

GENERAL NOTES:

1. BERTHA H.V. ACCORDION SHUTTER SYSTEM WITH H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3 SHOWN ON THIS PRODUCT EVALUATION DOCUMENT (P.E.D.) HAS BEEN VERIFIED FOR COMPLIANCE IN ACCORDANCE WITH THE 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 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 7-22 AND SHALL NOT EXCEED THE MAXIMUM (A.S.D.) DESIGN PRESSURE RATINGS INDICATED ON SHEETS 5, 6, 7, 8 & 18.
- IN ORDER TO VERIFY THE ABOVE CONDITION, ULTIMATE DESIGN WIND LOADS DETERMINED PER ASCE 7-22 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 5, 6, 7, 8 & 18.
- IN ORDER TO VERIFY THAT ANCHORS ON THIS P.E.D., AS TESTED, WERE NOT OVER STRESSED, A 33 % INCREASE IN ALLOWABLE STRESS FOR WIND LOADS WAS ANALYSIS. A WIND LOAD DURATION FACTOR $C_D=1.60$ WAS USED FOR VERIFICATION OF FASTENERS SPACING IN WOOD, PER NDS 2018.
- BERTHA H.V. ACCORDION SHUTTER SYSTEM WITH H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3 ADEQUACY FOR WIND AND IMPACT LOADS HAS BEEN VERIFIED IN ACCORDANCE WITH SECTION 1626 OF THE ABOVE MENTIONED CODE AS PER AMERICAN TEST LAB OF SOUTH FLORIDA REPORTS:
- ① H.V. BLADE #3 #0403.01-08 WITH ADDENDUMS #3 & #3A, DATED 4/30/14, 0825.01-10 (WITH ADDENDUM #2, DATED 4/30/14), 1220.01-10, 1209.01-10 & 0422.02-14 , AS PER PROTOCOLS TAS-201, TAS 202 & TAS-203, LARGE MISSILE.
 - ① H.V. BLADE #3 WORKING IN UNISON WITH ①A H.V. WINDOW BLADE #3 #0829.01-08 WITH ADDEMDUM #2, DATED 4/30/14, AS PER PROTOCOLS TAS-201, TAS 202 & TAS-203, LARGE MISSILE.
 - ① H.V. BLADE #3 AND ①A H.V. WINDOW BLADE #3 ARE ENGINEERED TO WORK IN UNISON WITH EACH OTHER UNDER THE GENERAL LIMITATIONS AND CONDITIONS OF USE INDICATED ON SHEET 18.
2. BERTHA ACCORDION PINS ③③, ③④, ③⑤ OR ALTERNATE ③⑥, SHALL BE AS INDICATED ON SHEETS 3 & 4, USED AT BLADE'S KNUCKLE . ACCORDION PINS ③②, USED AT HV DIRECT MOUNT SHALL BE AS INDICATED ON SHEET 3. PINS SHALL BE 410-HT MINIMUM SERIES STAINLESS STEEL SCREWS WITH 173.6 KSI YIELD STRENGTH AND 187.4 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.
3. ALL ALUMINUM EXTRUSIONS SHALL BE ALUMINUM ASSOCIATION 6063-T6 ALLOY AND TEMPER, WITH $F_y = 27.1$ ksi MINIMUM (UNLESS OTHERWISE NOTED). ALL ALUMINUM EXTRUSIONS IN CONTACT WITH DISSIMILAR MATERIALS SHALL COMPLY WITH SECTION III-6 OF THE 2020 ALUMINUM DESIGN MANUAL.
4. ALL SCREWS TO BE STAINLESS STEEL 304 OR 316 AISI SERIES OR CORROSION RESISTANT COATED CARBON STEEL AS PER DIN 50018 50 ksi YIELD STRENGTH AND 90 ksi TENSILE STRENGTH & SHALL COMPLY W/ FLORIDA BUILDING CODE SECTION 2411.3.3.4.
5. BOLTS TO BE ASTM A-307 GALVANIZED STEEL, OR AISI 304 SERIES STAINLESS STEEL WITH 35 ksi MINIMUM YIELD STRENGTH.
6. SEE SHEETS 6 & 8 FOR ANCHORS SPECIFICATIONS ON DIFFERENT SUBSTRATES.
7. THIS BERTHA H.V. ACCORDION SHUTTER SYSTEM BEARS A U.S. PATENT #6779582. COMPONENTS OF THIS APPROVAL ARE COVERED, IN WHOLE OR IN PART BY U.S. PATENT #5458179 ISSUED TO EASTERN METAL SUPPLY, INC.
8. 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.
9. 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 ALLCENTERMATES AND ENGAGE OR LOCK ALL LOCKS'
10. 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.
11. BERTHA H.V. ACCORDION SHUTTER SYSTEM WITH H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3 INSTALLATION SHALL COMPLY WITH SPECS INDICATED IN THIS DRAWING PLUS ANY BUILDING AND ZONING REGULATIONS PROVIDED BY THE JURISDICTION WHERE PERMIT IS APPLIED TO.
12. (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.

TABLE OF CONTENTS

AREA 1: HV BLADES ① & ①A

GENERAL NOTES.		SHEET 1
SYSTEM COMPONENTS.	1-21	SHEET 2
SYSTEM COMPONENTS.	22-36	SHEET 3
TYPICAL SHUTTER ASSEMBLY.		SHEET 3A

AREA 2: HV BLADE ① AND HV WINDOW BLADE ①A (WHERE APPLICABLE)

TYPICAL SHUTTER ELEVATION & NOTES ON LOCKS.	SHEET 4
MAXIMUM SPAN TABLES.	SHEET 5
ANCHOR SCHEDULE- CONCRETE	SHEET 6
ANCHOR SCHEDULE- CONCRETE & BLOCK.	SHEET 7
ANCHOR SCHEDULE- WOOD	SHEET 8
INSTALLATION DETAILS 1-6 -CONCRETE & BLOCK	SHEET 9
INSTALLATION DETAILS 7-9 -CONCRETE & BLOCK	SHEET 10
INSTALLATION DETAILS 10 -METAL STUD	SHEET 10A
INST. DETAILS W/ HV CENTERMATES ⑬ & ⑭	SHEET 11
INST. DETAILS W/ HV "T" LOCK CENTERMATES ⑱ & ⑲	SHEET 12
INST. DETAILS W/ HD CENTERMATES ⑳, ㉑ & ㉒	SHEET 12
END CONNECTION DETAILS 1-6-CONCRETE & BLOCK	SHEET 13
INSTALLATION DETAILS 1W-6W -WOOD	SHEET 14
INSTALLATION DETAILS 7W-10W -WOOD	SHEET 15
END CONNECTION DETAILS 1-6-WOOD	SHEET 16

AREA 3: HV WINDOW BLADE ①A ONLY

TYPICAL WINDOW BLADE & WINDOW DETAIL	SHEET 17
TYPICAL SHUTTER ELEVATION	SHEET 18

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

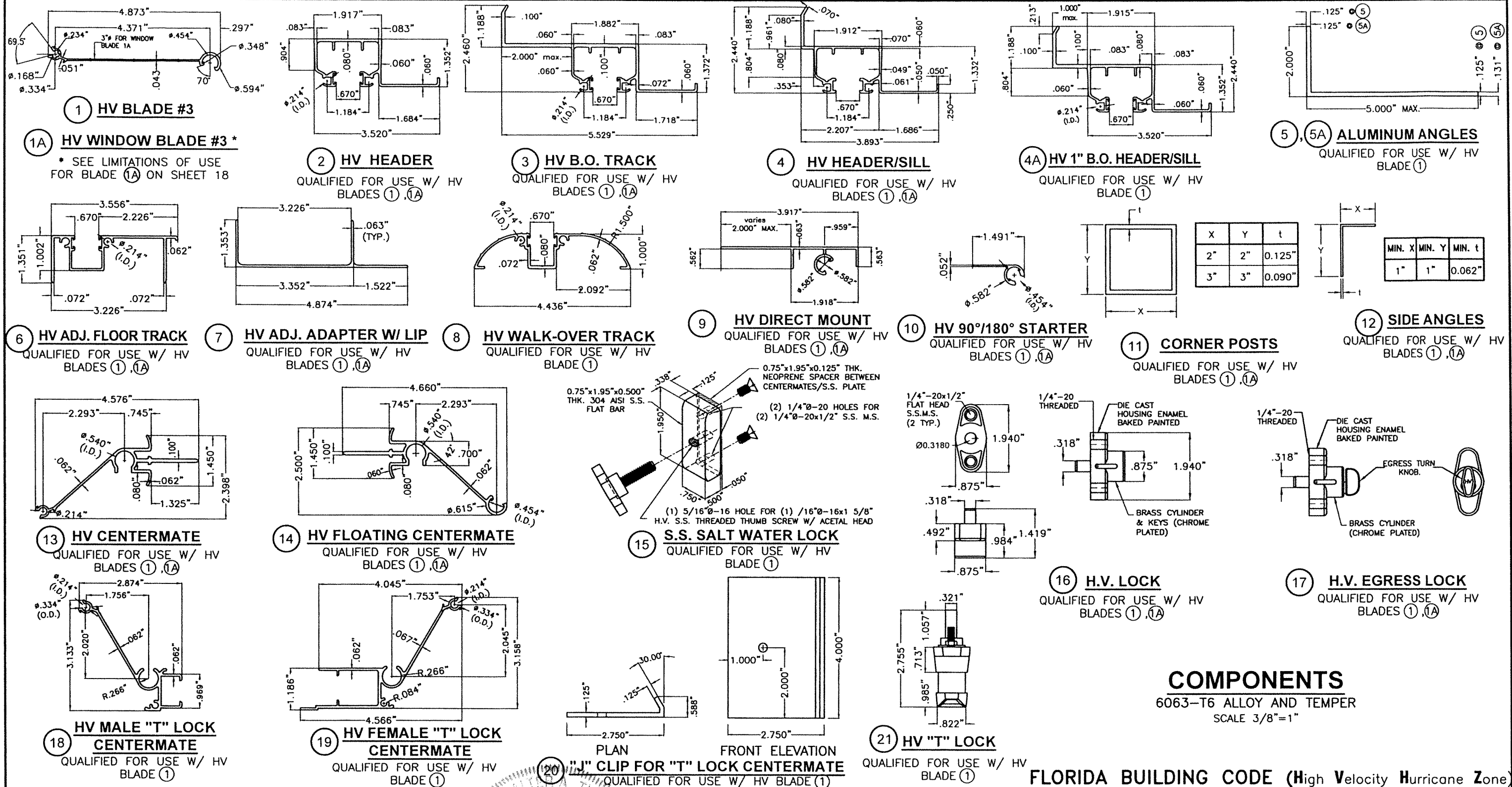
FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

No. 44167
STATE OF FLORIDA
7/26/2023
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Association, Inc.
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BERTHA HV™ Accordion Shutter System			
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			DRAWING No 23-129 SHEET 1 OF 18
3			
4			
5			
6			



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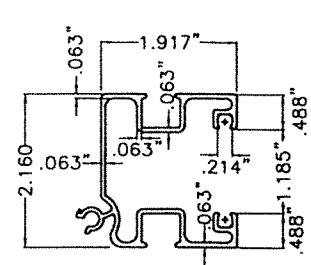
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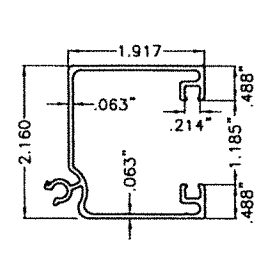
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Accordion Shutter System
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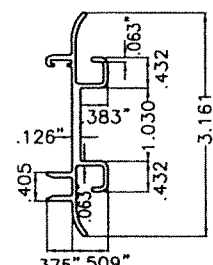
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3			23-129
4			SHEET
5			2 OF 18
6			



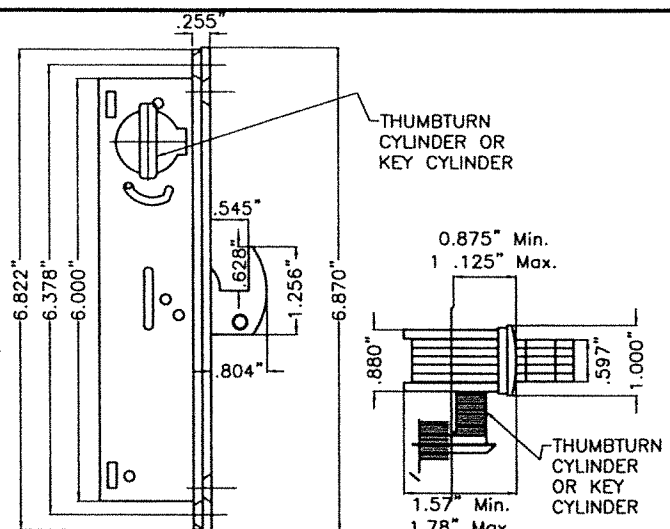
22 **HD CENTERMATE
W/ LOCKING ROD**
QUALIFIED FOR USE W/ HV
BLADE ①



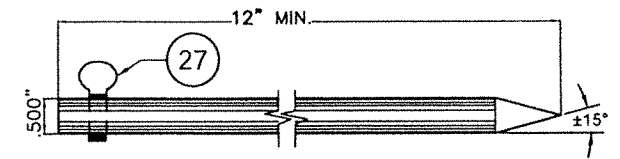
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W/ NO LOCKING ROD**
QUALIFIED FOR USE W/ HV
BLADE ①



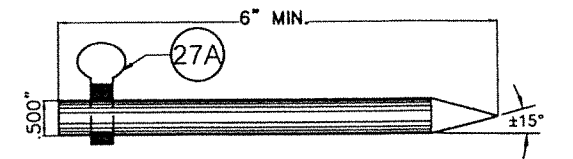
24 **HD CENTERMATE'S
INSERT**
QUALIFIED FOR USE W/ HV
BLADE ①



25 **HD LOCK**
QUALIFIED FOR USE W/ HV
BLADE ①

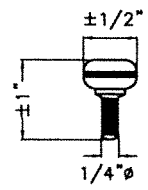


26 **12\"/>**

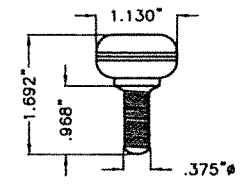


26A **6\"/>**

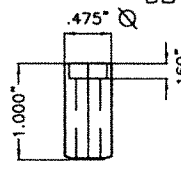
△ 26, 26A INSTALLATION WILL REQUIRE A
7/16\"/>



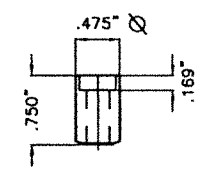
27 **HV 1/4\"/>**
QUALIFIED FOR USE W/ HV
BLADE ①



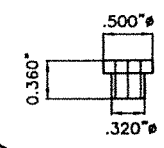
27A **HV 3/8\"/>**
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BLADE ①



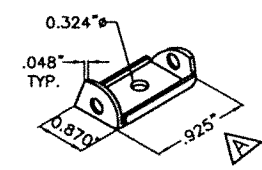
28 **HV LONG RECESSED
NYLON BUSHING**



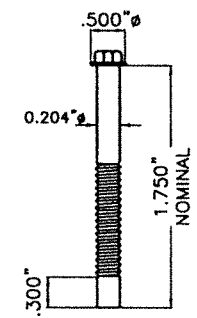
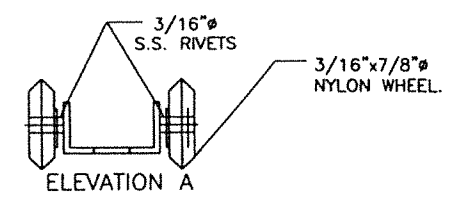
29 **HV SHORT RECESSED
NYLON BUSHING**



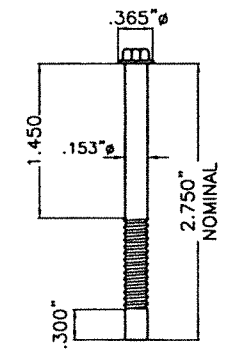
30 **HV NYLON HAT
WASHER**



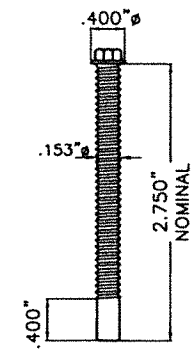
31 **HV WHEEL CARRIAGE**
AISI 302-303 SERIES



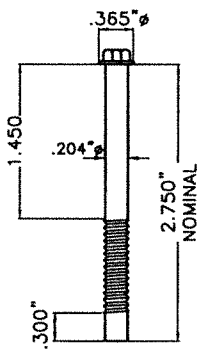
32 **HV DIRECT
MOUNT PIN**
#14-14x1 3/4\"/>



