

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 2023(8th 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 Kd=0.85, USING ASCE 7-22 FOR INSTALLATIONS UNDER 2023 (8th EDITION) 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 7-22 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 1609.1.2 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 7-22 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 7-22 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. ALL ALUMINUM EXTRUSIONS IN CONTACT WITH DISSIMILAR MATERIALS SHALL COMPLY WITH SECTION III-6 OF THE 2020 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 & 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 1709.9.2 OF FLORIDA BUILDING CODE. ONE LABEL SHALL BE PLACED FOR EVERY OPENING.

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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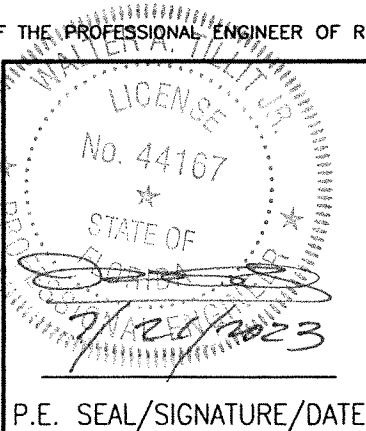
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THIS DRAWING SHALL ONLY BE USED TO
OBTAIN PERMITS IN THE STATE OF FLORIDA



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FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

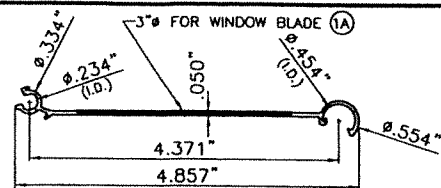
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BERTHA HV™
Accordion Shutter System

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

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126
SHEET
1 OF 28

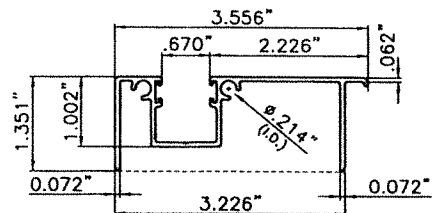


① HV SOLID BLADE

COVERED UNDER US PATENT # 5458179

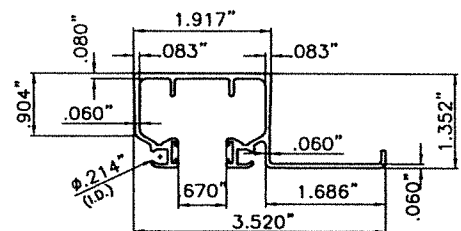
①A HV WINDOW BLADE*

*SEE LIMITATIONS OF USE OF BLADE ①A ON SHEET 28
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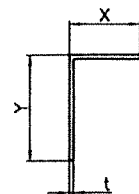
⑥ HV ADJ. FLOOR TRACK

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



⑪ HV CEILING HEADER

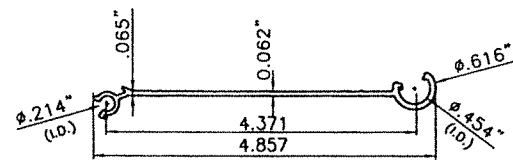
QUALIFIED FOR USE W/ HV BLADE ① ONLY,
SEE SECTIONS FOR VALIDITY.
6063-T6 ALLOY AND TEMPER



MN	X	MN	Y	MN	t
1"	1"	1"	1"	1"	0.062"

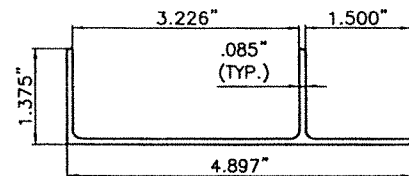
⑩ SIDE ANGLES

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



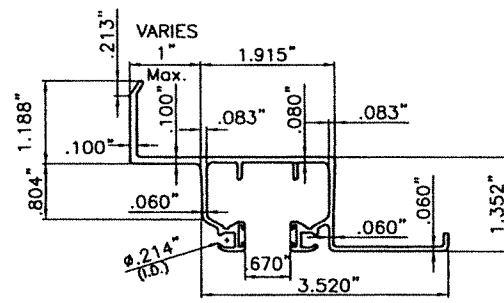
② HV BLADE

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



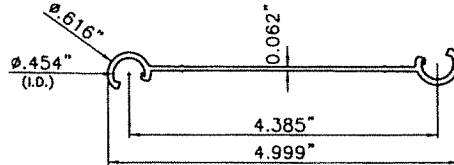
⑦ HV ADJ. ADAPTER W/LIP

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



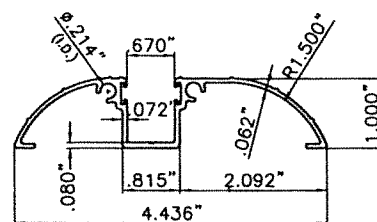
⑫ HV HEADER/SILL

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



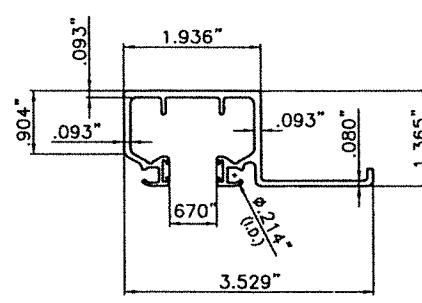
③ HV UNIVERSAL FLOATER

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



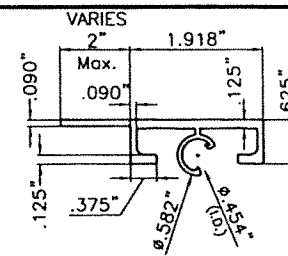
⑧ HV WALK-OVER TRACK

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



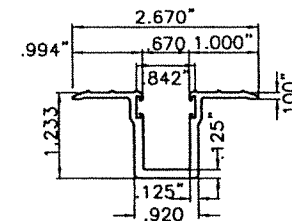
⑬ HD CEILING HEADER/SILL

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



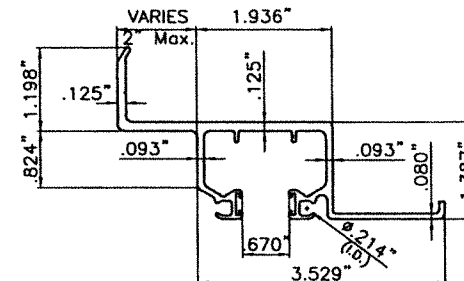
④ HV DIRECT MOUNT

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



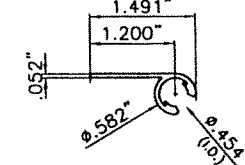
⑨ HV TRENCH TRACK

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



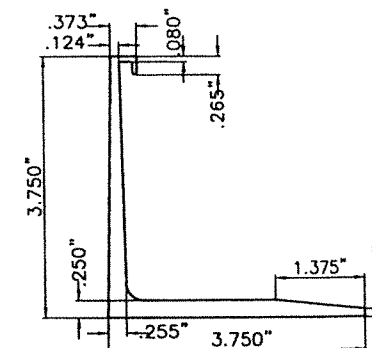
⑭ HD WALL HEADER/SILL

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



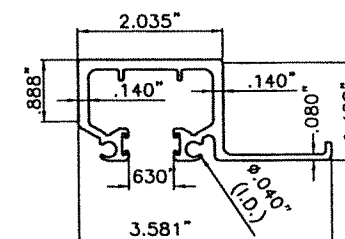
⑤ HV 90°/180° STARTER

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



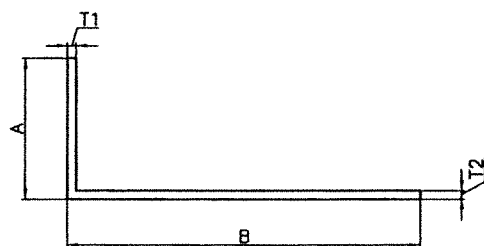
⑩ HV RAINGUARD

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



⑮ SHD CEILING HEADER/SILL

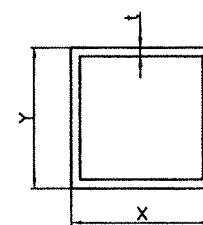
QUALIFIED FOR USE W/ HV BLADE ① & ②
6063-T6 ALLOY AND TEMPER



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

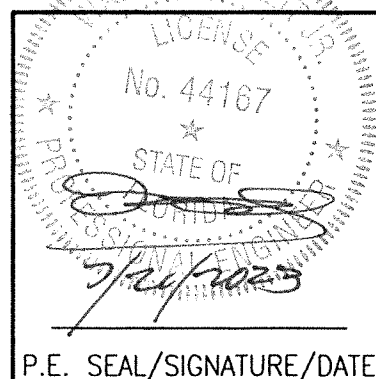


X	Y	t
2"	2"	0.125"
3"	3"	0.090"

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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BERTHA HV™
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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: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126

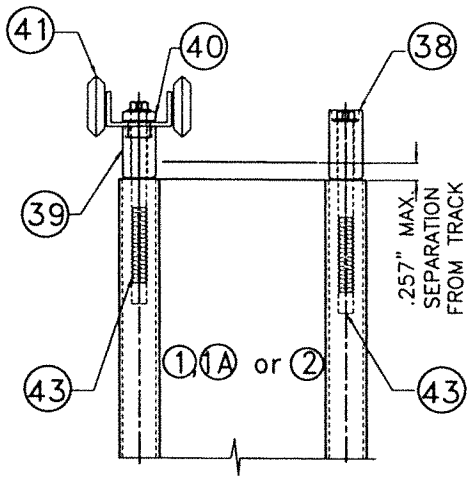
SHEET
2 OF 28

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

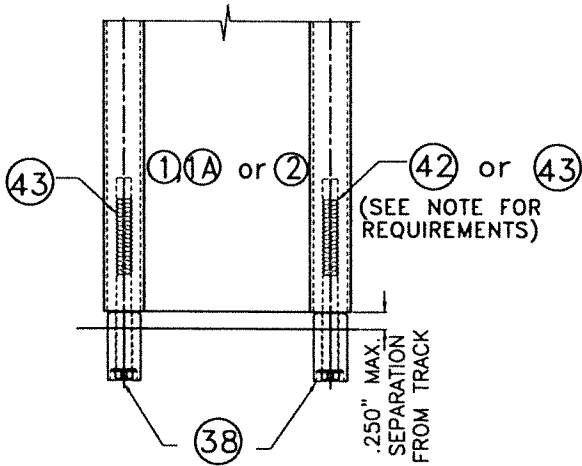
①	HV BLADE 1
①A	HV BLADE 1A
②	HV BLADE 2
③8	HV LONG RECESSED NYLON BUSHING
③9	HV SHORT RECESSED NYLON BUSHING
④0	HV NYLON HAT WASHER
④1	HV WHEEL CARRIAGE AISI 302-303 SERIES ø.870"x3/16" THICK NYLON WHEEL. 0.188"ø AISI 302 SERIES S.S. RIVETS
④2	HV 1 3/4" ACCORDION PIN W/ #8 HEAD *
④3	HV 2 3/4" ACCORDION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

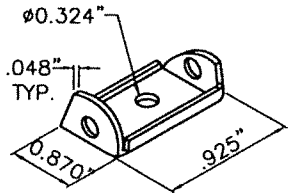


EXTERIOR



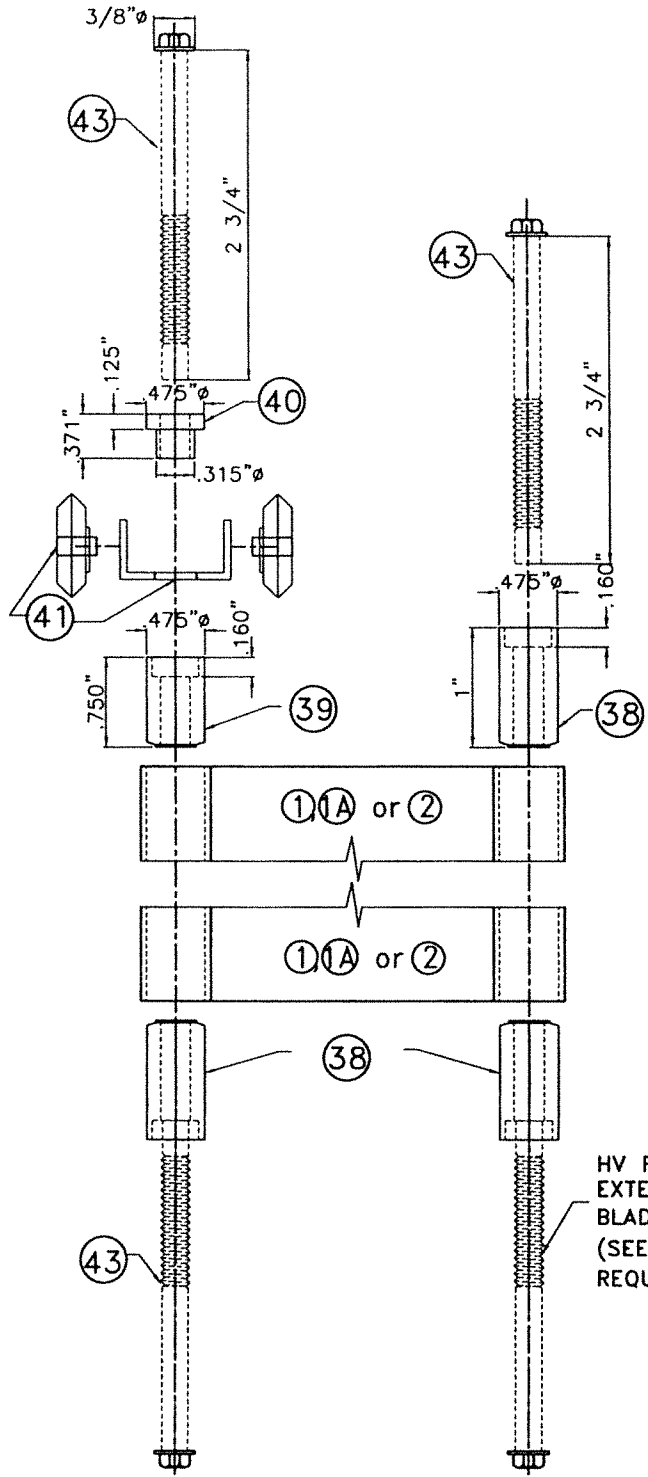
TYPICAL SHUTTER ASSEMBLY

SCALE: 3/8" = 1"



WHEEL CARRIAGE DETAIL

N.T.S.



EXTERIOR

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

ASSEMBLY LAYOUT

N.T.S.

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

STATE OF FLORIDA
TILTECO, INC.
No. 44167
7/21/2023
P.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 & H.V. BLADE #2

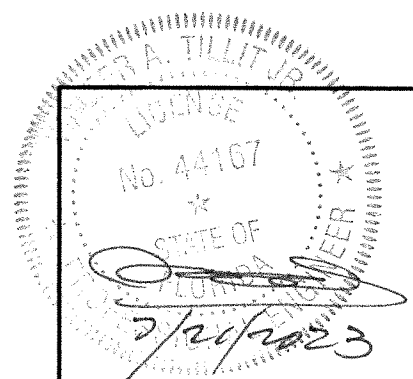
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126
SHEET
4 OF 28

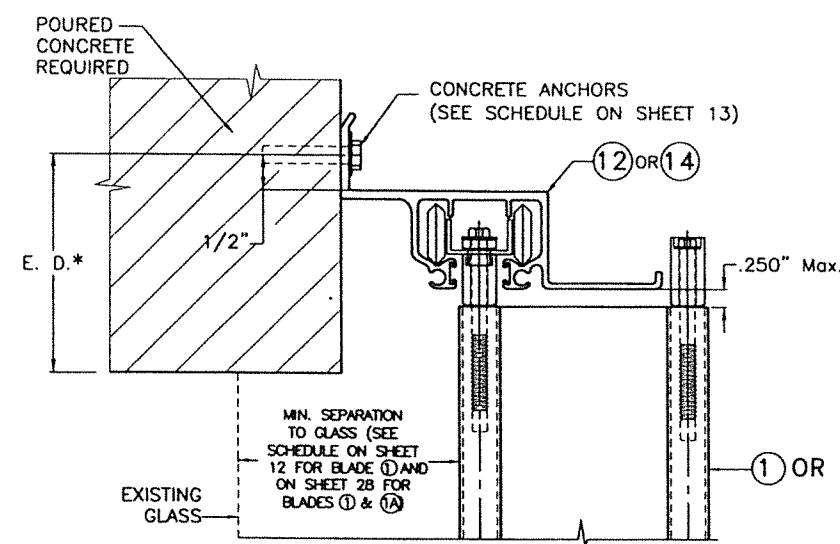


1. HD LOCK (34) W/ HD CENTERMATES (31) OR (32) W/ (33) : ONE ALTERNATE HD LOCK (34) MAYBE USED IN LIEU OF HV LOCKS (24) OR (25) FOR ANY SPAN AND INSTALLATIONS AT ANY ELEVATION. ALTERNATE HD LOCK (34) MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. ATTACHMENT OF HD LOCK (34) TO (33) IS W/ 3 #8 x 3/8" F.H. S.S.M.S., 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.

