

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 2026 (9th EDITION) OF THE FLORIDA BUILDING CODE.
- 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 THE 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 12 THRU 17, 25, 26, 28 & 28A.
- IN ORDER TO VERIFY THE ABOVE CONDITION, ULTIMATE DESIGN WIND LOADS DETERMINED PER ASCE 7-22 SHALL FIRST BE REDUCED TO A.S.D. DESIGN WIND LOADS BY MULTIPLYING THEM BY 0.6 IN ORDER TO COMPARE THESE WITH MAX. (A.S.D) DESIGN PRESSURE RATINGS INDICATED ON SHEETS 12 THRU 17, 25, 26, 28 & 28A.
- IN ORDER TO VERIFY THAT ANCHORS ON THIS P.E.D., AS TESTED, WERE NOT OVERSTRESSED, A 33 % INCREASE IN ALLOWABLE LOADS FOR WIND LOADS WAS NOT USED IN THEIR ANALYSIS. BERTHA H.V. ACCORDION SHUTTER SYSTEM'S ADEQUACY FOR WIND AND LARGE MISSILE IMPACT LOAD HAS BEEN VERIFIED IN ACCORDANCE WITH SECTION 1626 OF THE ABOVE MENTIONED CODE AS PER ATL REPORTS: IMPACT MISSILE IS 9lb, 2"x4", 5ft/Sec.
- 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 7-10 STANDARD, AND SHALL BE SUBMITTED TO THE BUILDING OFFICIAL AT THE TIME PERMIT IS APPLIED FOR.
- HV BLADE ① AND HV WINDOW BLADE ①A ARE ENGINEERED TO WORK IN UNISON WITH EACH OTHER UNDER THE GENERAL LIMITATIONS AND CONDITIONS OF USE INDICATED ON SHEET 28.
3. BERTHA H.V. ACCORDION PINS (HV SCREWS), USED AT BLADES KNUCKLE AND FOR DIRECT MOUNT CONNECTION TO TRACKS SHALL BE # 14X2.75 AND # 14X1.75 RESPECTIVELY, 410-HT MINIMUM SERIES STAINLESS STEEL SCREWS WITH 135.0 ksi YIELD STRENGTH AND 180 ksi TENSILE STRENGTH. PINS SHALL BE COATED WITH BERTHA HV DACROSHIELD COATING SYSTEM AS MANUFACTURED BY APPROVED COATING APPLICATORS, REGISTERED WITH AMERICAN SHUTTER SYSTEMS ASSOCIATION. PINS MUST BEAR THE HV MARKING ON THEIR HEAD.
4. ALL ALUMINUM EXTRUSIONS SHALL BE ALUMINUM ASSOCIATION ALLOY AND TEMPER AS INDICATED ON SHEETS 2 AND 3. MINIMUM YIELD STRENGTH FOR 6063-T6 ALLOY IS 31.7 ksi AND 35.7 ksi FOR 6005-T5 ALLOY. ALL ALUMINUM EXTRUSIONS IN CONTACT WITH DISSIMILAR MATERIALS SHALL COMPLY WITH SECTION OF THE 2020 ALUMINUM DESIGN MANUAL.
5. ALL SCREWS SHALL 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 WITH FLORIDA BUILDING CODE SECTIONS 2411.3.3.4 & 1711.
6. BOLTS SHALL 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: 13,14,15,15A,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 THE SHUTTER IS TO BE ATTACHED TO ENSURE PROPER ANCHORAGE. THE CONTRACTOR IS 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 A 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 AT A READILY VISIBLE LOCATION ON THE 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 A PERMIT IS APPLIED FOR.
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) THE CONTRACTOR IS 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 WHO 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 THE 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 & ②

GENERAL NOTES	SHEET 1
SYSTEM COMPONENTS 1-20	SHEET 2
SYSTEM COMPONENTS 21-37	SHEET 3
TYPICAL SHUTTER ASSEMBLY 38-43	SHEET 4

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

TYPICAL SHUTTER ELEVATION & NOTES ON LOCKS	SHEET 5
INSTALLATION DETAILS A-E, CONCRETE/BLOCK	SHEET 6
INSTALLATION DETAILS F-L, CONCRETE/BLOCK	SHEET 7
CENTERMATE DETAILS HV	SHEET 8
CENTERMATE ALTERNATING DETAILS HV	SHEET 9
CENTERMATE DETAILS HD	SHEET 10
END CONNECTION DETAILS 1-6, CONCRETE/BLOCK	SHEET 11
MAXIMUM SPAN TABLES	SHEET 12
ANCHOR SCHEDULE- CONCRETE	SHEET 13
ANCHOR SCHEDULE- CONCRETE	SHEET 14
ANCHOR SCHEDULE- CONCRETE	SHEET 15
ANCHOR SCHEDULE- CONCRETE BLOCK	SHEET 15A
ANCHOR SCHEDULE- WOOD	SHEET 16
ANCHOR SCHEDULE- WOOD	SHEET 17
INSTALLATION DETAILS M-R, WOOD	SHEET 18
INSTALLATION DETAILS S-X, WOOD	SHEET 19
END CONNECTION DETAILS 7-12 & X, WOOD	SHEET 20

AREA 3: HV BLADE ② ONLY

TYPICAL SHUTTER ELEVATION & NOTES ON LOCKS	SHEET 21
INSTALLATION DETAILS AA-GG, CONCRETE	SHEET 22
CENTERMATE DETAILS HD	SHEET 23
END CONNECTION DETAILS 1-6 & X, CONCRETE/BLOCK	SHEET 24
MAXIMUM SPAN TABLES	SHEET 25
ANCHOR SCHEDULE, CONCRETE	SHEET 26

AREA 4: HV WINDOW BLADE ①A ONLY

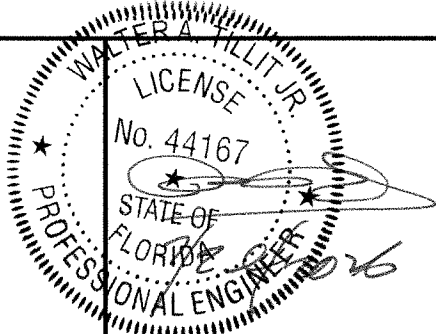
TYPICAL WINDOW BLADE & WINDOW DETAIL	SHEET 27
TYPICAL SHUTTER ELEVATION	SHEET 28

AREA 5: HV WINDOW BLADE ① ONLY

INSTALLATION DETAILS, METAL STUD WALLS	SHEET 28A
--	-----------

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

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



P.E. SEAL/SIGNATURE/DATE

© 2026 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.

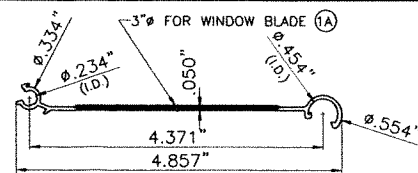
4268 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			SHEET 1 OF 28
6			