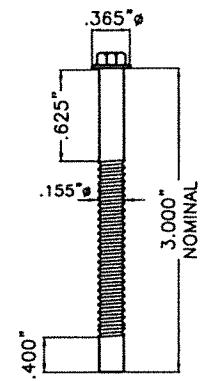
33 **HV PIN @ BLADE**
#10-18\"/>



34 **HV PIN @ (31)**
#10-18\"/>



35 **HV PIN @ MALE KNUCKLE
@ (13), (18), (19), (22), (23).**
#14-14\"/>



36 **ALTERNATE PIN
@ BLADE & @ (31).**
#10-18\"/>

**COMPONENTS
(CONTINUED)**
N.T.S

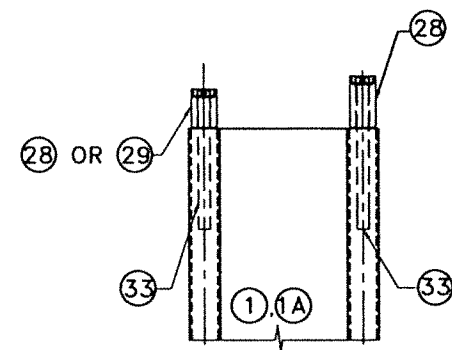
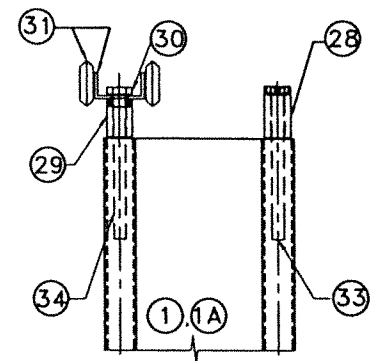
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WALTER A. TILLIT JR.
LICENSE
No. 44167
STATE OF
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PROFESSIONAL ENGINEER
7/21/2023
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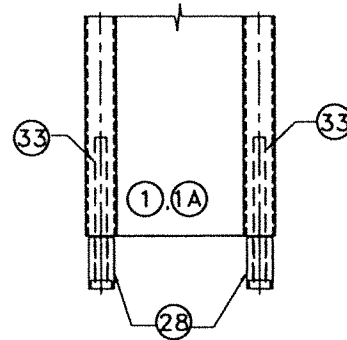
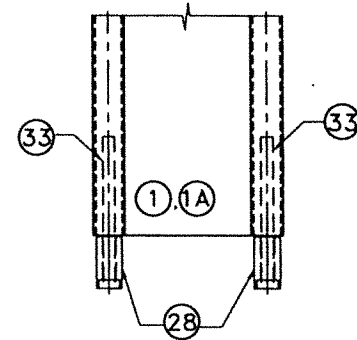
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1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			DRAWING No 23-129
3			
4			SHEET 3 OF 18
5			
6			



EXTERIOR

EXTERIOR



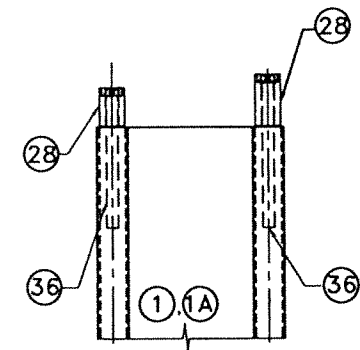
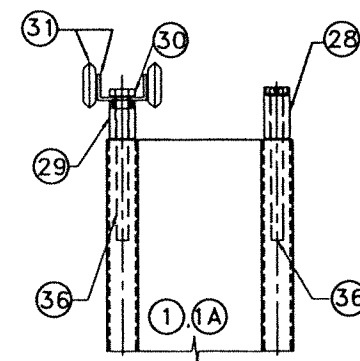
ASSEMBLY AT (31).

((31) GO EVERY OTHER INTERIOR KNUCKLE)

ASSEMBLY IN BETWEEN (31).

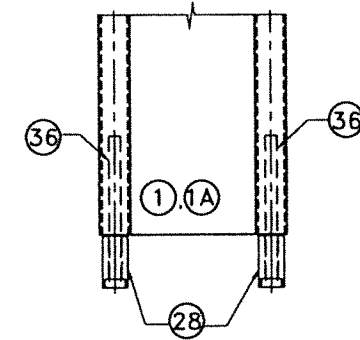
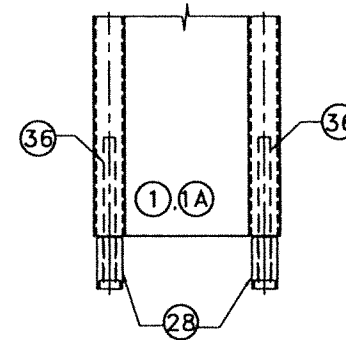
TYPICAL SHUTTER ASSEMBLY WHEN 2³/₄" LONG NOMINAL PINS ARE USED *

SCALE: 1/4" = 1"



EXTERIOR

EXTERIOR



ASSEMBLY AT (31).

((31) GO EVERY OTHER INTERIOR KNUCKLE)

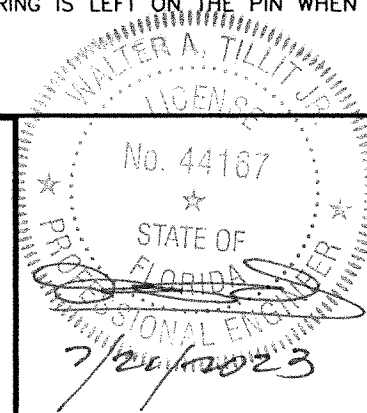
ASSEMBLY IN BETWEEN (31).

TYPICAL SHUTTER ASSEMBLY WHEN 3" LONG NOMINAL PINS ARE USED

SCALE: 1/4" = 1"

*THE HV PINS & BUSHINGS ARE PRE-ASSEMBLED. TO KEEP BUSHINGS ON THE PIN A NOMINAL 0.275" O.D. x 0.130" I.D. x 0.072" THK. RUBBER RING IS PLACED OVER THE END OF THE SCREW, THE RING IS LEFT ON THE PIN WHEN INSTALLED INTO THE KNUCKLE'S SCREW BOSS.

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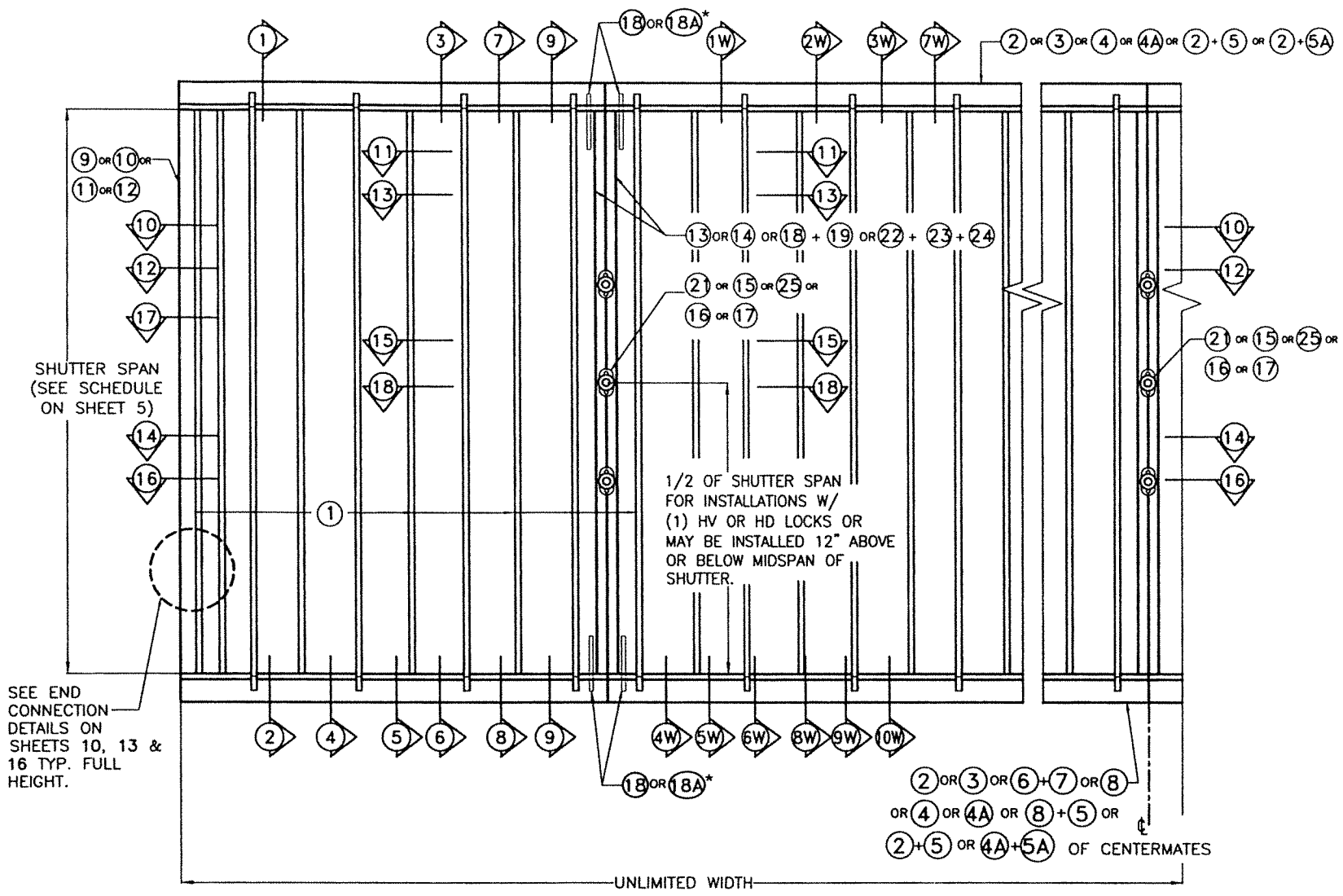
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H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

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1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-129
SHEET
3A OF 18



TYPICAL ① H.V. BLADE #3 SHUTTER ELEVATION
N.T.S.

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

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

* APPLICATION W/ HV LOCKS AND CENTERMATES:

- MANDATORY CONDITION #1:** ONE HV LOCK ⑮ or ⑯ or ⑰ SHALL BE USED AT 1/2 OF SHUTTER SPAN FOR ANY SPAN OR 12" ABOVE OR BELOW 1/2 OF SHUTTER SPAN FOR SPANS UP TO 156", AND FOR INSTALLATIONS AT ANY ELEVATION EXCEPT FOR INSTALLATIONS INTO METAL STUDS. HV LOCK ⑮ or ⑯ or ⑰ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK, ATTACHED TO ⑬ or ⑭ CENTERMATES W/ (2) 1/4"-20 x 1/2" LONG FLAT HEAD S.S. M.S. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION. USE OF LOCKING RODS ⑳ W/ ㉑ AND ㉒ IS COMPLETELY OPTIONAL.
- MANDATORY CONDITION #2 FOR INSTALLATIONS INTO METAL STUDS:** ONE HV LOCK ⑮ or ⑯ or ⑰ SHALL BE USED AT 1/2 OF SHUTTER SPAN FOR ANY SPAN OR 12" ABOVE OR BELOW 1/2 OF SHUTTER SPAN FOR SPANS UP TO 156", AND FOR INSTALLATIONS AT ANY ELEVATION EXCEPT FOR INSTALLATIONS INTO METAL STUD. HV LOCK ⑮ or ⑯ or ⑰ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK, ATTACHED TO ⑬ or ⑭ CENTERMATES W/ (2) 1/4"-20 x 1/2" LONG FLAT HEAD S.S. M.S. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION. USE OF LOCKING RODS ㉒ W/ ㉑ OR ㉒ TOP AND BOTTOM IS COMPLETELY MANDATORY.
- MANDATORY CONDITION #3 FOR KEYSTONE MOUNTING INSTALLATIONS:** ONE HV LOCK ⑮ or ⑯ or ⑰ SHALL BE USED AT 1/2 OF SHUTTER SPAN FOR ANY SPAN OR 12" ABOVE OR BELOW 1/2 OF SHUTTER SPAN FOR SPANS UP TO 96", AND FOR INSTALLATIONS AT ANY ELEVATION. HV LOCK ⑮ or ⑯ or ⑰ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK, ATTACHED TO ⑬ or ⑭ SYMMETRICAL CENTERMATES W/ (2) 1/4"-20 x 1/2" LONG FLAT HEAD S.S. M.S. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION. USE OF LOCKING RODS ㉒ W/ ㉑ OR ㉒ TOP AND BOTTOM IS COMPLETELY MANDATORY.
- OPTIONAL CONDITION #1:** IF DESIRED, FOR BETTER PERFORMANCE OR FOR SECURITY PURPOSES, UP TO TWO HV LOCKS ⑮, ⑰ OR ⑱ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. CONNECTION OF LOCKS TO CENTERMATES ⑬ OR ⑭ SHALL BE AS INDICATED ON NOTE (1) ABOVE. LOCATION OF LOCKS SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION.

* APPLICATION W/ HV "T" LOCKS AND CENTERMATES:

- SECOND ALTERNATE TO MANDATORY CONDITION #1 VALID ONLY FOR HV "T" LOCK ㉑, AND CENTERMATES ⑬ AND ⑭:** ONE ALTERNATE HV "T" LOCK ㉑ MAY BE INSTALLED IN LIEU OF OTHER LOCKS FOR ANY SPAN AND INSTALLATION AT ANY ELEVATION. ALTERNATE LOCK ㉑ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. ATTACHMENT OF LOCK ㉑ INCLUDES USING "J" CLIP ㉒, AS SHOWN ON SECTION 15, SHEET 12, WHICH MUST BE CONNECTED TO CENTERMATES ⑬ AND ⑭ W/ 1/4" ϕ -20x1" S.S.M.S. INTO A 1/4" ϕ x 5/8" RIVNUT. LOCK MAY BE INSTALLED AT MIDSPAN OR 12" MAXIMUM ABOVE AND BELOW MIDSPAN. USE OF TWO LOCKING RODS ㉒ OR ㉒ TOP AND BOTTOM IS MANDATORY.

* APPLICATION W/ HD LOCKS & CENTERMATES:

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

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

WALTER A. TILLIT JR.
No. 44167
STATE OF FLORIDA
Professional Engineer
7/24/2023
P.E. SEAL/SIGNATURE/DATE

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

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BERTHA HV™ Accordion Shutter System			
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			DRAWING No 23-129
3			
4			
5			SHEET
6			4 OF 18

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

MAXIMUM A.S.D. PRESSURE RATING (psf) (+ or -)	POURED CONCRETE, CONCRETE BLOCK ↑ AND WOOD INSTALLATIONS ♣					
	WALL MOUNTING		FLOOR / CEILING MOUNTING		MIN. SEPARATION TO GLASS	
	L ⁺ (FT)	L ⁻ (FT)	L ⁺ (FT)	L ⁻ (FT)	KNUCKLE	LOCK/ CENTERMATE
35	12' - 7"	13' - 0"	12' - 7"	13' - 0"	4"	4 3/8"
40	11' - 10"	12' - 3"	11' - 10"	12' - 3"	4"	4 3/8"
45	11' - 9"	11' - 11"	11' - 9"	11' - 11"	4"	4 3/8"
50	11' - 5"	11' - 6"	11' - 5"	11' - 6"	4"	4 3/8"
55	11' - 4"	11' - 4"	11' - 4"	11' - 4"	4"	4 3/8"
60	10' - 6"	10' - 6"	10' - 6"	10' - 6"	4"	4 3/8"
65	8' - 8"	8' - 8"	8' - 8"	8' - 8"	4"	4 3/8"
70	8' - 3"	8' - 3"	8' - 3"	8' - 3"	3 1/8"	4 1/8"
75	7' - 9"	7' - 9"	7' - 9"	7' - 9"	3 1/8"	4 1/8"
80	7' - 3"	7' - 3"	7' - 3"	7' - 3"	3 1/8"	4 1/8"
85	6' - 10"	6' - 10"	6' - 10"	6' - 10"	3 1/8"	4 1/8"
90	5' - 7"	5' - 7"	5' - 7"	5' - 7"	3 1/8"	4 1/8"
95	5' - 6"	5' - 6"	5' - 6"	5' - 6"	3 1/8"	4 1/8"
100	5' - 5"	5' - 5"	5' - 5"	5' - 5"	3 1/8"	4 1/8"
105	5' - 3"	5' - 3"	5' - 3"	5' - 3"	3 1/8"	4 1/8"
110	5' - 2"	5' - 2"	5' - 2"	5' - 2"	3 1/8"	2 3/4"

↑ 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 7'-6" SPAN, SEE SECTION 9 ON SHEET 10.