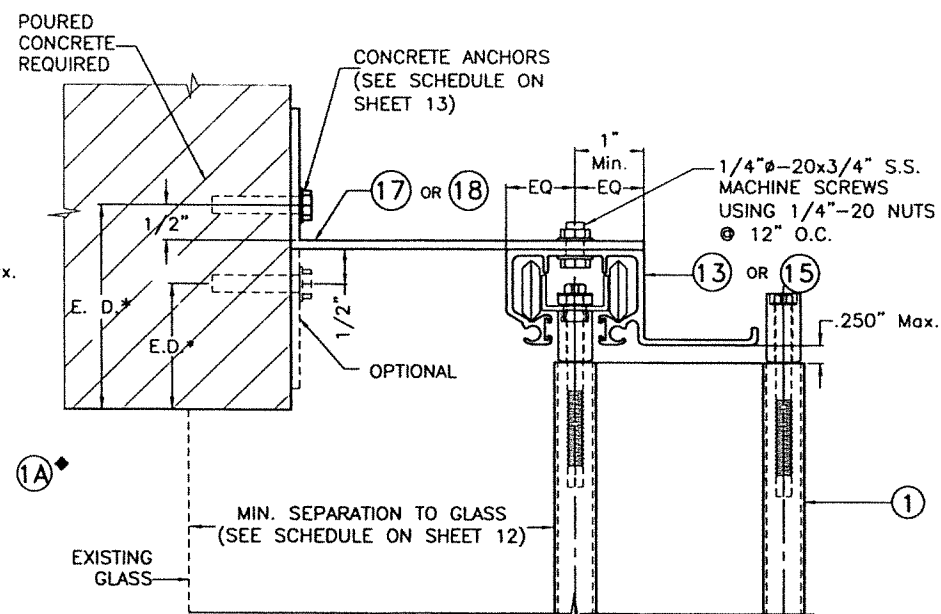
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			DRAWING No 23-126
3			
4			
5			SHEET 5 OF 28
6			



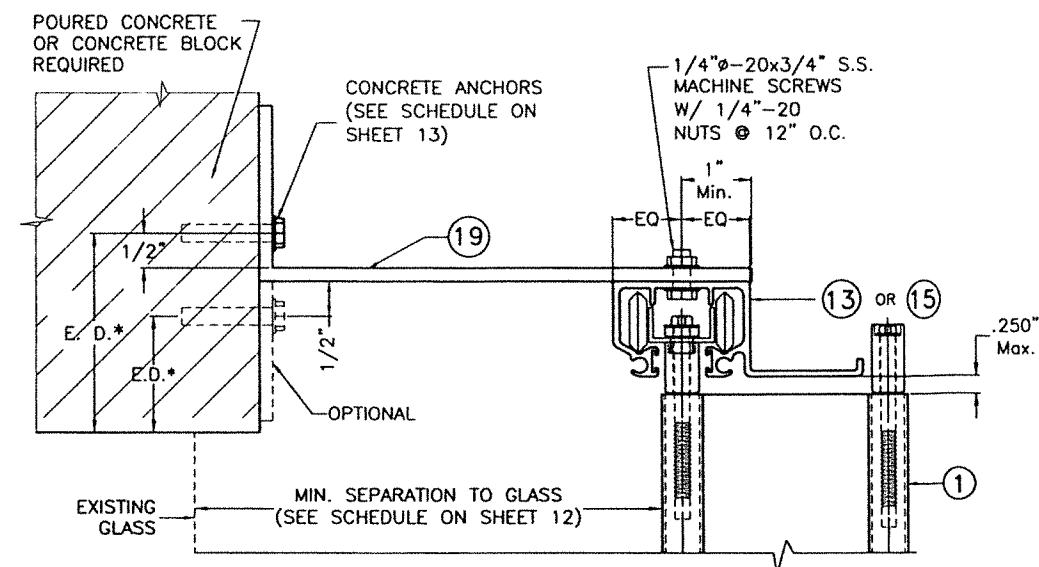
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West Palm Beach, FL 33407



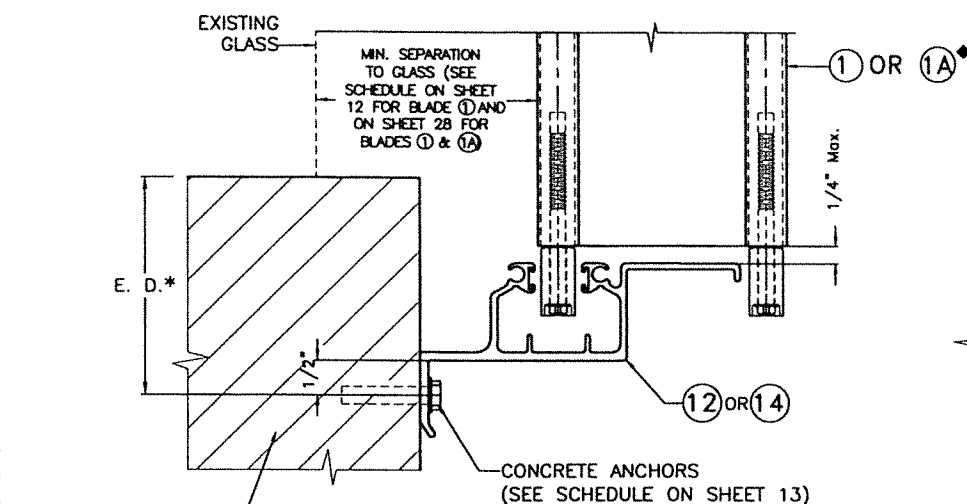
A HV WALL HEADER INSTALLATION



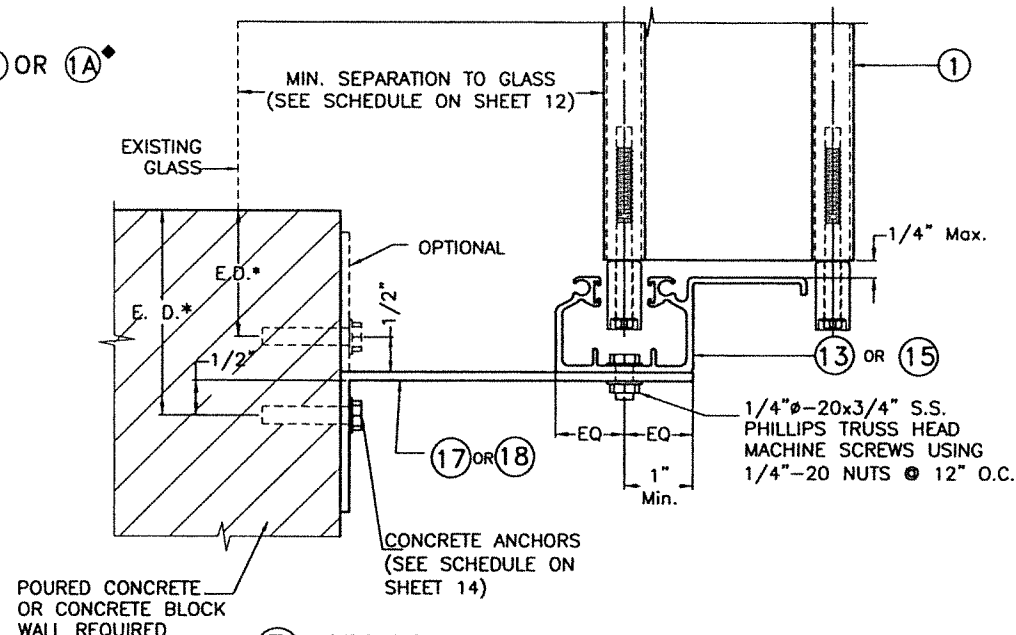
B HV WALL HEADER INSTALLATION



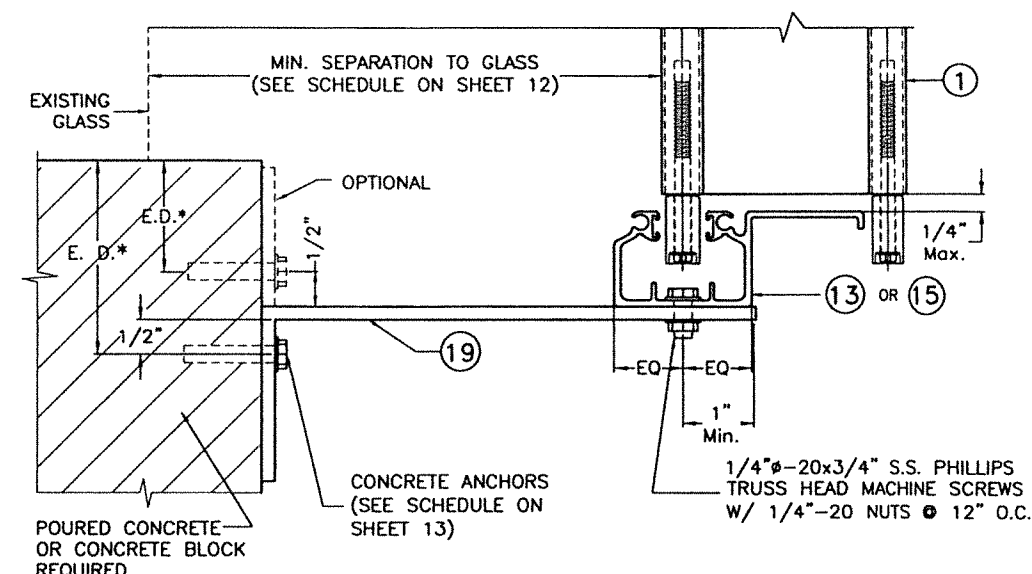
C HV WALL HEADER INSTALLATION



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**

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

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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: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

**DRAWING No
23-126**

**SHEET
6 OF 28**

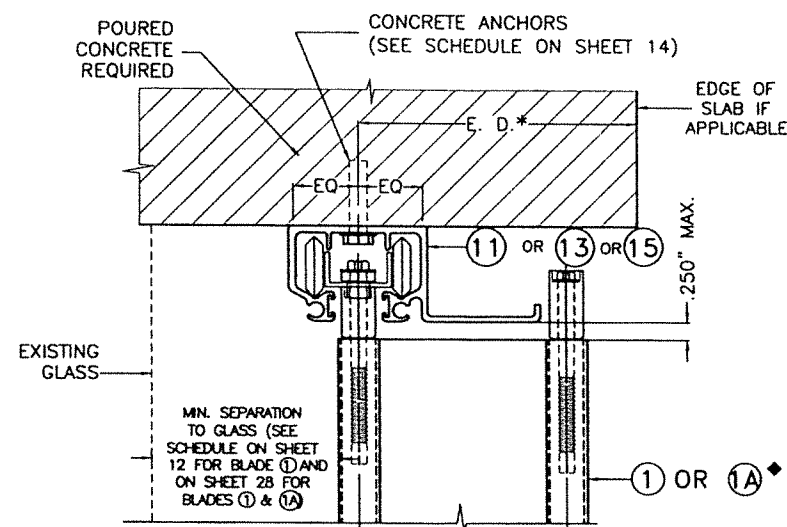
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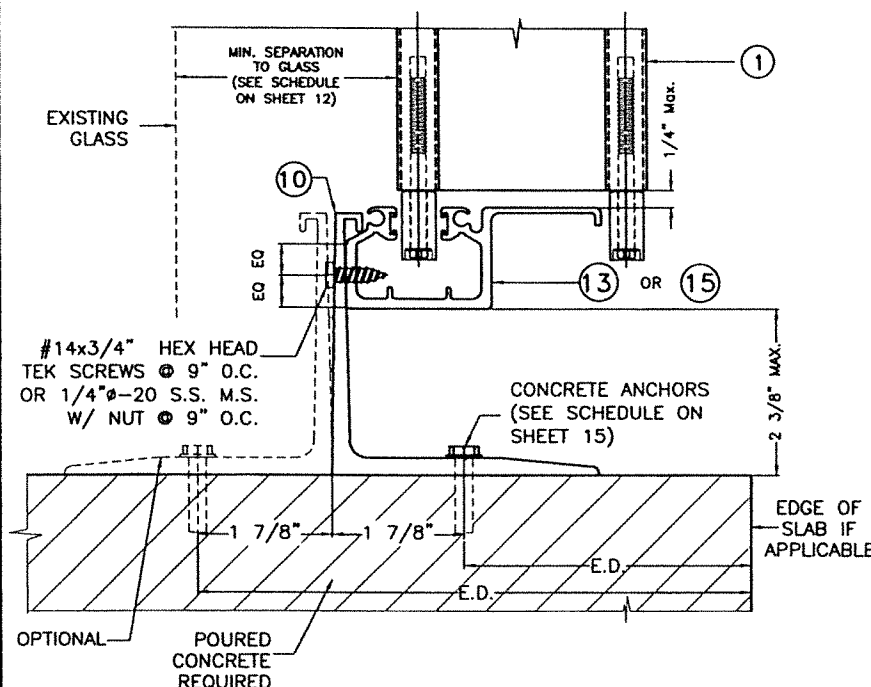
TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th. St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1530 . Fax : (305)871-1531
e-mail: tilteco@aol.com
CA-0006719
WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

P.E. SEAL/SIGNATURE/DATE

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



© HV CEILING INSTALLATION



© HV RAINGUARD INSTALLATION †

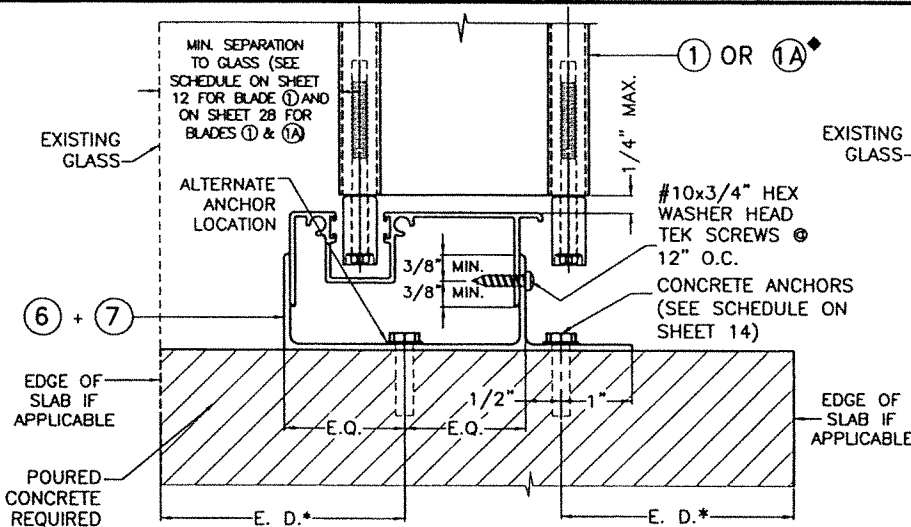
NOTE FOR COMBINATION OF SECTIONS:
1- SEE SHEET 4 FOR TYPICAL SHUTTER ASSEMBLY
2- MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.

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

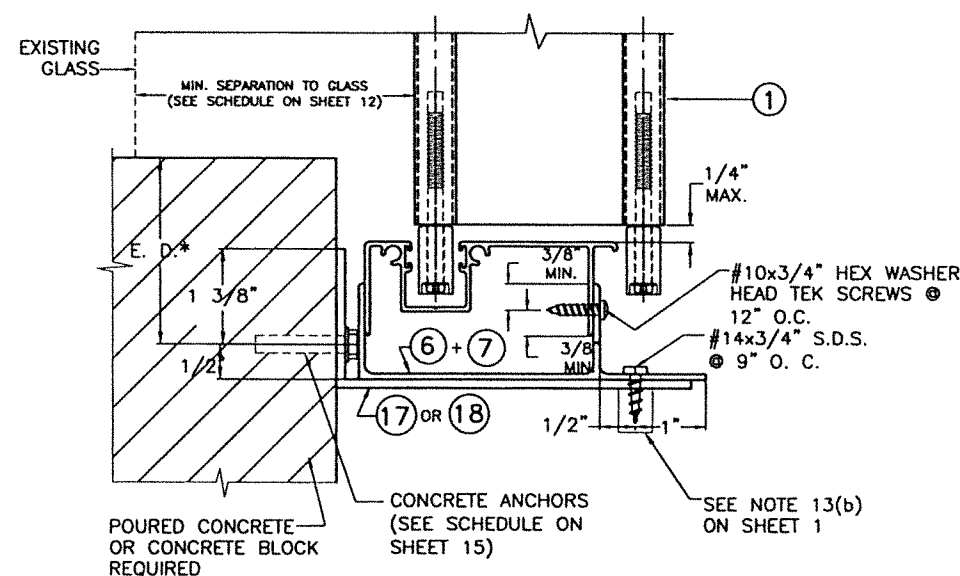
NOTE:

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

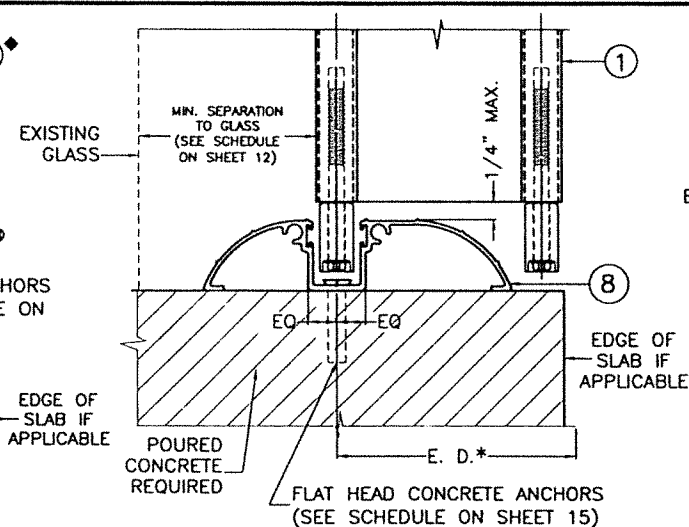
♦ SEE LIMITATIONS OF USE FOR BLADE 1A ON SHEET 28