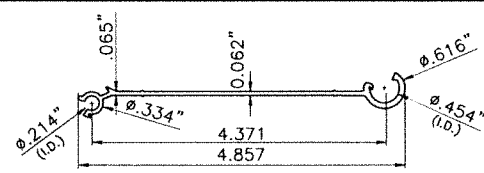


1 HV SOLID BLADE

COVERED UNDER US PATENT # 5458179

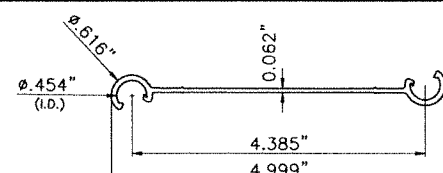
1A HV WINDOW BLADE*

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



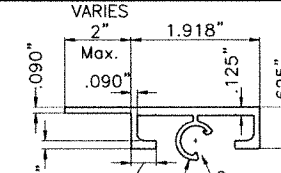
2 HV BLADE

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



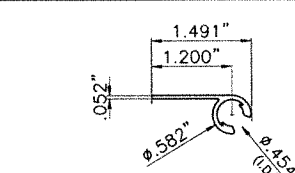
3 HV UNIVERSAL FLOATER

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



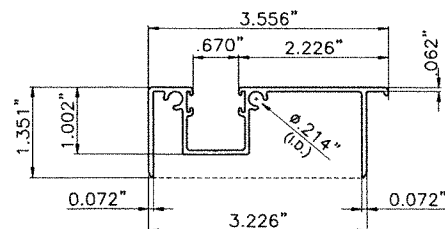
4 HV DIRECT MOUNT

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



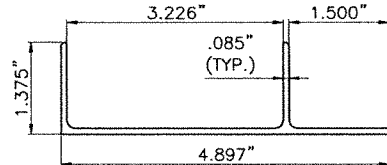
5 HV 90°/180° STARTER

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



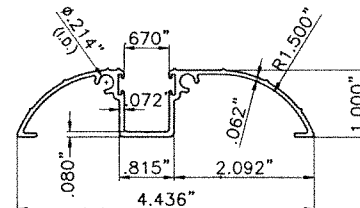
6 HV ADJ. FLOOR TRACK

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



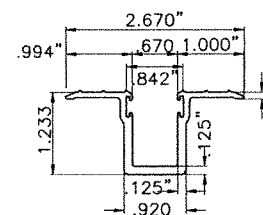
7 HV ADJ. ADAPTER W/LIP

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



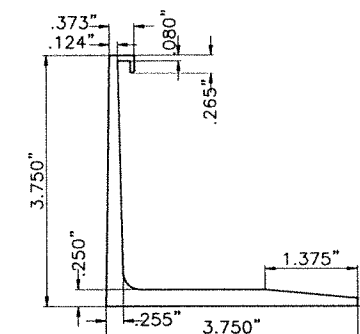
8 HV WALK-OVER TRACK

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



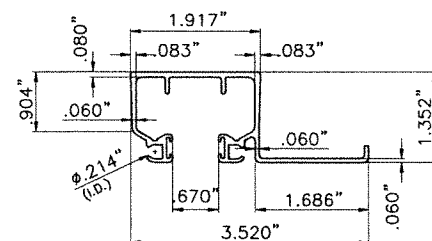
9 HV TRENCH TRACK

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



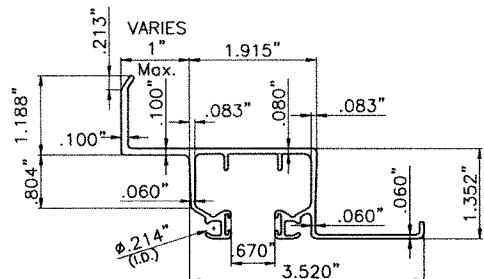
10 HV RAINGUARD

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



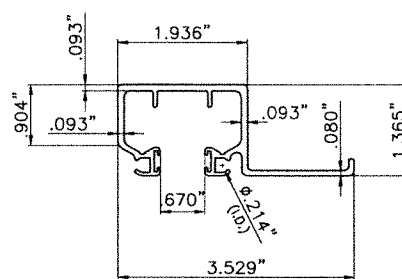
11 HV CEILING HEADER

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



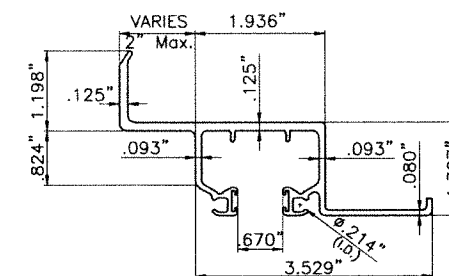
12 HV HEADER/SILL

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



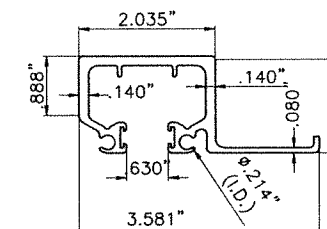
13 HD CEILING HEADER/SILL

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



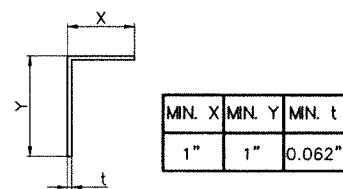
14 HD WALL HEADER/SILL

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



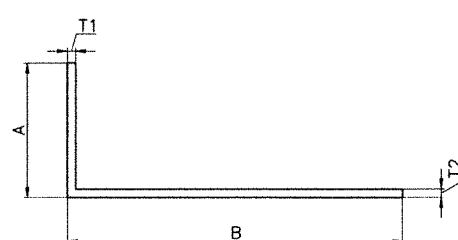
15 SHD CEILING HEADER/SILL

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



16 SIDE ANGLES

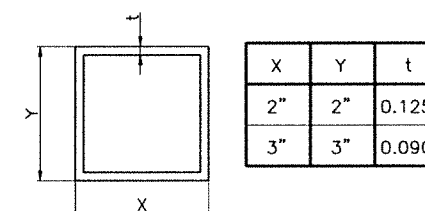
QUALIFIED FOR USE W/ HV
BLADE 1 & 2
6063-T6 ALLOY AND TEMPER



ALUMINUM ANGLES

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

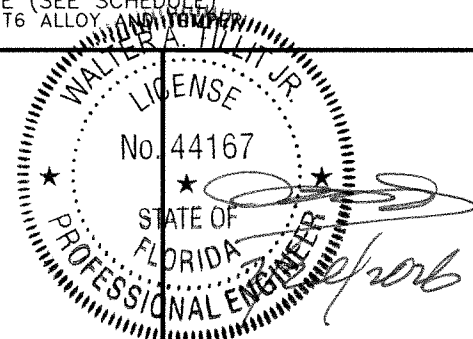
COMPONENT	A	B	T1	T2	BLADE QUALIFIED
17	2"	5" MAX.	1/8"	1/8"	HV 1
18	2"	5" MAX.	0.192"	0.192"	HV 2
19	2.5"	7" MAX.	0.190"	0.190"	HV 1



20 CORNER POSTS

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

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



P.E. SEAL/SIGNATURE/DATE

© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

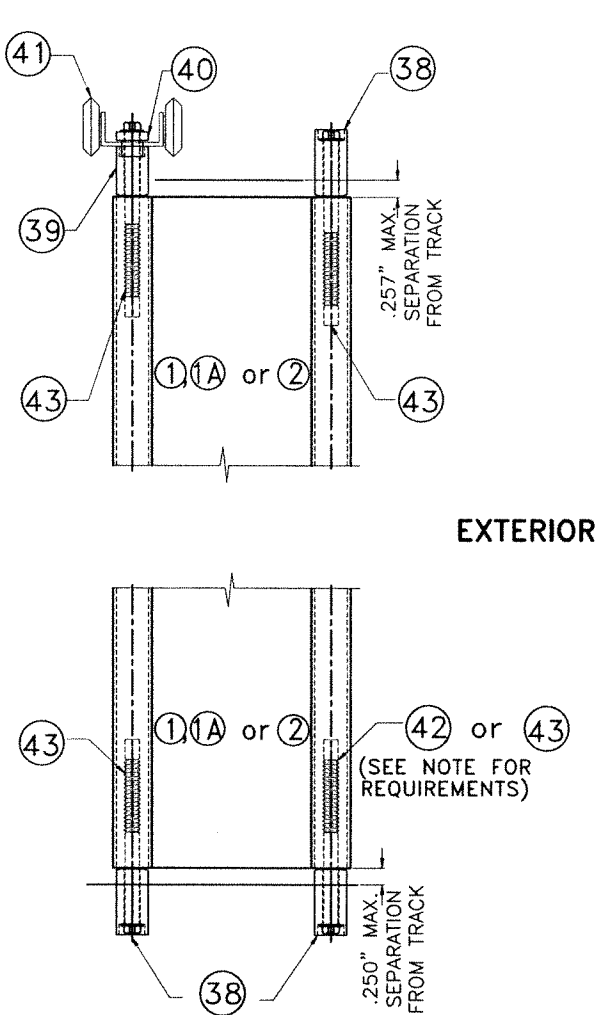
SHEET
2 OF 28

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)

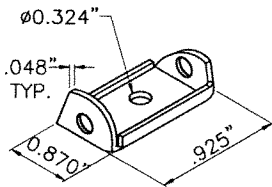
* HV PIN REQUIREMENTS AT EXTERIOR BLADE KNUCKLE FOR HV ① HV ①A & HV ② BLADES.

- (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.