♣ EXCEPT THAT MAXIMUM SHUTTER SPAN "L+" OR "L-" AND MAXIMUM A.S.D. DESIGN PRESSURE RATING FOR INSTALLATIONS INTO WOOD SHALL BE LIMITED AS FOLLOWS:
1- CONNECTIONS TO PLYWOOD LIMITED TO ±62 p.s.f. AND 8'-11" SPAN, SEE SECTION 5W ON SHEET 14.
2- CONNECTIONS TO HOLLOW CEILING LIMITED TO ±62 p.s.f. AND 8'-0" SPAN, SEE SECTION 2W ON SHEET 14.

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

MAXIMUM A.S.D. PRESSURE RATING (psf) (+ or -)	FOR METAL STUD INSTALLATIONS ■					
	WALL MOUNTING		FLOOR / CEILING MOUNTING		MIN. SEPARATION TO GLASS	
	L ⁺ (FT)	L ⁻ (FT)	L ⁺ (FT)	L ⁻ (FT)	KNUCKLE	LOCK/ CENTERMATE
64	7' - 0"	7' - 0"	-	-	2 3/4"	4 1/8"
72	6' - 7"	6' - 7"	-	-	2 3/4"	4 1/8"

■ SEE SECTION ⑩ ON SHEET 10A.

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

MAXIMUM A.S.D. PRESSURE RATING (psf) (+ or -)	POURED CONCRETE, CONCRETE BLOCK AND WOOD INSTALLATIONS					
	WALL MOUNTING		FLOOR / CEILING MOUNTING		MIN. SEPARATION TO GLASS	
	L ⁺ (FT)	L ⁻ (FT)	L ⁺ (FT)	L ⁻ (FT)	KNUCKLE	LOCK/ CENTERMATE
55	9' - 6"	9' - 6"	9' - 6"	9' - 6"	3 1/2"	3 3/8"
62	8' - 11"	8' - 11"	8' - 11"	8' - 11"	3 1/2"	3 3/8"

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

* NOTES:

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

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

FINAL MAXIMUM ALLOWABLE SPAN IS EQUAL TO THE MINIMUM DETERMINED SPAN BETWEEN "L+" AND "L-".
- (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 ON SHEETS 6 & 7 FOR CONCRETE AND BLOCK, SHEET 8 FOR WOOD AND TO SECTION ON SHEET 10 FOR KEYSTONE MOUNTINGS AND SHEET 10A FOR METAL STUDS WITH FINAL MAXIMUM ALLOWABLE SPAN AND NEGATIVE A.S.D. DESIGN PRESSURE RATING TO DETERMINE MAXIMUM ANCHOR SPACING.
- (5) MINIMUM SEPARATION TO GLASS SHALL BE THE GREATEST MEASURED FROM EITHER REAR OF KNUCKLES OR REAR OF LOCKS/CENTERMATES (AS APPLICABLE) TO GLASS.

Δ INSTALLATION LEGEND APPLICABLE FOR ① HV AND ①A HV BLADES

SUBSTRATES MOUNTINGS	CONCRETE & MASONRY	METAL STUD	WOOD
WALL	1, 2, 3, 4, 5 & 9	10	1W, 3W, 4W 7W, 9W & 10W
FLOOR/CEILING	6, 7 & 8	---	2W, 3W, 6W & 8W

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

WALTER A. TILLIT JR.
LICENSE
No. 44167
STATE OF
FLORIDA
PROFESSIONAL ENGINEER
7/26/2023
P.E. SEAL/SIGNATURE/DATE

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

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

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-129
SHEET
5 OF 18

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

MAXIMUM SPAN (ft)	POURED CONCRETE																													
	① & ② WALL MOUNTINGS W/ ③ , ④ OR ④A										③ & ④ WALL MOUNTING W/ ② + ⑤										⑤ WALL SILL MOUNTING W/ ⑧ + ⑤									
	A.S.D. DESIGN NEGATIVE LOAD (psf)										A.S.D. DESIGN NEGATIVE LOAD (psf)										A.S.D. DESIGN NEGATIVE LOAD (psf)									
	30	40	50	60	70	80	90	100	110	30	40	50	60	70	80	90	100	110	30	40	50	60	70	80	90	100	110			
3'-0" OR LESS	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9			
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
4'-0"	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	9	9	9	9	9	9	8	6	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
5'-0"	9	9	9	9	9	9	9	7.5	6	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	9	9	9	9	8	5.5	4.5	3.5	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
	9	9	9	9	9	9	8.5	7	5.5	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
6'-0"	9	9	9	9	9	8.5	6.5	5	-	9	9	9	9	9	9	9	9	-	9	9	9	9	9	9	9	-				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	9	9	9	6.5	4.5	4	3	-	9	9	9	9	9	9	9	9	-	9	9	9	9	9	9	9	-				
	9	9	9	9	9	7.5	5.5	4.5	-	9	9	9	9	9	9	9	9	-	9	9	9	9	9	9	9	-				
7'-0"	9	9	9	9	8	6	4.5	-	-	9	9	9	9	9	9	9	-	-	9	9	9	9	9	9	-	-				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	9	9	6.5	4.5	3.5	3.5	-	-	9	9	9	9	9	9	9	-	-	9	9	9	9	9	9	-	-				
	9	9	9	9	7	5.5	4	-	-	9	9	9	9	9	9	9	-	-	9	9	9	9	9	9	-	-				
8'-0"	9	9	9	8.5	6	4.5	-	-	-	9	9	9	9	9	9	-	-	-	9	9	9	9	9	9	-	-				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	9	8	4.5	3.5	-	-	-	-	9	9	9	9	9	9	-	-	-	9	9	9	9	9	9	-	-				
	9	9	9	7.5	5.5	4	-	-	-	9	9	9	9	9	9	-	-	-	9	9	9	9	9	9	-	-				
9'-0"	9	9	9	6.5	4.5	-	-	-	-	9	9	9	9	9	-	-	-	-	9	9	9	9	9	-	-	-				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	9	5.5	3.5	-	-	-	-	-	9	9	9	9	9	-	-	-	-	9	9	9	9	9	-	-	-				
	9	9	8.5	5.5	4	-	-	-	-	9	9	9	9	9	-	-	-	-	9	9	9	9	9	-	-	-				
10'-0"	9	9	7.5	5	4	-	-	-	-	9	9	9	9	9	-	-	-	-	9	9	9	9	9	-	-	-				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	8	4.5	3	-	-	-	-	-	9	9	9	9	9	-	-	-	-	9	9	9	9	9	-	-	-				
	9	9	7	4.5	-	-	-	-	-	9	9	9	9	9	-	-	-	-	9	9	9	9	9	-	-	-				
11'-0"	9	9	6	4.5	3.5	-	-	-	-	9	9	9	9	9	-	-	-	-	9	9	9	9	9	-	-	-				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	6	3.5	-	-	-	-	-	-	9	9	9	9	9	-	-	-	-	9	9	9	9	9	-	-	-				
	9	9	5.5	4	-	-	-	-	-	9	9	9	9	9	-	-	-	-	9	9	9	9	9	-	-	-				
12'-0"	9	8.5	5	3.5	-	-	-	-	-	9	9	9	9	-	-	-	-	-	9	9	9	9	-	-	-	-				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	9	4.5	3	-	-	-	-	-	-	9	9	9	9	-	-	-	-	-	9	9	9	9	-	-	-	-				
	9	7.5	4.5	-	-	-	-	-	-	9	9	9	9	-	-	-	-	-	9	9	9	9	-	-	-	-				
13'-0"	9	7	-	-	-	-	-	-	-	9	9	-	-	-	-	-	-	-	9	9	-	-	-	-	-	-				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	8.5	4	-	-	-	-	-	-	-	9	9	-	-	-	-	-	-	-	9	9	-	-	-	-	-	-				
	9	6	-	-	-	-	-	-	-	9	9	-	-	-	-	-	-	-	9	9	-	-	-	-	-	-				

ACTUAL EDGE DISTANCE E.D.	FACTOR					
	TAPCON WITH ADVANCED THREADFORM TECH.		ALL POINTS SOLID SET	BLUE TAP WITH CAP	TAPPER +	
	MIN. SPACING				MIN. SPACING	
	3"	4"	MIN. SPACING = 3 1/2"	MIN. SPACING = 3"	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 MIN. E.D. = 3 1/2"	CONCRETE BLOCK MIN. E.D. = 2 1/2"
3"	0.90	1.0	0.78	1.0	0.84	1.0
2 1/2"	0.81	1.0	—	—	0.67	1.0
2"	0.71	—	—	—	0.51	—
1 3/4"	0.91	—	—	—	0.43	—
1 1/2"	—	—	—	—	0.35	—

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

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

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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BERTHA HV™

Accordion Shutter System

H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			DRAWING No 23-129
3			
4			
5			
6			SHEET 6 OF 18

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TILECO INC.

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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

P.E. SEAL/SIGNATURE/DATE

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

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

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

[illegible]

TILECO INC.

BERTHA HV™ Accordion Shutter System

H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			DRAWING No 23-129
3			
4			
5			
6			SHEET 7 OF 18

MAXIMUM ANCHOR ⁺ SPACING (in.) SCHEDULE FOR A GIVEN MAX. SHUTTER SPAN, A.S.D. DESIGN NEGATIVE PRESSURE RATING AND A CORRESPONDING MOUNTING TYPE. (SEE MOUNTINGS ON SHEETS 14 & 15).																																																											
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 1W, 4W, 7W, 9W & 10W									CEILING MOUNT 3W FLOOR MOUNTINGS 6W & 8W									WALL MOUNTINGS 1W, 4W, 7W, 9W & 10W									CEILING MOUNT 3W FLOOR MOUNTINGS 6W & 8W									WALL MOUNTINGS 1W, 4W, 7W, 9W & 10W									CEILING MOUNT 3W FLOOR MOUNTINGS 6W & 8W									WALL MOUNTING 5W				
	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)									A.S.D. DESIGN NEGATIVE LOAD (psf)				
	30	40	50	60	70	80	90	100	110	30	40	50	60	70	80	90	100	110	30	40	50	60	70	80	90	100	110	30	40	50	60	70	80	90	100	110	30	40	50	60	70	80	90	100	110	30	40	50	62										
3'-0" OR LESS	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	7	6.5	6	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9					
4'-0"	9	9	9	9	9	9	9	9	8	9	9	9	8	7	6	5.5	5	4.5	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9					
5'-0"	9	9	9	9	9	9	7.5	6	4.5	9	9	8	6.5	5.5	5	4	4	3.5	9	9	9	9	9	8	9	8	8	9	8.5	6.5	5.5	4.5	4	3.5	3	3	9	9	9	9	9	9	5.5	4	3	2.5	9	7	5.5	4.5	4	3.5	3	2.5	2.5	9	9	9	9
6'-0"	9	9	9	9	9	8	5	4	3.5	9	8	6.5	5.5	4.5	4	3.5	3	3	9	9	9	9	6.5	4.5	9	8	-	9	7	5.5	4.5	4	3.5	3	2.5	-	9	9	9	8	4.5	3	2.5	-	-	7.5	5.5	4.5	3.5	3	8	2.5	2	-	9	9	9	4.5	
7'-0"	9	9	9	9	6	4.5	-	-	-	9	7	5.5	4.5	4	3.5	-	-	-	9	9	9	9	4.5	3.5	-	-	-	8	6	4.5	4	3.5	3	-	-	-	9	9	9	4.5	3	2.5	-	-	-	6.5	5	4	3	2.5	2.5	-	-	-	9	9	6.5	2.5	
8'-0"	9	9	9	6.5	4.5	4.5	-	-	-	8	6	5	4	2.5	3	-	-	-	9	9	8	8	3.5	2.5	-	-	-	7	5	4	3.5	3	2	-	-	-	9	8	5.5	3	2.5	-	-	-	-	5.5	4	3.5	2.5	2	2	-	-	-	9	9	3.5	2	
9'-6"	9	9	6	4	3.5	-	-	-	-	6.5	5	4	3	2.5	-	-	-	-	9	8	5.5	3	2.5	-	-	-	-	5.5	4	3	2.5	2.5	-	-	-	-	9	5.5	3	2.5	-	-	-	-	-	4.5	3.5	2.5	2	2	-	-	-	-	9	4.5	2	-	
10'-0"	9	9	6	4	-	-	-	-	-	6.5	5	4	3	-	-	-	-	-	9	8	4	2.5	-	-	-	-	-	5.5	4	3	2.5	-	-	-	-	-	9	5.5	3	-	-	-	-	-	-	4.5	3.5	2.5	2	-	-	-	-	-	-	-	-		
11'-0"	9	9	4.5	3	-	-	-	-	-	6	4.5	3.5	2.5	-	-	-	-	-	9	6	3.5	-	-	-	-	-	-	5	3.5	3	2	-	-	-	-	-	9	4	2.5	-	-	-	-	-	-	4	3	2	-	-	-	-	-	-	-	-	-		
12'-0"	9	9	3.5	-	-	-	-	-	-	5.5	4	3	-	-	-	-	-	-	9	4	2.5	-	-	-	-	-	-	4.5	3.5	2.5	-	-	-	-	-	-	8	3	-	-	-	-	-	-	-	4	2.5	-	-	-	-	-	-	-	-	-	-		
13'-0"	9	5.5	3.5	-	-	-	-	-	-	5	3.5	3	-	-	-	-	-	-	8.5	4	2.5	-	-	-	-	-	-	4	3	-	-	-	-	-	-	-	6	2.5	-	-	-	-	-	-	-	3.5	2.5	-	-	-	-	-	-	-	-	-	-	-	

- †NOTES ON ANCHORS REQUIREMENTS: WOOD SUBSTRATES.**
- ANCHORS TO WALL, FLOOR OR SOLID WOOD SOFFIT SHALL BE AS FOLLOWS:
- 1/4" TAPCON W/ ADVANCED THREADFORM TECHNOLOGY ANCHORS, AS MANUFACTURED BY I.T.W. BUILDEX W/ MINIMUM PENETRATION OF THREADED AREA AS INDICATED AT EACH SECTION ON SHEETS 14 & 15.
EXCEPTION: SEE NOTE 2 BELOW.
 - ANCHORS TO HOLLOW CEILING SHALL BE AS PER MOUNTING TYPE 2W, SHEET 14 AND SHALL CONSIST OF LAG SCREWS AS PER NDS 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 PER NDS 2018

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

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

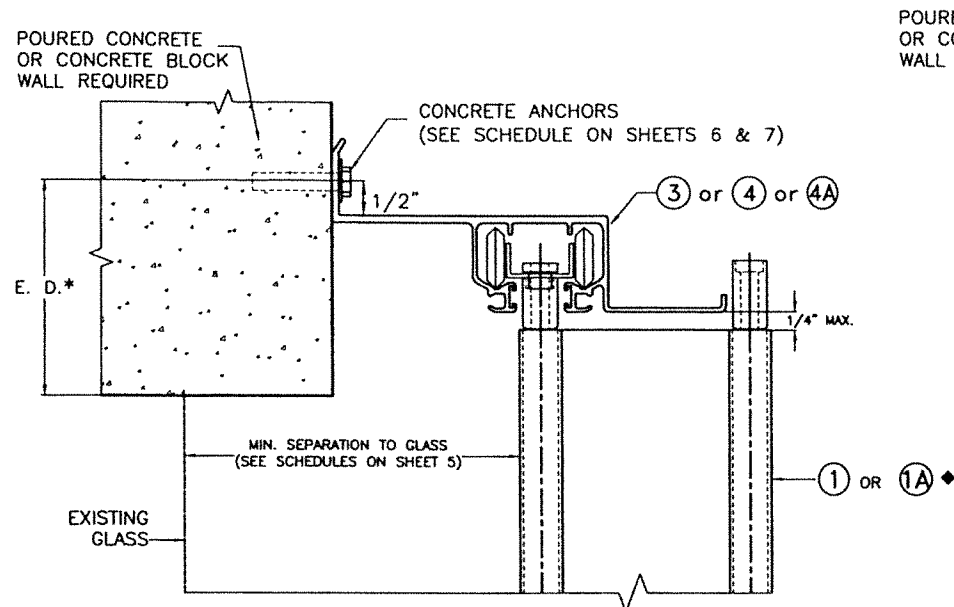
FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