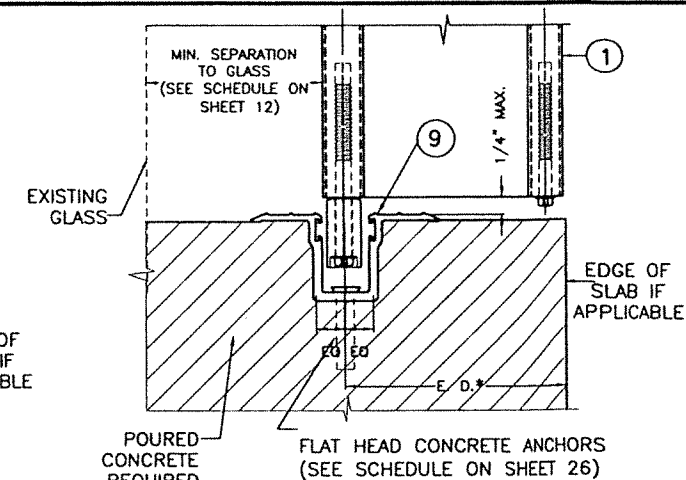
© HV FLOOR INSTALLATION †



© HV WALL FLOOR INSTALLATION

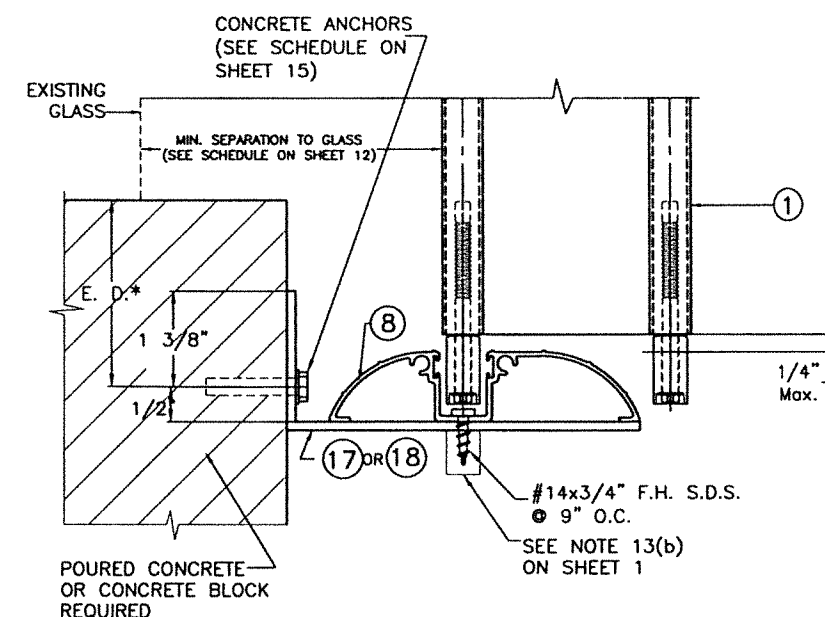


© HV WALK-OVER INSTALLATION



© TRENCH INSTALLATION

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



© HV WALL WALK-OVER INSTALLATION

INSTALLATION DETAILS W/ © HV BLADE

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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: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126

SHEET
7 OF 28

WALTER A. TILLIT JR.
P.E. SEAL/SIGNATURE/DATE
7/24/2023

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e-mail: tilteco@aol.com
CA-0006719
WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

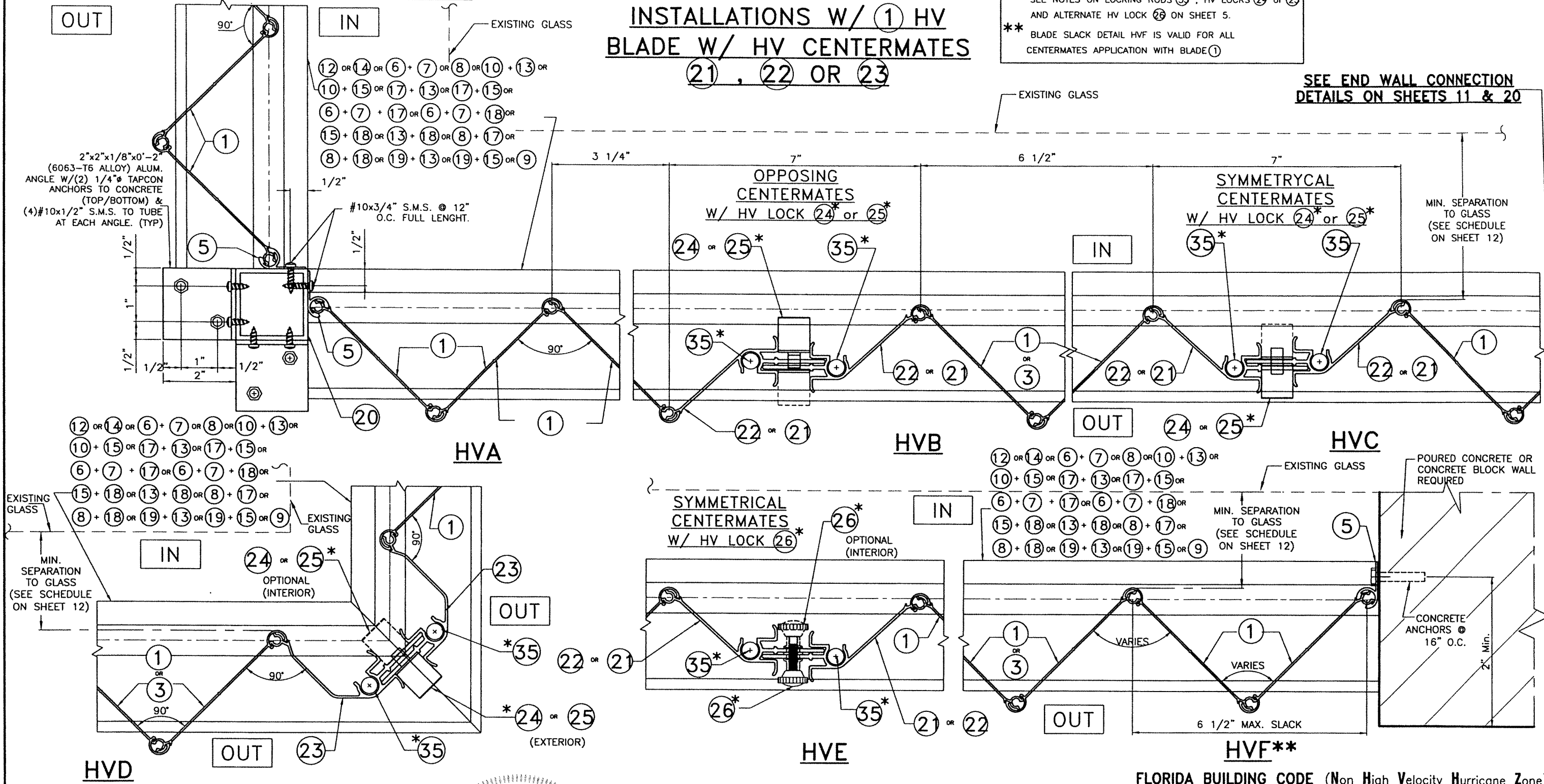
A.S.S.A.
American Shutter Systems
Association, Inc.
4268 Westroads Drive
West Palm Beach, FL 33407

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 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 11 & 20



FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

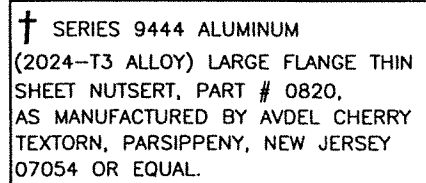
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BERTHA HV™ Accordion Shutter System			
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			
			DRAWING No 23-126
			SHEET 8 OF 28

SEE END CONNECTION DETAILS ON SHEETS 11 & 20

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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: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			DRAWING No 23-126
3			
4			
5			SHEET 9 OF 28
6			

WALTER A. TILLITT JR.
LICENSE
No. 44167
STATE OF FLORIDA
PROFESSIONAL ENGINEER
7/24/2023

P.E. SEAL/SIGNATURE/DATE

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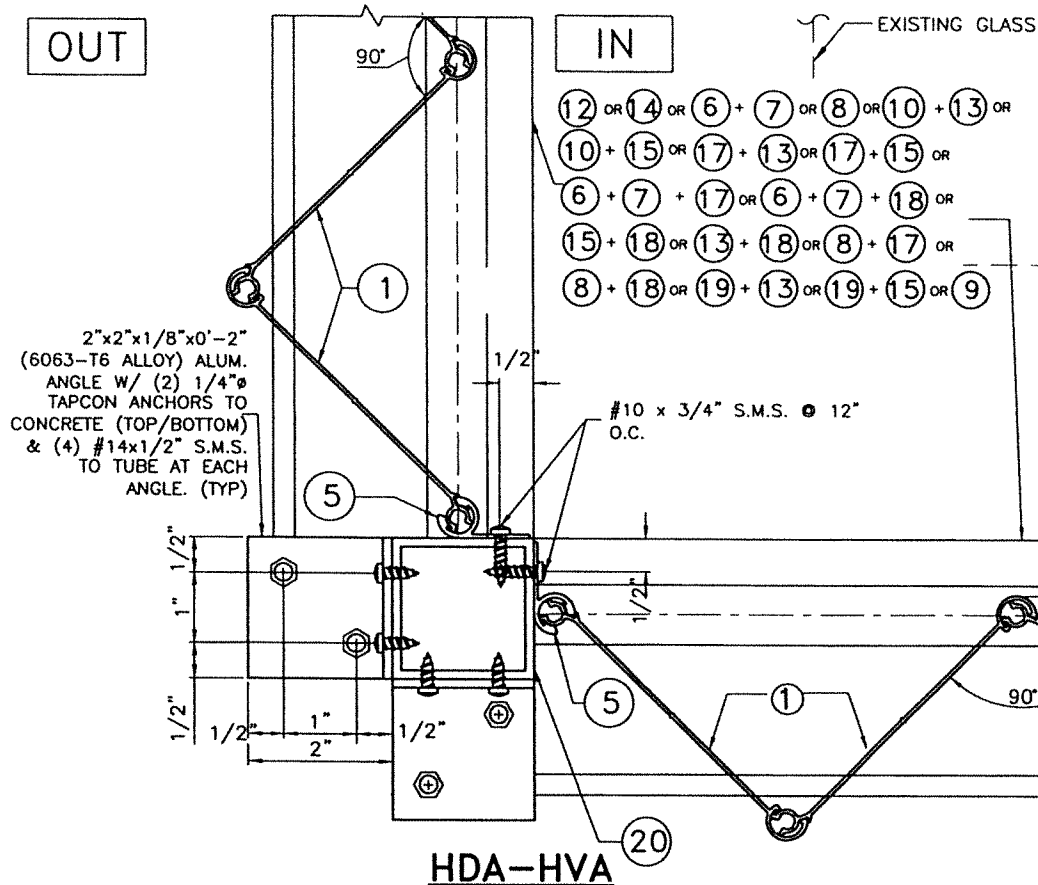
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e-mail: tilteco@aol.com
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WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

A.S.S.A.

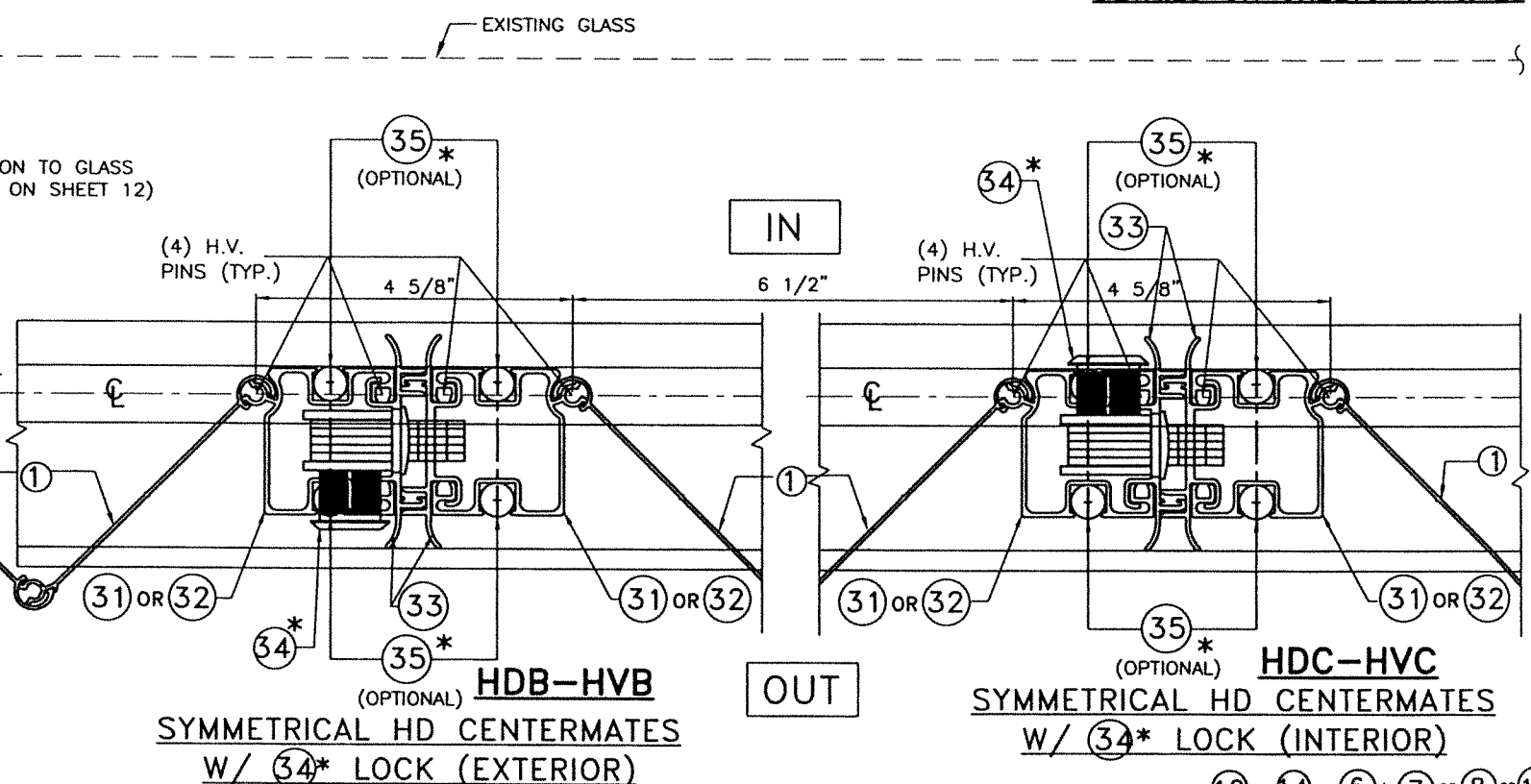
**American Shutter Systems
Association, Inc.**
4268 Westroads Drive
West Palm Beach, FL 33407

SEE END WALL CONNECTION DETAILS ON SHEETS 11 & 20

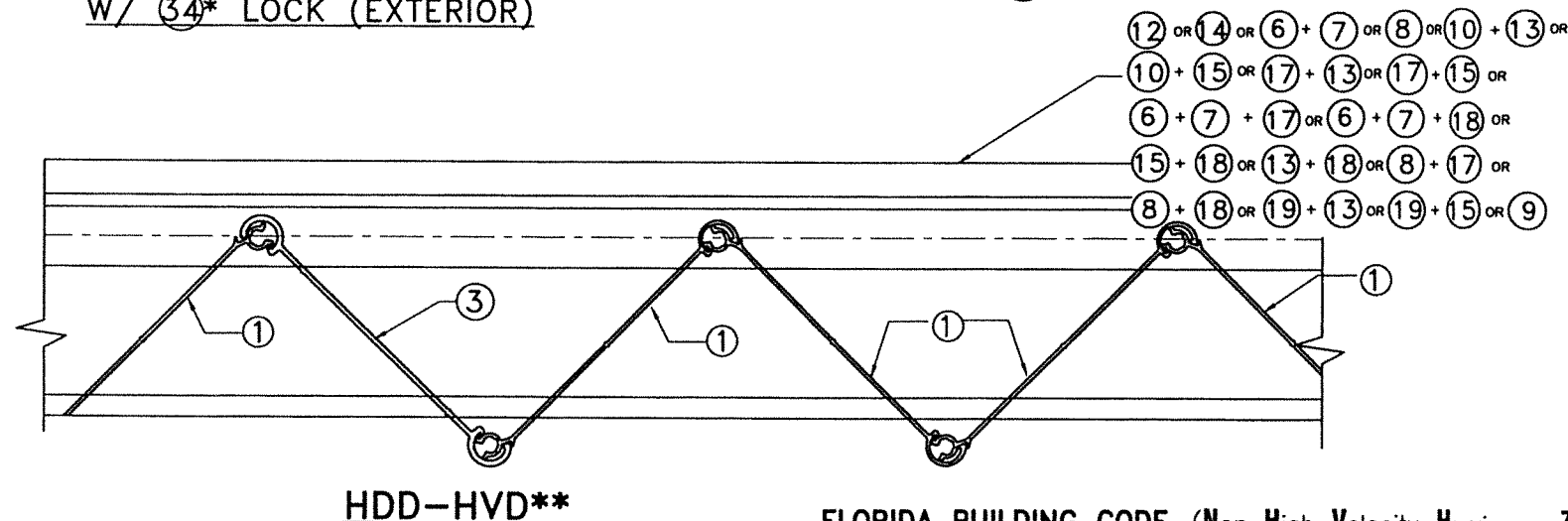


INSTALLATION ① HV BLADE W/ HD CENTERMATES ③①, ③②, ③③

SEE END WALL CONNECTION
DETAILS ON SHEETS 11 & 20



- * SEE NOTES ON LOCKING RODS ③③ & 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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No. 44167
STATE OF FLORIDA
7/21/2023
P.E. SEAL/SIGNATURE/DATE