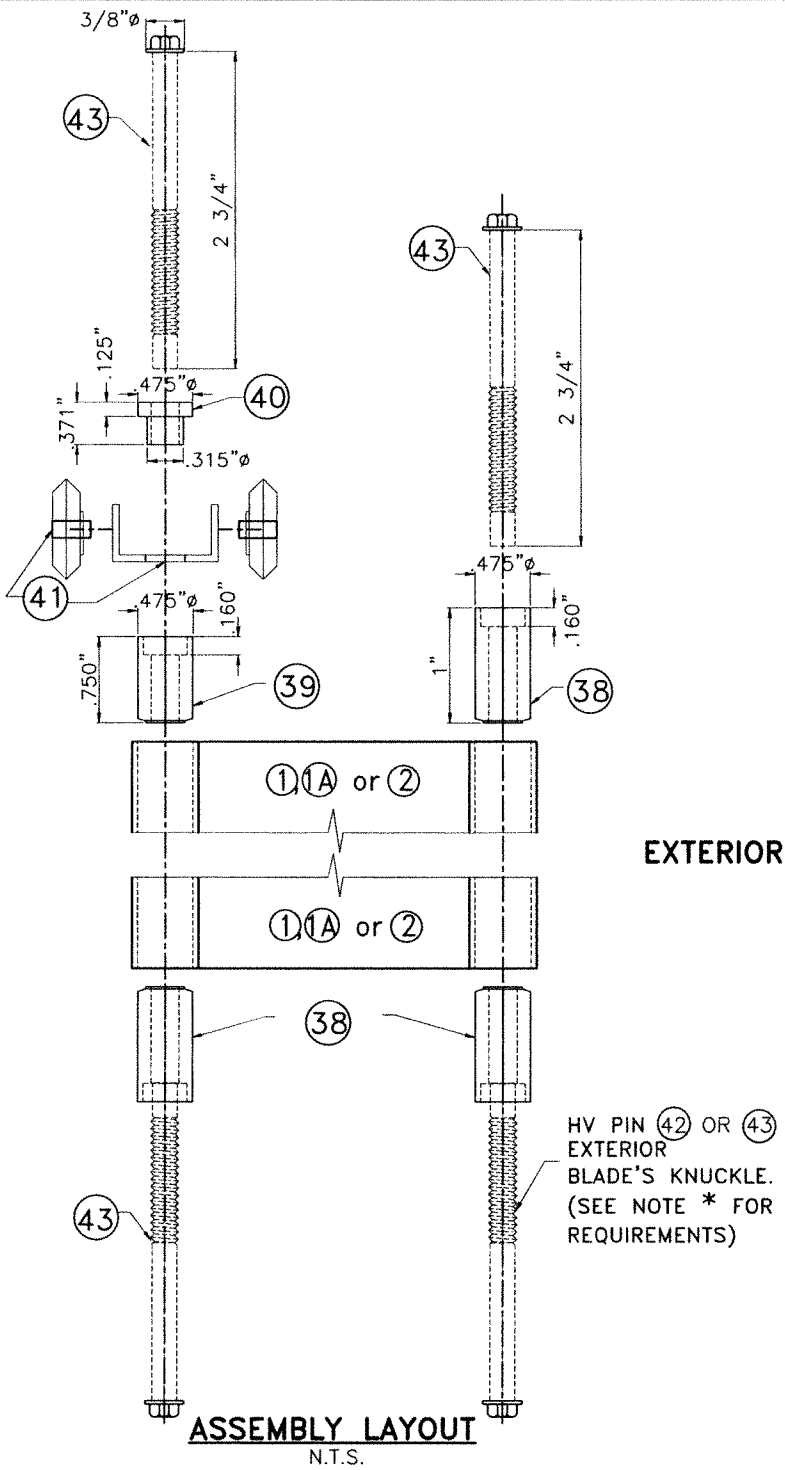
TYPICAL SHUTTER ASSEMBLY

SCALE: 3/8" = 1"



WHEEL CARRIAGE DETAIL

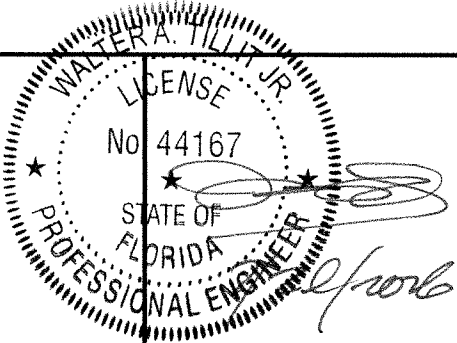
N.T.S.



ASSEMBLY LAYOUT

N.T.S.

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



P.E. SEAL/SIGNATURE/DATE

© 2026 TILTECO, INC.



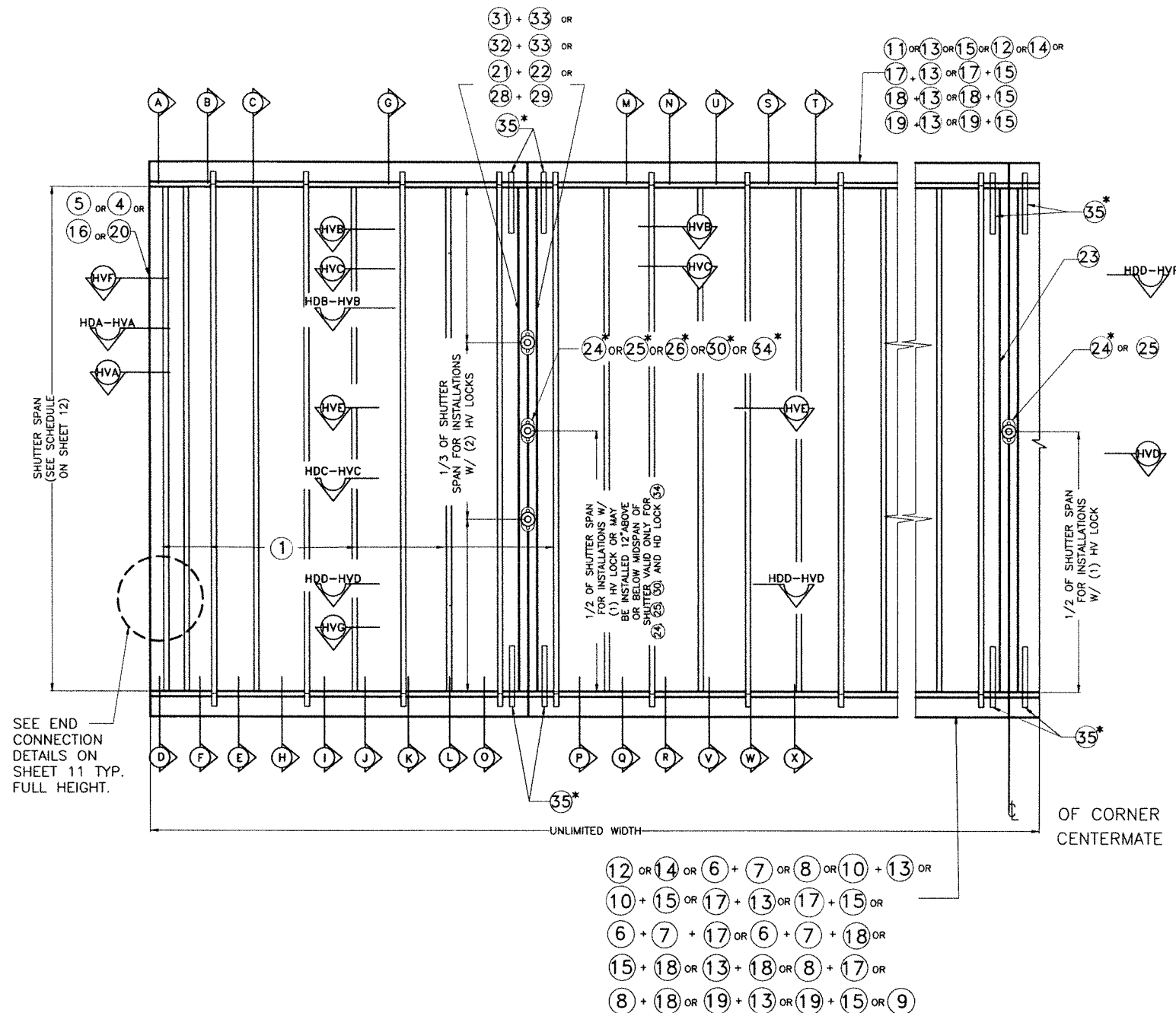
TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th. St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1530 . Fax : (305)871-1531
e-mail: tilteco@aol.com
CA-0006719
WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

A.S.S.A.