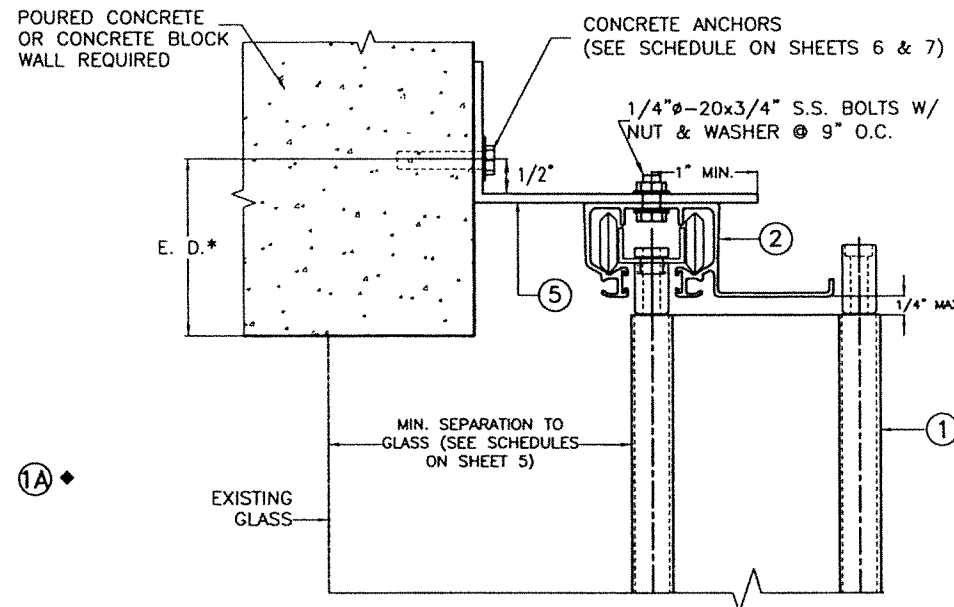
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TILLIT TESTING & ENGINEERING COMPANY
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e-mail: tilteco@aol.com
CA-0006719
WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

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4268 Westroads Drive
West Palm Beach, FL 33407

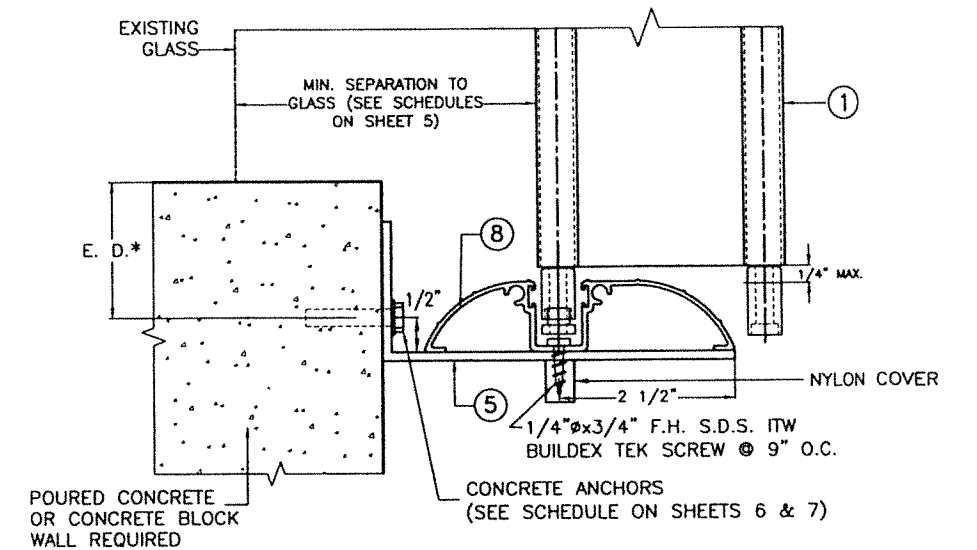
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BERTHA HV™ Accordion Shutter System H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			DRAWING No 23-129
3			
4			
5			SHEET 8 OF 18
6			



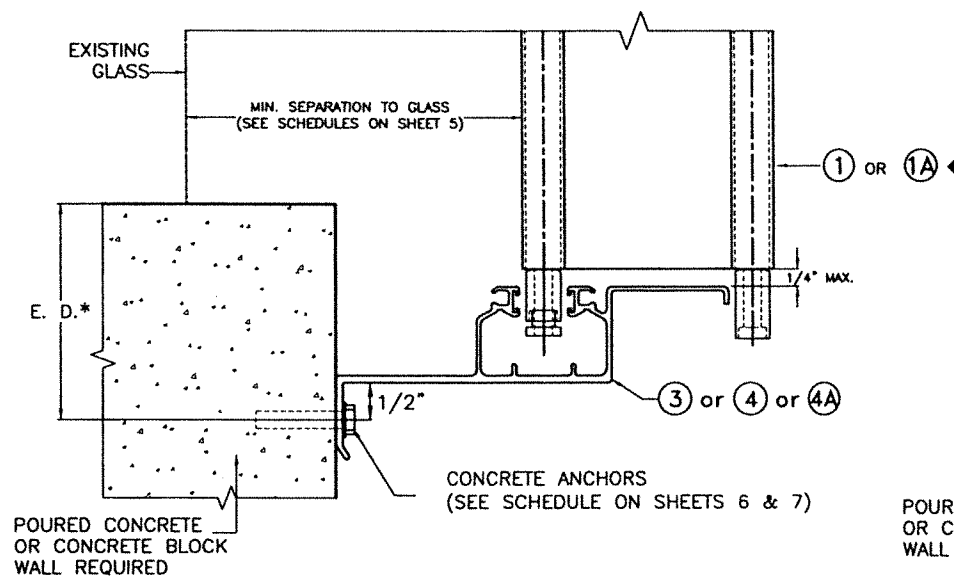
① WALL MOUNTING INSTALLATION



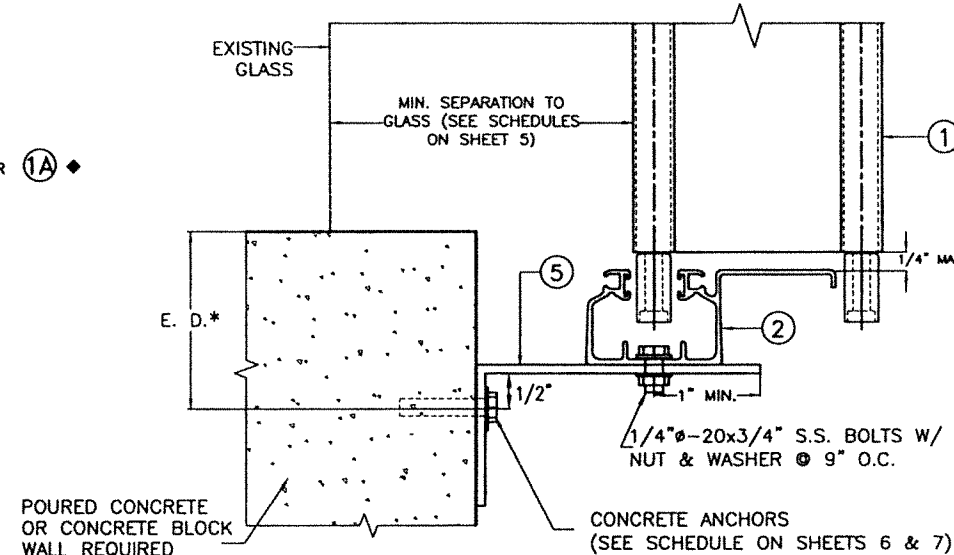
③ WALL MOUNTING INSTALLATION



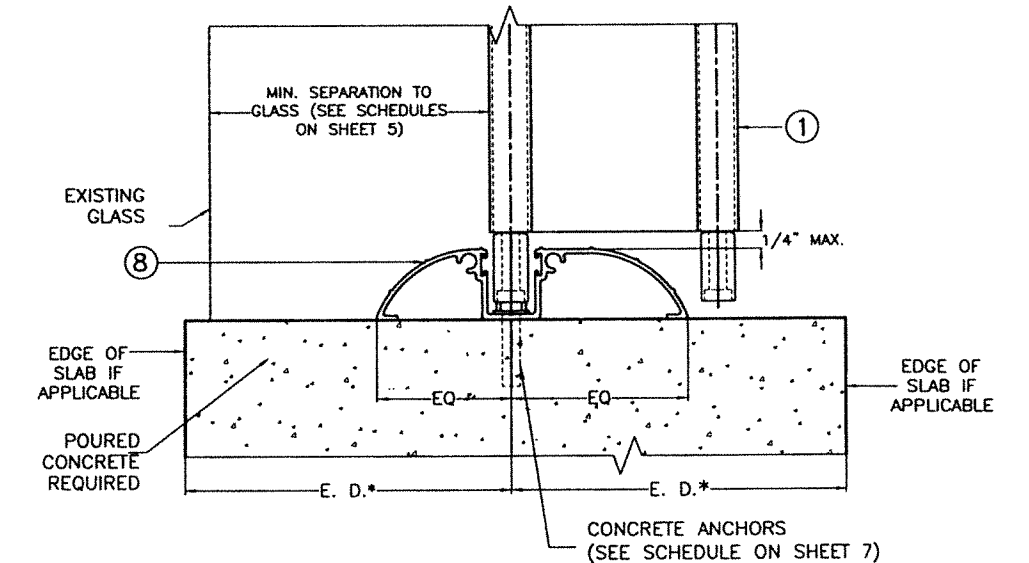
⑤ WALL MOUNTING INSTALLATION



② WALL MOUNTING INSTALLATION



④ WALL MOUNTING INSTALLATION



⑥ FLOOR MOUNTING INSTALLATION

NOTE FOR COMBINATION OF SECTIONS:

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

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

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

INSTALLATION DETAILS

SCALE 3/8"=1"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

WALTER A. TILLIT JR.
LICENSE
No. 44167
STATE OF FLORIDA
7/24/2023
P.E. SEAL/SIGNATURE/DATE

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

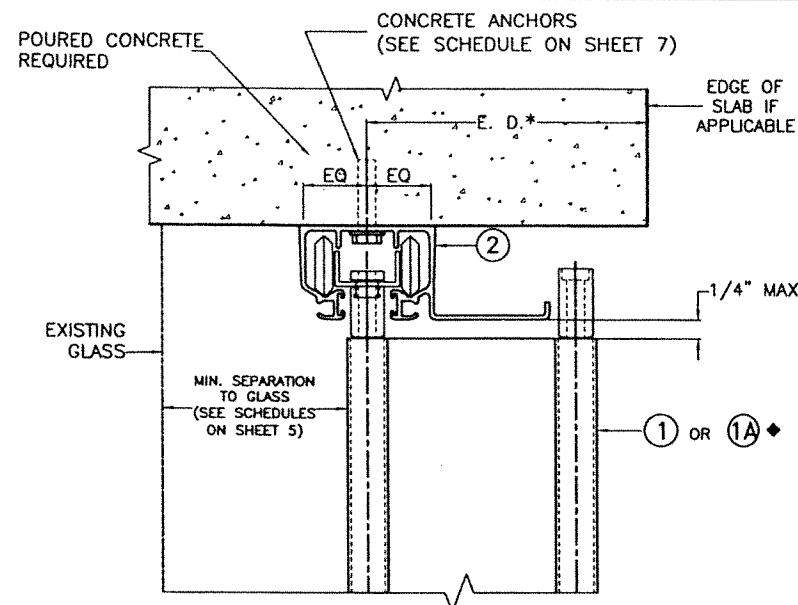
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American Shutter Systems
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4268 Westroads Drive
West Palm Beach, FL 33407

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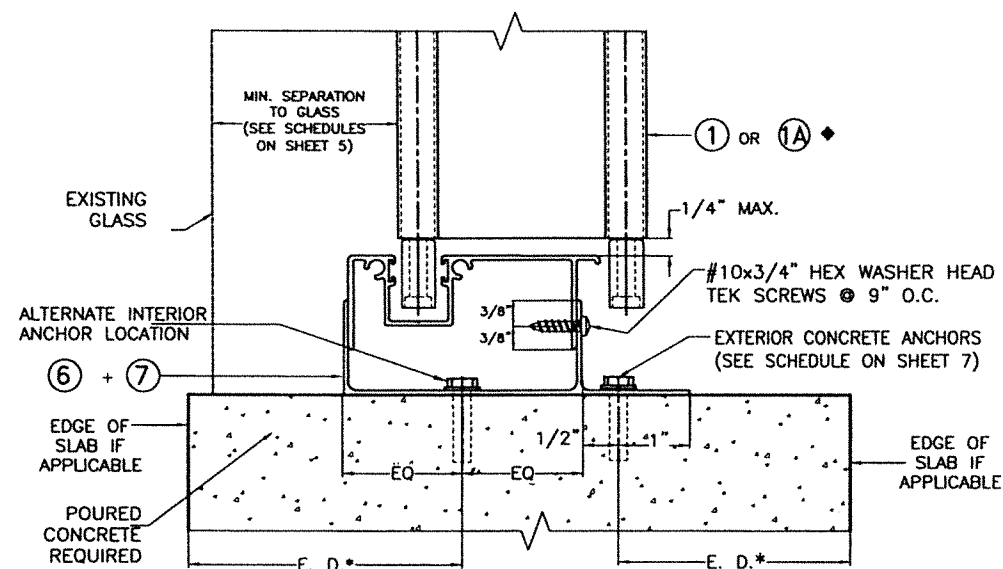
BERTHA HV™
Accordion Shutter System
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-129
SHEET
9 OF 18



⑦ CEILING MOUNTING INSTALLATION



⑧ FLOOR MOUNTING INSTALLATION

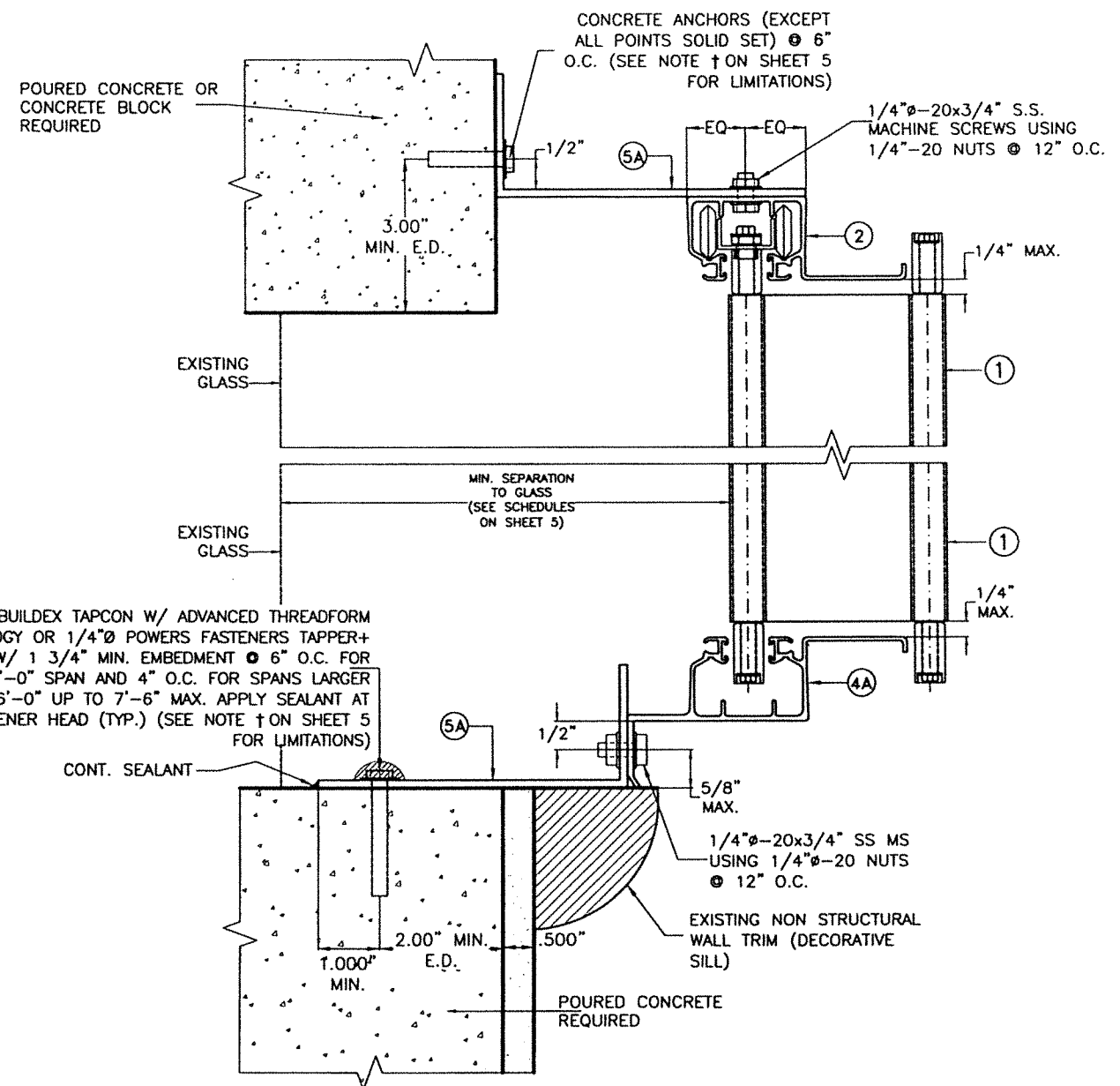
NOTE: THIS INSTALLATION SHALL BE REMOVABLE WHEN PERFORMED ADJACENT TO AN OPERABLE EXIT OR ENTRANCE