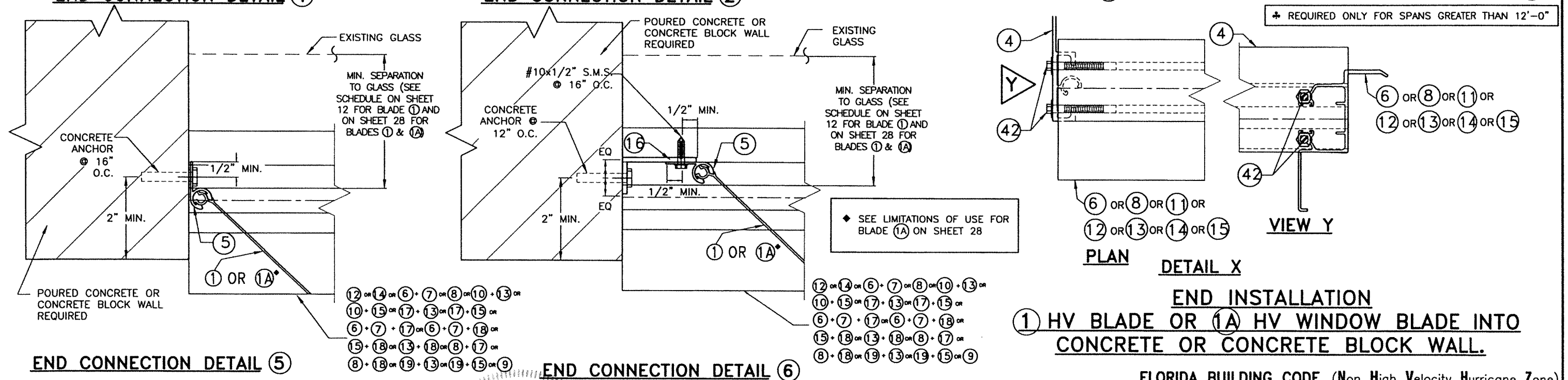
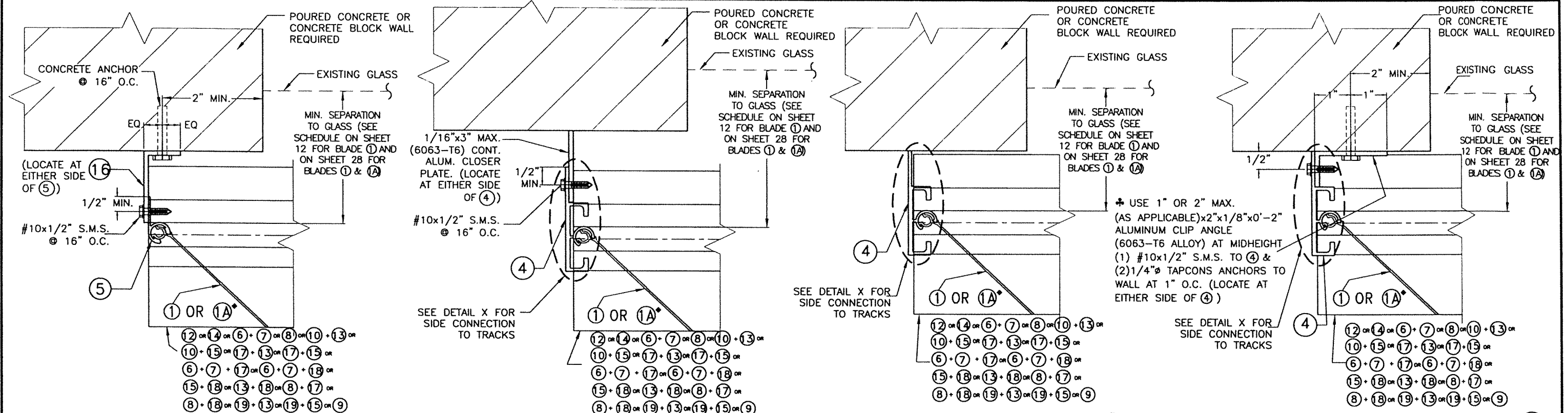
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BERTHA HV™ Accordion Shutter System			
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			
			DRAWING No 23-126
			SHEET 10 OF 28



① HV BLADE OR ①A HV WINDOW BLADE INTO CONCRETE OR CONCRETE BLOCK WALL.

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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: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			DRAWING No 23-126
3			
4			
5			SHEET 11 OF 28
6			

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SCHEDULE #1

MAXIMUM SHUTTER SPAN* "L+" OR "L-" (ft.). FOR INSTALLATIONS W/ SYMMETRICAL CENTERMATES, ② & ③ or ④ or ⑤ W/ ONE H.V. LOCK ②④ or ②⑤ or ②⑥ or HD LOCK ③④ W/ NO LOCKING RODS ③⑤ or CENTERMATES ②⑧ & ②⑨ W/ ONE HV "†" LOCK ③⑩ W/TWO LOCKING RODS ③③ 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 ONE HV LOCK ②④ or ②⑤ or ②⑥ W/ NO LOCKING RODS ③③ (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 ②④ OR ②⑤ W/ NO LOCKING RODS ③③

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 & J	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.

SEPARATION TO GLASS SCHEDULE

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

* 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.

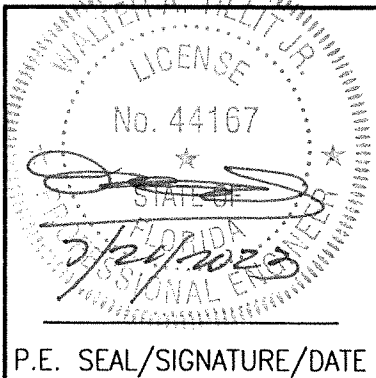
FOR A GIVEN NEGATIVE A.S.D. DESIGN PRESSURE RATING:
DETERMINE:
L1-= MAX. SPAN FOR WALL MOUNTING INSTALLATIONS.
L2-= MAX. SPAN FOR FLOOR/CEILING MOUNTING INSTALLATIONS.

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.

① HV BLADE

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)



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CA-0006719
WALTER A. TILLIT Jr. P.E.
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4268 Westroads Drive
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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: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126

SHEET
12 OF 28

MAXIMUM ANCHOR* SPACING (in.) SCHEDULE FOR A GIVEN MAX. SHUTTER SPAN.
DESIGN NEGATIVE LOAD AND A CORRESPONDING MOUNTING TYPE FOR CONCRETE OR CONCRETE BLOCK INSTALLATIONS
(SEE MOUNTINGS A, B, C, D AND F ON SHEET 6)

ANCHORS SPACING LEGEND

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

* SEE ANCHOR
SPECIFICATIONS
ON SHEET 14

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

MAXIMUM SPAN (ft)	POURED CONCRETE																				POURED CONCRETE/CONCRETE BLOCK																														
	Ⓐ WALL HEADER MOUNTING W/ (12)								Ⓐ WALL HEADER MOUNTING W/ (14)								Ⓑ WALL HEADER MOUNTING								Ⓓ WALL SILL MOUNTING W/ (12)								Ⓓ WALL SILL MOUNTING W/ (14)								Ⓒ & Ⓕ 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	5.5	8	8	8	8	8	8	7	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	8	6	6	8	8	8	8	8	8	8	8			
	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	8	8	8	8	8	8	8	6.5			
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	7	5.5	8	8	8	8	8	7	5.5	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	5.5	8	8	8	8	8	8	8	8				
	14	12	10	9	8	8	6	4.5	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	8	8	8	8	8	8	8	8			
5'-0"	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	8	6	8	8	8	8	8	8	8	6.5	5		
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	7.5	5.5	4	3				
	14	12	10	9	8	8	6	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	7	5.5	8	8	8	8	8	8	8	8				
6'-0"	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	7.5	5.5	4	3			
	14	12	10	9	8	8	6	4.5	14	12	10	9	8	8	6	4.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	7.5	5.5	8	8	8	8	8	7.5	5.5	4	3			
	14	12	10	9	8	8	6	4.5	14	12	10	9	8	8	6	4.5	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	7.5	5.5	8	8	8	8	8	7.5	5.5	4	3			
7'-0"	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
8'-0"	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
9'-0"	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
10'-0"	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
11'-0"	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
12'-0"	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8	8	8	8	8	8	8
13'-0"	14	12	10	9	8	8	6	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	7.5	5.5	8	8	8	8	8	8						

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

MAXIMUM SPAN (ft)	POURED CONCRETE/CONCRETE BLOCK										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" OR LESS	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	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	7			14	12	10	9	8	8	6	6		14	12	10	9	8	8	6	6	
4'-0"	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	
	14	12	10	9	8	8	6	6			14	12	10	9	8	8	6	6		14	12	10	9	8	8	6	4.5	
	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	
	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	8	6	6			14	12	10	9	8	8	6	5.5		14	12	10	9	8	8	6	4.5	
	14	12	10	9	8	7	4	-			14	12	10	9	8	6.5	5	3.5		14	12	10	9	8	6.5	5	3.5	
	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	4.5	3.5	
6'-0"	14	12	10	9	8	8	6	-			14	12	10	9	8	8	6	5		14	12	10	9	8	6.5	5	3.5	
	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	9	8	8	-	-			14	12	10	9	8	7	5	4		14	12	10	9	7.5	5.5	4	3	
	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	10	9	8	6.5	-	-			14	12	10	9	8	6	4	-		14	12	10	8	6.5	5	3.5	-	
	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	-	-	
	13	9.5	6.5	5	3.5	-	-	-			14	12	10	8	6.5	5	-	-		14	12	8	6.5	5	4	-	-	
9'-0"	14	12	10	9	8	-	-	-			14	12	10	9	7.5	4.5	-	-		14	12	8.5	7	5.5	4	-	-	
	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	12	10	9	7.5	-	-	-			14	12	10	8	6.5	5	-	-		14	12	8	6	5	4	-	-	
	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"	14	12	10	-	-	-	-	-			14	12	9	7	6	4.5	-	-		14	10.5	7	5.5	4.5	3.5	-	-	
	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"	14	12	10	-	-	-	-	-			14	12	8	6.5	5.5	-	-	-		13	10	6.5	5	4	-	-	-	
	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"	14	12	-	-	-	-	-	-			14	11.5	7.5	6	5	-	-	-		12	9	6	4.5	4	-	-	-	
	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"	14	12	-	-	-	-	-	-			14	10.5	7	5.5	-	-	-	-		11	8.5	5.5	4.5	-	-	-	-	
	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"	14	-	-	-	-	-	-	-			13.5	10	6.5	-	-	-	-	-		10.5	8	5	-	-	-	-	-	
	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"	14	-	-	-	-	-	-	-			12.5	9.5	6	-	-	-	-	-		10	7.5	5	-	-	-	-	-	
	8	-	-	-	-	-	-	-			8	6	4	-	-	-	-	-		6	4.5	3	-	-	-	-	-	
	9.5	-	-	-	-	-	-	-			9.5	7	5	-	-	-	-	-		8	6	4	-	-	-	-	-	

ANCHORS SPACING LEGEND

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

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

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

NOTES:

- A.1) MINIMUM EMBEDMENT INTO POURED CONCRETE OF TAPCON OR 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"Ø 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"Ø-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"Ø TAPCON OR TAPCON WITH ADVANCED THREADFORM TECHNOLOGY ANCHORS, AS MANUFACTURED BY I.T.W. BUILDDEX.
- 1/4"Ø x 3/4" ALL POINTS SOLID-SET ANCHORS, AS DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY.
- 1/4"Ø BLUE TAP CONCRETE ANCHORS W/ CAP AS MANUFACTURED BY FLORIDA FASTENERS DIRECT, INC.
<

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 & 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	
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	
	14	12	10	9	8	8	6	6	12	12	12	12	12	12	9.5	7	7	7	7	7	7	7	7	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	
	14	12	10	9	8	8	6	6	12	12	12	12	12	12	10	7.5	6	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	11.5	8.5	6.5	5	7	7	7	7	7	7	5.5	4	5	5	5	5	5	4	
	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	
	14	12	10	9	8	8	6	6	12	12	12	9.5	8	6	4.5	3.5	7	7	7	7	7	7	6.5	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	6	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'-0"	14	12	10	9	8	8	6	6	12	12	12	11	9	7	5	4	7	7	7	7	7	5.5	4	3	5	5	5	5	5	5	4	3
	14	12	10	9	8	8	6	6	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	
	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	5	3.5	5	5	5	5	5	5	5	4	
	14	12	10	9	8	8	6	6	12	12	12	9.5	8	6	4.5	7	7	7	7	7	7	5.5	4	5	5	5	5	5	5	5	4	
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	4.5	3.5	7	5	5	5	5	5	4.5	3.5	7
	14	12	10	9	8	8	6	6	12	12	12	10	8	6	4.5	3.5	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	6	12	12	8	6	5	4	3	7	7	7	7	7	5.5	4	7	5	5	5	5	5	5	4	3	
	14	12	10	9	8	8	6	6	12	12	10	8	6.5	5	3.75	7	7	7	7	7	6	4.5	7	5	5	5	5	5	5	4.5	7	
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	7	7	7	5	5	5	5	5	4	3	7
	14	12	10	9	8	8	6	6	12	12	12	8.5	7	5	4	3	7	7	7	7	7	7	6	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	6	12	10	6.5	5	4.5	3	7	7	7	7	6.5	5	3	7	5	3	5	5	5	5	5	3.5	3	
	14	12	10	9	8	8	6	6	12	12	8.5	7	5.5	4	7	7	7	7	7	5	7	5	7	5	5	5	5	5	5	4	7	
8'-0"	14	12	10	9	8	8	6	7	12	12	8.5	7	5.5	4	3	7	7	7	5.5	4.5	3	7	7	7	5	5	5	5	4.5	3.5	7	7
	14	12	10	9	8	8	6	7	12	12	10.5	7.5	6	4.5	3.5	7	7	7	7	7	7	7	4	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	7	12	9	6	4.5	4	3	7	7	7	7	5.5	4	7	7	7	5	5	5	5	5	4	3	7	
	14	12	10	9	8	8	6	7	12	11	7.5	6	5	3.75	7	7	7	7	6	4.5	7	7	7	5	5	5	5	5	4.5	7	7	
9'-0"	14	12	10	9	8	8	6	7	12	11.5	7.5	6	5	3.5	7	7	7	6.5	5	4	7	7	7	5	5	5	5	4	3	7	7	
	14	12	10	9	8	8	6	7	12	12	9.5	6.5	5.5	4	3	7	7	7	7	7	7	6	3	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	7	10.5	8	5	4	3.5	7	7	7	7	6	5	3.5	7	7	5	5	5	5	5	5	4	3	7	
	14	12	10	9	8	8	6	7	12	10	6.5	5	4.5	7	7	7	7	6.5	5.5	7	7	7	5	5	5	5	5	5	4	7	7	
10'-0"	14	12	10	9	8	8	6	7	12	10.5	7	5.5	4.5	3.5	7	7	7	5.5	4.5	3.5	7	7	7	5	5	5	4.5	3.5	7	7	4.5	
	14	12	10	9	8	8	6	7	9.5	7	4.5	3.5	3	7	7	7	7	5.5	4.5	7	7	7	5	5	5	5	4.5	3.5	7	7	7	
	14	12	10	9	8	8	6	7	12	9	6	5	4	7	7	7	7	6	5	7	7	7	5	5	5	4.5	3.5	7	7	7		
	14	12	10	9	8	8	6	7	12	9.5	6	5	4	3	7	7	7	5	4	3	7	7	7	5	5	5	4	3.5	7	7	7	
11'-0"	14	12	10	9	8	8	6	7	12	10	7	5.5	4.5	3.5	7	7	7	7	7	7	3.5	7	5	5	5	5	5	5	5	4	3	7
	14	12	10	9	8	8	6	7	8.5	6.5	4	3.5	3	7	7	7	7	6	5	4	7	7	7	5	5	5	5	4	3	7	7	
	14	12	10	9	8	8	6	7	11	8	5.5	4	7	7	7	7	7	5.5	4.5	7	7	7	5	5	5	5	4.5	7	7	7		
	14	12	10	9	8	8	6	7	11.5	8.5	5.5	4.5	3.5	7	7	7	7	4.5	3.5	7	7	7	5	5	4.5	3.5	3	7	7	7		
12'-0"	14	12	10	9	8	8	6	7	12	9.5	6.5	5	4	3	7	7	7	7	7	7	6	3	5	5	5	5	5	5	4.5	3.5	7	3.5
	14	12	10	9	8	8	6	7	8	6	4	3	7	7	7	7	7	5.5	4.5	3.5	7	7	7	5	5	5	4.5	4	3	7	7	
	14	12	10	9	8	8	6	7	10	7.5	5	4	7	7	7	7	7	6	5	7	7	7	5	5	5	5	4	7	7	7		
	14	12	10	9	8	8	6	7	10.5	8	5	4	3.5	7	7	7	7	6.5	4.5	3.5	7	7	7	5	5	4.5	3.5	3	7	7	7	
13'-0"	14	12	10	9	8	8	6	7	11.5	8.5	6	4.5	3.5	3	7	7	7	7	7	7	4.5	7	7	5	5	5	5	5	4.5	3.5	7	3.5
	14	12	10	9	8	8	6	7	7	5.5	3.5	3	7	7	7	7	7	5	4	3	7	7	7	5	5	5	4	3	7	7	7	
	14	12	10	9	8	8	6	7	9	7	4.5	3.75	7	7	7	7	7	5.5	4.5	7	7	7	5	5	5	4.5	4	7	7	7		
	14	12	10	9	8	8	6	7	10	7.5	5	4	3	7	7	7	7	6	5	7	7	7	5	5	5	4.5	4	7	7	7		
14'-0"	14	12	10	9	8	8	6	7	10	7.5	5	4	3	7	7	7	7	6	4	3	7	7	7	5	5	4	3	7	7	7	7	
	14	12	10	9	8	8	6	7	10.5	8	5.5	4	3.5	7	7	7	7	7	7	7	4	7	7	5	5	5	5	5	5	4	3	
	14	12	10	9	8	8	6	7	8.5	6.5	4	7	7	7	7	7	7	5	3.5	7	7	7	5	5	5	4	7	7	7	7		
	14	12	10	9	8	8	6	7	8.5	6.5	4	7	7	7	7	7	7	5	4	7	7	7	5	5	5	4	7	7	7	7		
15'-0"	14	12	10	9	8	8	6	7	9	7	4.5	3.5	3	7	7	7	7	5.5	3.5	7	7	7	5	5	3.5	3	7	7	7	7		
	14	12	10	9	8	8	6	7	10	7.5	5	4	3	7	7	7	7	7	7	7	3.5	7	7	5	5	5	5	5	5	4	3	
	14	12	10	9	8	8	6	7	6	4.5	3	7	7	7	7	7	7	4.5	3	7	7	7	5	5	4.5	3.5	7	7	7	7		
	14	12	10	9	8	8	6	7	8	6	4	7	7	7	7	7	7	5	7	7	7	7	7	5	5	5	4	7	7	7		
16'-0"	14	12	10	9	8	8	6	7	8.5	6.5	4	3.5	7	7	7	7	7	5.5	3.5	7	7	7	5	5	3.5	7	7	7	7	7		
	14	12	10	9	8	8	6	7	9.5	7	4.5	3.5																				

