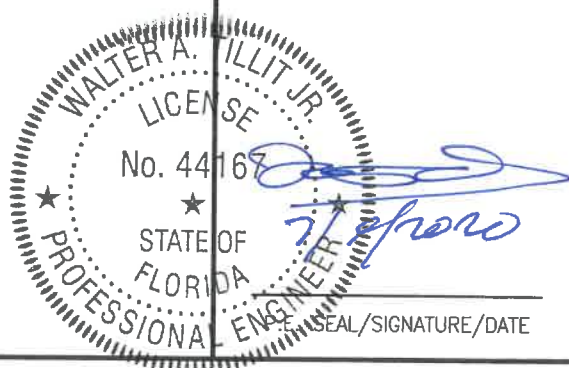
*** USE 4 1/8" FOR HV "T" LOCK (30) W/ (35)
USE INDICATED VALUES FOR HV CENTERMATES.

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 + J. + M.	T, U, W & X.

1 HV BLADE

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



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© 2020 EASTERN METAL SUPPLY, INC.			
BERTHA HV™ Accordion Shutter System H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE			
REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			
3			
4			
5			
6			
			DRAWING No 20-169
			SHEET 11 OF 20

ANCHORS SPACING LEGEND

TAPCON WITH ADVANCED THREADFORM TECHNOLOGY
BLUE TAP
TAPPER+

* SEE ANCHOR
SPECIFICATIONS
ON SHEET 13

◆ SEE LIMITATIONS OF USE FOR
BLADE (1A) ON SHEET 19

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

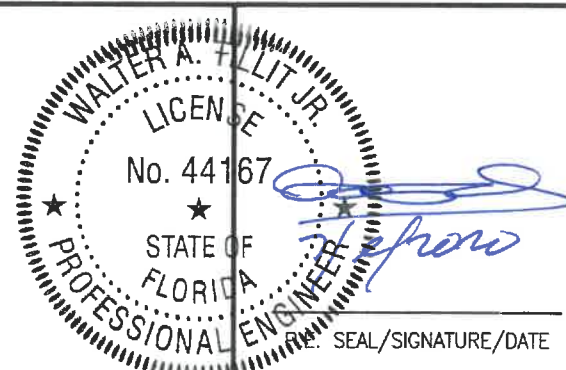
MAXIMUM SPAN (ft)	POURED CONCRETE																																																							
	(A) WALL HEADER MOUNTING W/ (12)								(A) WALL HEADER MOUNTING W/ (14)								(B) WALL HEADER MOUNTING								(D) WALL SILL MOUNTING W/ (12)								(D) WALL SILL MOUNTING W/ (14)								(C) & (F) WALL HEADER/SILL 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)								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	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	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
4'-0"	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	4	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
5'-0"	14	12	10	9	8	8	4.5	-	14	12	10	9	8	8	6	4	14	12	10	9	8	8	6	4	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	4.5	-	14	12	10	9	8	8	6	3.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
6'-0"	14	12	10	9	8	5.5	-	-	14	12	10	9	8	8	4.5	-	14	12	10	9	8	8	6	5	14	12	10	9	8	8	6	5	14	12	10	9	8	8	6	5	14	12	10	9	8	8	6	5	14	12	10	9	8	8	6	5
	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	3.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
7'-0"	14	12	10	9	8	5.5	3	-	14	12	10	9	8	8	4.5	-	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	3	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	5.5	3.5	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	5.5
8'-0"	14	12	10	9	8	5	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	4	-	-	14	12	10	9	8	6.5	3	-	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
9'-0"	14	12	10	9	8	4	-	-	14	12	10	9	8	6.5	3	-	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	4.5	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
10'-0"	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
11'-0"	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
12'-0"	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
13'-0"	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
14'-0"	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
15'-0"	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
16'-0"	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	4	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6

FLORIDA BUILDING CODE (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

REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			DRAWING No 20-169
3			
4			
5			SHEET 12 OF 20
6			



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A.S.S.A.

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Association, Inc.**

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West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

MAXIMUM ANCHOR* SPACING (in.) SCHEDULE FOR A GIVEN MAX. SHUTTER SPAN. A.S.D.
DESIGN NEGATIVE LOAD AND A CORRESPONDING MOUNTING TYPE FOR CONCRETE INSTALLATIONS
(SEE MOUNTINGS E, G, & H ON SHEETS 6 & 7)

MAXIMUM SPAN (ft)	POURED CONCRETE																							
	E WALL SILL MOUNTING								G CEILING MOUNTING								H FLOOR MOUNTING							
	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
3'-0"	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
OR LESS	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	7	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	7	5.5	3.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	5
4'-0"	14	12	10	9	8	8	6	4	14	12	10	9	8	8	6	4.5	14	12	10	9	8	8	6	5.5
	14	12	10	9	8	8	6	4.5	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	4.5
	14	12	10	9	7.5	5.5	3.5	—	14	12	10	9	8	8	6	5	14	12	10	9	8	7	5.5	4
5'-0"	14	12	10	9	8	7	4	—	14	12	10	9	8	6.5	5	3.5	14	12	10	8	6.5	5	3.5	3
	14	12	10	9	8	7.5	4.5	—	14	12	10	9	8	8	6	4.5	14	12	10	9	8	6	4.5	3.75
	14	12	9.5	7.5	6.5	4.5	—	—	14	12	10	9	8	7.5	5.5	4	14	12	10	9	8	6	5	3.5
6'-0"	14	12	10	9	7.5	5.5	3	—	14	12	10	8.5	7	5.5	4	3	14	12	8	6.5	5.5	4	3	—
	14	12	10	9	8	6	—	—	14	12	10	9	8	6.5	5	3.75	14	12	10	8.5	8	5	4	—
	14	12	8	6.5	5.5	3	—	—	14	12	10	9	8	6.5	4.5	3.5	14	12	10	8	7	5	3.5	3
7'-0"	14	12	10	8	6.5	4	—	—	14	12	9	7.5	6	4.5	3.5	—	14	10.5	7	5.5	4.5	3.5	—	—
	14	12	10	8.5	7	4	—	—	14	12	10	9	7.5	5.5	4	—	14	12	9	7	7.5	4.5	—	—
	14	11	7	5.5	4.5	—	—	—	14	12	10	9	7.5	5.5	4	—	14	12	9	7	6	4.5	3	—
8'-0"	14	12	8.5	7	5.5	3	—	—	14	12	8	6.5	5.5	4	3	—	12.5	9.5	6	5	4	3	—	—
	14	12	9.5	7.5	6	—	—	—	14	12	9.5	8	6.5	5	—	—	14	12	8	6	6.5	4	—	—
	14	12	8	6.5	5	3.5	—	—	14	12	10	8	6.5	5	—	—	14	12	8	6.5	5	4	—	—
9'-0"	14	11.5	7.5	6	4	—	—	—	14	11	7	5.5	5	3.5	—	—	11	8	5.5	4.5	3.5	—	—	—
	14	12	8	6.5	4.5	—	—	—	14	12	8.5	7	5.5	4	—	—	14	10.5	7	5.5	6	4.5	—	—
	11.5	8.5	5.5	4	—	—	—	—	14	12	9	7	6	4.5	—	—	14	11	7	5.5	4.5	3.5	—	—
10'-0"	14	10.5	7	5	3.5	—	—	—	13	9.5	6.5	5	4	3	—	—	10	7.5	5	4	3	—	—	—
	14	11	7.5	5.5	—	—	—	—	14	11.5	9	6	5	4	—	—	12.5	9.5	6	5	4	4	—	—
	10.5	8	5	—	—	—	—	—	14	12	8	6.5	5.5	4	—	—	13	10	6.5	5	4	3	—	—
11'-0"	12.5	9.5	5	—	—	—	—	—	12	9	6	4.5	4	3	—	—	9	7	4.5	3.5	3	—	—	—
	14	10	7	—	—	—	—	—	14	10.5	7	5.5	4.5	—	—	—	11.5	8.5	5.5	4.5	3.75	—	—	—
	9.5	7	4.5	—	—	—	—	—	14	11.5	7.5	6	5	—	—	—	12	9	6	4.5	4	—	—	—
12'-0"	11.5	8.5	4.5	—	—	—	—	—	11	8	5.5	4	3.5	—	—	—	8	6	4	3	—	—	—	—
	13.5	9.5	6	—	—	—	—	—	13	9.5	6.5	5	4	—	—	—	10.5	8	5	4	—	—	—	—
	9	6.5	—	—	—	—	—	—	14	10.5	7	5.5	4.5	—	—	—	11	8.5	5.5	4.5	3.5	—	—	—
13'-0"	10.5	8	—	—	—	—	—	—	10	7.5	5	4	3	—	—	—	7.5	5.5	4	3	—	—	—	—
	12.5	8.5	—	—	—	—	—	—	12	9	6	4.5	4	—	—	—	9.5	7	5	4	—	—	—	—
	8	6	—	—	—	—	—	—	13	9.5	6.5	5	—	—	—	—	10.5	7.5	5	4	—	—	—	—
14'-0"	10	7.5	—	—	—	—	—	—	9	7	4.5	3.5	—	—	—	—	7	5	3.5	3	—	—	—	—
	11.5	8	—	—	—	—	—	—	11	8	5.5	4.5	—	—	—	—	9	6.5	4.5	—	—	—	—	—
	7.5	—	—	—	—	—	—	—	12	9	6	—	—	—	—	—	9.5	7	4.5	—	—	—	—	—
15'-0"	9	—	—	—	—	—	—	—	8.5	6.5	4	—	—	—	—	—	6.5	5	3	—	—	—	—	—
	10	—	—	—	—	—	—	—	10.5	8	5	—	—	—	—	—	8.5	6	4	—	—	—	—	—
	7	—	—	—	—	—	—	—	11.5	8.5	5.5	—	—	—	—	—	9	6.5	4.5	—	—	—	—	—
16'-0"	8	—	—	—	—	—	—	—	8	6	4	—	—	—	—	—	6	4.5	3	—	—	—	—	—
	9.5	—	—	—	—	—	—	—	9.5	7	5	—	—	—	—	—	8	6	4	—	—	—	—	—