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

NOTE FOR COMBINATION OF SECTIONS:

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

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



⑨ KEYSTONE MOUNTING INSTALLATION

MAXIMUM A.S.D. DESIGN PRESSURE: +64,-72 psf
MAXIMUM SHUTTER SPAN 7'-6"

INSTALLATION DETAILS (CONTINUED)

SCALE 3/8"=1"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

WALTER A. TILLIT JR.
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PROFESSIONAL ENGINEER
5/25/2023
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CA-0006719
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FLORIDA Lic. # 44167

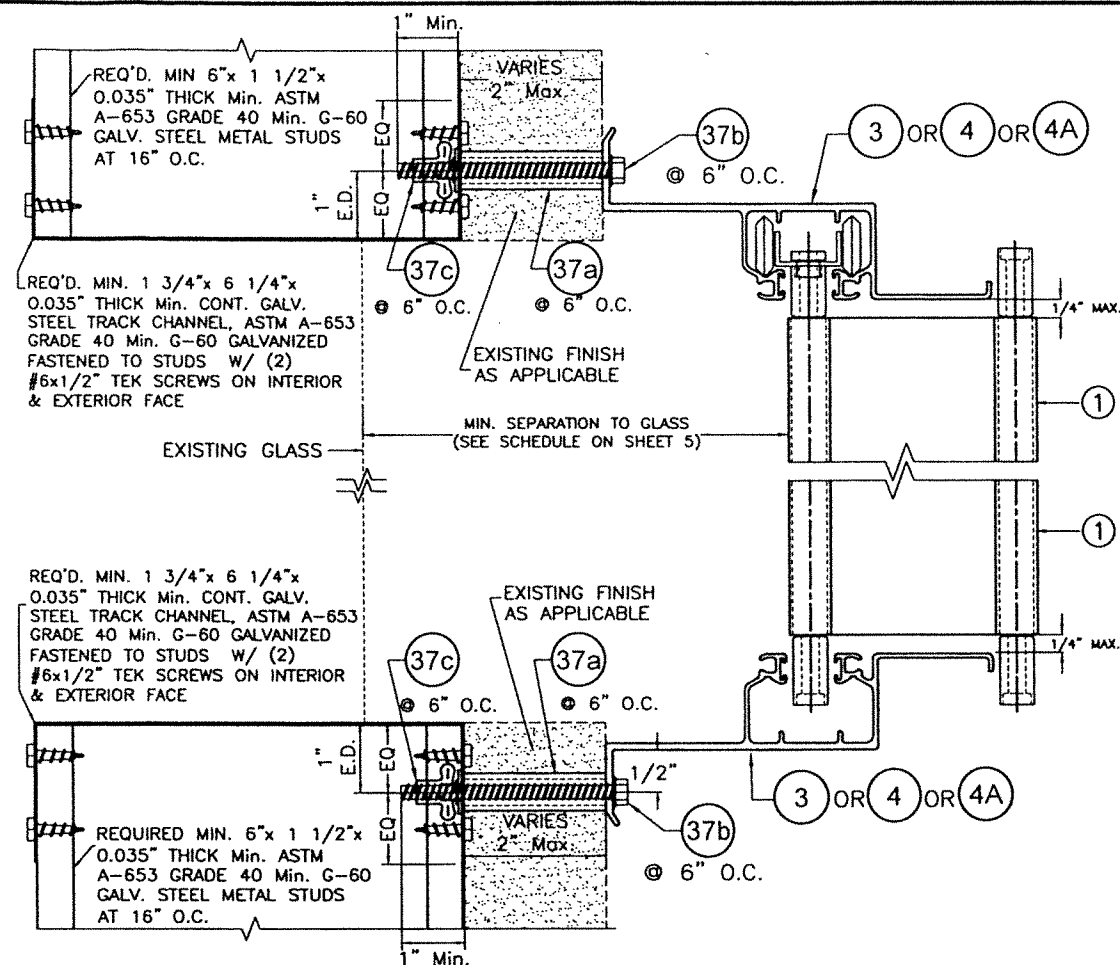
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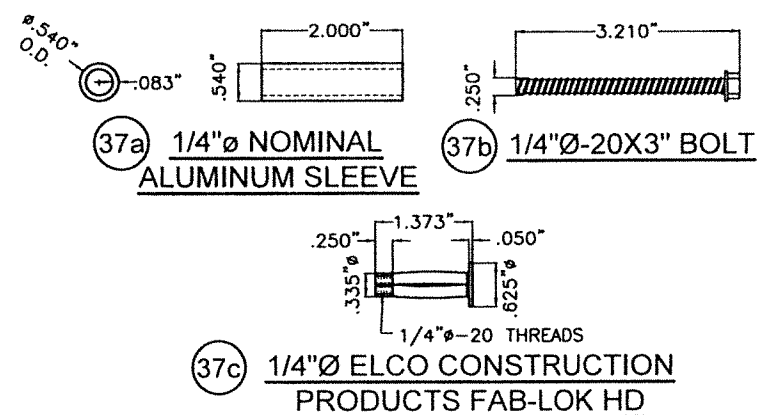
BERTHA HV™
Accordion Shutter System
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-129
SHEET
10 OF 18

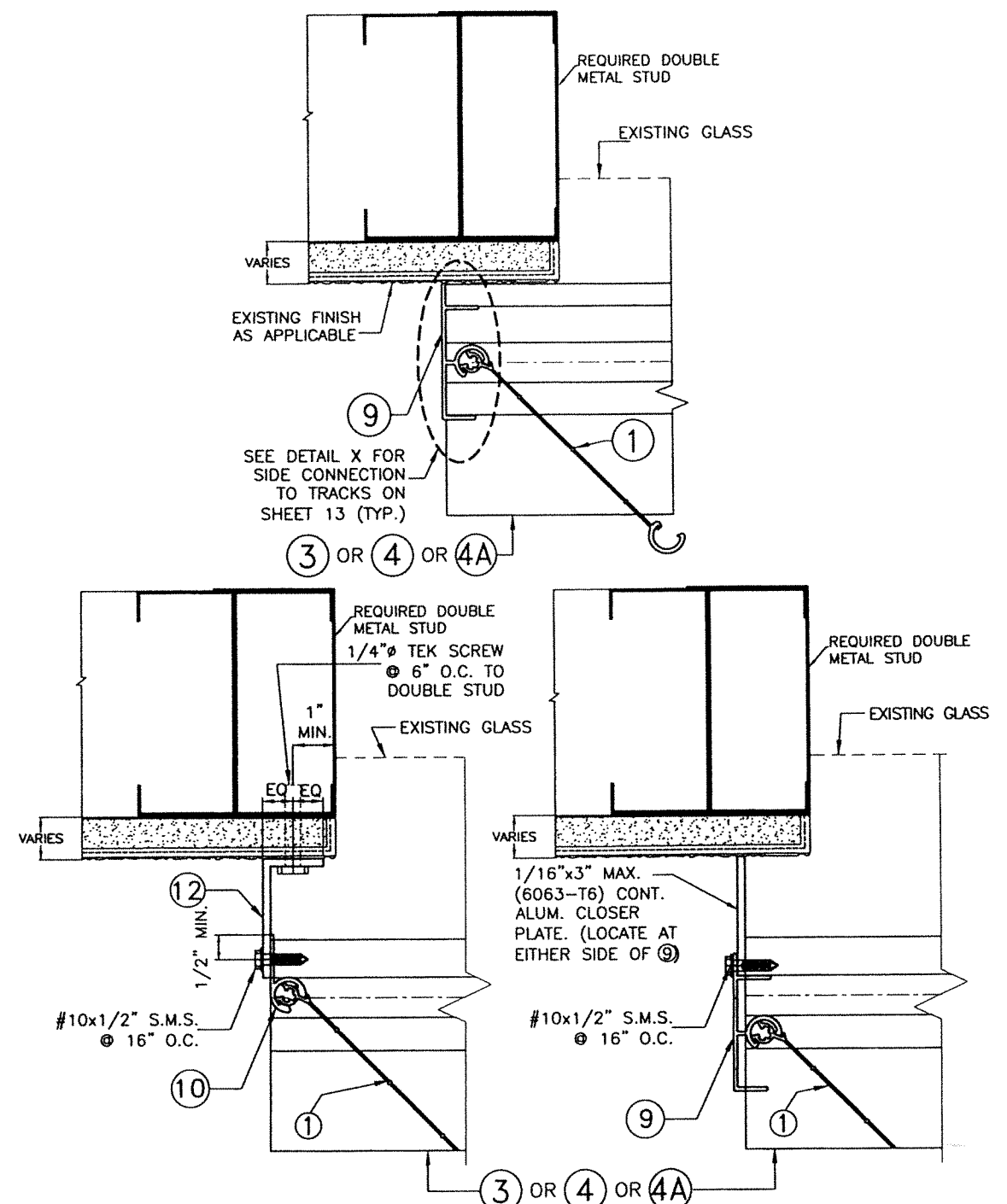


10 B.O. WALL MOUNTING INSTALLATION



INSTALLATION DETAILS (CONTINUED)

SCALE 3/8"=1"



END INSTALLATION INTO METAL STUD WALL

SCALE 3/8"=1"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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BERTHA HV™ Accordion Shutter System			
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3			
REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			DRAWING No 23-129
3			
4			SHEET 10A OF 18
5			
6			

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

INSTALLATION WITH
① OR ①A ♦ HV BLADE W/
HV CENTERMATES ⑬ & ⑭

SCALE 3/8"=1"

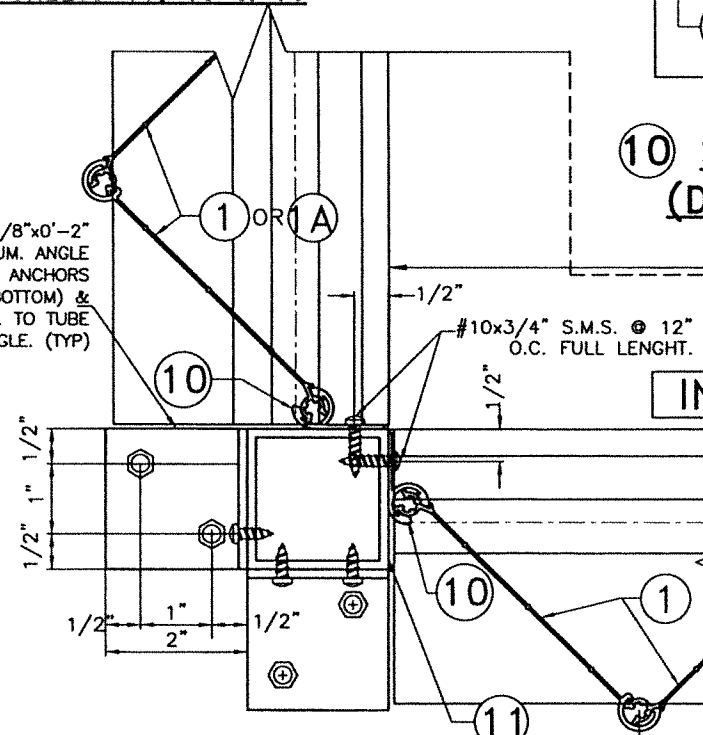
* SEE NOTES ON HV LOCK ⑮ AND
ALTERNATE LOCKS ⑯ OR ⑰
ON SHEET 4.

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

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

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

2"x2"x1/8"x0'-2"
(6063-T6 ALLOY) ALUM. ANGLE
W/(2) 1/4"Ø TAPCON ANCHORS
TO CONCRETE (TOP/BOTTOM) &
(4) #10x1/2" S.M.S. TO TUBE
AT EACH ANGLE. (TYP)



⑩ SECTION AT END
(DIRECT MOUNT)

⑪ SECTION AT SYMMETRICAL
CENTERMATES W/ LOCK ⑯ OR ⑰*

⑪ SECTION AT OPPOSING
CENTERMATES W/ LOCK ⑯ OR ⑰*

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

⑫ SECTION AT CORNER POST

⑬ SECTION AT OPPOSING
CENTERMATES W/ LOCK ⑮*

⑬ SECTION AT SYMMETRICAL
CENTERMATES W/ LOCK ⑮*
FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

WALTER A. TILLIT JR.
LICENSE
No. 44167
STATE OF FLORIDA
PROFESSIONAL ENGINEER
2/24/2023
P.E. SEAL/SIGNATURE/DATE

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REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

DRAWING No
23-129
SHEET
11 OF 18

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

INSTALLATION WITH ① HV BLADE W/ HV "T" LOCK CENTERMATES

①⑧ & ①⑨
SCALE 3/8"=1"

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

* SEE NOTES ON HV "T" LOCKS ②① ON
SHEET 4.

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

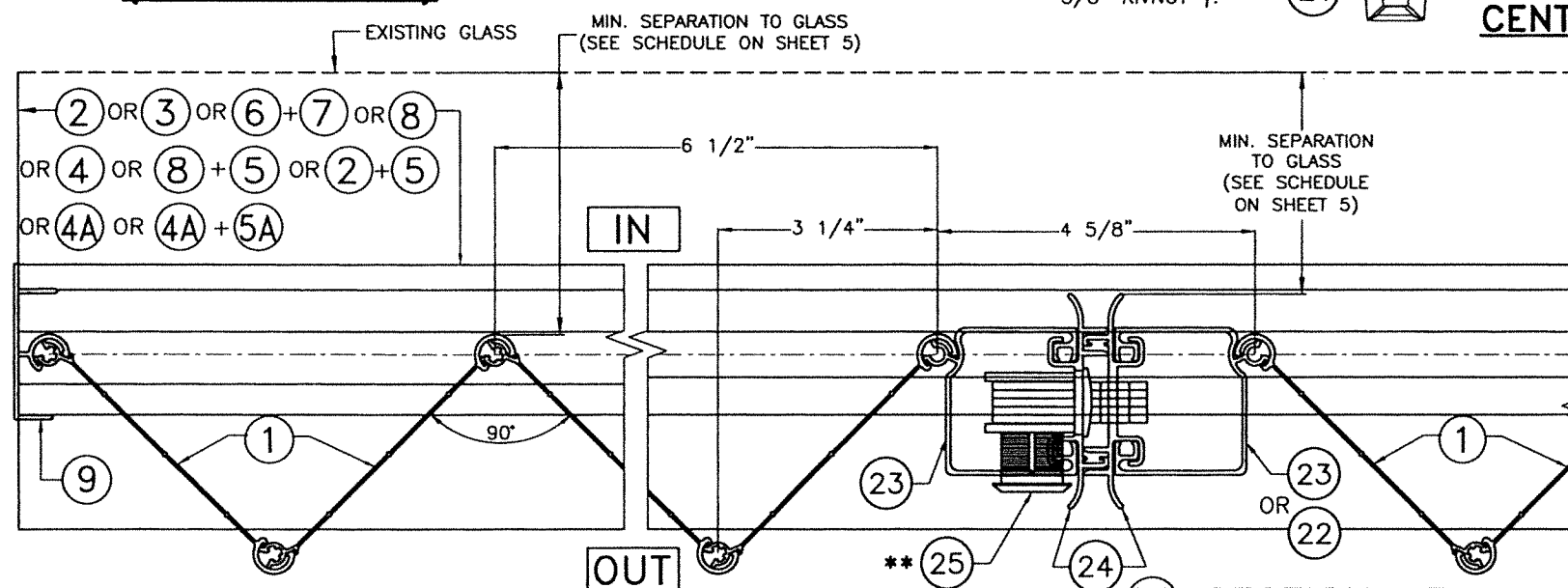
② OR ③ OR ⑥ + ⑦ OR ⑧
OR ④ OR ⑧ + ⑤ OR ② + ⑤
OR ④A OR ④A + ⑤A

EXISTING
SUBSTRATE

①④ SECTION AT END
(DIRECT MOUNT)