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

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			SHEET 4 OF 28
6			



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

*** NOTES ON HV LOCKS AND CENTERMATES:**

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

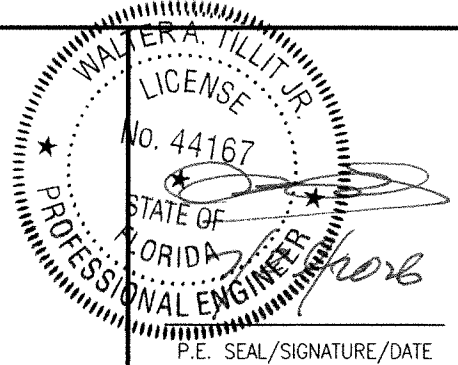
***NOTES ON HV "T" LOCKS AND CENTERMATES:**

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

***NOTES ON HD LOCKS & CENTERMATES:**

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

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 EASTERN METAL SUPPLY, INC.

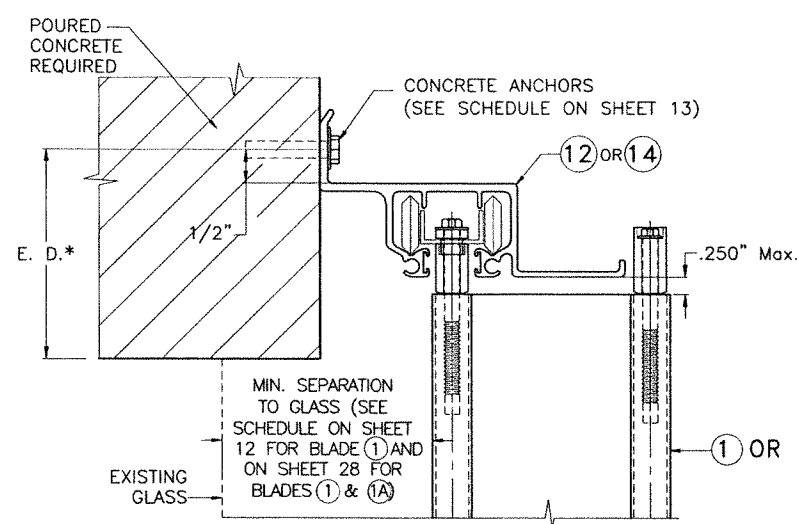
BERTHA HV™
Accordion Shutter System

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

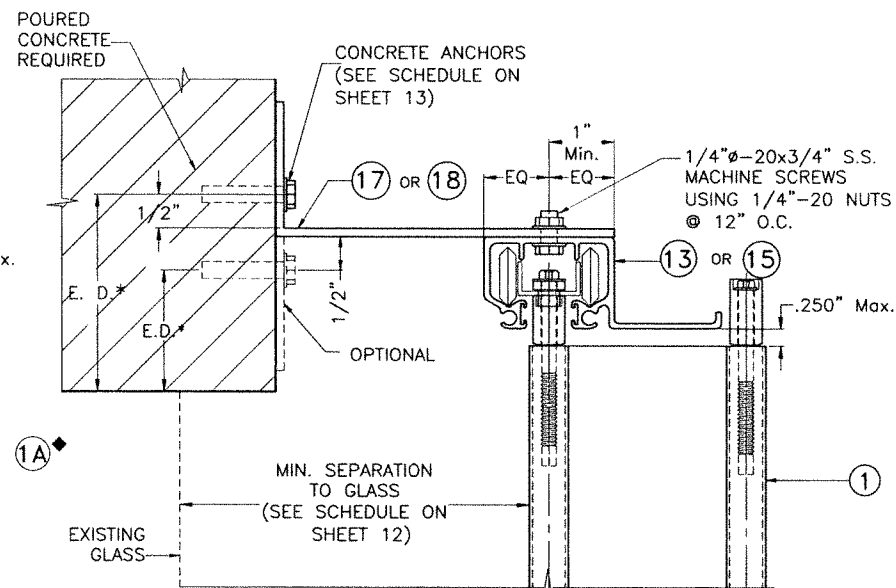
REV.No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