ANCHORS SPACING LEGEND

TAPCON WITH ADVANCED THREADFORM TECHNOLOGY
ALL POINTS SOLID-SET
BLUE TAP W/ CAP
TAPPER+

SEE LIMITATIONS OF USE FOR
BLADE (A) ON SHEET 19

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

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

1. ANCHORS TO SUBSTRATE SHALL BE AS FOLLOWS:

- (A) TO EXISTING POURED CONCRETE: (Min. $f'_c = 3$ ksi)
- 1/4" ϕ TAPCON WITH ADVANCED THREADFORM TECHNOLOGY ANCHORS, AS MANUFACTURED BY I.T.W. BUILDEX. (Min. $f'_c = 3$ ksi)
- 1/4" ϕ x 3/4" ALL POINTS SOLID-SET ANCHORS, AS DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY. (Min. $f'_c = 3$ ksi)
- 1/4" ϕ BLUE TAP CONCRETE ANCHORS W/ CAP AS MANUFACTURED BY FLORIDA FASTENERS DIRECT, INC. (Min. $f'_c = 2$ ksi)
- 1/4" ϕ TAPPER+ ANCHORS AS MANUFACTURED BY DEWALT, INC., AND DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY OR ANY OTHER APPROVED LICENSED OR AUTHORIZED VENDOR REGISTERED WITH THE AMERICAN SHUTTER SYSTEMS ASSOCIATION, INC. (Min. $f'_c = 3$ ksi)

NOTES:

- A.1) MINIMUM EMBEDMENT INTO POURED CONCRETE OF TAPCON WITH ADVANCED THREADFORM TECHNOLOGY ANCHORS AND TAPPER+ ANCHORS IS 1 3/4", AND FOR BLUE TAP W/ CAP ANCHORS IS 1 1/2".
- A.2) MINIMUM EMBEDMENT OF 1/4" ϕ 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" ϕ -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 OR FLOOR, 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 OR EIFS WITH OR WITHOUT METAL STUDS CONSULT THIS ENGINEER. FOR INSTALLATION INTO EIFS WITH METAL STUDS SEE SHEET 28A.

(B) TO EXISTING CONCRETE BLOCK: (ASTM C-90)

- 1/4" ϕ TAPCON WITH ADVANCED THREADFORM TECHNOLOGY ANCHORS, AS MANUFACTURED BY I.T.W. BUILDEX.
- 1/4" ϕ x 3/4" ALL POINTS SOLID-SET ANCHORS, AS DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY.
- 1/4" ϕ BLUE TAP CONCRETE ANCHORS W/ CAP AS MANUFACTURED BY FLORIDA FASTENERS DIRECT, INC.
- 1/4" ϕ TAPPER+ ANCHORS AS MANUFACTURED BY DEWALT, INC., AND DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY OR ANY OTHER APPROVED LICENSED OR AUTHORIZED VENDOR REGISTERED WITH THE AMERICAN SHUTTER SYSTEMS ASSOCIATION, INC.

NOTES:

- B.1) MINIMUM EMBEDMENT INTO CONCRETE BLOCK OF BLUE TAP W/ CAP ANCHORS AND TAPPER+ ANCHORS IS 1 1/4" AND TAPCON WITH ADVANCED THREADFORM TECHNOLOGY ANCHORS IS 1".
- B.2) MINIMUM EMBEDMENT OF 1/4" ϕ 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" ϕ -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 OR EIFS WITH OR WITHOUT METAL STUDS CONSULT THIS ENGINEER. FOR INSTALLATION INTO EIFS WITH METAL STUDS SEE SHEET 20.

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

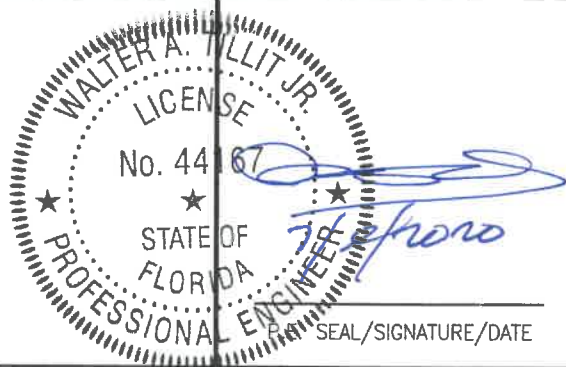
(D) SEE SCHEDULE BELOW FOR EDGE DISTANCE (E.D.) VERSUS SPACING RELATIONSHIP FOR ANCHORS.

EDGE DISTANCE VERSUS SPACING SCHEDULE FOR ANCHORS:

MAXIMUM ANCHOR SPACINGS ARE VALID FOR EDGE DISTANCES INDICATED BELOW. FOR E. D. LESS THAN THE INDICATED, REDUCE ANCHOR SPACING BY MULTIPLYING SPACING SHOWN ON SCHEDULE BY THE FOLLOWING FACTORS.
REDUCED SPACING OBTAINED USING FACTOR SHALL NOT BE LESS THAN MINIMUM SPACING INDICATED FOR EACH ANCHOR TYPE.

ACTUAL EDGE DISTANCE E.D.	FACTOR					
	TAPCON W/ ADVANCED THREADFORM TECH. MIN. SPACING		ALL POINT SOLID SET		TAPPER + MIN. SPACING	
	3"	4"	MIN. SPACING = 3 1/2"		3 3/4"	4"
	POURED CONCRETE MIN. E.D. = 3 1/2"	CONCRETE BLOCK MIN. E.D. = 2 1/2"	POURED CONCRETE & CONCRETE BLOCK MIN. E.D. = 3 1/2"		POURED CONCRETE & CONCRETE BLOCK MIN. E.D. = 3"	POURED CONCRETE & CONCRETE BLOCK MIN. E.D. = 2 1/2"
3"	0.90	1.0	0.78		1.0	0.84
2 1/2"	0.81	1.0	—		—	0.67
2"	0.71	—	—		—	0.51
1 3/4"	0.91 (A & B MOUNTINGS ONLY)	—	—		—	0.43
1 1/2"	—	—	—		—	0.35

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



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FLORIDA Lic. # 44167

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Association, Inc.

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BERTHA HV™
Accordion Shutter System
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE

REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			
3			
4			
5			
6			

DRAWING No
20-169
SHEET
13 OF 20

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

MAXIMUM SPAN (ft)	POURED CONCRETE																																												
	① WALK OVER & ⑪ TRENCH MOUNTINGS ◇								② RAINGUARD MOUNTING								③ WALL/FLOOR MOUNTING								④ 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	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	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	6	12	12	12	12	12	12	9.5	7	7	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	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	5	5	5	5	5	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	6	12	12	12	12	12	12	10	7.5	6	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
4'-0"	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	5.5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	14	12	10	9	8	8	6	6	12	12	12	12	12	12	9.5	7	5.5	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	14	12	10	9	8	8	6	6	12	12	12	12	12	12	9.5	8	6	4.5	7	7	7	7	7	7	6.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	14	12	10	9	8	8	6	6	12	12	12	12	12	10	7.5	5.5	4	7	7	7	7	7	7	7	5.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5'-0"	14	12	10	9	8	8	6	6	12	12	12	12	11	9	7	5	4	7	7	7	7	7	5.5	4	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	14	12	10	9	8	8	6	6	12	12	12	12	12	10	7.5	5.5	4	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	14	12	10	9	8	8	6	6	12	12	9.5	7.5	6	4.5	3.5	—	7	7	7	7	7	7	7	5	3.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	14	12	10	9	8	8	6	6	12	12	12	9.5	8	6	4.5	—	7	7	7	7	7	7	7	5.5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6'-0"	14	12	10	9	8	8	6	6	12	12	11.5	9	7.5	5.5	4	3	7	7	7	7	7	7	4.5	3.5	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
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	14	12	10	9	8	8	6	6	12	12	8	6	5	4	3	—	7	7	7	7	7	7	5.5	4	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	14	12	10	9	8	8	6	6	12	12	10	8	6.5	5	3.75	—	7	7	7	7	7	7	6	4.5	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
7'-0"	14	12	10	9	8	8	6	6	12	12	10	8	6.5	5	3.5	—	7	7	7	6.5	5.5	4	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
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	14	12	10	9	8	8	6	6	12	12	8.5	7	5.5	4	—	—	7	7	7	7	7	5	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
8'-0"	14	12	10	9	8	8	6	—	12	12	8.5	7	5.5	4	3	—	7	7	7	5.5	4.5	3	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
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9'-0"	14	12	10	9	8	8	—	—	12	11.5	7.5	6	5	3.5	—	—	7	7	6.5	5	4	—	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
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	14	12	10	9	8	8	—	—	10.5	8	5	4	3.5	—	—	—	7	7	7	6	5	3.5	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	—	—	12	10	6.5	5	4.5	—	—	—	7	7	7	6.5	5.5	—	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
10'-0"	14	12	10	9	8	8	—	—	12	10.5	7	5.5	4.5	3.5	—	—	7	7	5.5	4.5	3.5	—	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
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11'-0"	14	12	10	9	8	8	—	—	12	9.5	6	5	4	3	—	—	7	7	5	4	3	—	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
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	14	12	10	9	8	8	—	—	8.5	6.5	4	3.5	3	—	—	—	7	7	6	5	4	—	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
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12'-0"	14	12	10	9	8	—	—	—	11.5	8.5	5.5	4.5	3.5	—	—	—	7	7	4.5	3.5	—	—	—	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	14	12	10	9	8	—	—	—	12	9.5	6.5	5	4	3	—	—	7	7	7	7	7	6	3	—	—	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	14	12	10	9	8	—	—	—	8	6	4	3	—	—																															