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)						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	30	40	60	75	90	105		
3'-0" OR LESS	12	10	10	9	8	8	6	6	6	6	6	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.

1. 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. BUILDEX W/ MINIMUM THREADED PENETRATION AS INDICATED AT EACH SECTION ON SHEETS 18 & 19. EXCEPTION: SEE NOTE 2 BELOW.
2. ANCHORS TO HOLLOW CEILING SHALL BE AS PER MOUNTING TYPE U, SHEET 19 AND SHALL CONSIST OF LAG SCREWS AS PER N.D.S. 2018 SPECIFICATIONS.
3. 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)
4. 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

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

© 2020 EASTERN METAL SUPPLY, INC.

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: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126

SHEET
16 OF 28

WALTER A. TILLIT JR.
LICENSE
No. 44167
7/21/2023
P.E. SEAL/SIGNATURE/DATE

©2023 TILTECO, INC.
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
CA-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

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 2018 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

WALTER A. TILLIT JR.
LICENSE
No. 44167
STATE OF
FLORIDA
Professional Engineer
3/20/2023
P.E. SEAL/SIGNATURE/DATE

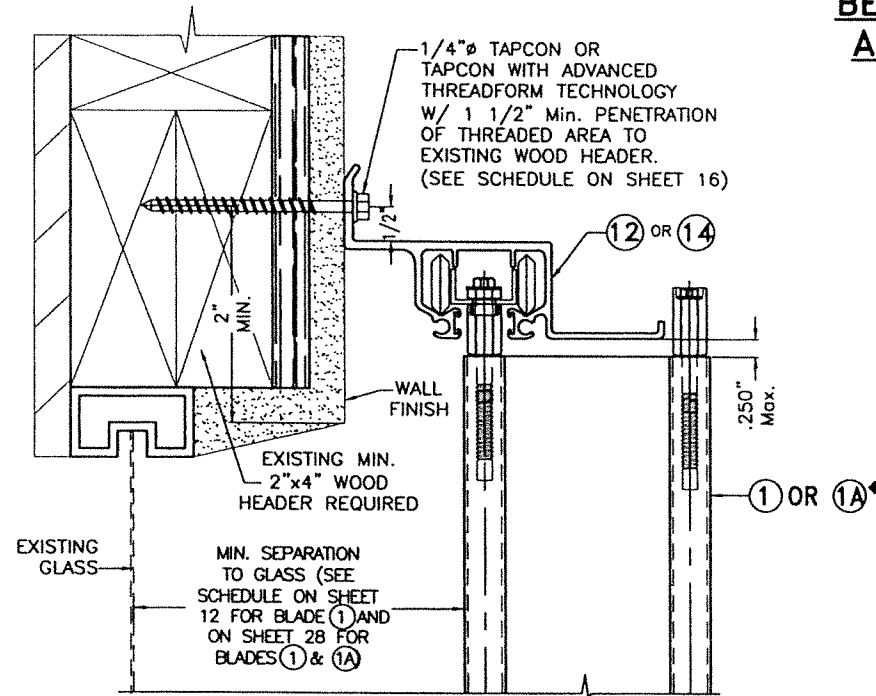
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CA-0006719
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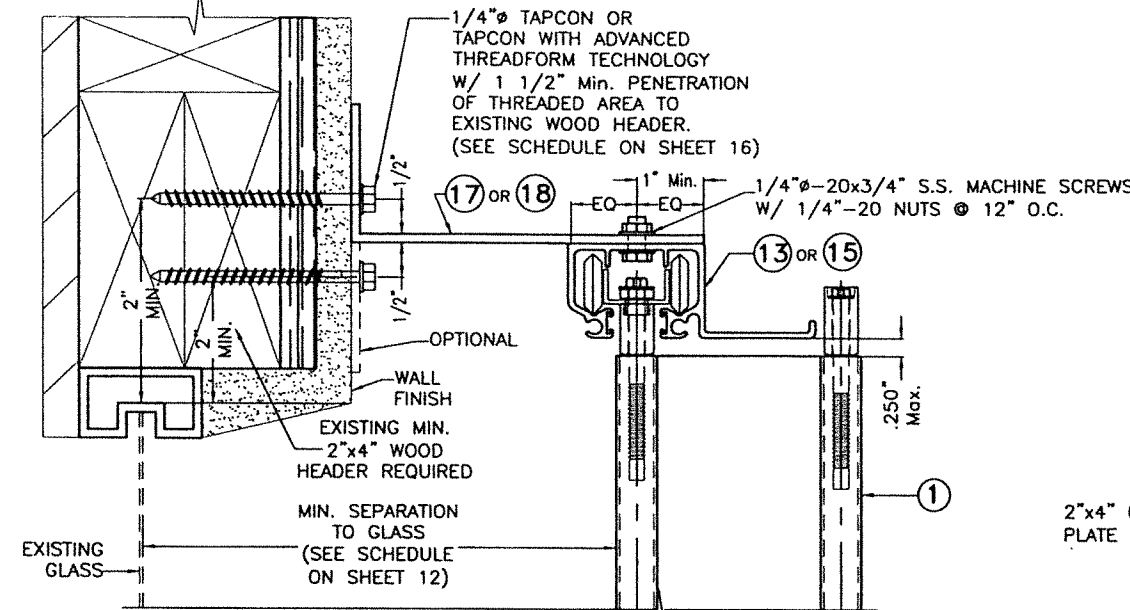
FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)			
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BERTHA HV™ Accordion Shutter System			
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			DRAWING No 23-126
3			
4			
5			
6			SHEET 17 OF 28

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

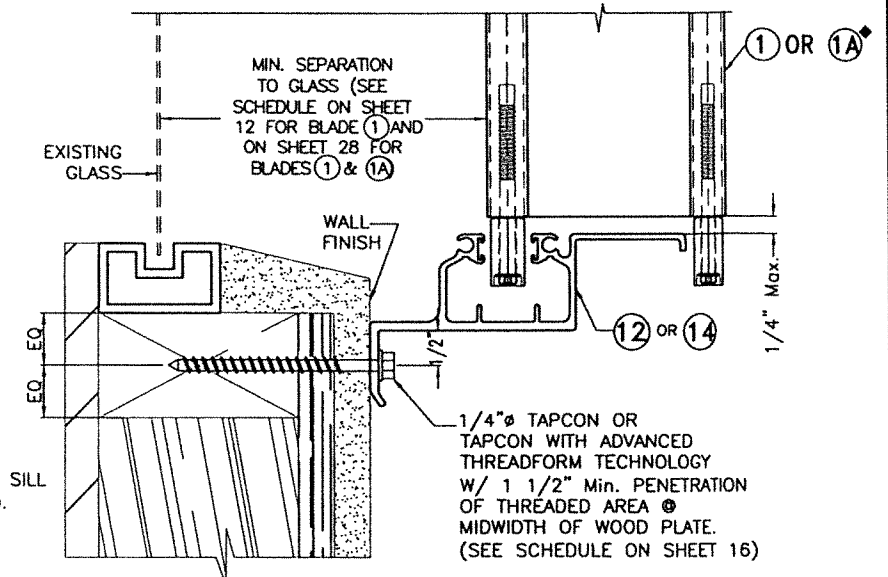
MAX. SHUTTER SPAN L+ OR L- FOR INSTALLATIONS INTO WOOD WITH HV BLADE ① ONLY SHALL BE LIMITED TO 105.0 psf. A.S.D. DESIGN PRESSURE RATING. SEE SHEET 28 FOR MAX SPAN & A.S.D. DESIGN PRESSURE RATING FOR INSTALLATION WITH BLADE ① & ①A WORKING IN UNISON



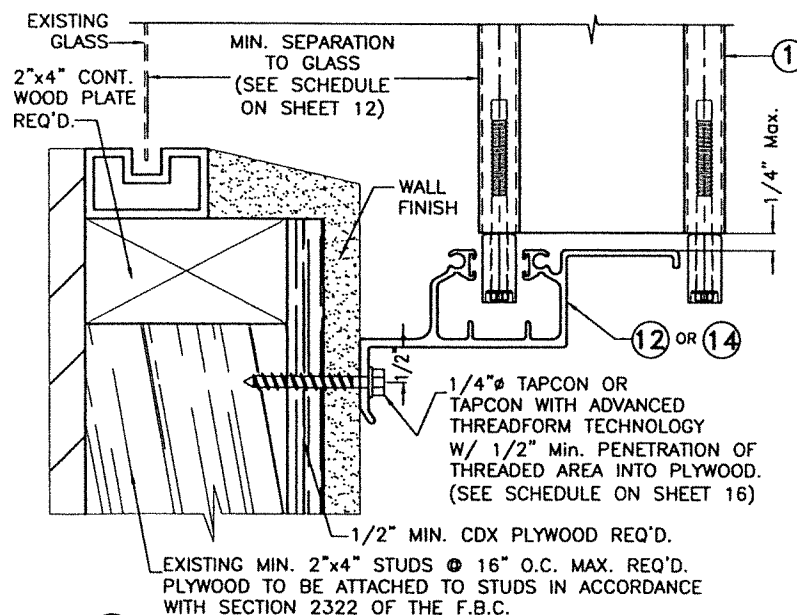
M HV WALL HEADER INSTALLATION



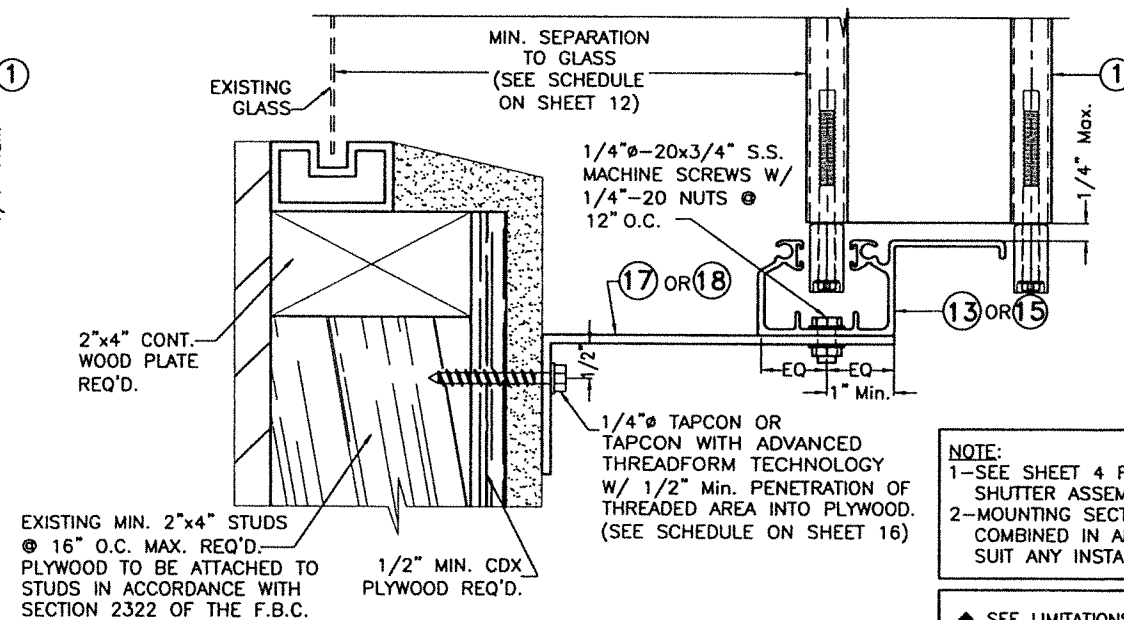
N HV WALL HEADER INSTALLATION



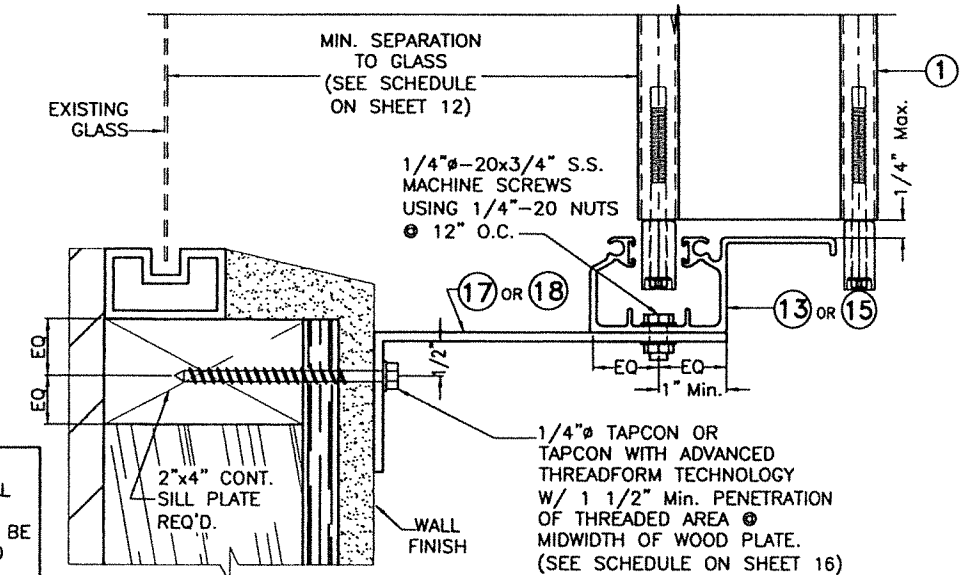
O HV WALL SILL INSTALLATION



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)