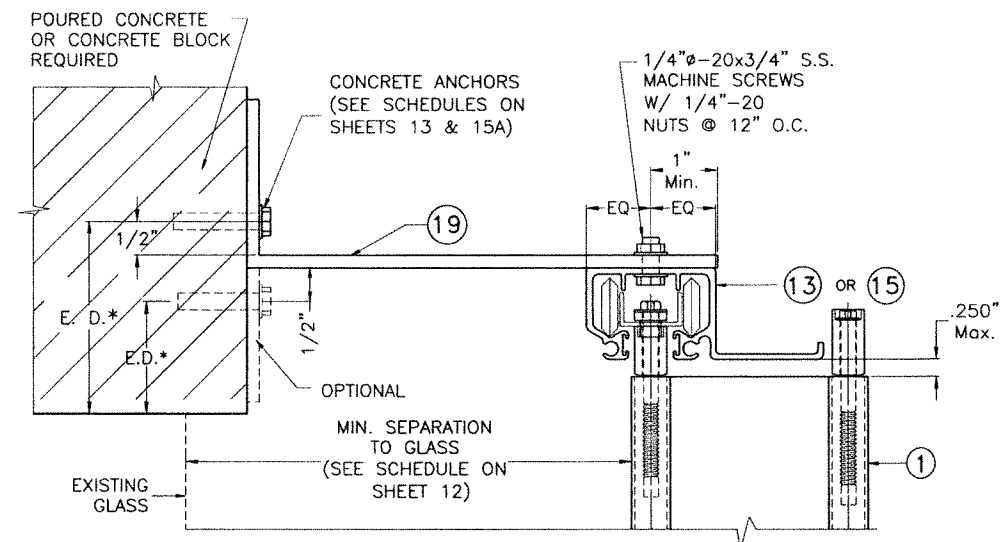
SHEET
5 OF 28



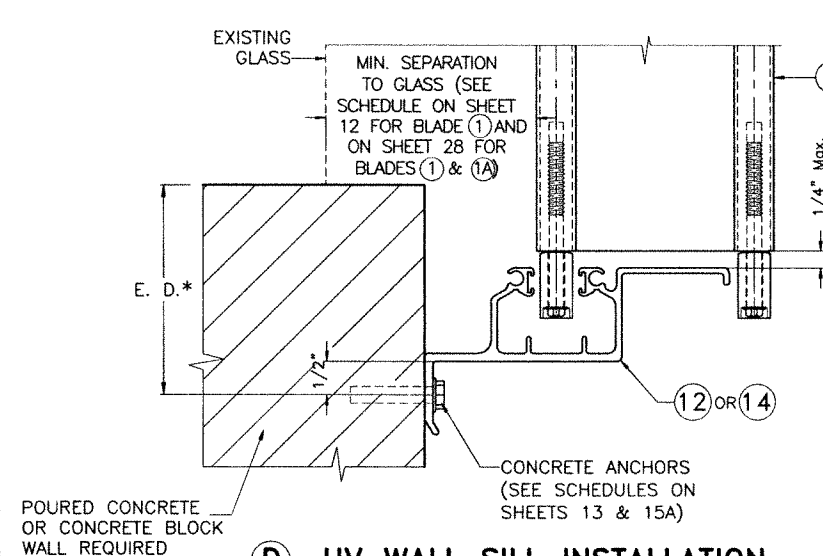
A HV WALL HEADER INSTALLATION



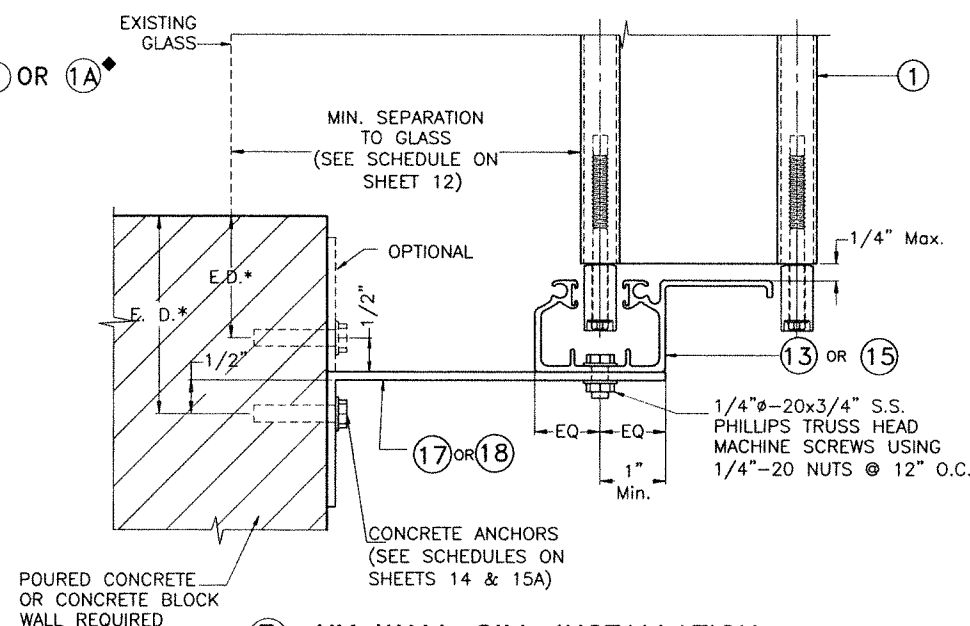
B HV WALL HEADER INSTALLATION



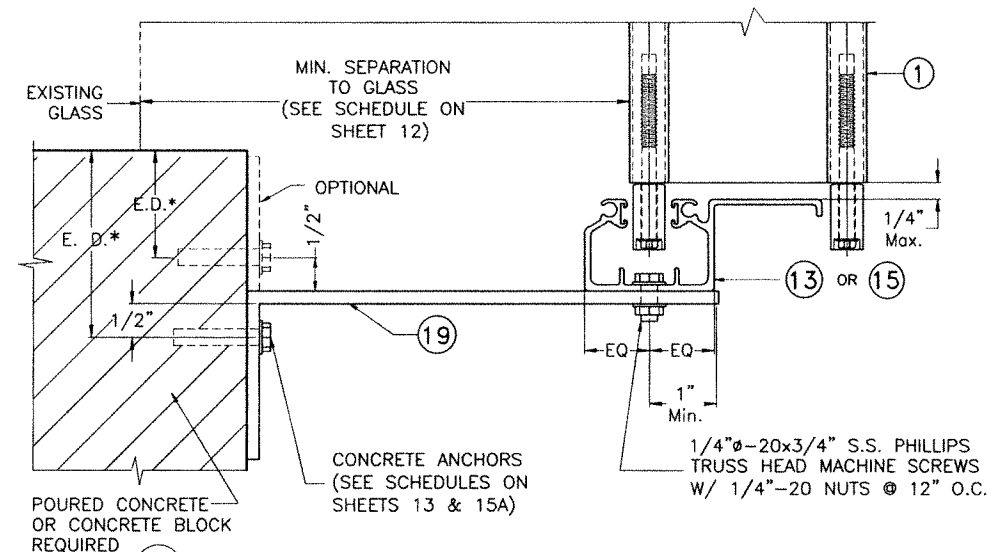
C HV WALL HEADER INSTALLATION



D HV WALL SILL INSTALLATION



E HV WALL SILL INSTALLATION



F HV WALL SILL INSTALLATION

NOTE FOR COMBINATION OF SECTIONS:

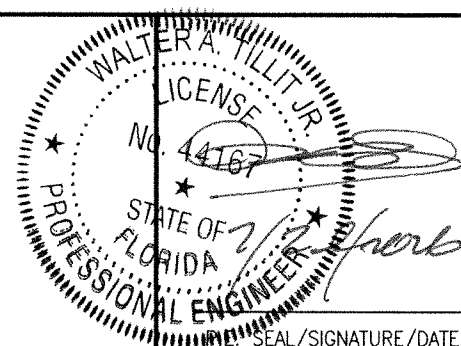
1- SEE SHEET 4 FOR TYPICAL SHUTTER ASSEMBLY
2- MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.

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

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

**INSTALLATION DETAILS W/
1 HV BLADE**

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 EASTERN METAL SUPPLY, INC.

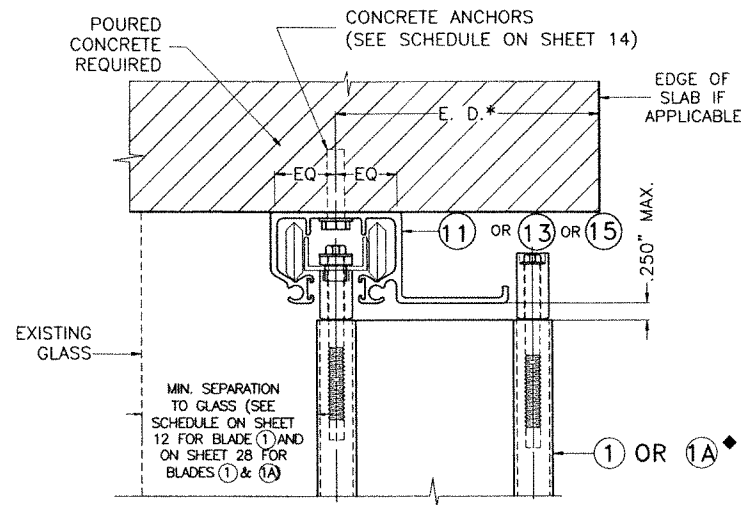
BERTHA HV™
Accordion Shutter System

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

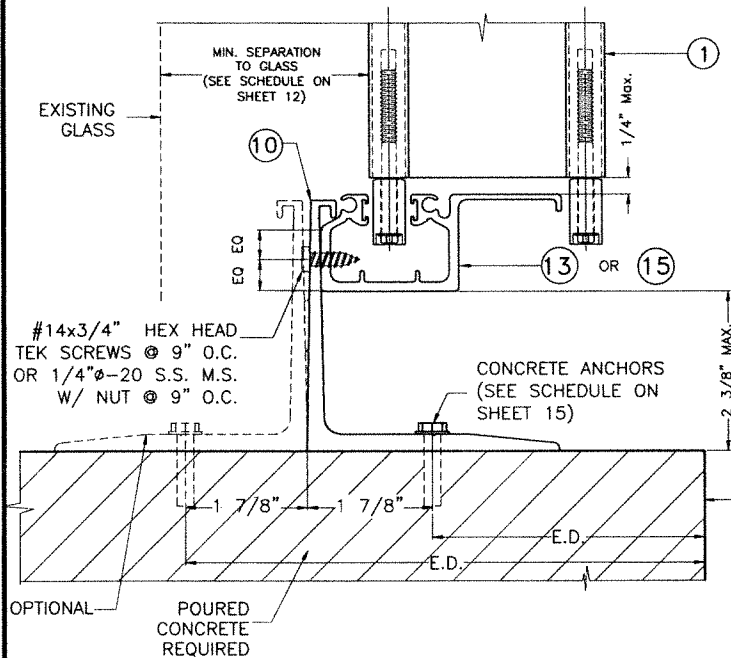
REV.No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

SHEET
6 OF 28



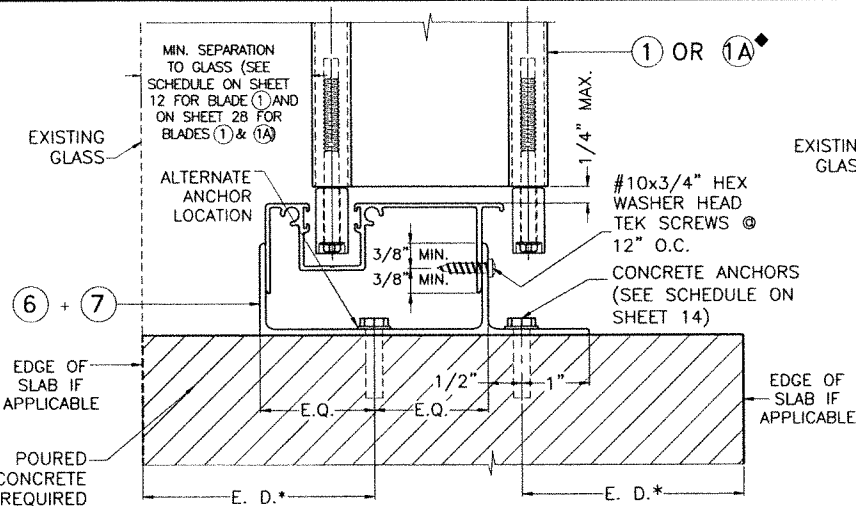
G HV CEILING INSTALLATION



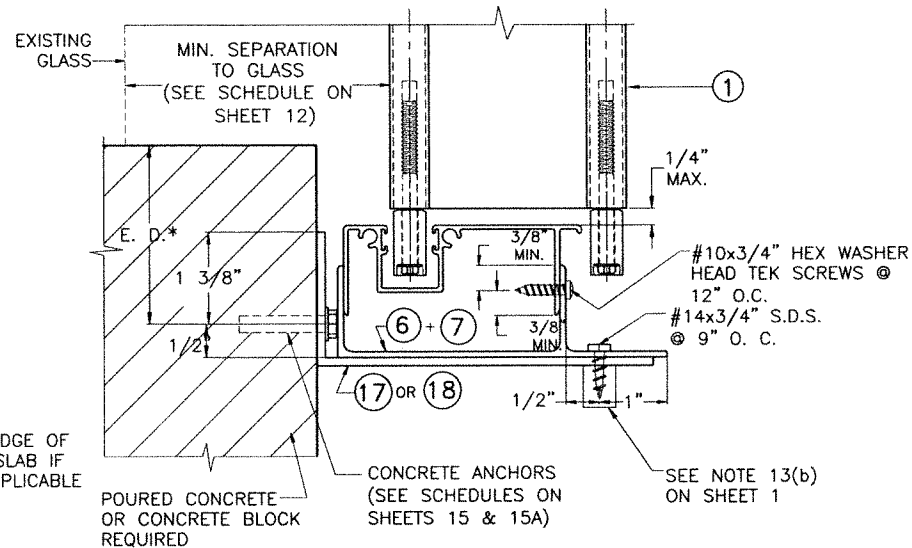
J HV RAINGUARD INSTALLATION †

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.