**American Shutter Systems
Association, Inc.**
4268 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

(SEE MOUNTINGS ON SHEETS 16 & 17).

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

+ NOTES ON ANCHORS REQUIREMENTS: WOOD SUBSTRATES.

- FLORIDA BUILDING CODE (High Velocity Hurricane Zone)**

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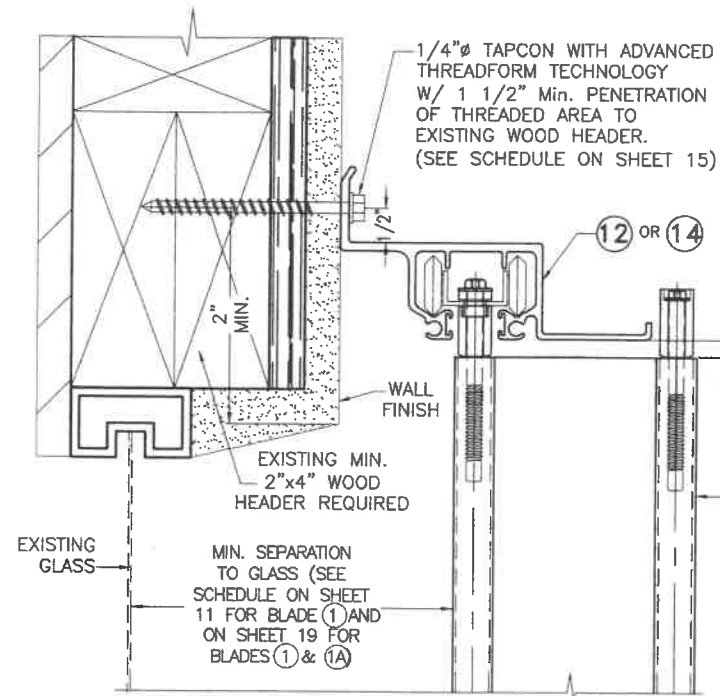
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BERTHA HV™
Accordion Shutter System
 H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE

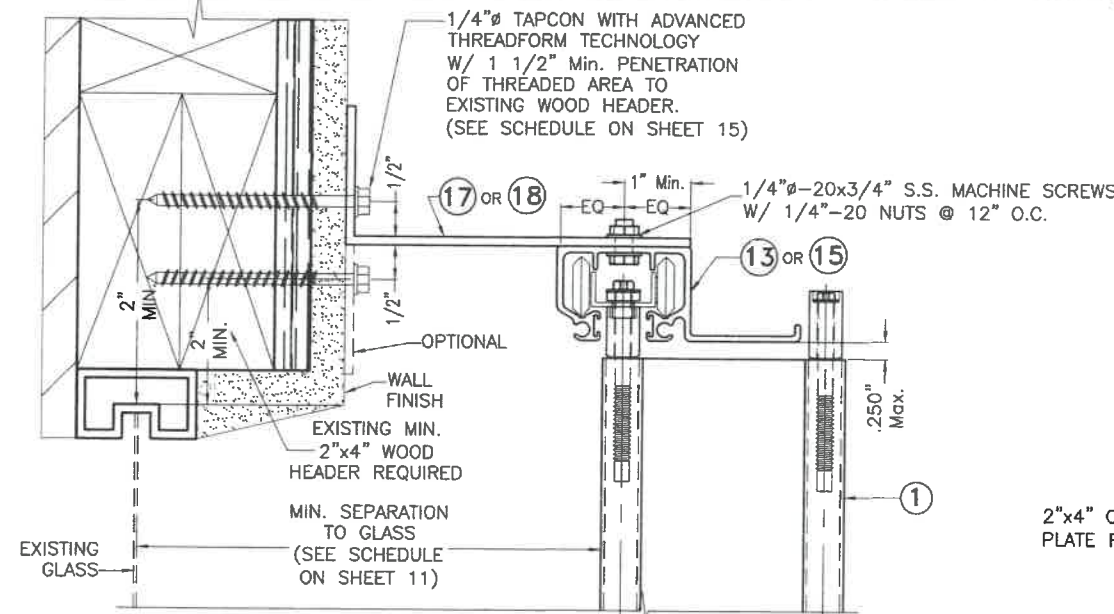
REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			DRAWING No 20-169
3			
4			
5			
6			SHEET 15 OF 20

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

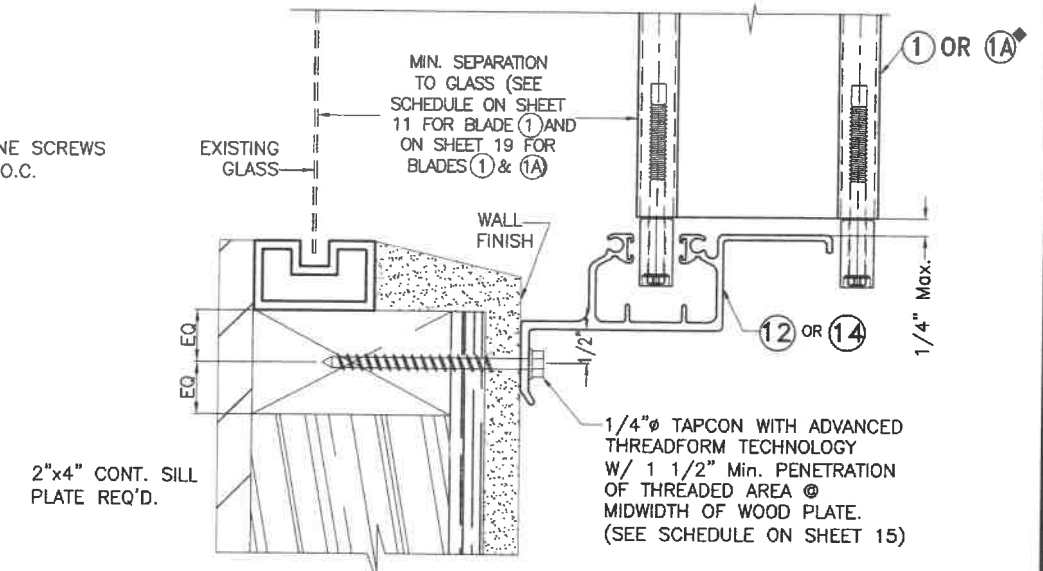
MAX. SHUTTER SPAN L+ OR L- FOR INSTALLATIONS INTO WOOD WITH HV BLADE ① ONLY SHALL BE LIMITED TO 105.0 psf. A.S.D. DESIGN PRESSURE RATING, SEE SHEET 19 FOR MAX SPAN & A.S.D. DESIGN PRESSURE RATING FOR INSTALLATION WITH BLADE ① & ①A WORKING IN UNISON