LICENSE
No. 44107
7/20/2023
P.E. SEAL/SIGNATURE/DATE

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Accordion Shutter System

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126

SHEET
18 OF 28

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) & (A) WORKING IN UNISON



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

(T) HV CEILING INSTALLATION

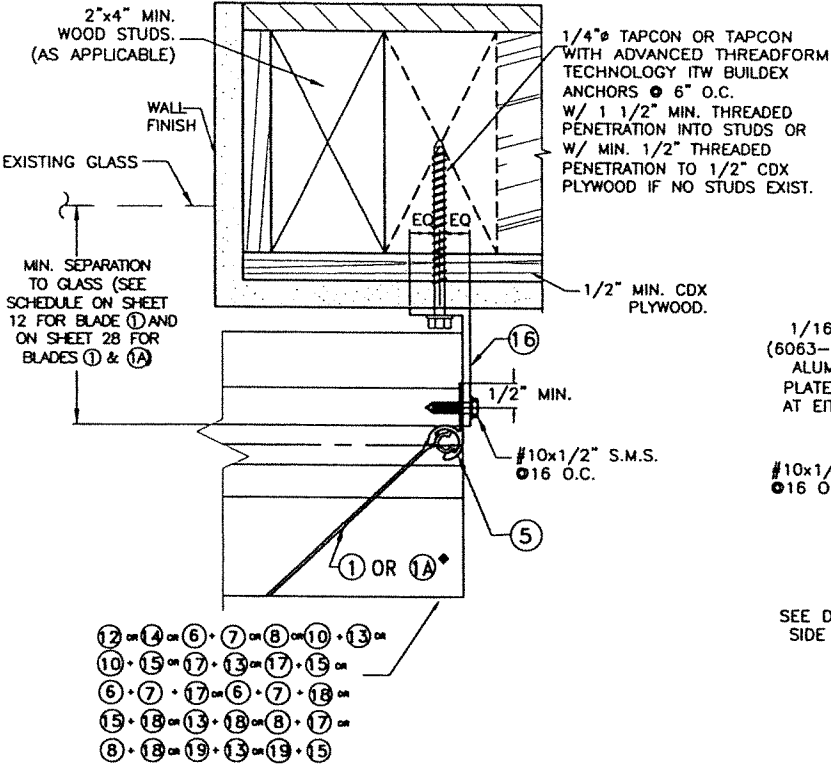


☒ HV WALK-OVER INSTALLATION

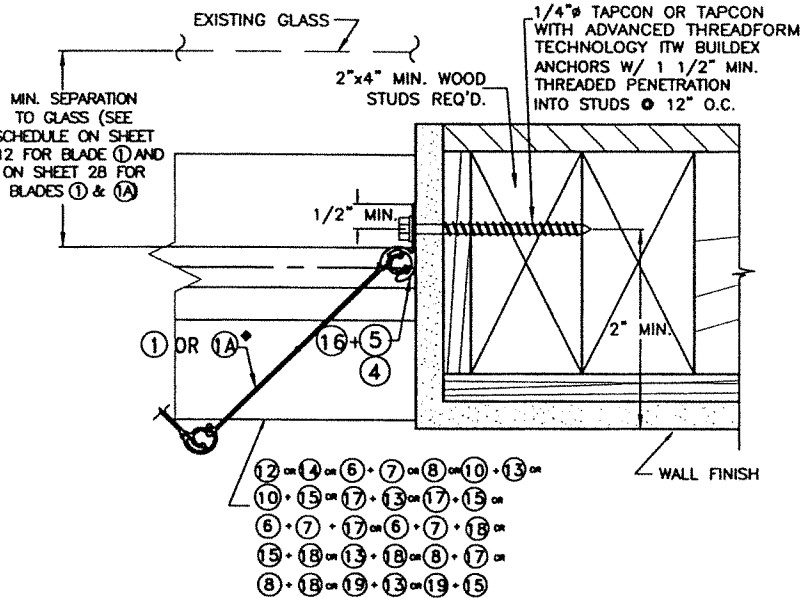
P.E. SEAL/SIGNATURE/DATE

H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. WINDOW BLADE #2			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			DRAWING No 23-126
3			
4			
5			SHEET 19 OF 28
6			

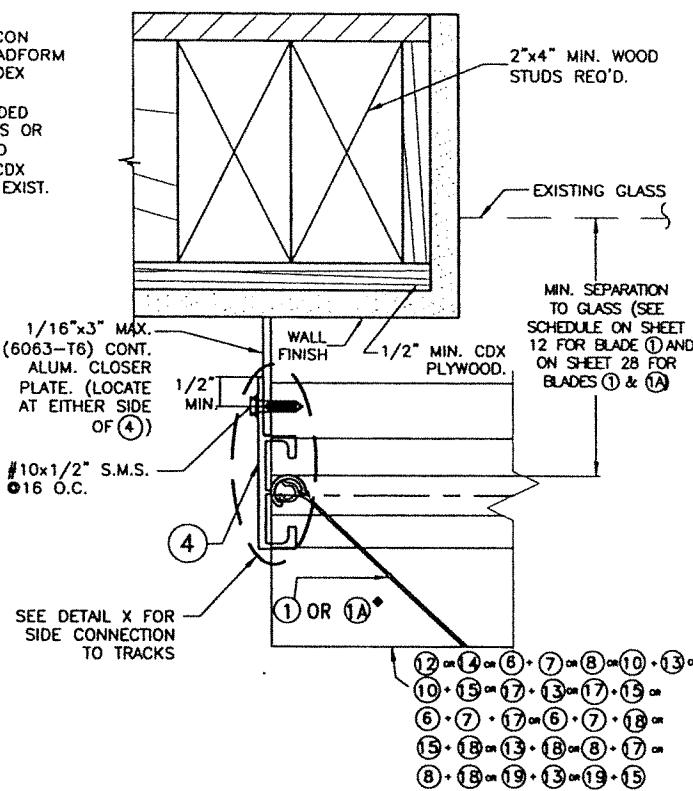
END INSTALLATIONS ① HV & ①A HV ♦ BLADES INTO 2"x4" MIN. WOOD STUDS.



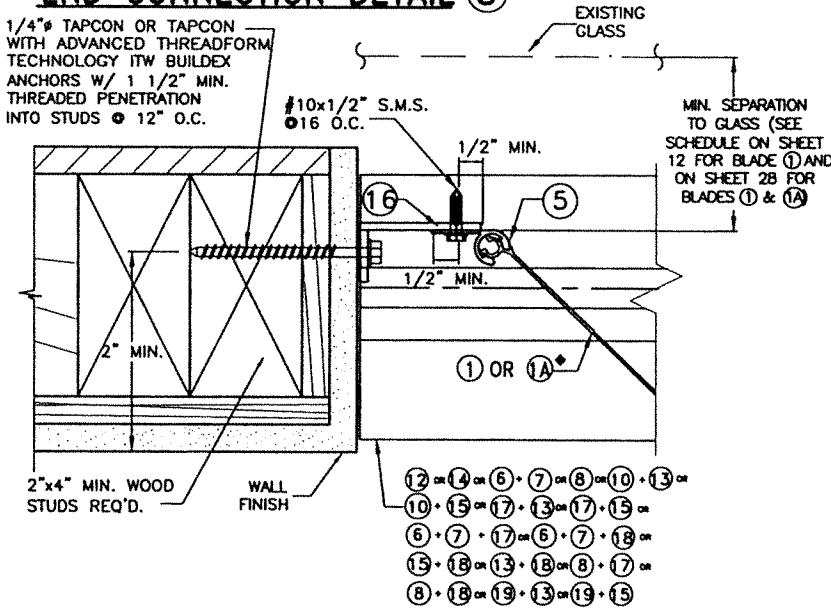
END CONNECTION DETAIL ⑦



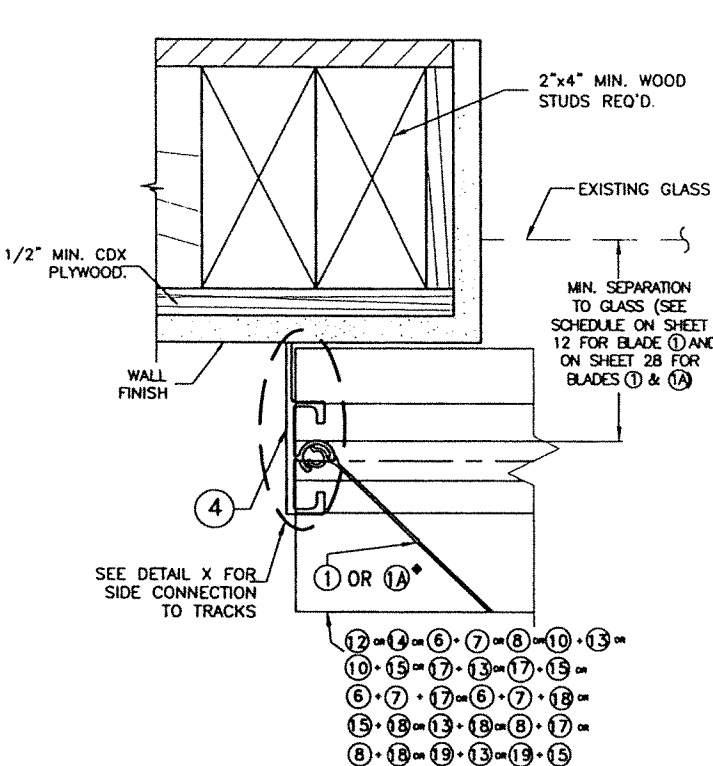
END CONNECTION DETAIL ⑪



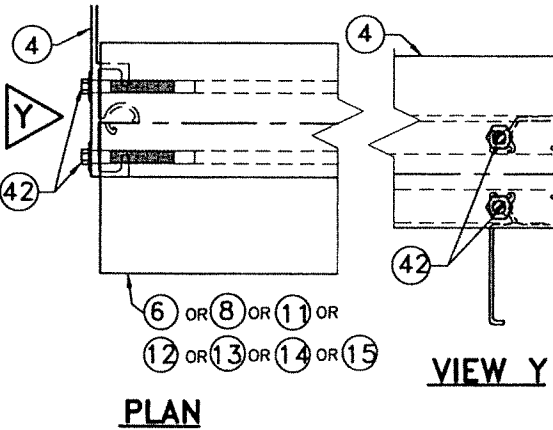
END CONNECTION DETAIL ⑧



END CONNECTION DETAIL ⑫

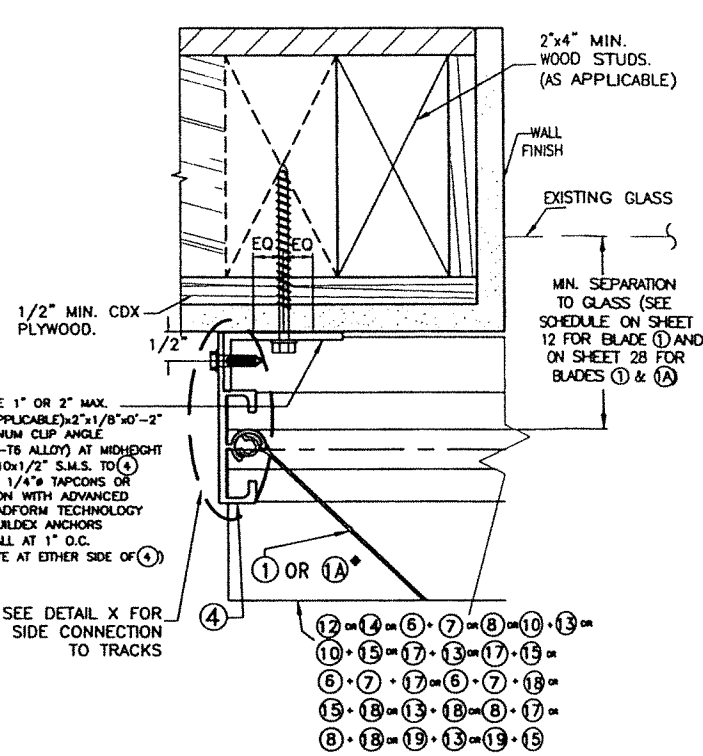


END CONNECTION DETAIL ⑨



PLAN

DETAIL X



END CONNECTION DETAIL ⑩

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

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

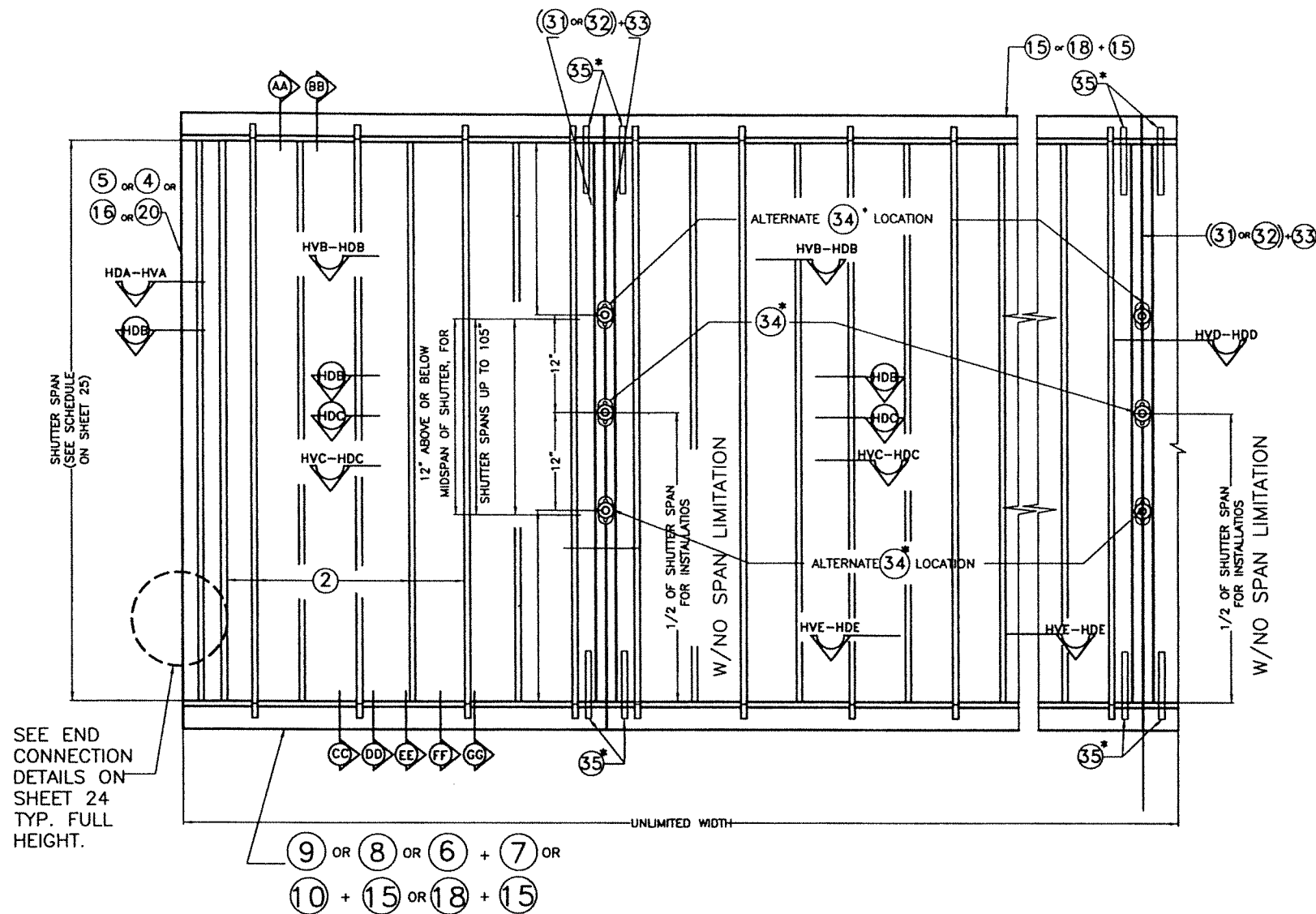
FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

WALTER A. TILLIT JR.
LICENSE
No. 44167
STATE OF
7/20/2023
PROFESSIONAL ENGINEER
P.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 & H.V. BLADE #2			
REV. NO	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			
			DRAWING No 23-126
			SHEET 20 OF 28



SEE END
CONNECTION
DETAILS ON
SHEET 24
TYP. FULL
HEIGHT.

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

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

- 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.
- 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.