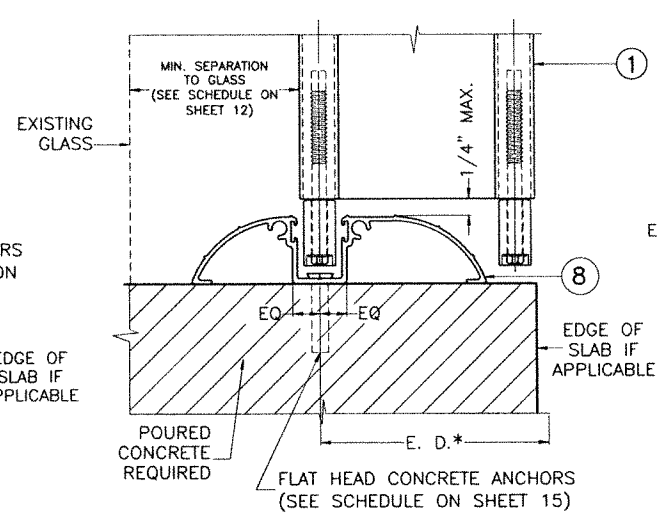
* E. D. = EDGE DISTANCE
(SEE SPECIFICATIONS ON SHEET 14)



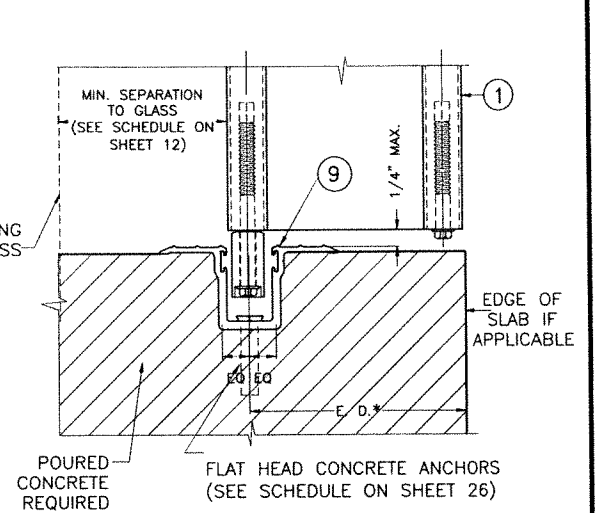
H HV FLOOR INSTALLATION †



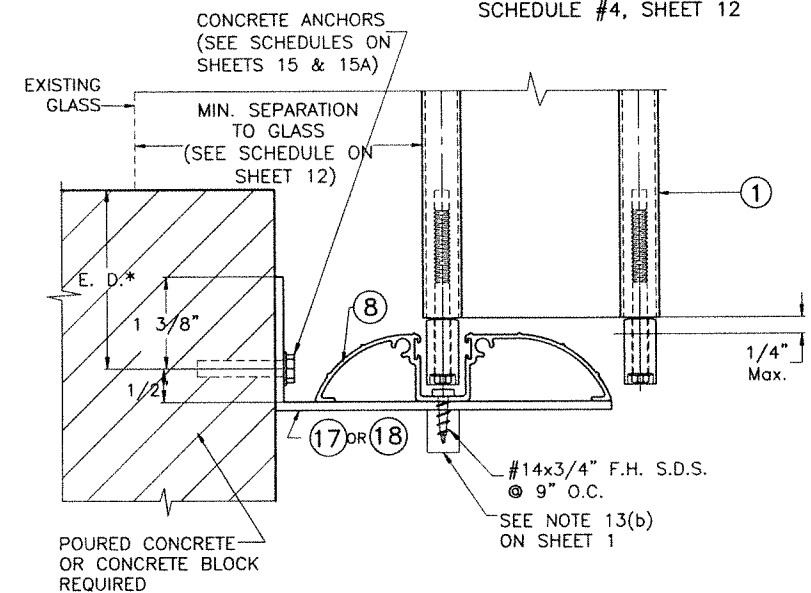
K HV WALL FLOOR INSTALLATION



I HV WALK-OVER INSTALLATION



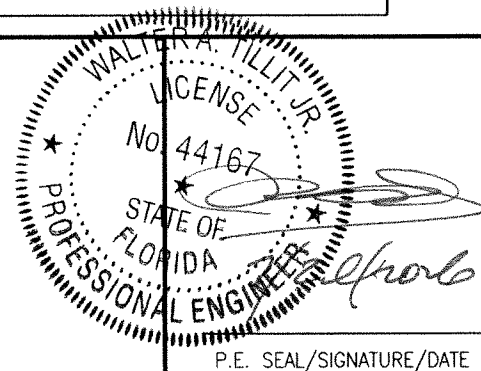
11 TRENCH INSTALLATION
VALID ONLY FOR UP TO +70, -75 PSF PRESSURE RATING & FOR SPANS PER SCHEDULE #4, SHEET 12



L HV WALL WALK-OVER INSTALLATION

INSTALLATION DETAILS W/ 1 HV BLADE

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



P.E. SEAL/SIGNATURE/DATE

© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

SHEET
7 OF 28

OUT

IN

EXISTING GLASS

* 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

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

#10x3/4" S.M.S. @ 12"
O.C. FULL LENGHT.

OPPOSING
CENTERMATES
w/ HV LOCK (24)* or (25)*

SYMMETRICAL
CENTERMATES
W/ HV LOCK (24)* or (25)*

MIN. SEPARATION
TO GLASS
(SEE SCHEDULE ON
SHEET 12)

HVAHVBHVC

EXISTING GLASS
MIN. SEPARATION TO GLASS
(SEE SCHEDULE ON SHEET 12)

24 or 25
OPTIONAL
(INTERIOR)

SYMMETRICAL
CENTERMATES
W/ HV LOCK (26)

OPTIONAL
(INTERIOR)

(12) OR (14) OR (6) + (7) OR (8) OR (10) + (13) OR
 (10) + (15) OR (17) + (13) OR (17) + (15) OR
 (6) + (7) + (17) OR (6) + (7) + (18) OR
 (15) + (18) OR (13) + (18) OR (8) + (17) OR
 (8) + (18) OR (19) + (13) OR (19) + (15) OR (9)

MIN. SEPARATION
TO GLASS
(SEE SCHEDULE ON
9 SHEET 12)

POURED CONCRETE OR
CONCRETE BLOCK WALL
REQUIRED

CONCRETE
ANCHORS @
16" O.C. in.

HVD

OUT

23

(EXTERIOR)

HVE

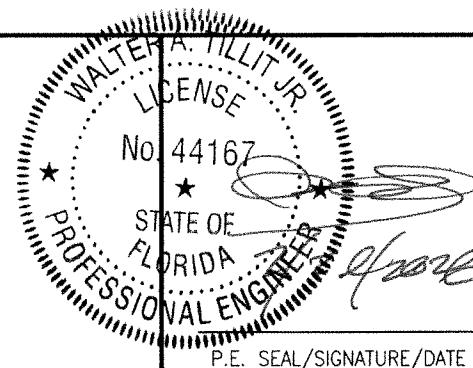
HVF**

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			SHEET 8 OF 28
6			



© 2026 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.