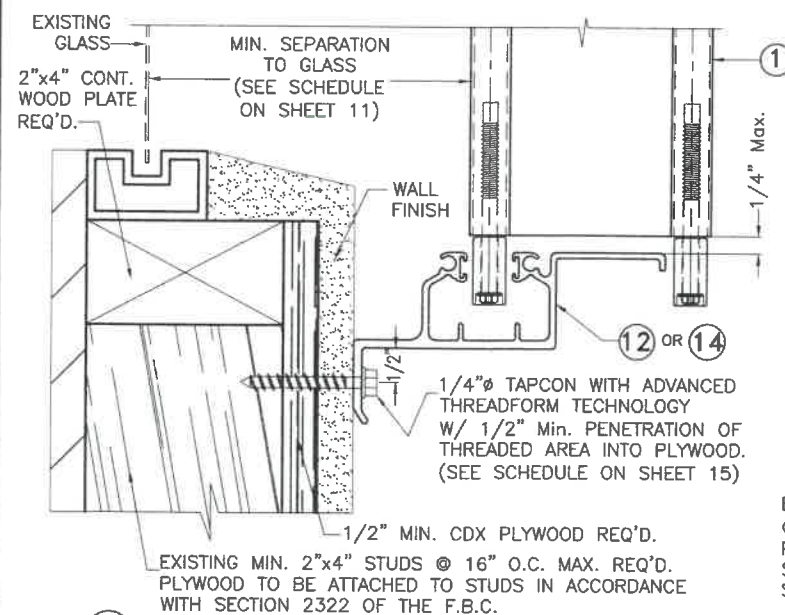
M HV WALL HEADER INSTALLATION



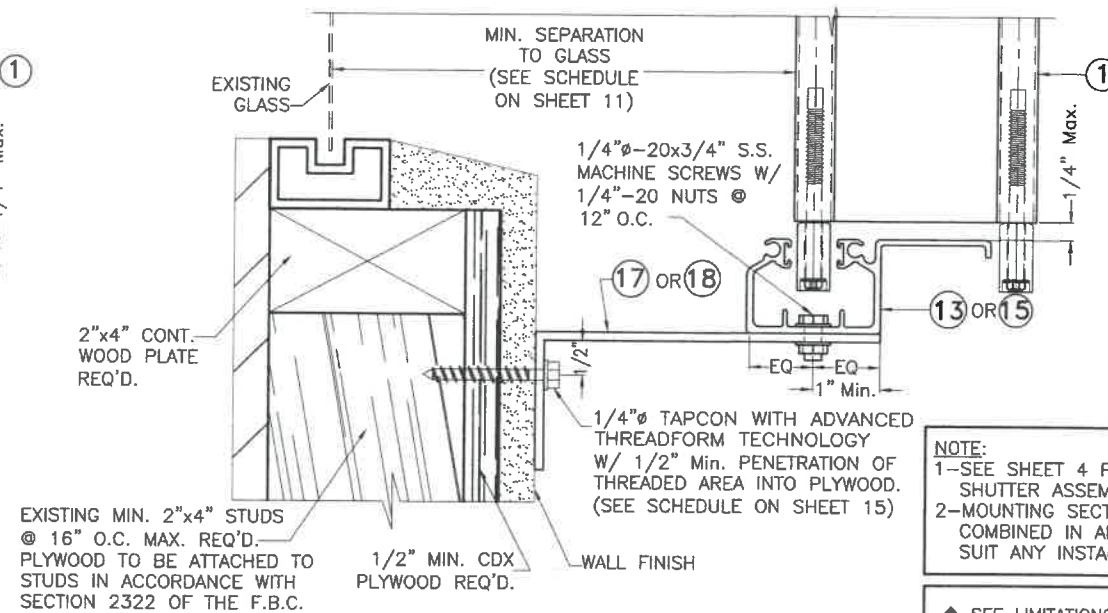
N HV WALL HEADER INSTALLATION



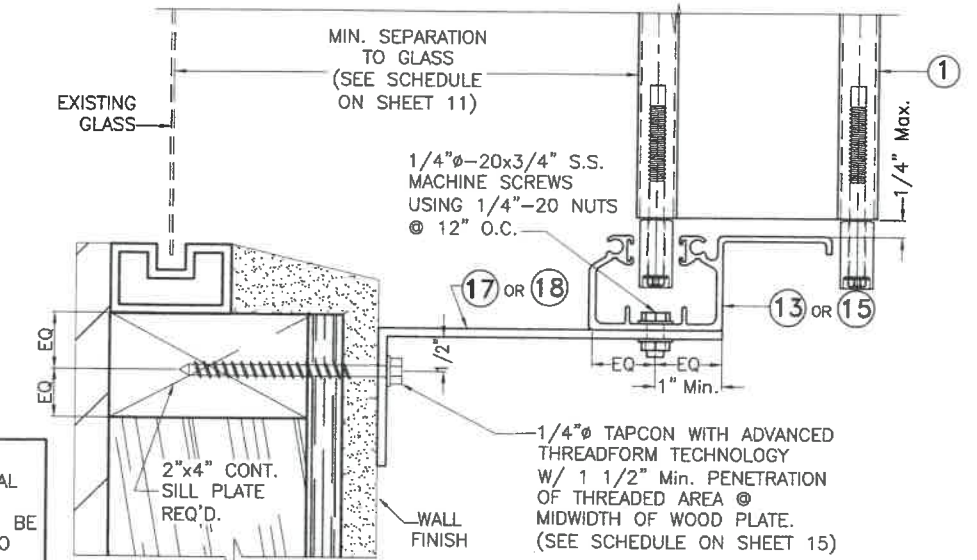
O HV WALL SILL INSTALLATION



P HV WALL SILL INSTALLATION



Q HV WALL SILL INSTALLATION

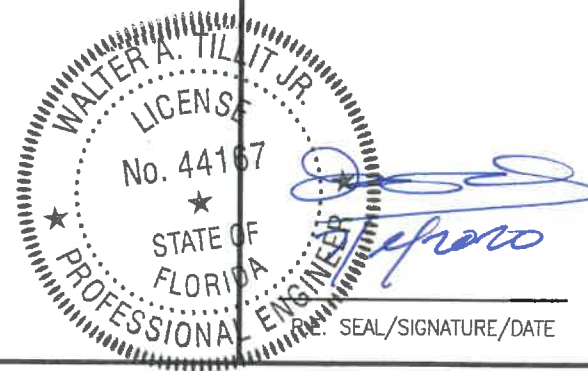


R HV WALL SILL INSTALLATION

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 19

FLORIDA BUILDING CODE (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

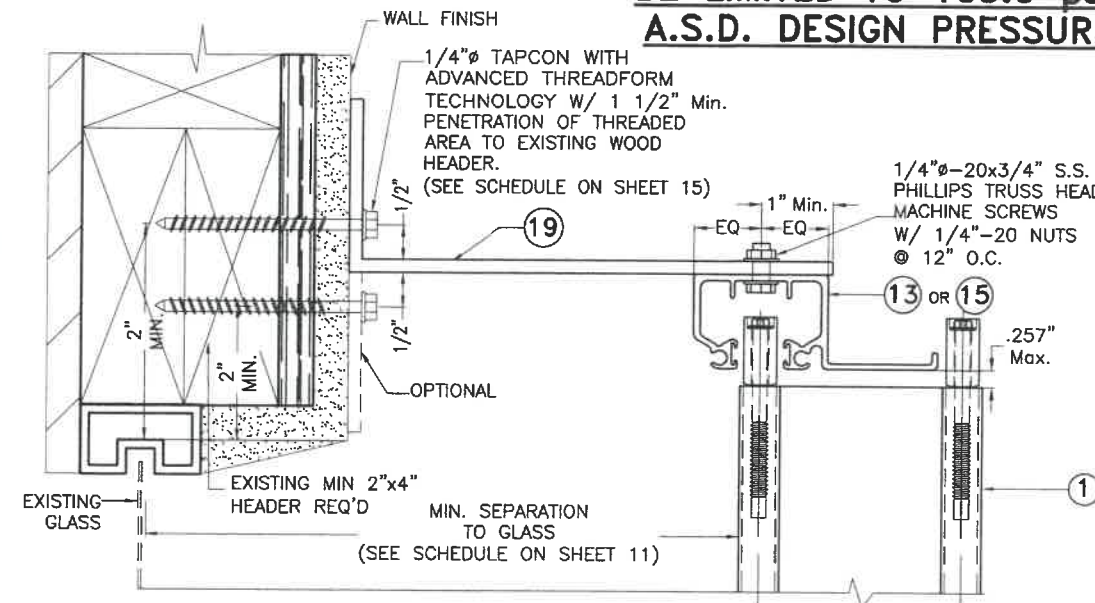
REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			
3			
4			
5			
6			

DRAWING No
20-169

SHEET
16 OF 20

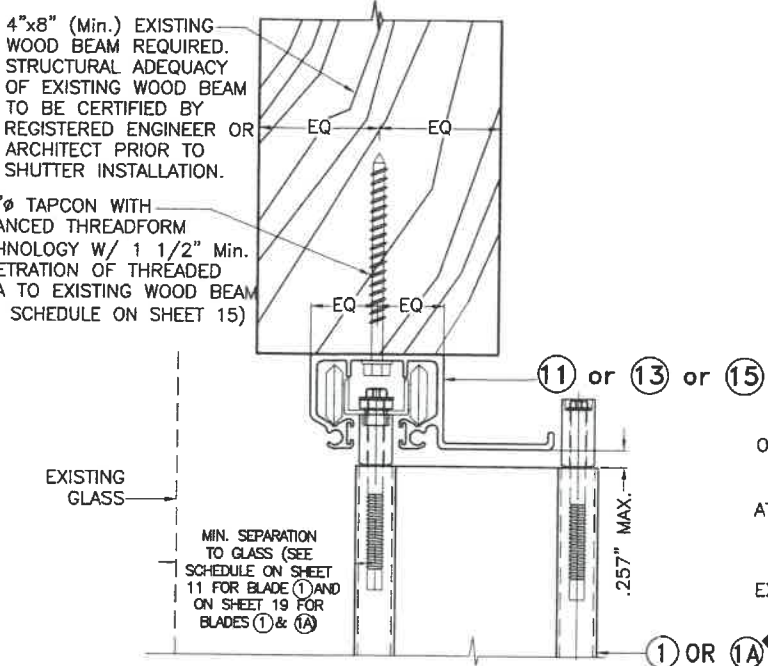
INSTALLATION DETAILS ON EXISTING WOOD BUILDINGS FOR ① HV & ①A HV♦ BLADES (AS APPLICABLE)