①⑤ SECTION AT HV "T" LOCK
CENTERMATES W/ LOCK ②①

①⑥ SECTION AT SLACK DETAIL (IF APPLICABLE)



①⑦ SECTION AT END (DIRECT MOUNT)

①⑧ SECTION AT SYMMETRICAL HD LOCK
CENTERMATES W/ HD LOCK ②⑤

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

INSTALLATION WITH ① HV BLADE W/ HD CENTERMATES

②② , ②③ , ②④
SCALE 3/8"=1"

**SEE NOTES ON HD LOCKS ②⑤ ON SHEET 4.

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Accordion Shutter System

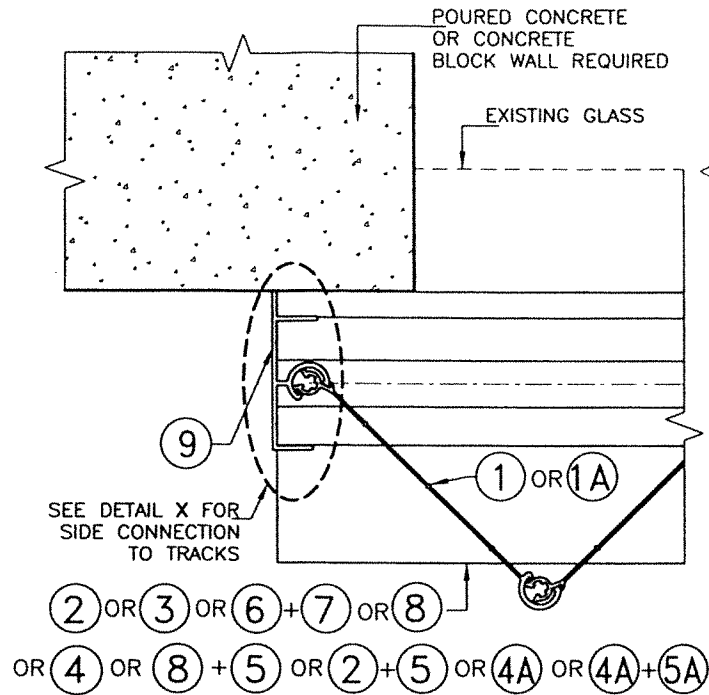
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			
3			
4			
5			
6			

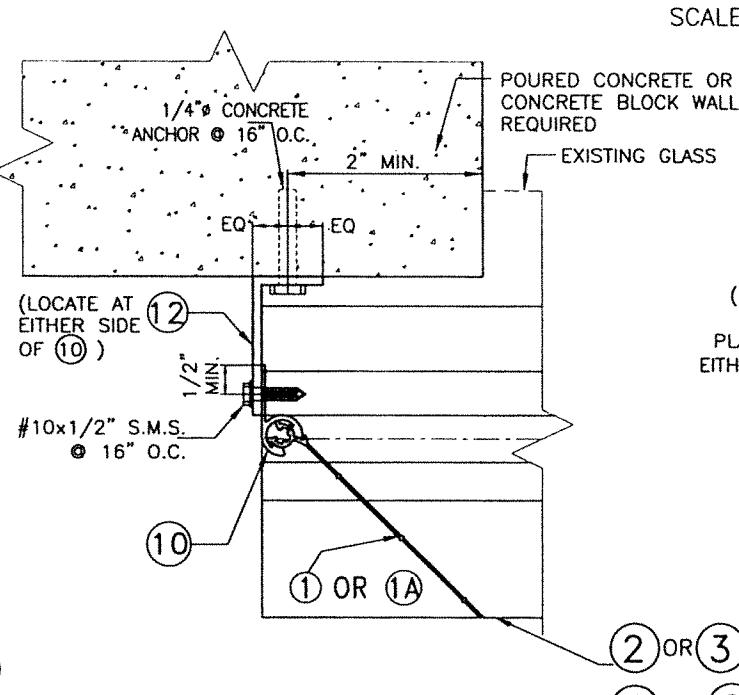
DRAWING No
23-129
SHEET
12 OF 18

END INSTALLATION INTO CONCRETE OR CONCRETE BLOCK WALL ♦

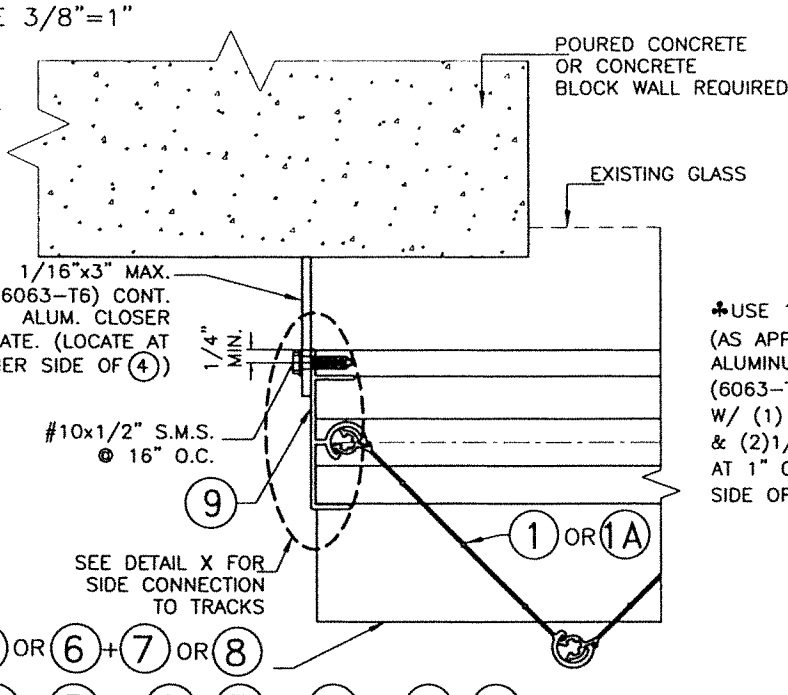
SCALE 3/8"=1"



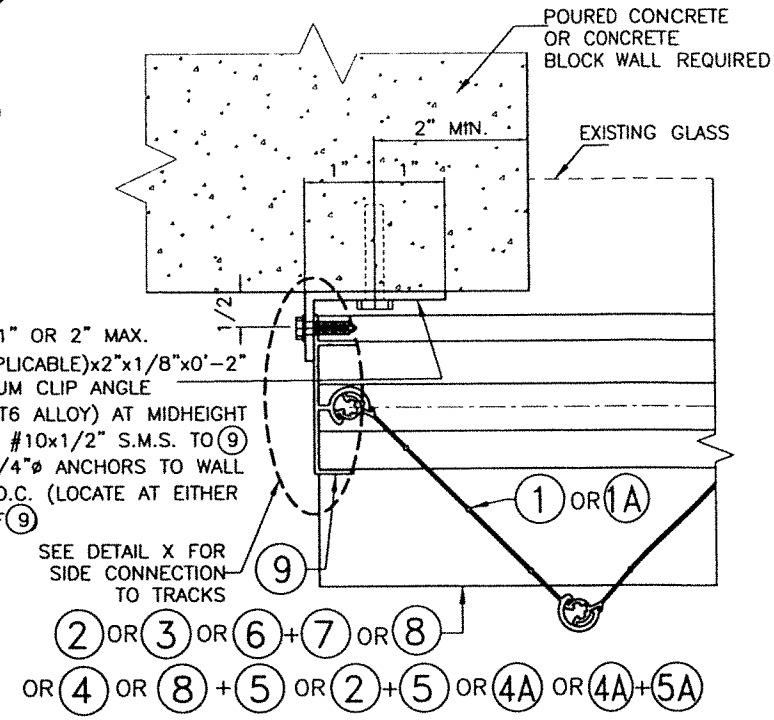
1 END CONNECTION DETAIL



2 END CONNECTION DETAIL

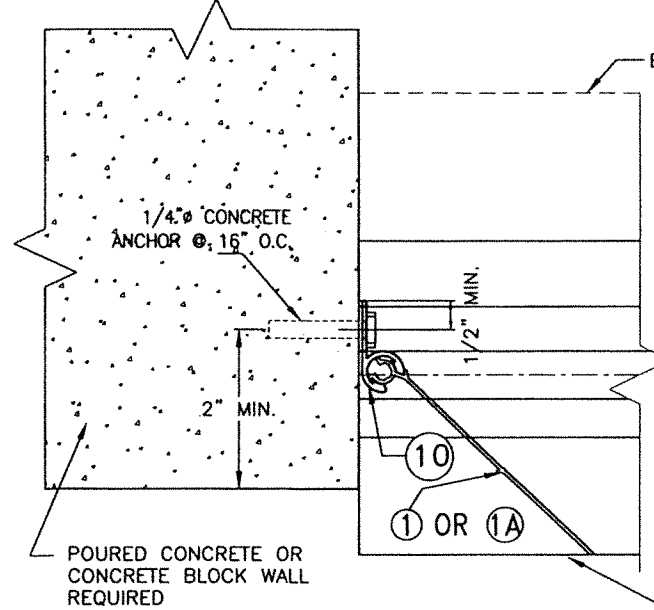


3 END CONNECTION DETAIL

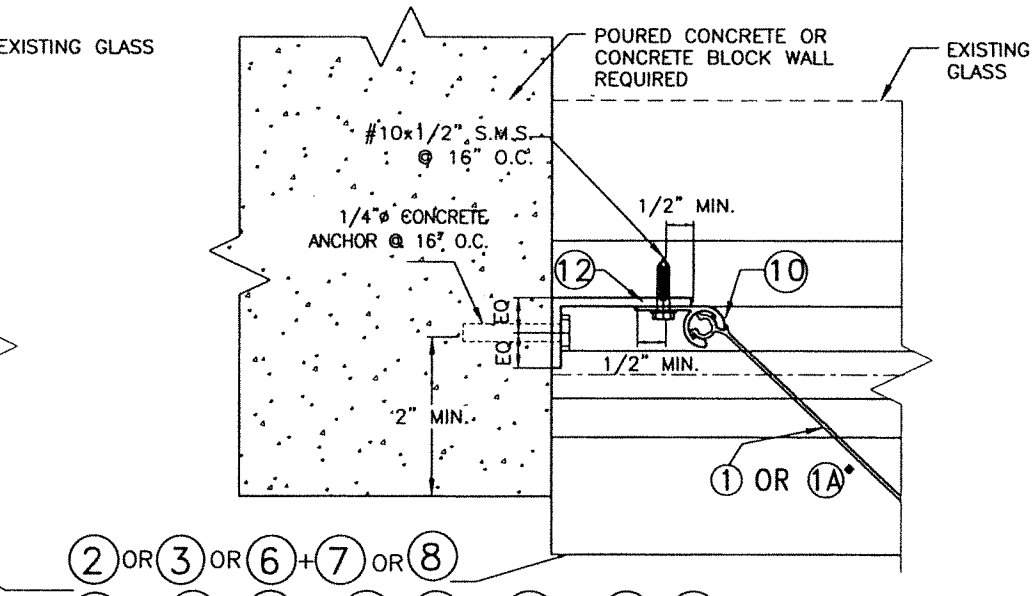


4 END CONNECTION DETAIL

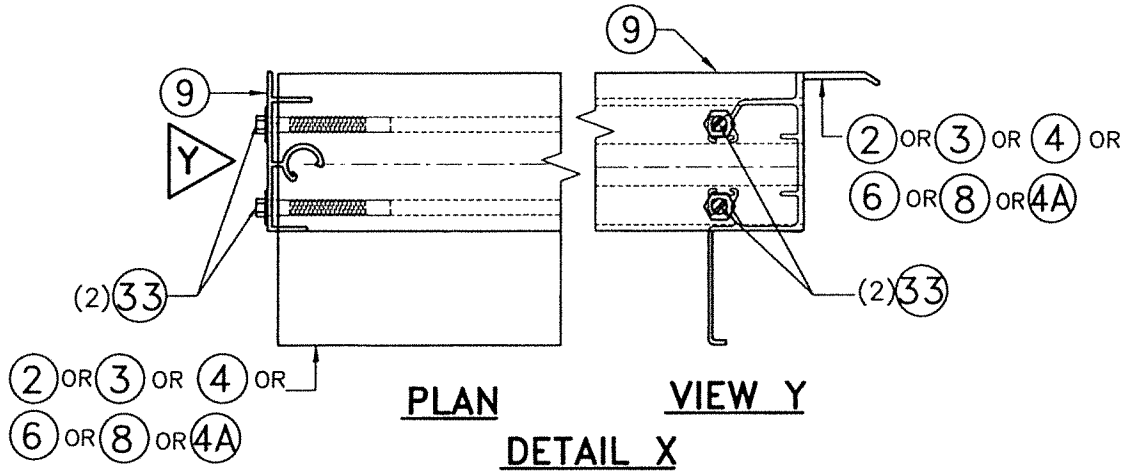
♦ REQUIRED ONLY FOR SPANS GREATER THAN 12'-0"



5 END CONNECTION DETAIL



6 END CONNECTION DETAIL



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

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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7/24/2023
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TILTECO INC.

TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th. St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
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WALTER A. TILLIT Jr. P.E.
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A.S.S.A.
American Shutter Systems
Association, Inc.
4268 Westroads Drive
West Palm Beach, FL 33407

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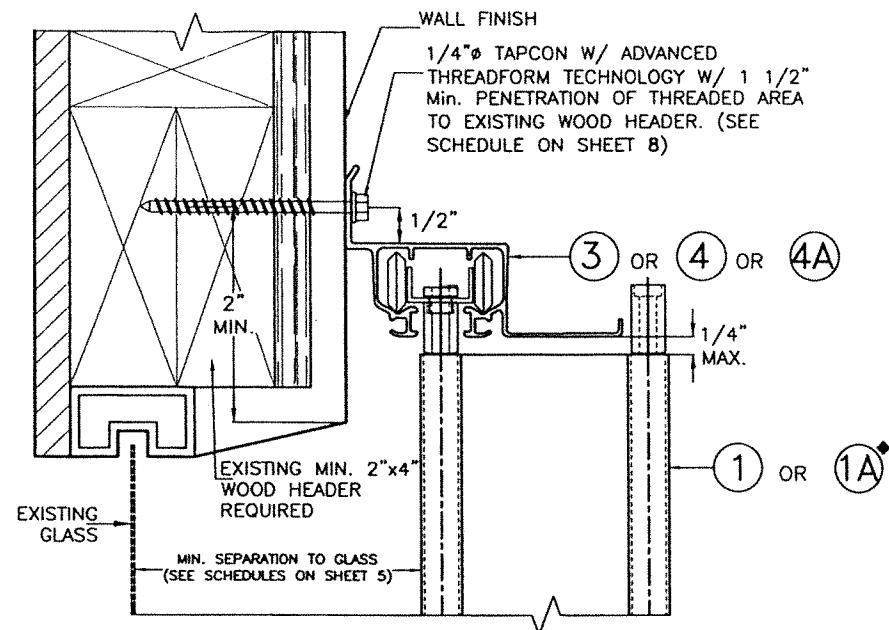
BERTHA HV™