FLORIDA BUILDING CODE (Non High Velocity Hurricane Zone)

WALTER A. TILLIT JR.
LICENSE
No. 44167
STATE OF FLORIDA
Professional Engineer
3/24/2023
P.E. SEAL/SIGNATURE/DATE

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

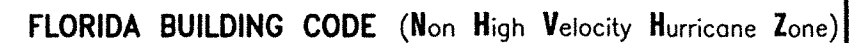
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126

SHEET
21 OF 28

② HV BLADE

SEE END WALL CONNECTION
DETAILS ON SHEET 24



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: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			DRAWING No 23-126
3			
4			
5			SHEET 23 OF 28
6			

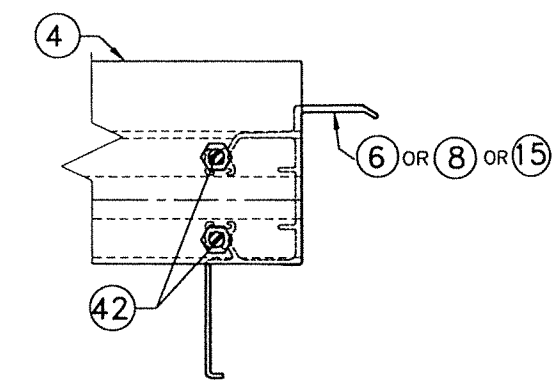
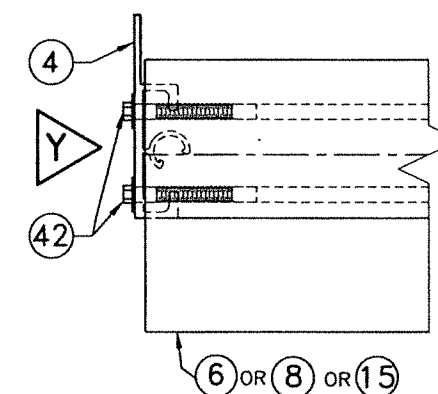
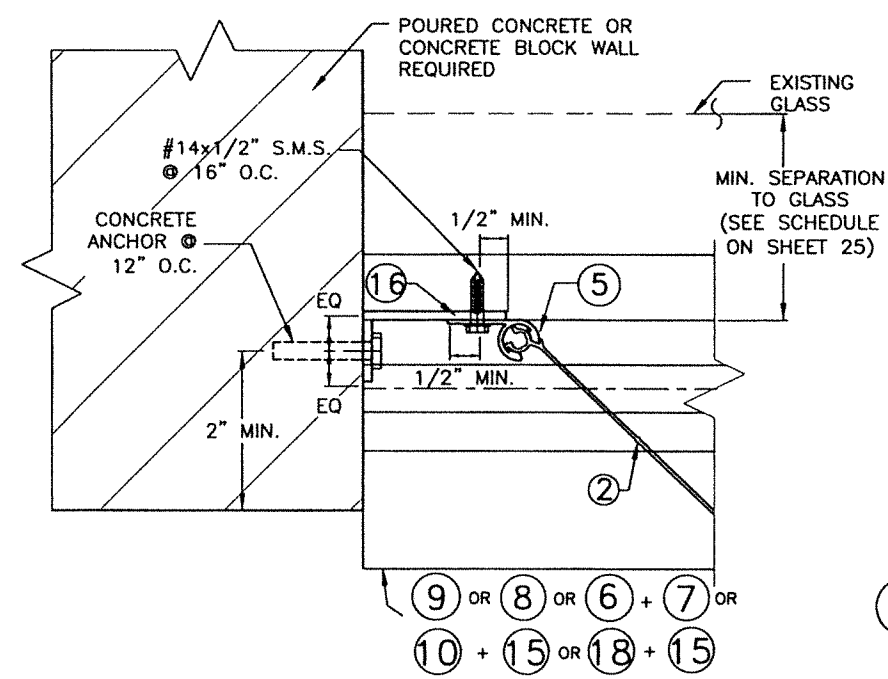
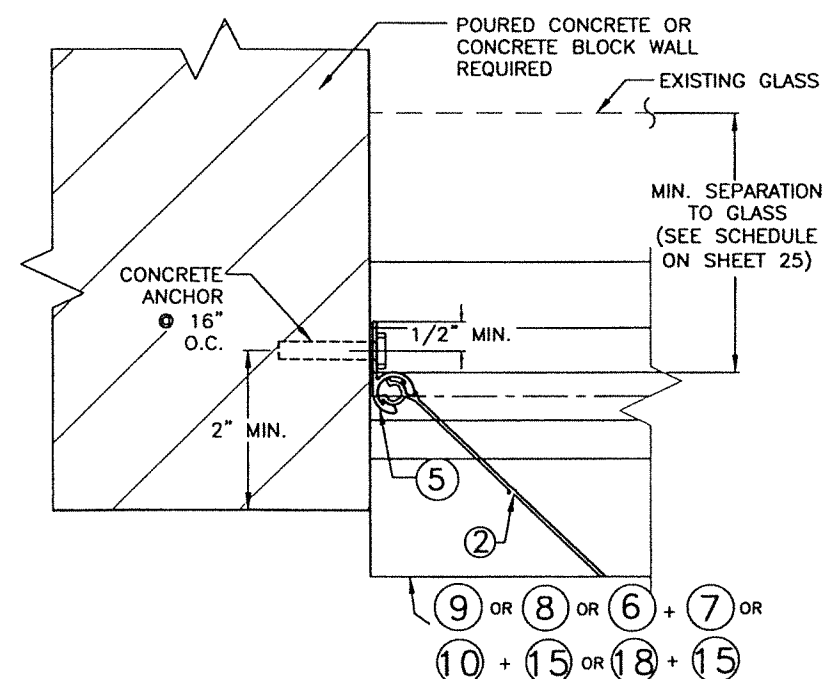
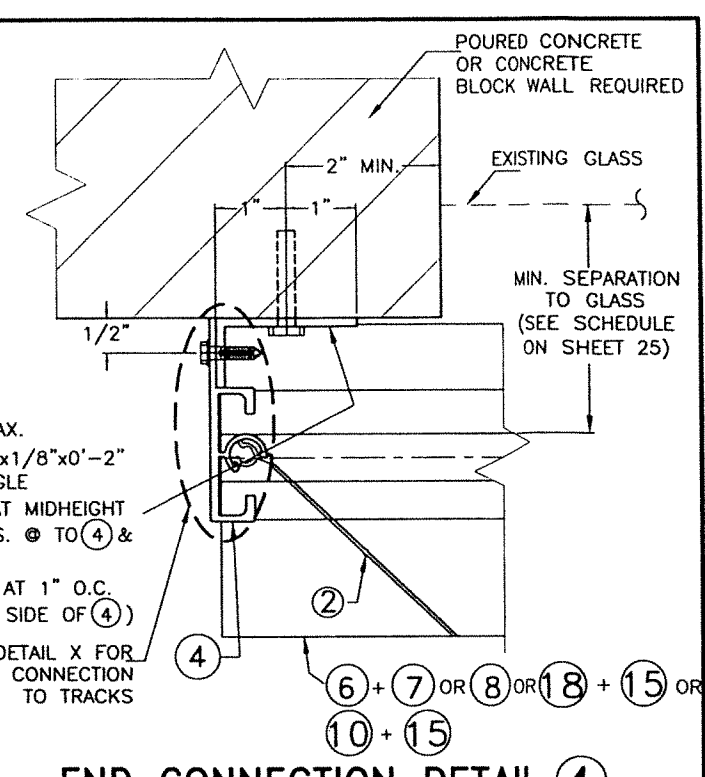
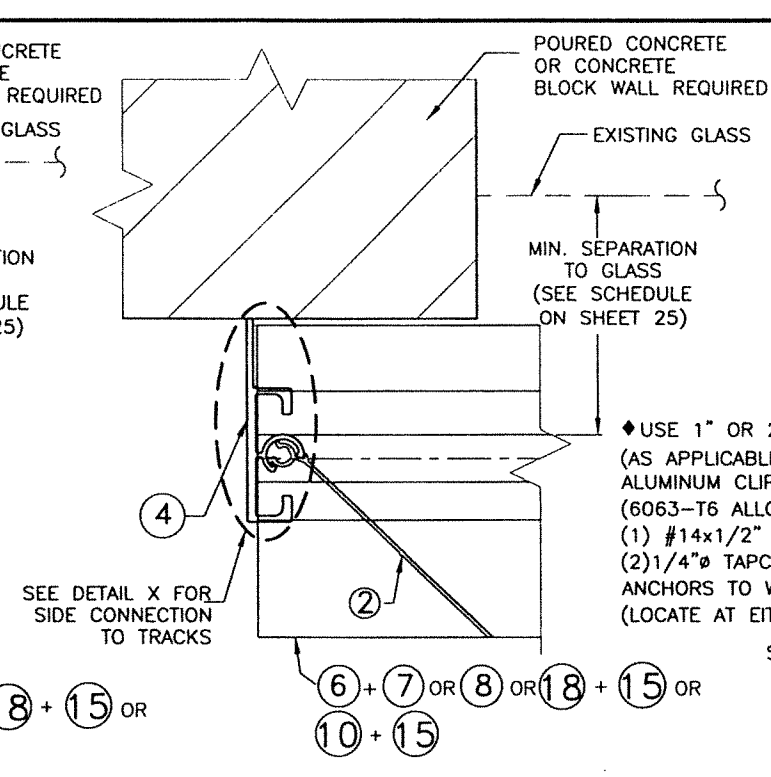
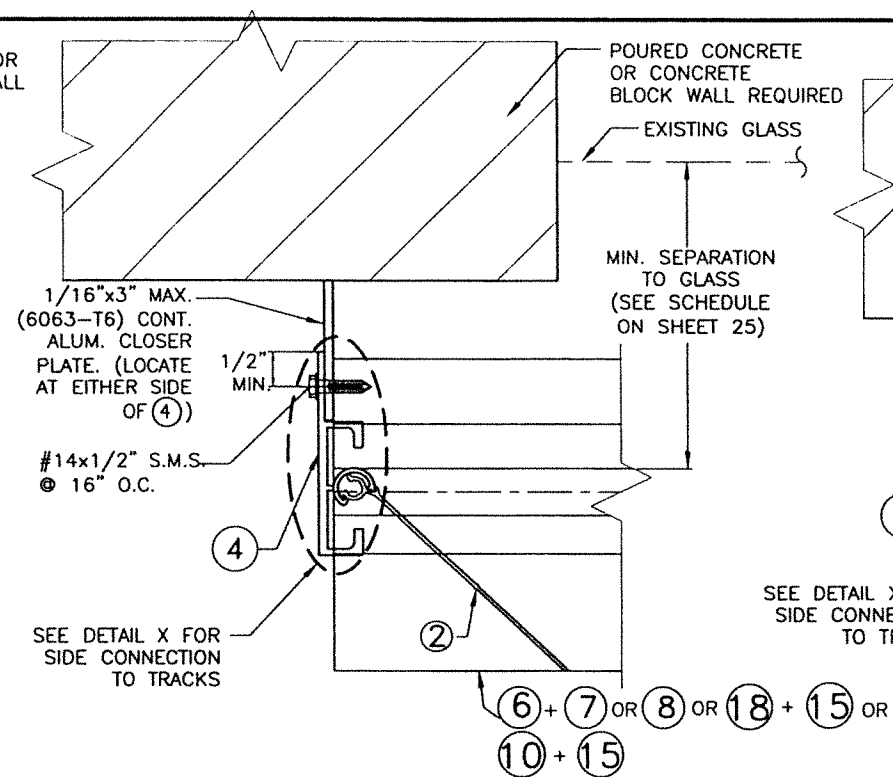
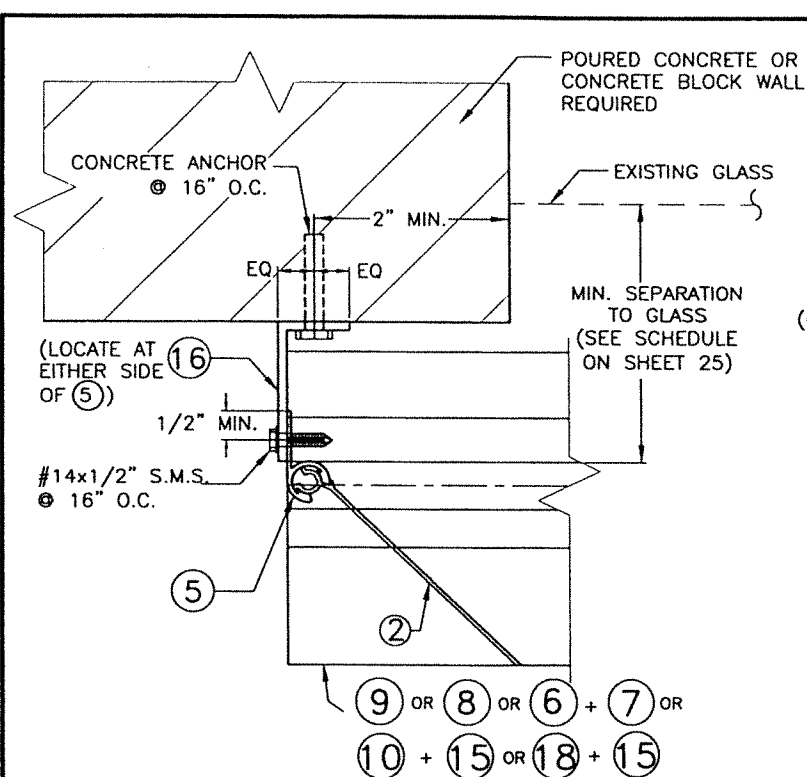


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FLORIDA Lic. # 44167

A.S.S.A.

**American Shutter Systems
Association, Inc.**
4268 Westroads Drive
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DETAIL X

END INSTALLATION
② HV BLADE INTO CONCRETE OR
CONCRETE BLOCK WALL.

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: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			DRAWING No 23-126
3			
4			
5			SHEET 24 OF 28
6			

WALTER A. TILLER, JR.
LICENSE
No. 44167
STATE OF FLORIDA
7/24/2023
PROFESSIONAL ENGINEER

P.E. SEAL/SIGNATURE/DATE

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4268 Westroads Drive
West Palm Beach, FL 33407

		SHEET
		24 OF 28

MAXIMUM SHUTTER SPAN*
"L+" OR "L-" (ft.)
INSTALLATIONS W/ SYMMETRICAL
HD CENTERMATES. ③1 OR ③2 ,
W/ ONE H.D. ③4 LOCK & NO
LOCKING RODS ③5 ♦

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

WIND ZONE
ASTM E-1996

MINIMUM
SEPARATION
TO GLASS

1 THRU 3

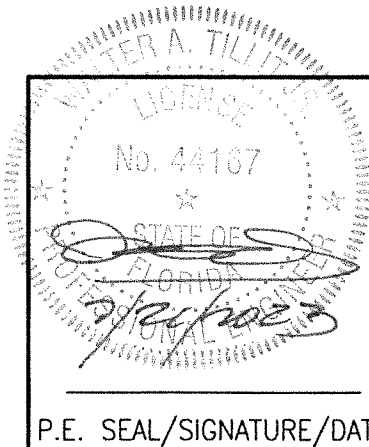
1"

4

3"

② HV BLADE

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

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126

SHEET
25 OF 28

ANCHORS SPACING LEGEND

1/4"Ø TAPCON
5/16"Ø 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"Ø TAPCON ANCHORS, AS MANUFACTURED BY I.T.W. BUILDDEX.
MINIMUM EMBEDMENT INTO POURED CONCRETE OF TAPCON IS 1 3/4".

A.2) TO EXISTING POURED CONCRETE: (Min. f'c = 2899 psi)
— 5/16"Ø TAPCON XL ANCHORS, AS MANUFACTURED BY I.T.W. BUILDDEX.
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.

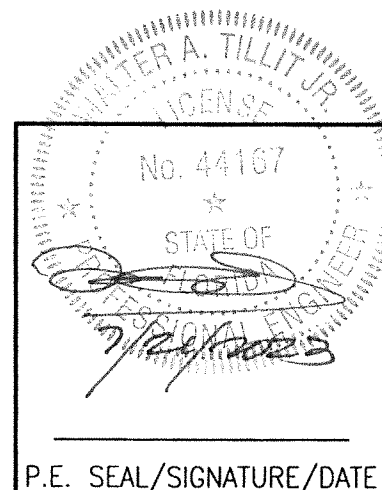
(C) SEE BELOW FOR MINIMUM REQUIRED EDGE DISTANCE FOR ANCHORS.