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 19 FOR MAX SPAN & A.S.D. DESIGN PRESSURE RATING FOR INSTALLATION WITH BLADE ① & ①A WORKING IN UNISON

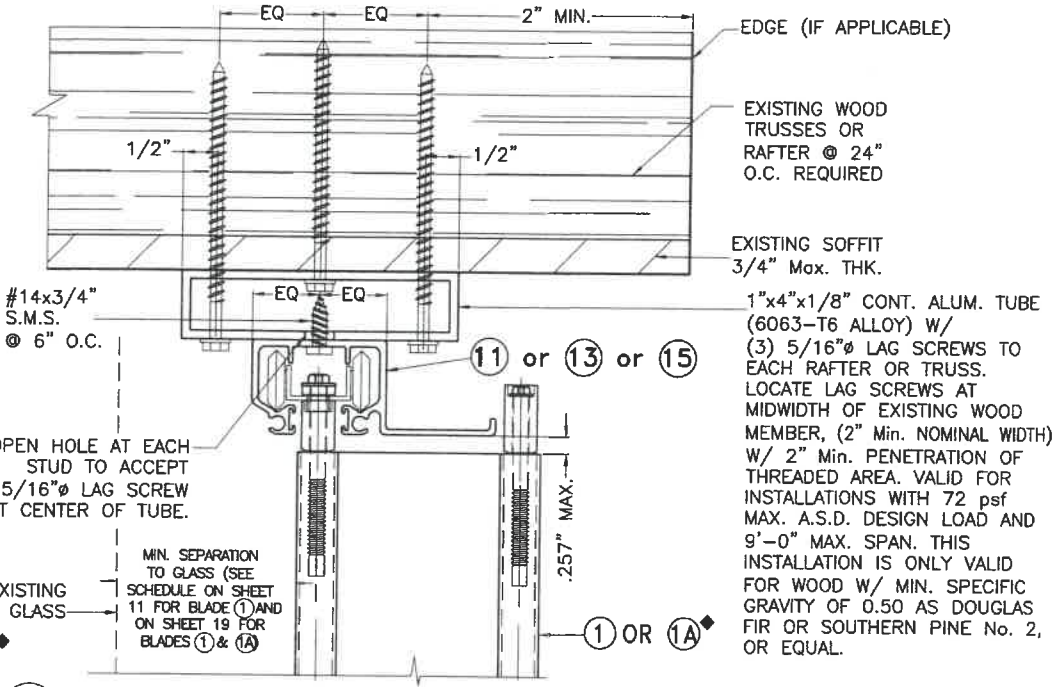


⑤ HV WALL HEADER INSTALLATION

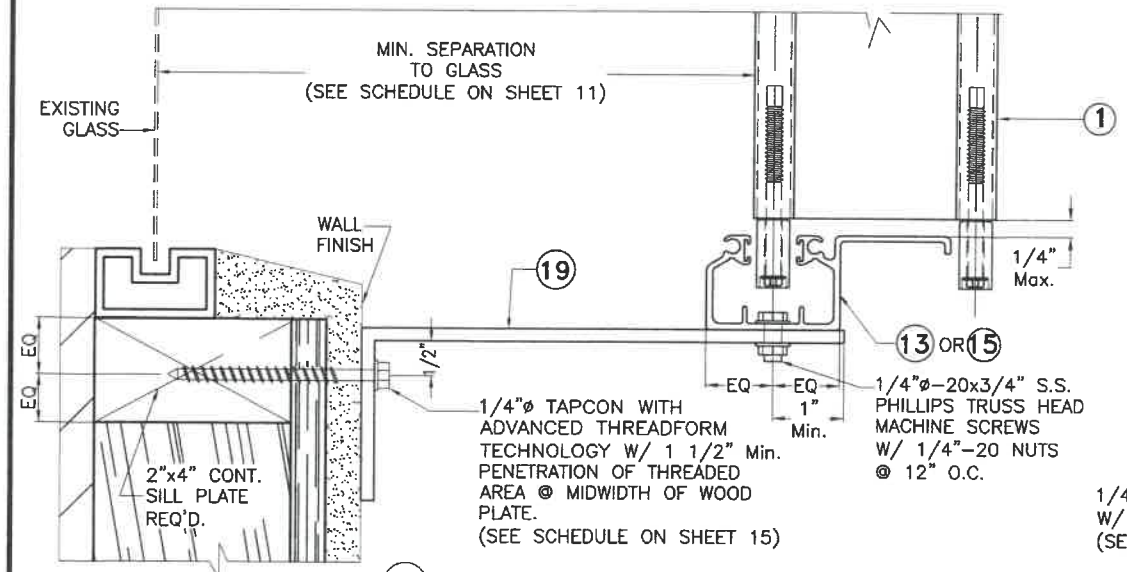
NOTES:
1-SEE SHEET 4 FOR TYPICAL SHUTTER ASSEMBLY,
2-MOUNTING SECTIONS CAN BE COMBINED
IN ANY WAY TO SUIT ANY INSTALLATION.