Accordion Shutter System

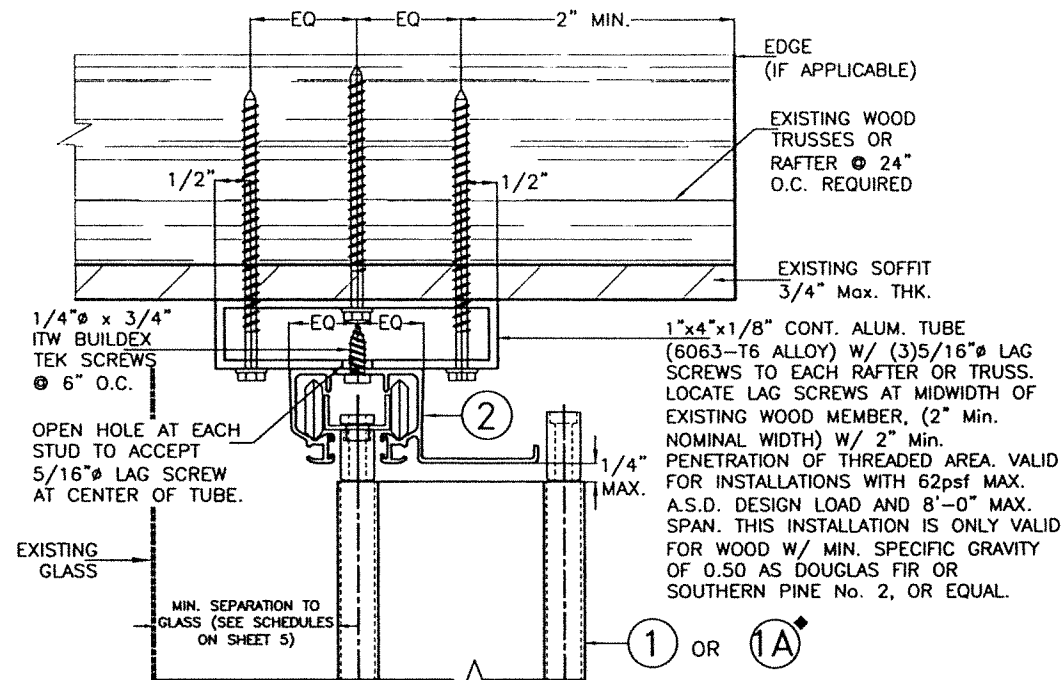
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-150	07/21/23	DATE: 07/21/2023
2			
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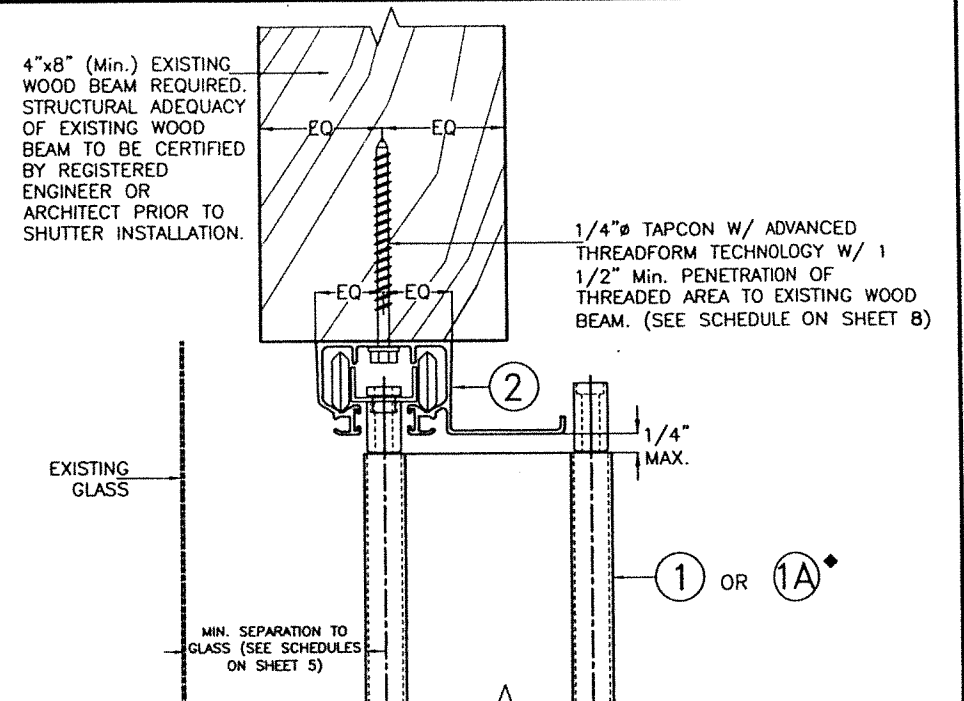
DRAWING No
23-129
SHEET
13 OF 18



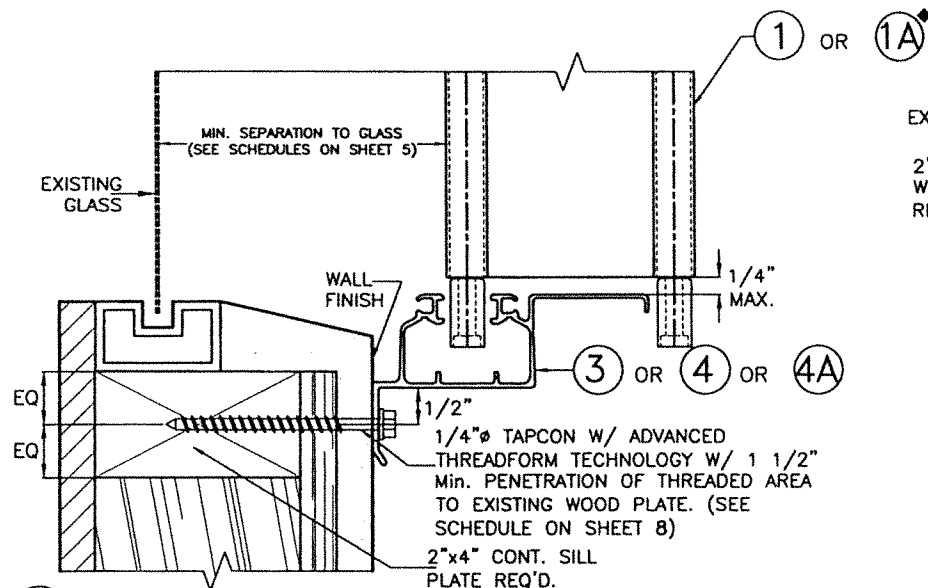
1W WALL CONNECTION AT TOP



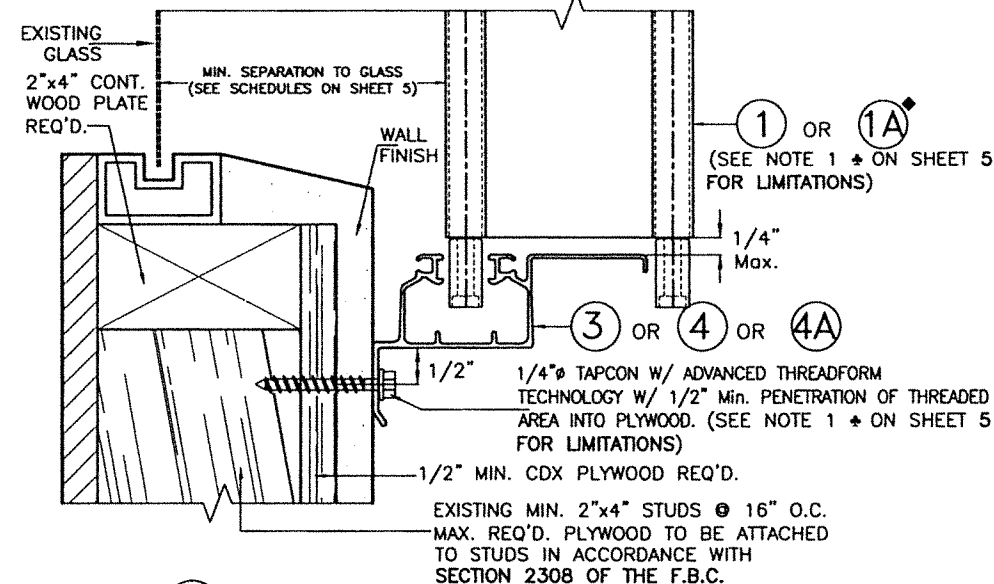
2W HOLLOW CEILING MOUNTING INSTALLATION



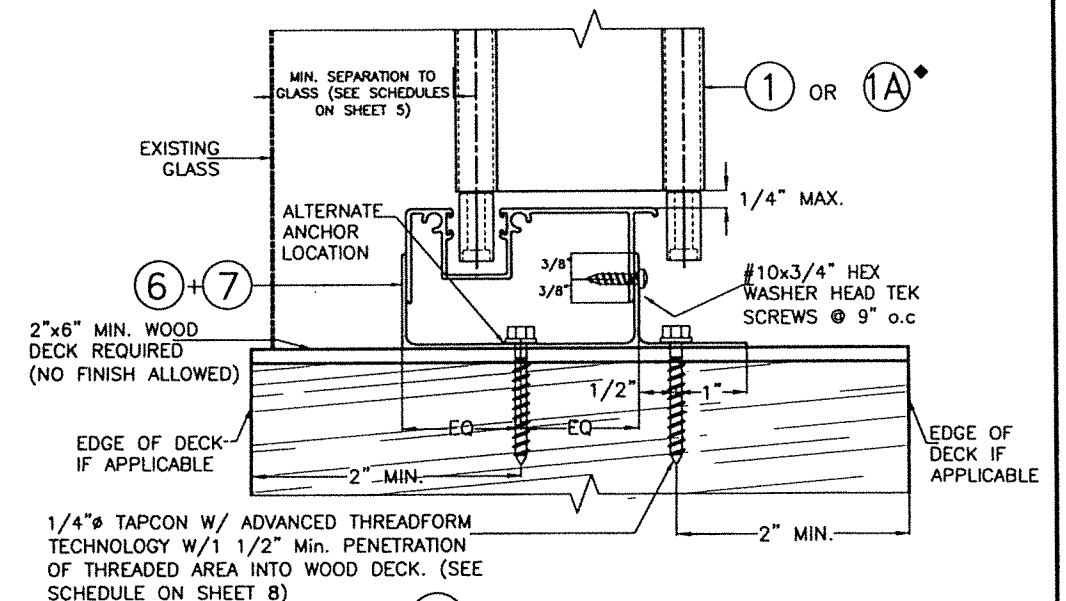
3W SOFFIT MOUNTING INSTALLATION



4W WALL CONNECTION AT BOTTOM



5W WALL CONNECTION AT BOTTOM



6W FLOOR CONNECTION

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

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

INSTALLATION DETAILS ON EXISTING WOOD BUILDINGS

SCALE 3/8"=1"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

WALTER A. TILLIT JR.
LICENSE
No. 44167
FLORIDA
PROFESSIONAL ENGINEER
FLO/20/2023
P.E. SEAL/SIGNATURE/DATE

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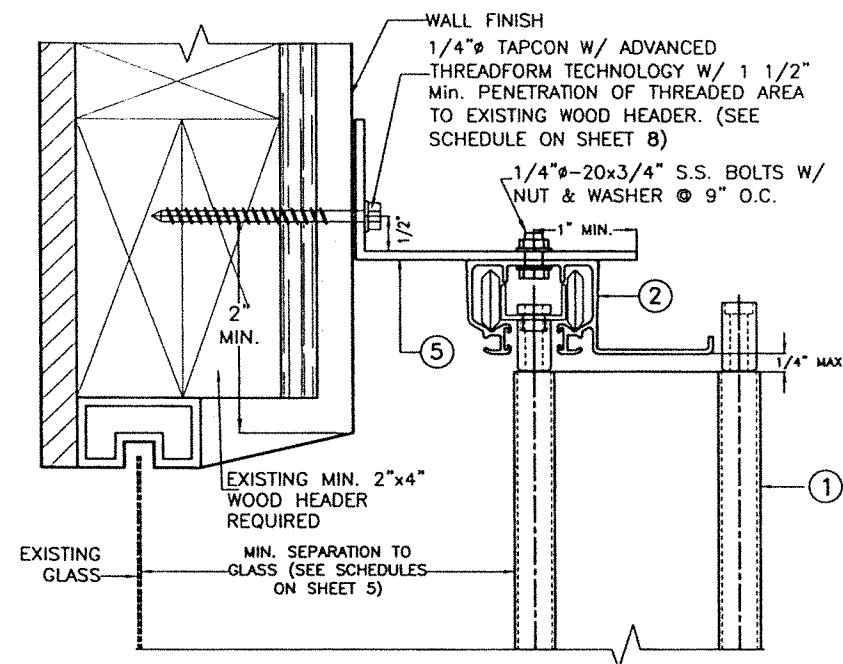
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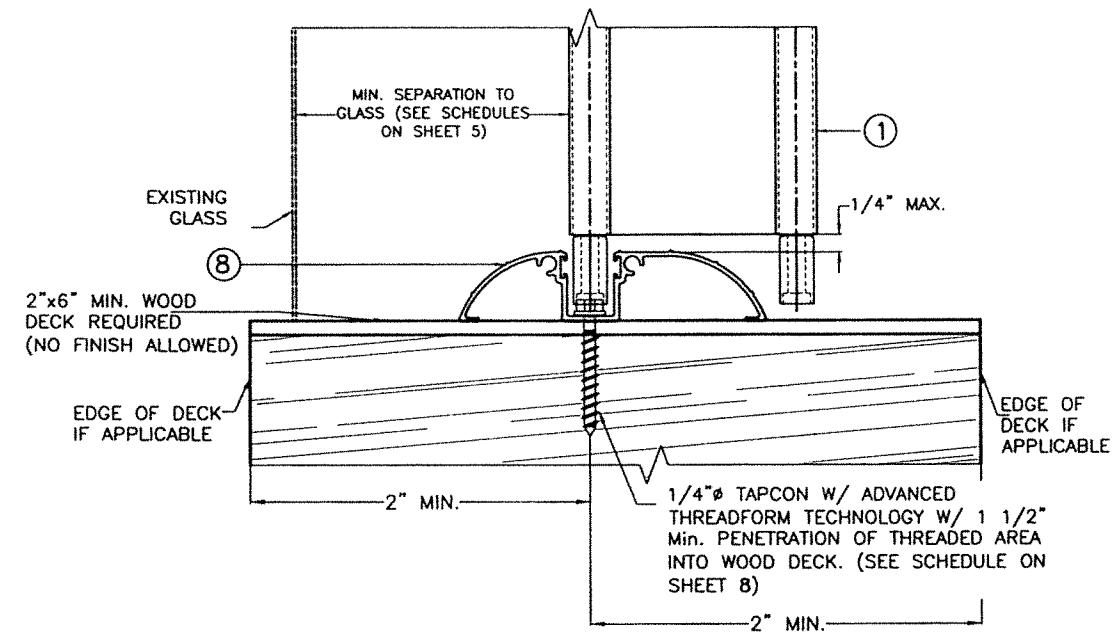
BERTHA HV™
Accordion Shutter System
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
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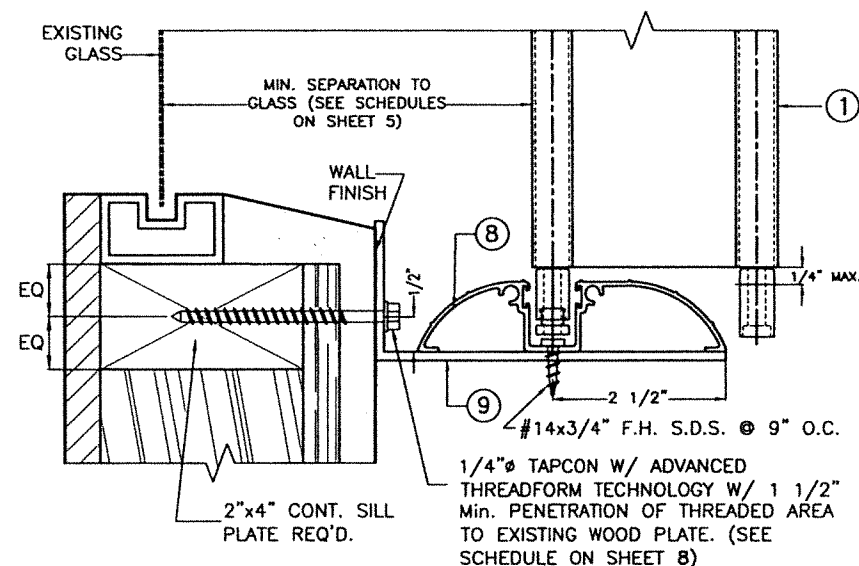
DRAWING No
23-129
SHEET
14 OF 18