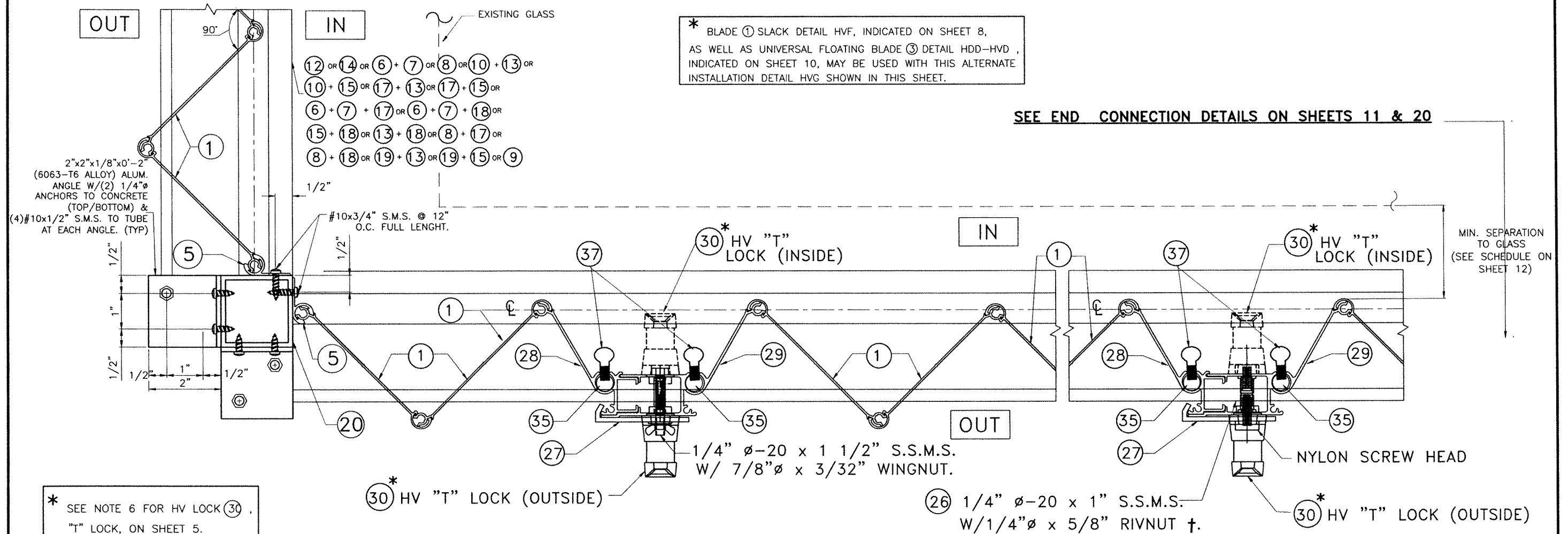
4268 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

BERTHA HV

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

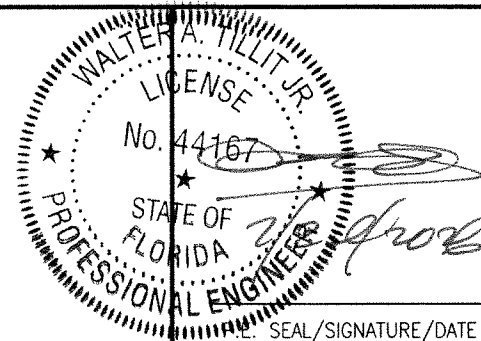
SEE END CONNECTION DETAILS ON SHEETS 11 & 20

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



HVG*

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 EASTERN METAL SUPPLY, INC.

BERTHA HV™
Accordion Shutter System

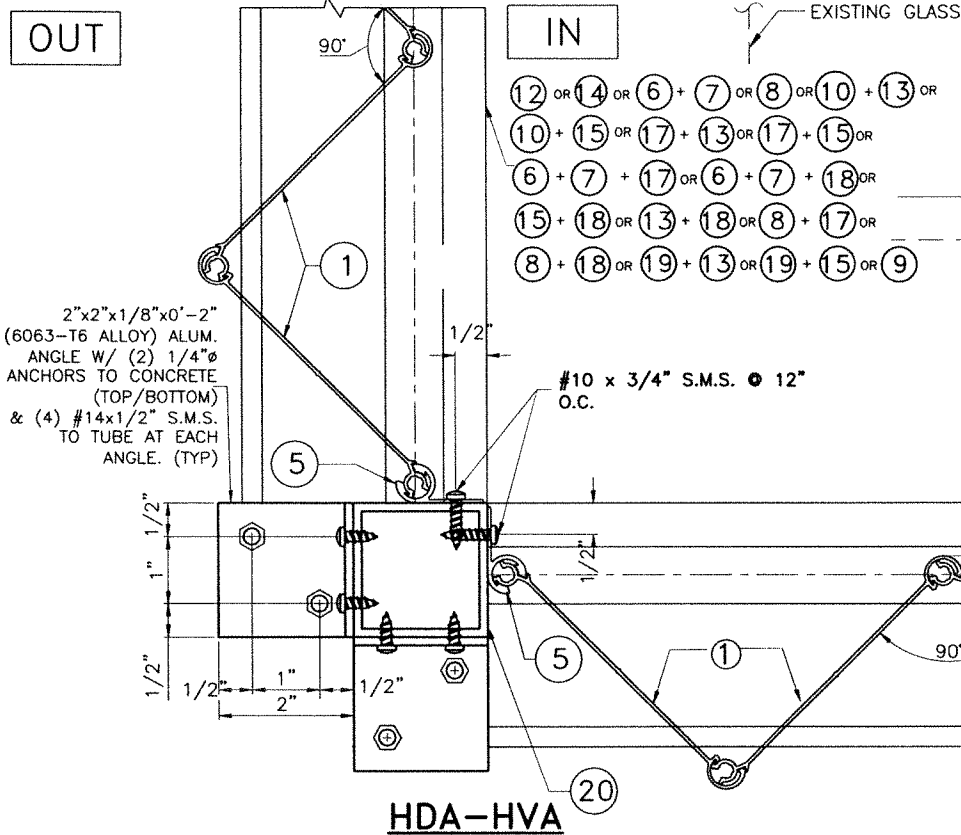
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