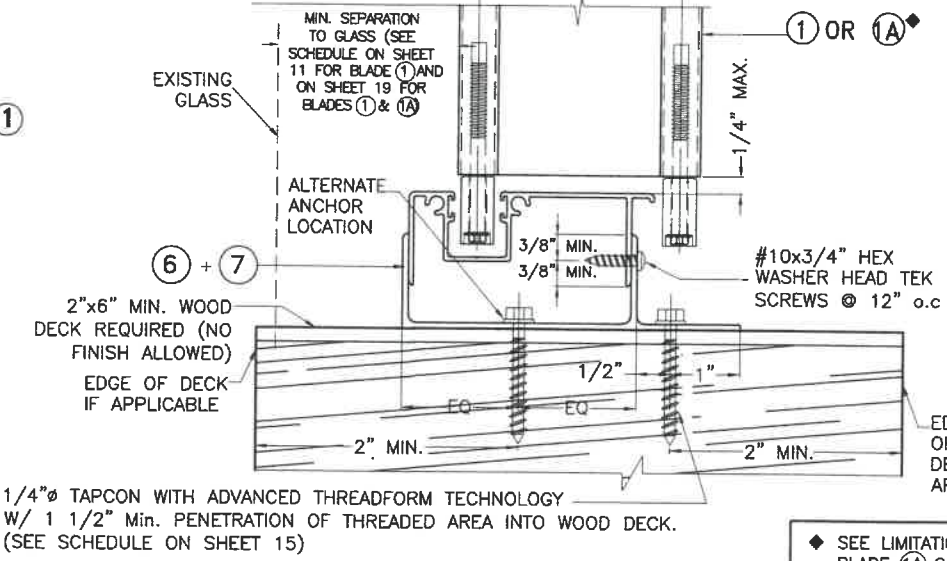
⑦ HV CEILING INSTALLATION



⑧ HV CEILING INSTALLATION

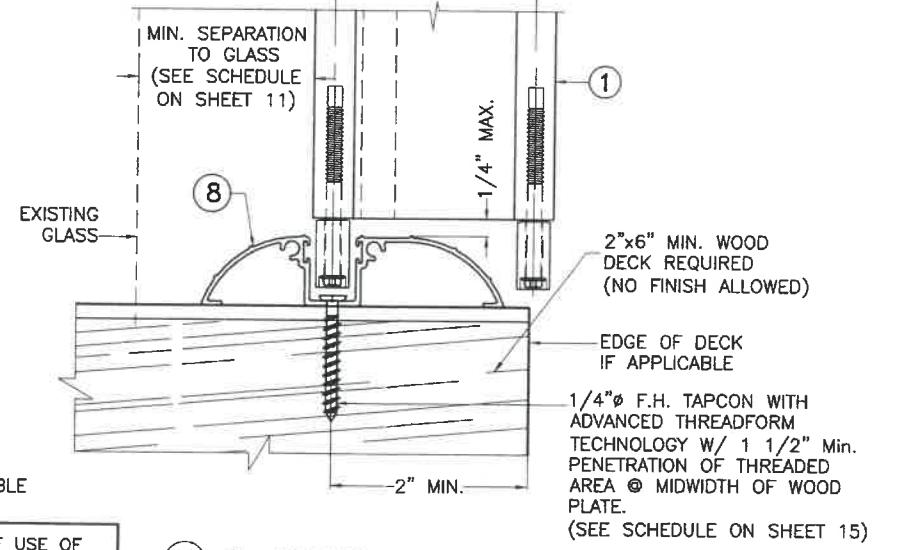


⑥ HV WALL SILL INSTALLATION



⑨ HV FLOOR INSTALLATION

♦ SEE LIMITATIONS OF USE OF BLADE ①A ON SHEET 19



⑩ HV WALK-OVER INSTALLATION

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

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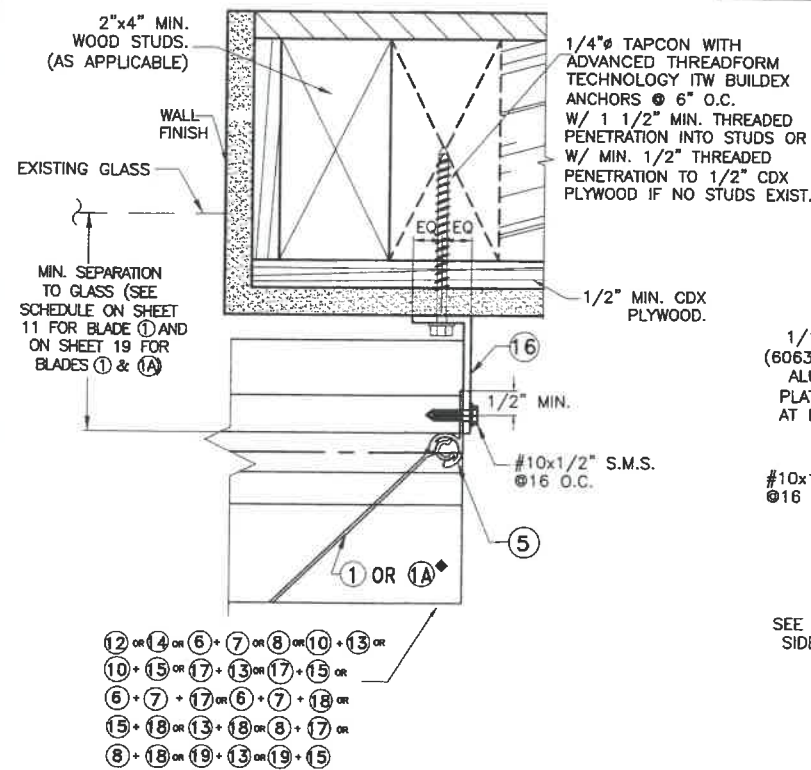
BERTHA HV™
Accordion Shutter System
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE

REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			
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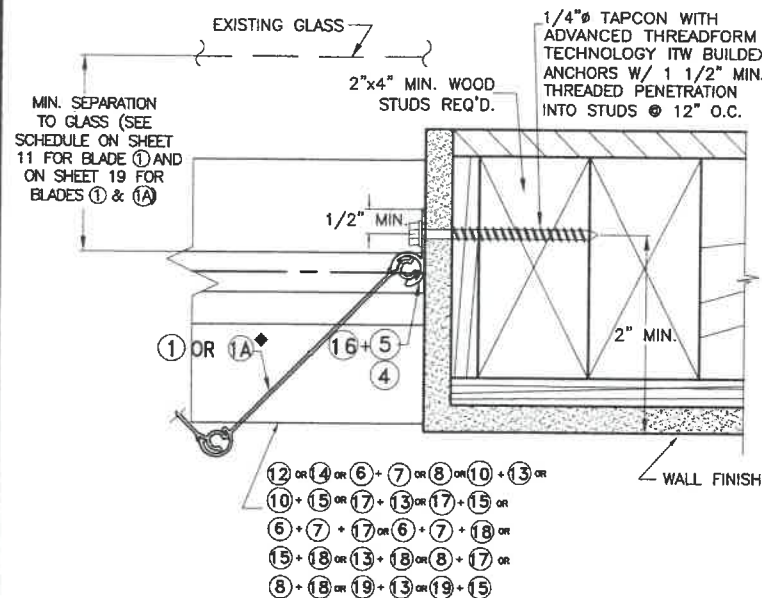
DRAWING No
20-169

SHEET
17 OF 20

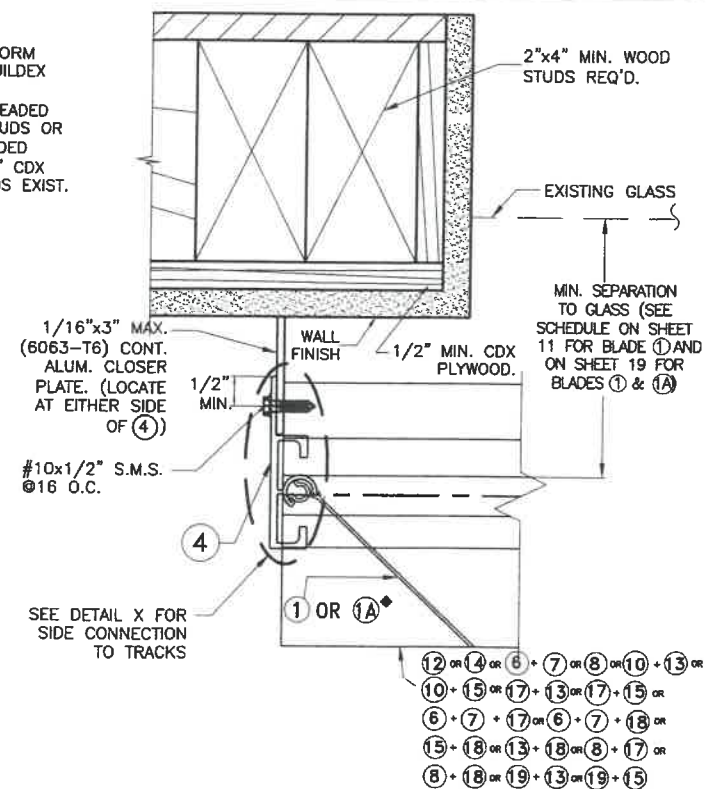
END INSTALLATIONS ① HV & ①A HV ♦ BLADES INTO 2"x4" MIN. WOOD STUDS.



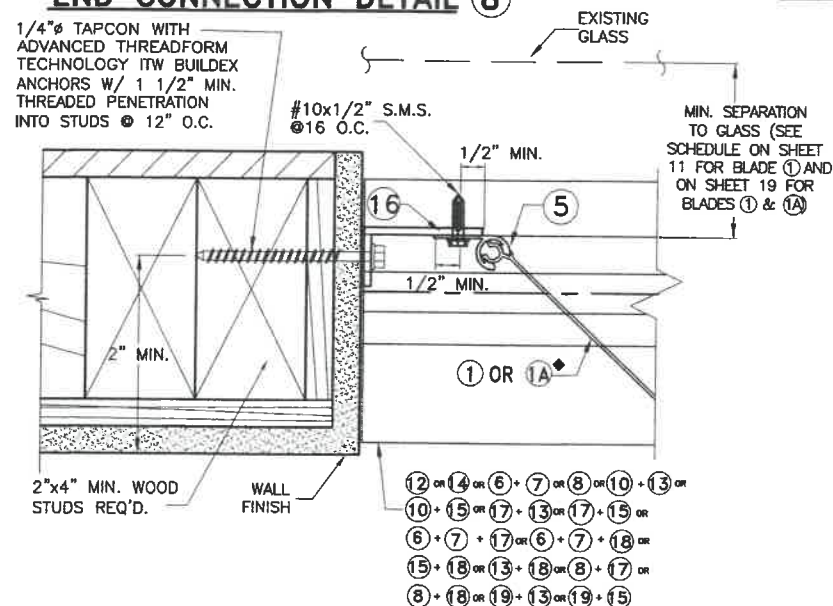
END CONNECTION DETAIL ⑦



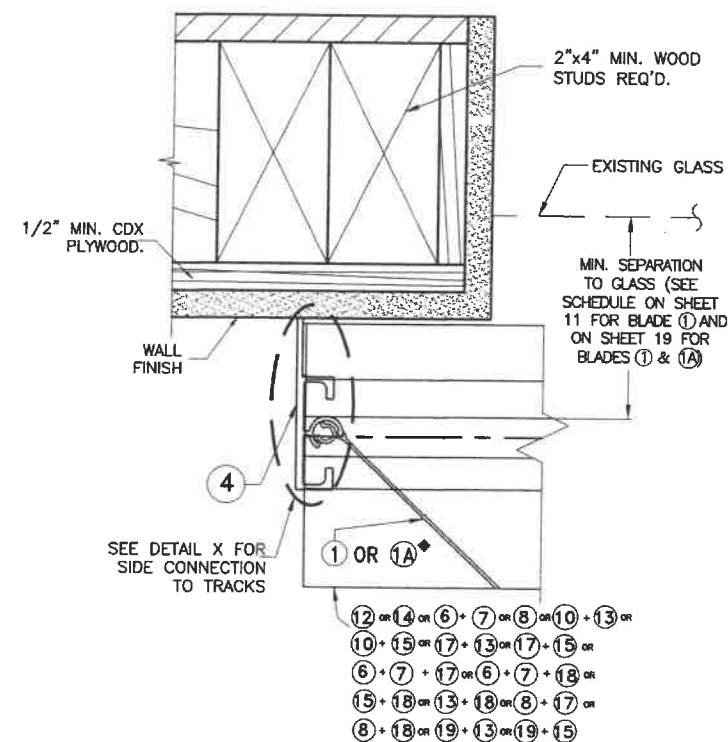
END CONNECTION DETAIL 11



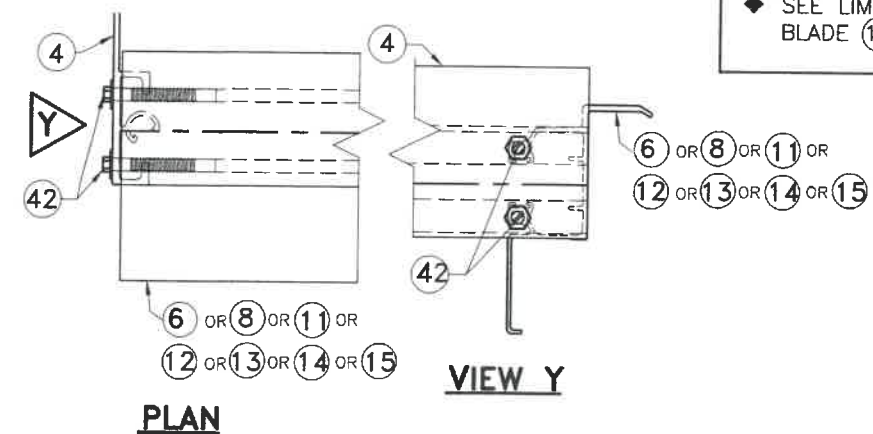
END CONNECTION DETAIL ⑧



END CONNECTION DETAIL (12)