MINIMUM REQUIRED EDGE DISTANCE FOR ANCHORS

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

② HV BLADE ONLY

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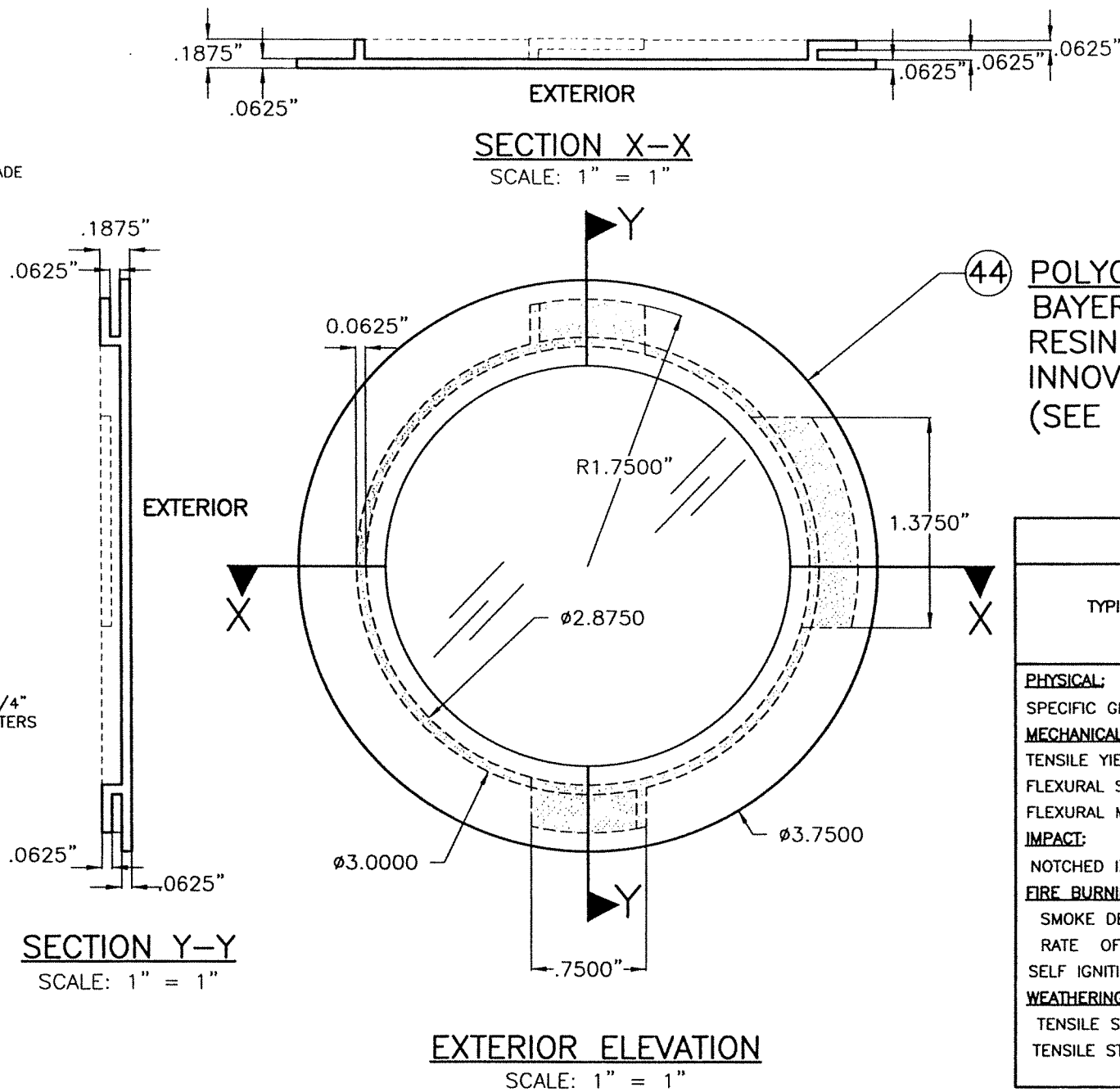
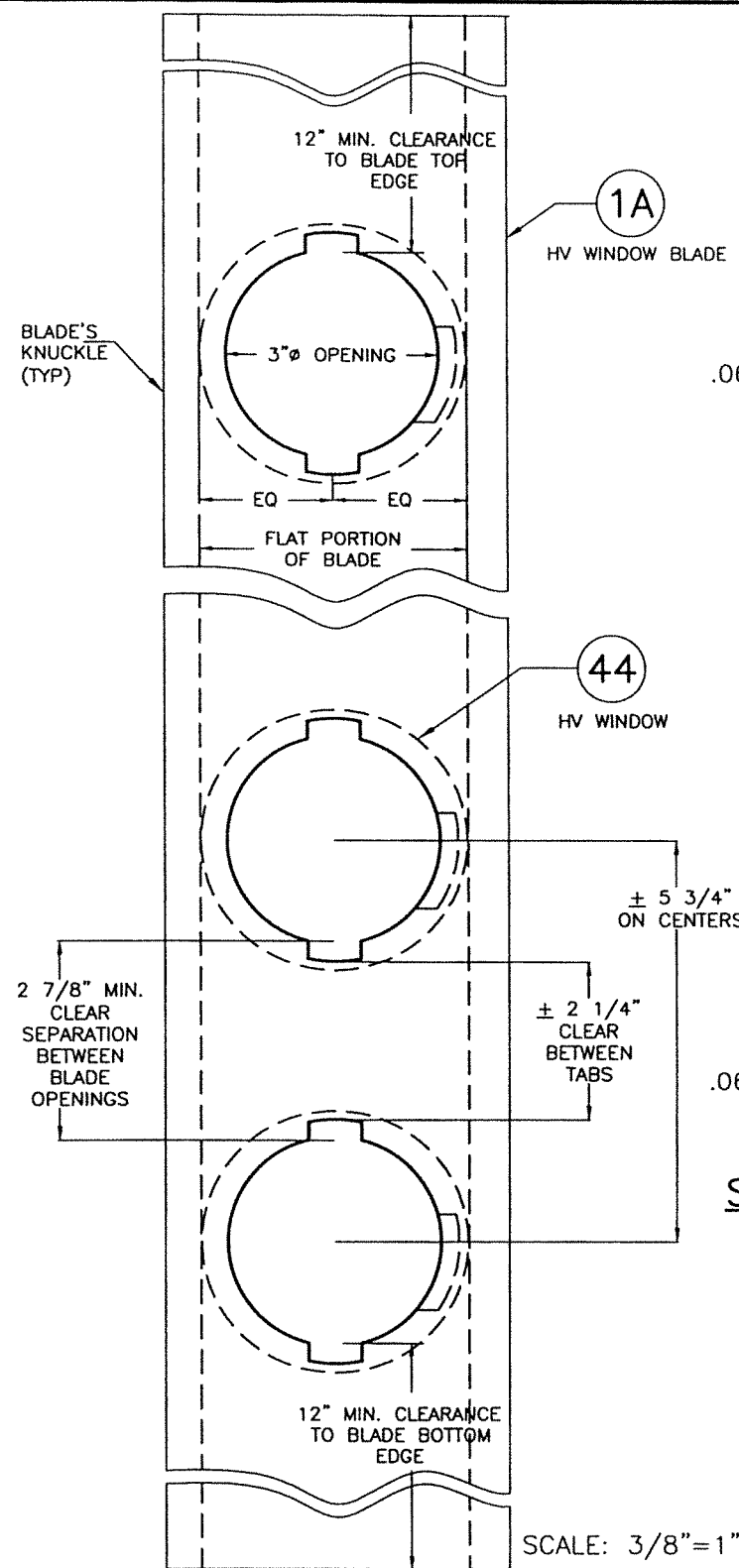
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BERTHA HV™
Accordion Shutter System
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-163	7/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-126

SHEET
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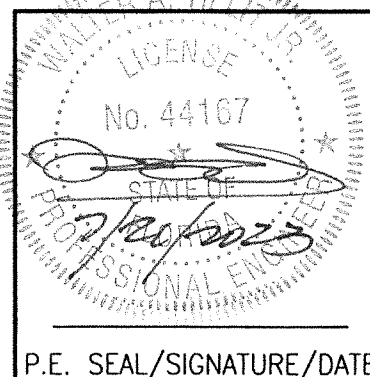


44 POLYCARBONATE IMPACT RESISTANT HV WINDOW
 BAYER MAKROLON 3103 POLYCARBONATE
 RESINS, UV-STABILIZED GRADE OR SABIC
 INNOVATIVE PLASTIC LEXAN 103 RESIN
 (SEE NOTE "F" ON SHEET 28).

POLYCARBONATE SOURCES FOR 44			
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:	ASTM G155		
TENSILE STRENGTH AFTER WEATHERING	ASTM 638	9302 p.s.i.	8840 p.s.i.
TENSILE STRESS BEFORE WEATHERING	ASTM 638	8461 p.s.i.	8880 p.s.i.

TYPICAL HV WINDOW BLADE 1A AND POLYCARBONATE HV WINDOW DETAIL

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2			
3			
4			
5			
6			
			DRAWING No
			23-126
			SHEET
			27 OF 28

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"

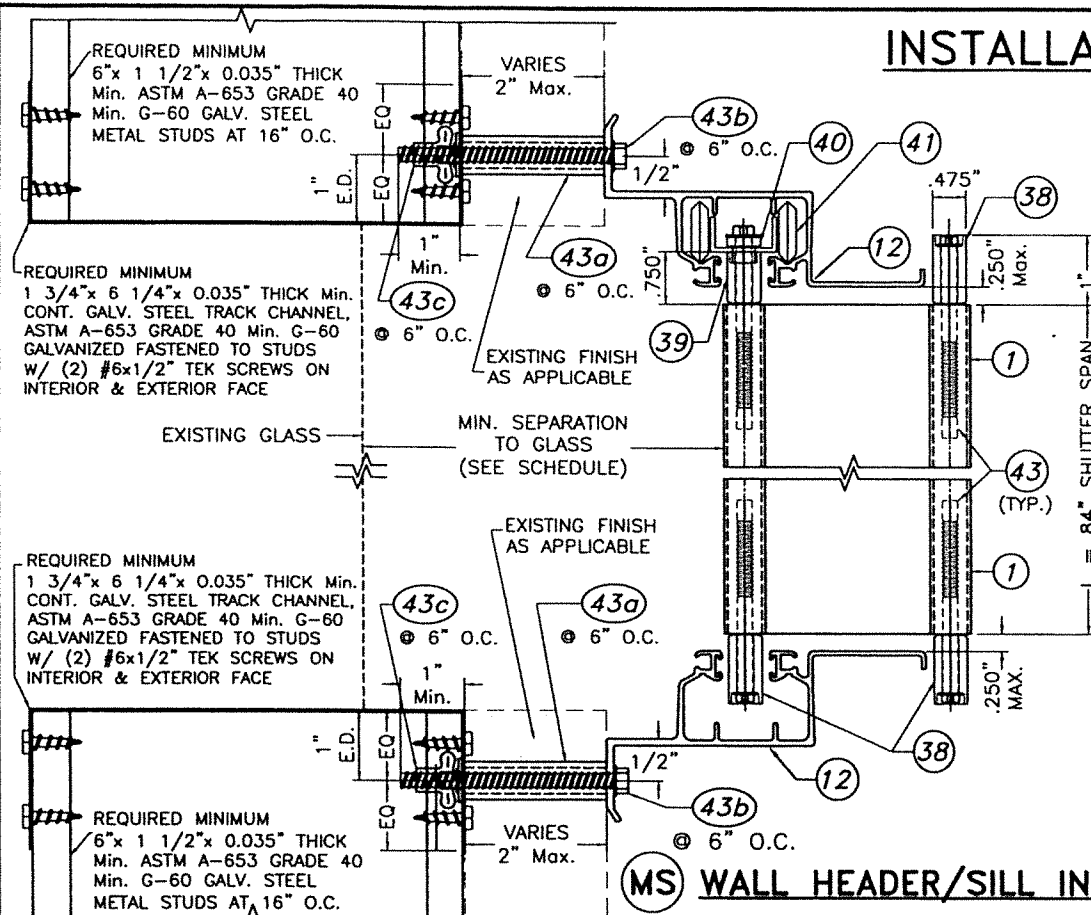
(43a) 1/4"Ø NOMINAL
ALUMINUM SLEEVE
6063-T5 ALLOY

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

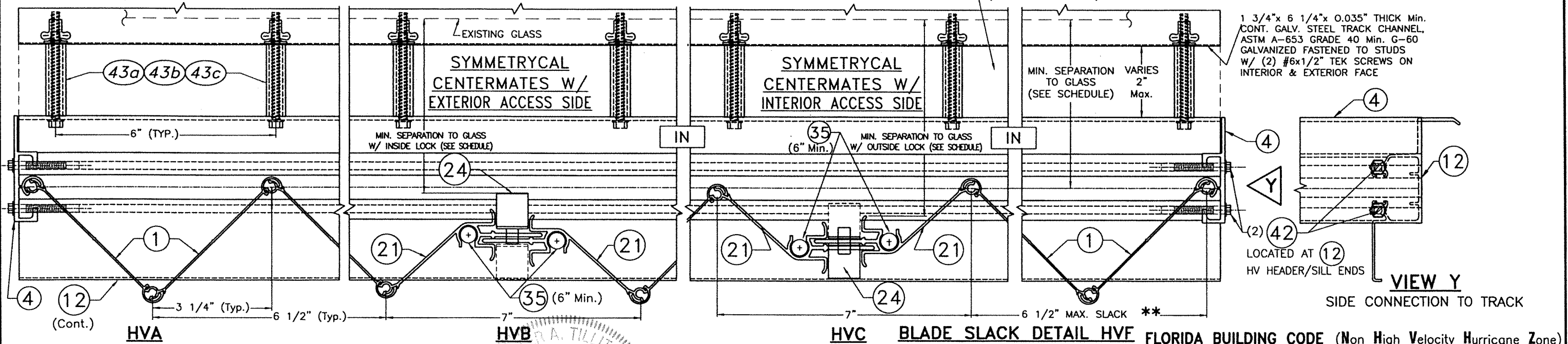
(43c) 1/4"Ø ELCO CONSTRUCTION
PRODUCTS FAB-LOK HD

COMPONENTS

SCALE: 3/8" = 1"



(MS) WALL HEADER/SILL INSTALLATION



P.E. SEAL/SIGNATURE/DATE

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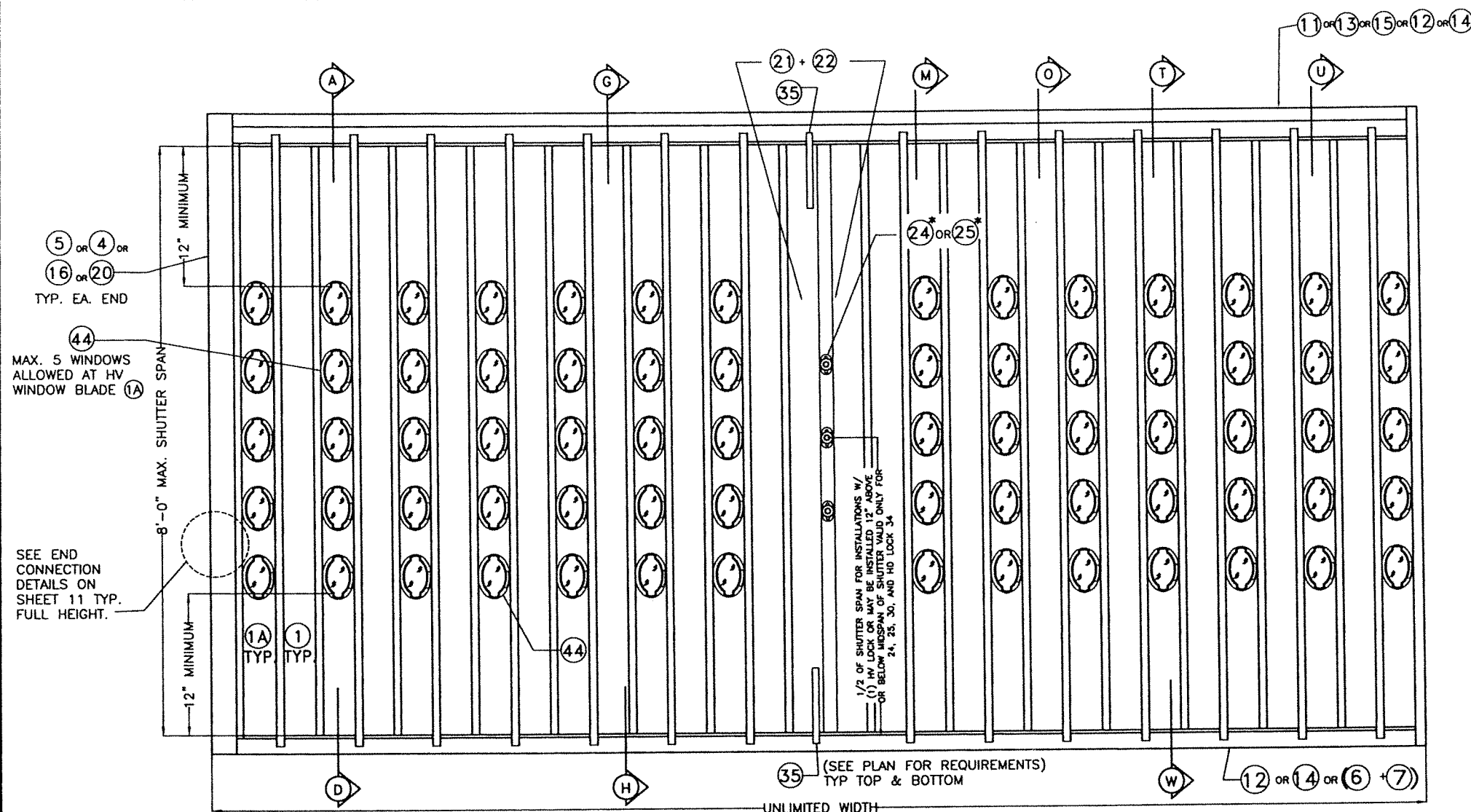
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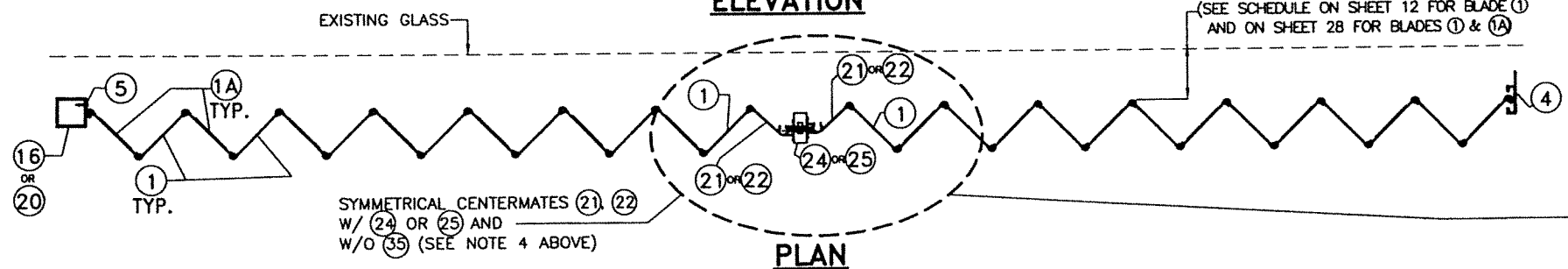
BERTHA HV™
Accordion Shutter System

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ELEVATION



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

N.T.S.

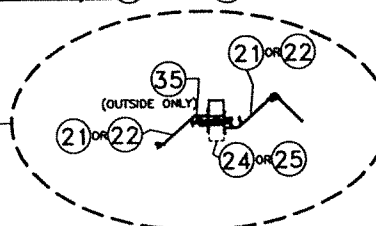
*** GENERAL LIMITATIONS AND CONDITIONS OF USE FOR BERTHA**

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 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" 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" 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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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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SHEET
28 OF 28

FLORIDA
Professional Engineer
No. 44167
WALTER A. TILLIT Jr. P.E.
P.E. SEAL/SIGNATURE/DATE

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