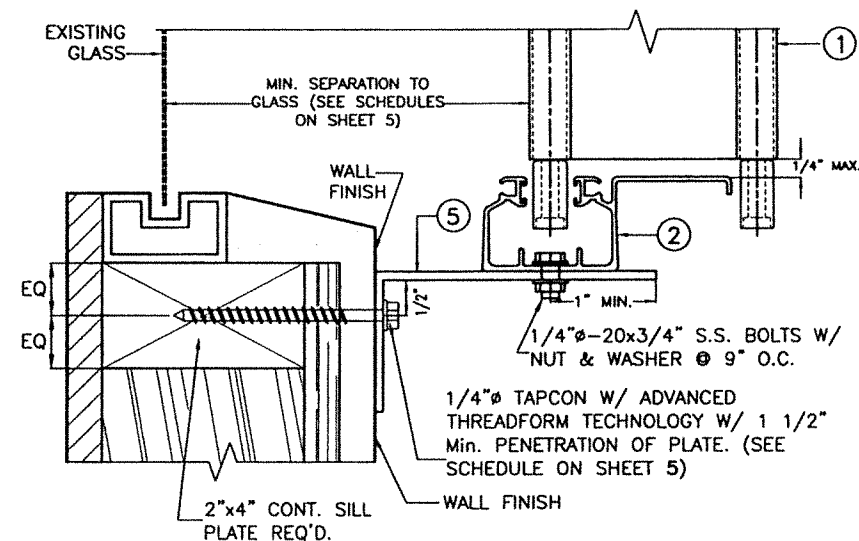
7W WALL MOUNTING INSTALLATION



8W FLOOR CONNECTION



9W WALL MOUNTING INSTALLATION



10W WALL MOUNTING INSTALLATION

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

INSTALLATION DETAILS ON EXISTING WOOD BUILDINGS

SCALE 3/8"=1"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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7/24/2023
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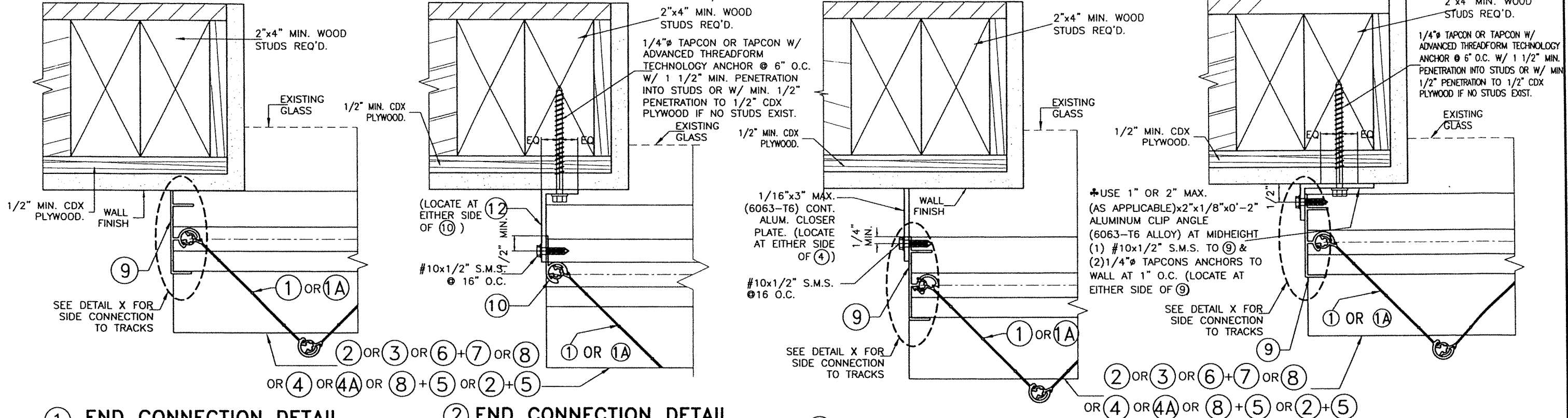
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H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

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2			
3			
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5			
6			

DRAWING No
23-129
SHEET
15 OF 18

END INSTALLATION INTO 2"x4" MIN. WOOD STUDS ♦

SCALE 3/8"=1"



1 END CONNECTION DETAIL

2 END CONNECTION DETAIL

3 END CONNECTION DETAIL

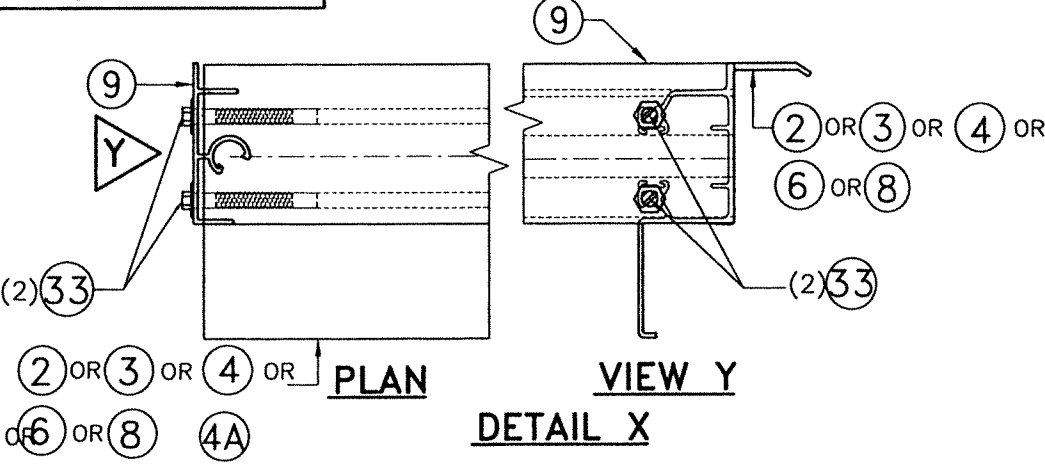
4 END CONNECTION DETAIL

1/4" TAPCON OR TAPCON W/ ADVANCED THREADFORM TECHNOLOGY ANCHORS W/ 1 1/2" MIN. PENETRATION @ 12" O.C.

1/4" TAPCON OR TAPCON W/ ADVANCED THREADFORM TECHNOLOGY ANCHORS W/ 1 1/2" MIN. PENETRATION @ 12" O.C.

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

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



5 END CONNECTION DETAIL

6 END CONNECTION DETAIL

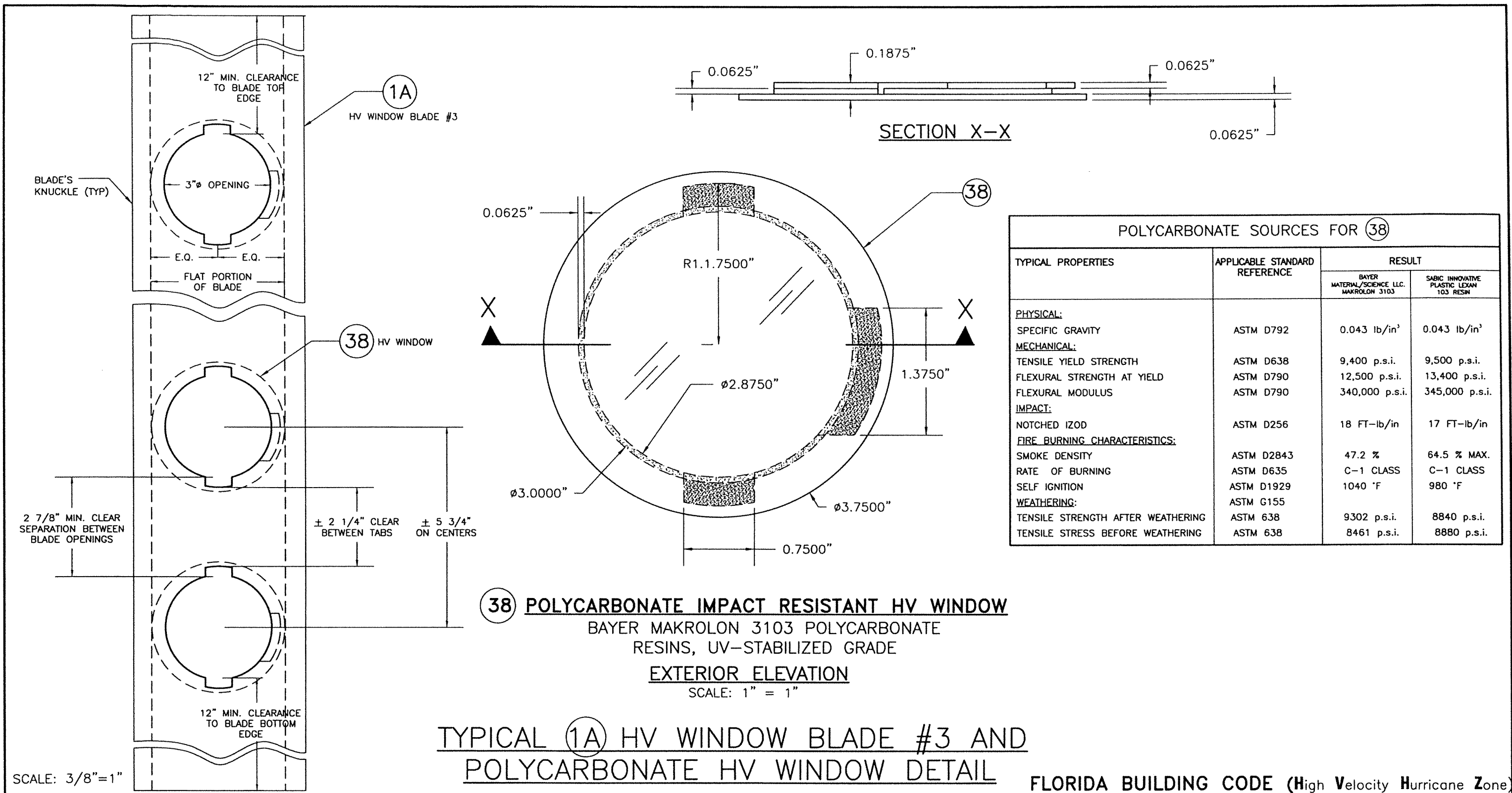
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BERTHA HV™ Accordion Shutter System			
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REV. No	DESCRIPTION	DATE	DRAWN BY: Y.M.
1	OLD 20-160	07/21/23	DATE: 07/21/2023
2			DRAWING No 23-129
3			
4			SHEET 16 OF 18
5			
6			



SCALE: 3/8" = 1"

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

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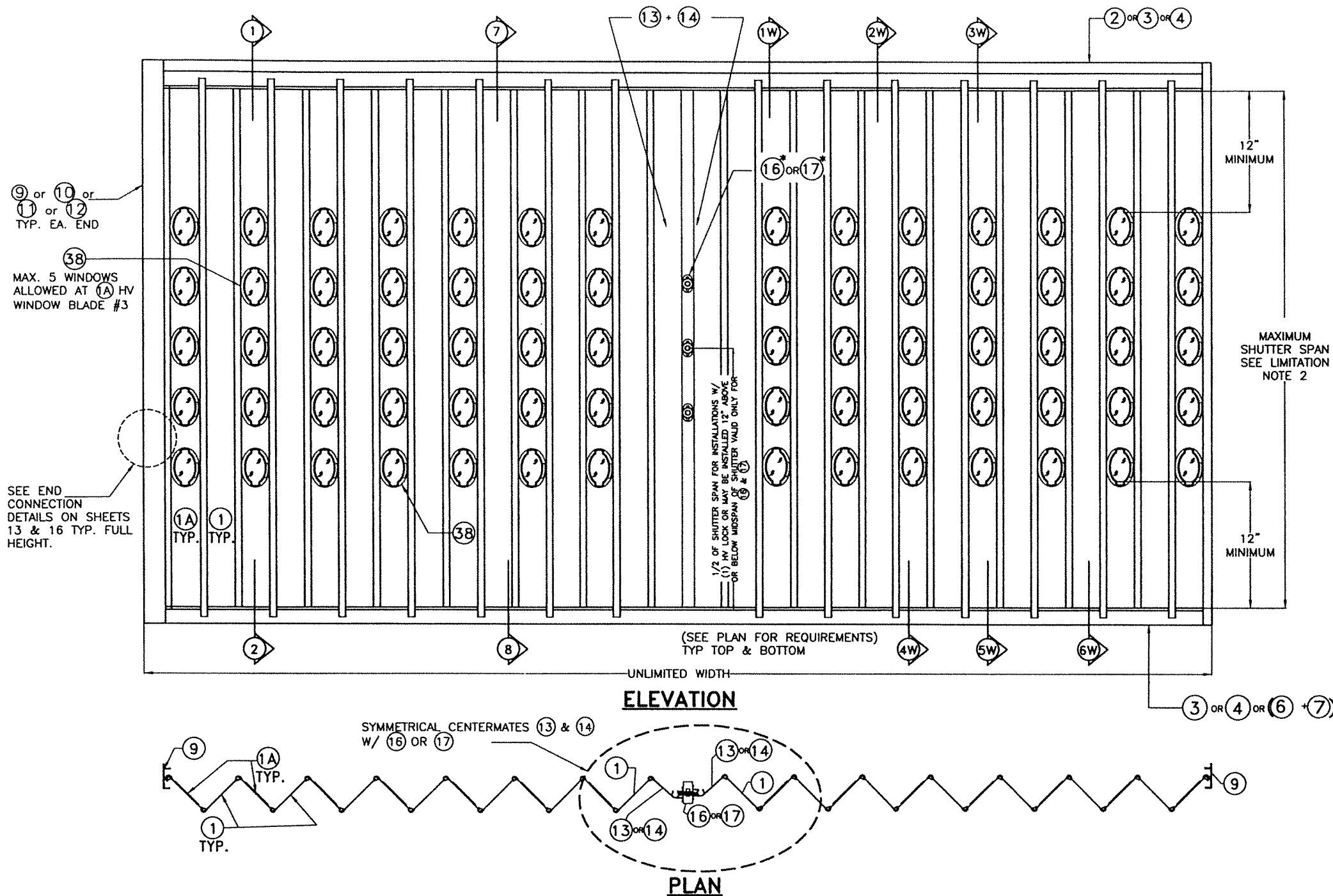
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BERTHA HV™
Accordion Shutter System
H.V. BLADE #3 W/ OR W/O H.V. WINDOW BLADE #3

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2			
3			
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DRAWING No
23-129

SHEET
17 OF 18

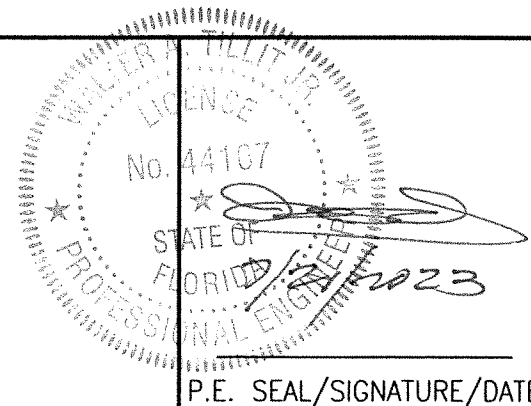


- * GENERAL LIMITATIONS AND CONDITIONS OF USE FOR BERTHA**
- (1) HV BLADE #3 ACCORDION SHUTTER SYSTEM WORKING IN UNISON WITH (1A) HV WINDOW BLADE #3.**
1. MAX. A.S.D. DESIGN PRESSURE RATING: +62, -62 p.s.f.
 2. MAX. SHUTTER SPAN: 107" = 8'-11" • +62, -62 psf
MAX. SHUTTER SPAN: 114" = 9'-6" • +55, -55 psf
 3. ALLOWED MOUNTINGS: 1, 2, 7 & 8 ON SHEETS 9 & 10; AS WELL AS MOUNTINGS 1W, 2W, 3W, 4W, 5W & 6W ON SHEET 14.
 4. ONLY CENTERMATES (13) (14) (BOTH W/ (16) OR (17)) ARE ALLOWED WITH (13) (14) ARRANGED IN A SYMMETRICAL LAYOUT.
 5. (A) (1A) HV WINDOW BLADE #3 SHALL ONLY ALLOW A MAXIMUM OF 5 OPENINGS (3" Ø HOLES) FOR (38) PER BLADE AT SPACINGS SHOWN ON SHEET 17.
(B) MIN. CLEARANCE FROM TOP OR BOTTOM EDGE OF (1A) HV WINDOW BLADE #3 OF ANY 3" Ø HOLE FOR (38) SHALL BE 12".
(C) FIRST OR LAST BLADE COMING OUT FROM STARTERS AT ENDS MAY BE (1A) HV WINDOW BLADE #3.
(D) (1A) HV WINDOW BLADE #3 MUST BE USED ALTERNATE TO A SOLID (1) HV BLADE #3 THROUGHOUT SHUTTER'S WIDTH.
(E) CENTERMATES SHALL ALWAYS BE INSTALLED ADJACENT TO A SOLID (1) HV BLADE #3 AT EITHER SIDE OF THEM.
(F) POLYCARBONATE HV WINDOW (38) SHALL BE INSTALLED SO THAT TABS FACE THE INTERIOR OF THE OPENING BEING PROTECTED. HV WINDOW (38) MUST BE ONLY INSTALLED AND LOCKED USING A HV SETTING TOOL PROVIDED BY ASSA, INC.
 6. SEE ANCHOR SPACING SCHEDULE FOR INSTALLATIONS INTO WOOD FRAME BUILDINGS ON SHEET 8, AS LIMITED BY SPAN AND DESIGN LOAD (SEE NOTES 1 & 2 ABOVE).
 7. SEE ANCHOR SPACING SCHEDULE FOR INSTALLATIONS INTO POURED CONCRETE OR CONCRETE BLOCK WALL ON SHEETS 6 & 7 AS LIMITED BY SPAN AND DESIGN LOAD (SEE NOTES 1 & 2 ABOVE).
 8. SEE MINIMUM SEPARATION TO GLASS ON SHEET 5.

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

N.T.S.

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

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3			23-129
4			SHEET
5			18 OF 18
6			