END CONNECTION DETAIL ⑨



DETAIL X

END CONNECTION DETAIL 10

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

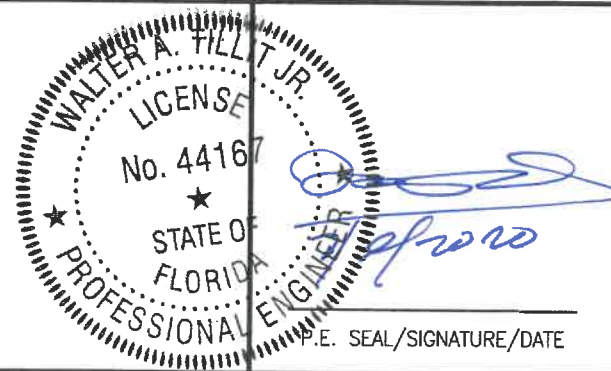
◆ SEE LIMITATIONS OF USE OF
BLADE (1A) ON SHEET 19

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1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			DRAWING No 20-169
3			
4			
5			
6			SHEET 18 OF 20



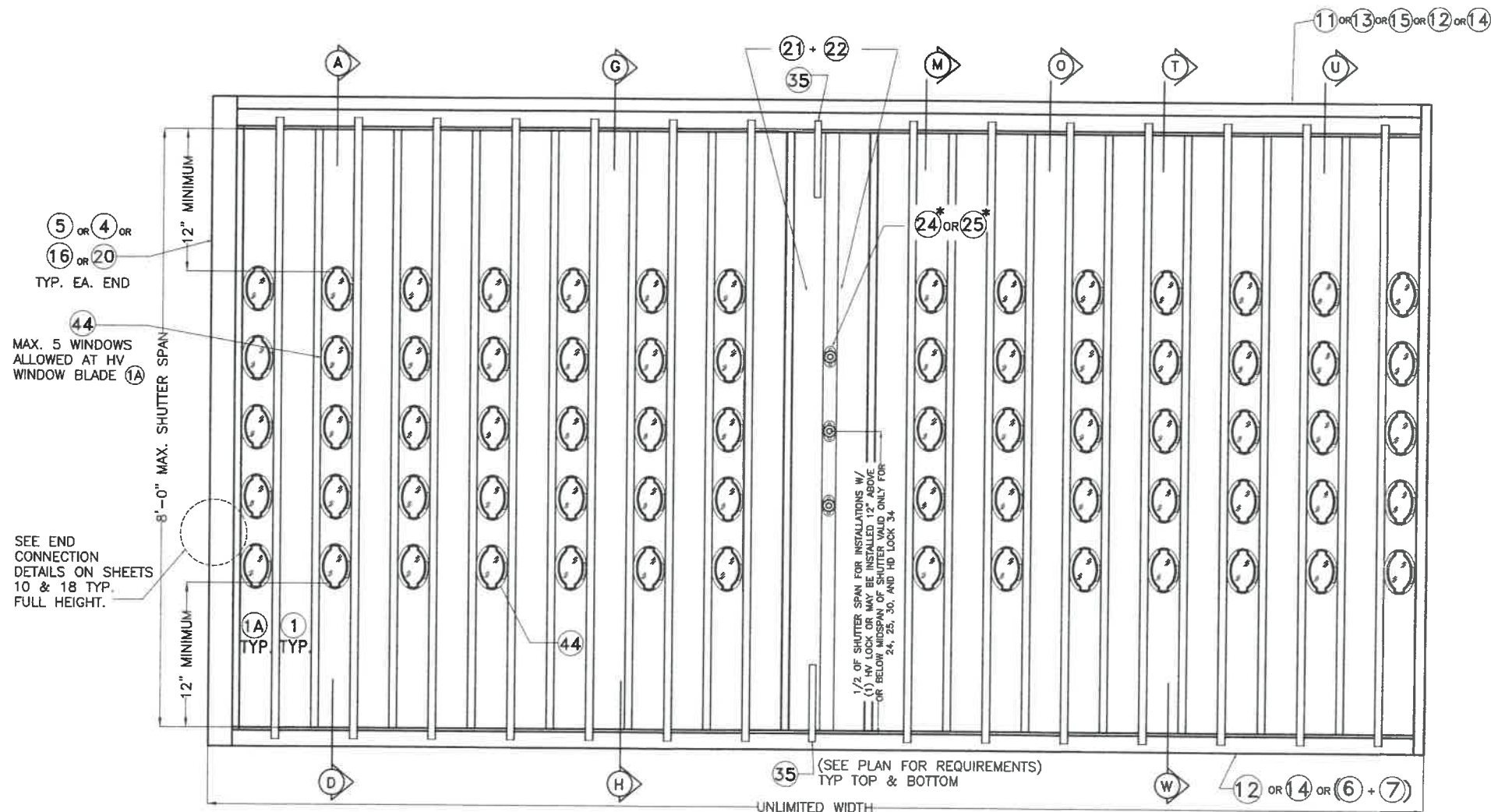
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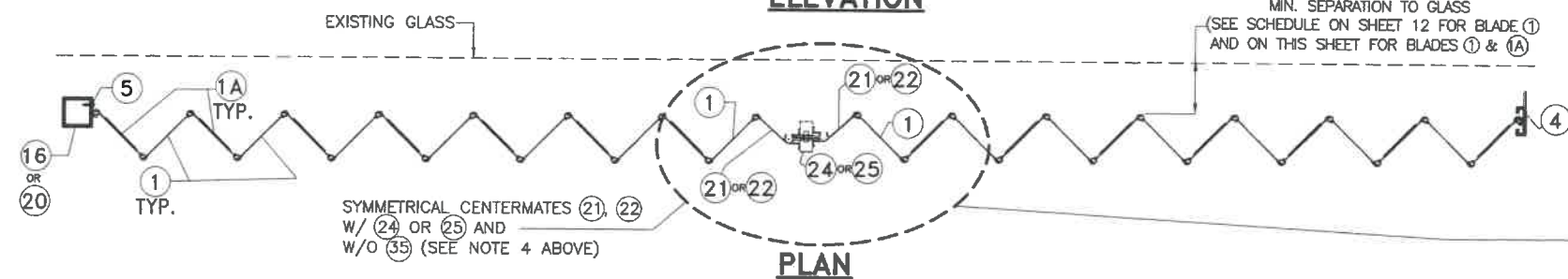
TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th. St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33168
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ELEVATION



PLAN

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

N.T.S.

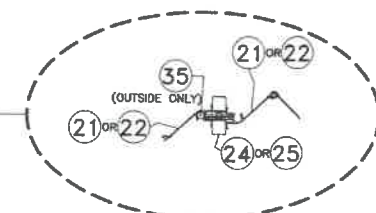
*** GENERAL LIMITATIONS AND CONDITIONS OF USE FOR BERTHA**

(1) HV BLADE ACCORDION SHUTTER SYSTEM WORKING IN UNISON WITH HV WINDOW BLADE (1A)

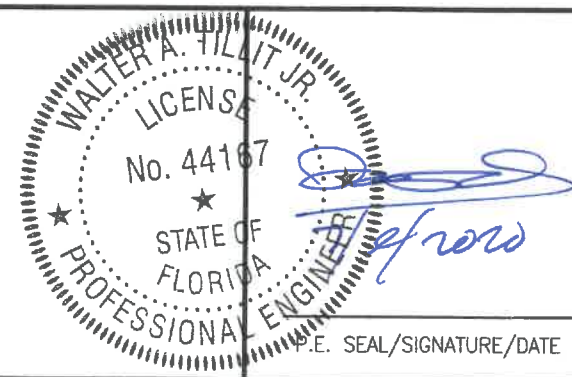
1. MAX. A.S.D. DESIGN PRESSURE RATING: +110, - 110 p.s.f.
2. MAX. SHUTTER SPAN: 96".
3. ALLOWED MOUNTINGS: A, D, G & H ON SHEETS 6, 7; AS WELL AS MOUNTINGS M, O, T, U & W ON SHEETS 16 & 17.
4. ONLY CENTERMATES (21), (22) (BOTH W/ (24) OR (25)) ARE ALLOWED WITH (21), (22) ARRANGED IN A SYMMETRICAL OR 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 4.
(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 15, AS LIMITED BY SPAN AND DESIGN LOAD (SEE NOTES 1 & 2 ABOVE).
7. SEE ANCHOR SPACING SCHEDULE FOR INSTALLATIONS INTO POURED CONCRETE OR CONCRETE BLOCK WALL ON SHEETS 12 & 13 AS LIMITED BY SPAN AND DESIGN LOAD (SEE NOTES 1 & 2 ABOVE).
8. MINIMUM SEPARATION TO GLASS SCHEDULE:

SHUTTER SPAN	MINIMUM SEPARATION TO GLASS
96" Max.	5"

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



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

REV.No	DESCRIPTION	DATE	DRAWN BY: M.P
1	OLD 17-122	7/6/2020	DATE: 7/6/2020
2			
3			
4			
5			
6			

DRAWING No
20-169

SHEET
19 OF 20

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

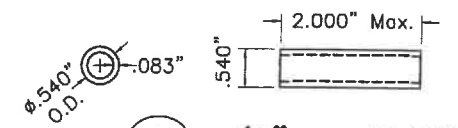
* GENERAL LIMITATIONS AND CONDITIONS OF USE FOR BERTHA 1 HV BLADE ACCORDION SHUTTER SYSTEM INSTALLATION TO METAL STUD WALLS

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.

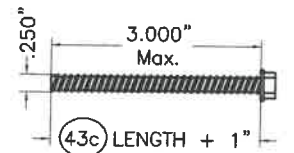
** BLADE SLACK DETAIL HVF IS VALID ALSO FOR CENTERMATE (21) APPLICATION WITH BLADE (1)

SEPARATION TO GLASS SCHEDULE

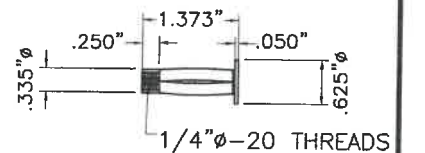
MINIMUM SEPARATION TO GLASS
3 1/4"



43a 1/4" NOMINAL ALUMINUM SLEEVE
6063-T5 ALLOY



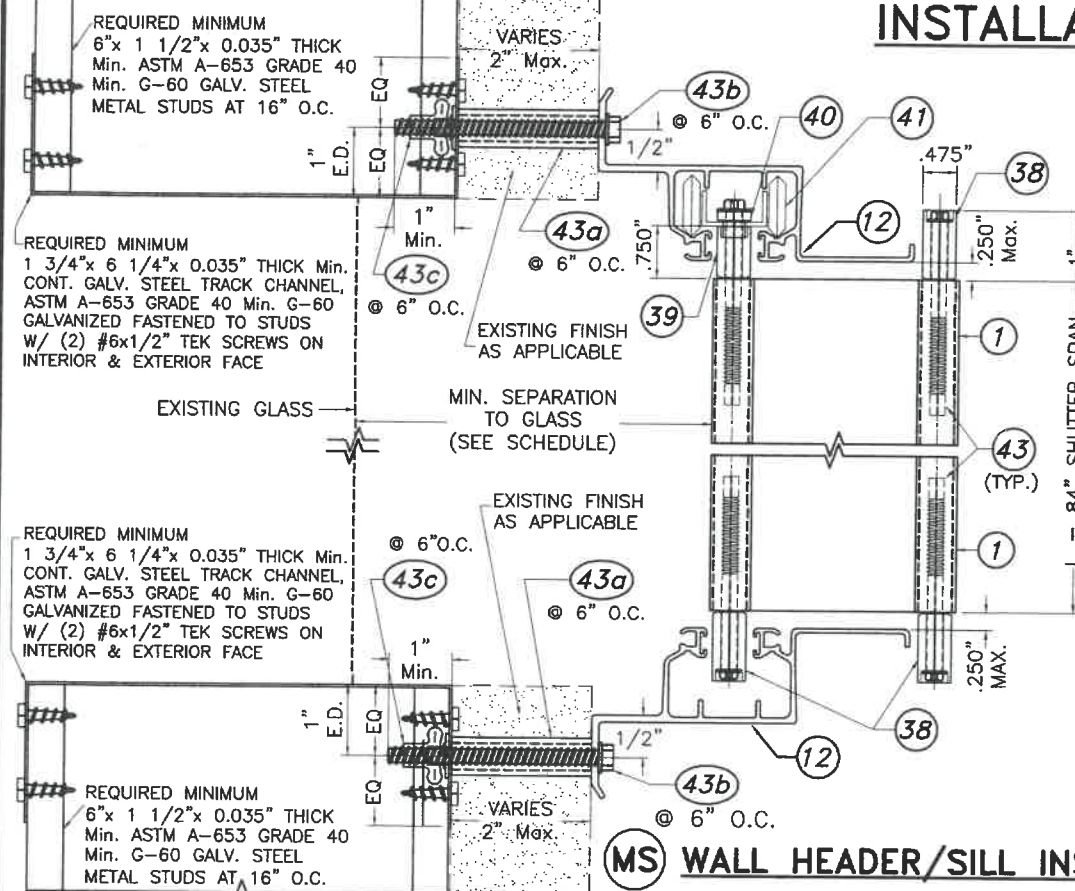
43b 1/4"-20X3" BOLT
MUST PENETRATE 43c 1"



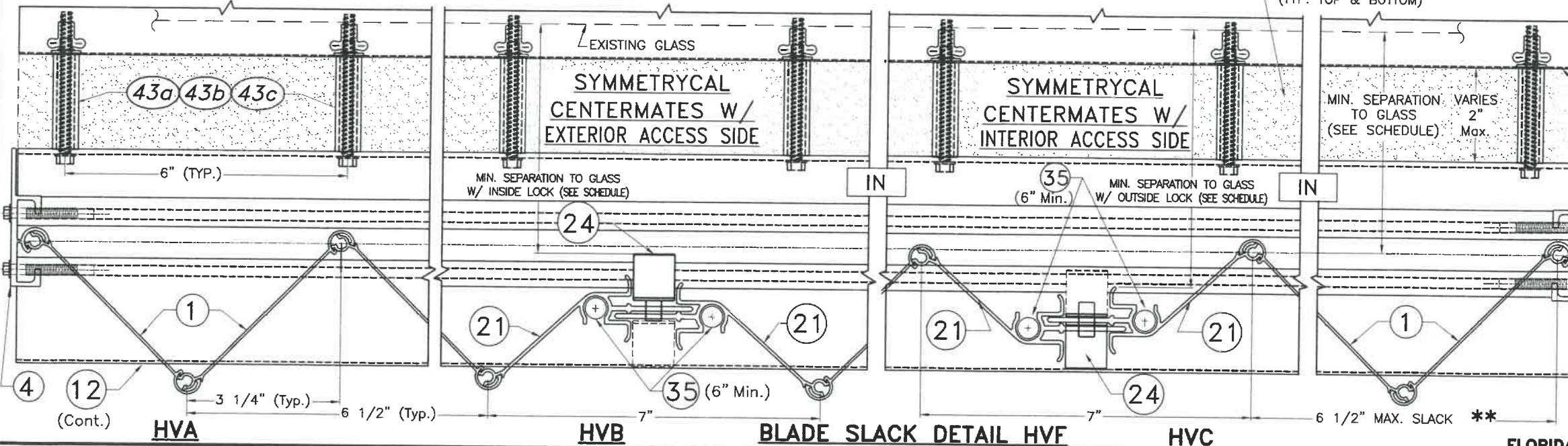
43c 1/4" ELCO CONSTRUCTION PRODUCTS FAB-LOK HD

COMPONENTS

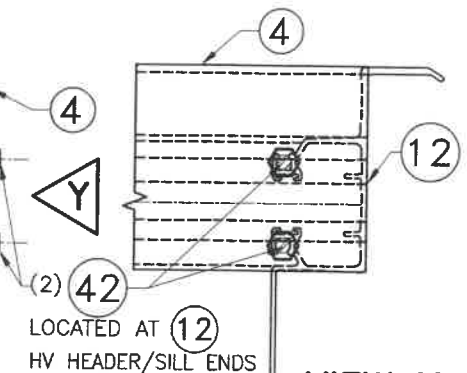
SCALE: 3/8" = 1"



MS WALL HEADER/SILL INSTALLATION



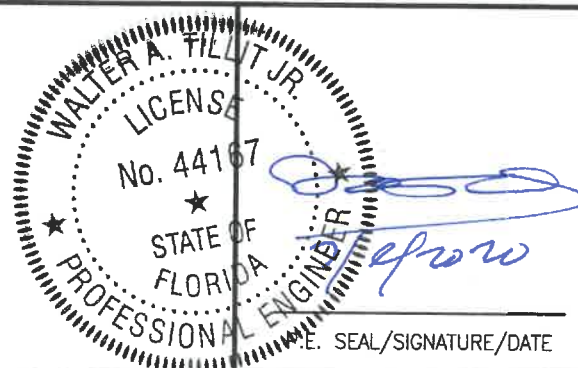
1 3/4"x 6 1/4"x 0.035" THICK Min. CONT. GALV. STEEL TRACK CHANNEL, ASTM A-653 GRADE 40 Min. G-60 GALVANIZED FASTENED TO STUDS W/ (2) #6x1/2" TEK SCREWS ON INTERIOR & EXTERIOR FACE



VIEW Y

SIDE CONNECTION TO TRACK

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			DRAWING No
			20-169
			SHEET
			20 OF 20