REV.No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

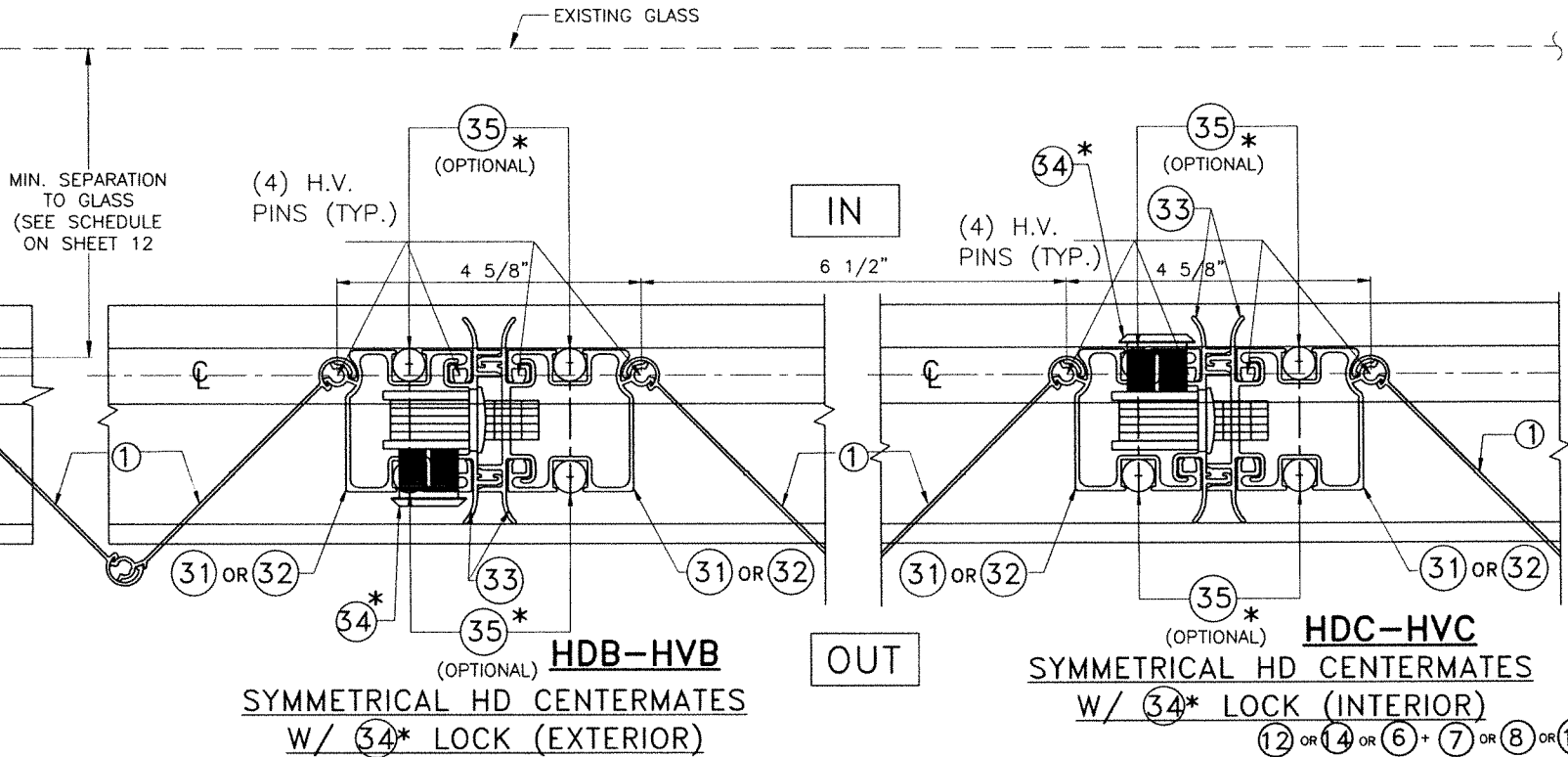
SHEET
9 OF 28

SEE END WALL CONNECTION DETAILS ON SHEETS 11 & 20

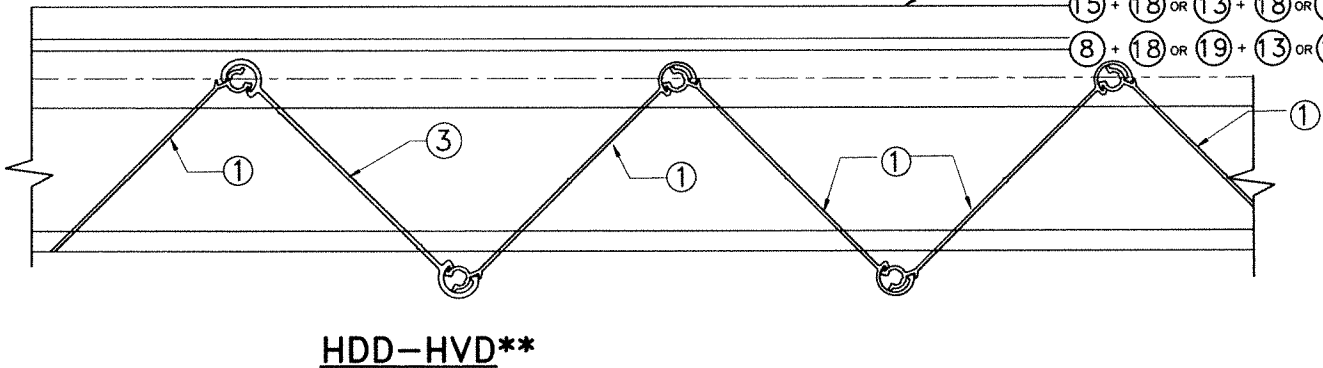


INSTALLATION ① HV BLADE
W/ HD CENTERMATES ③①, ③②, ③③

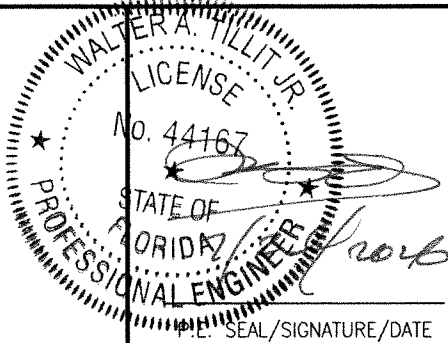
SEE END WALL CONNECTION
DETAILS ON SHEETS 11 & 20



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



FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 EASTERN METAL SUPPLY, INC.

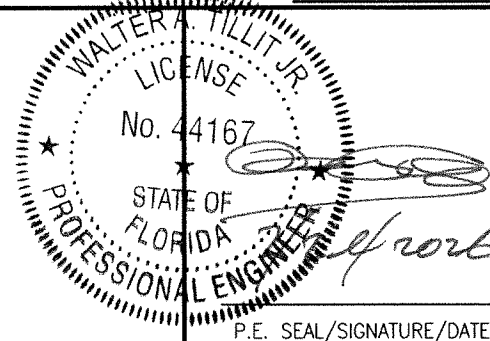
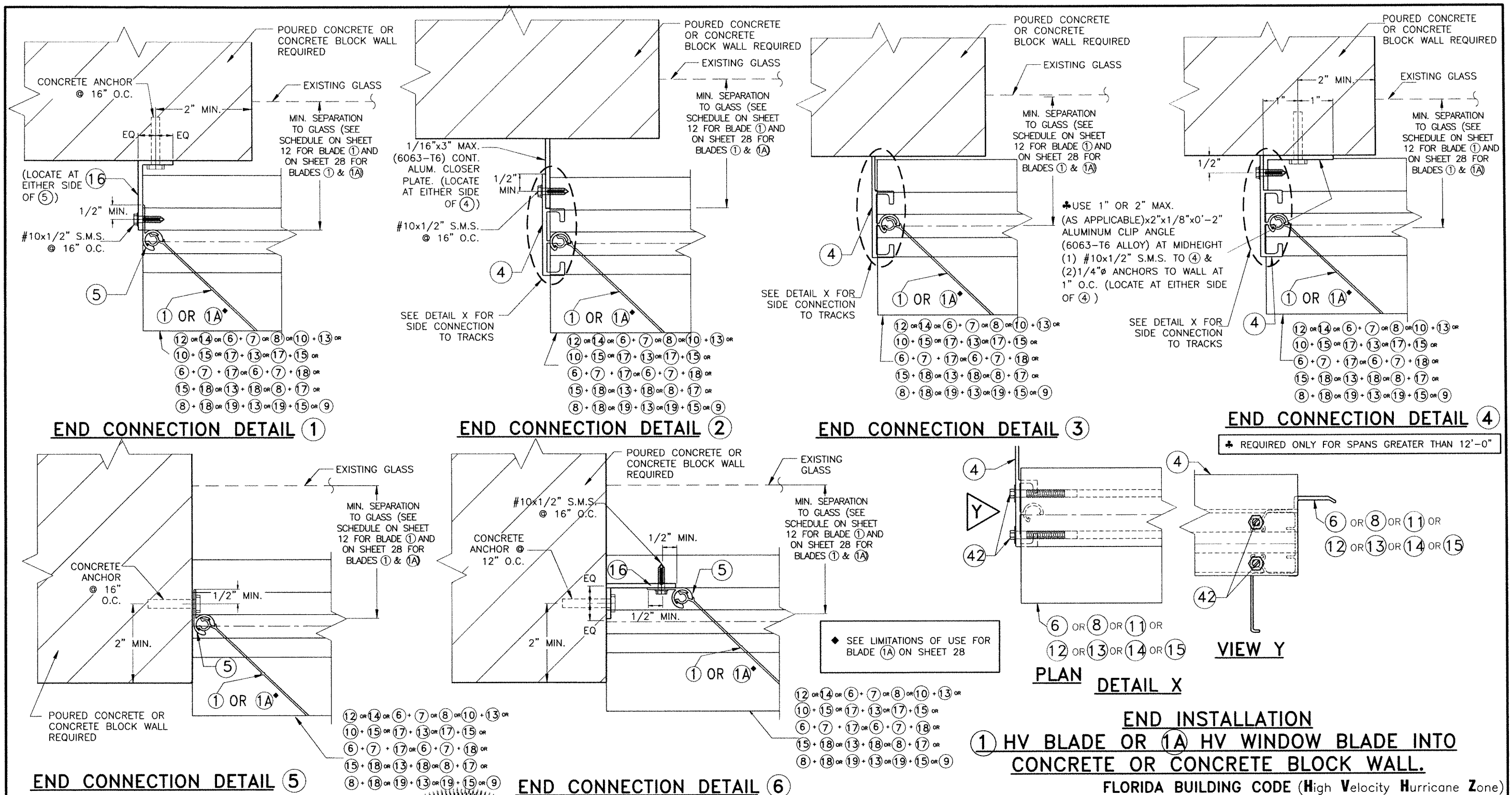
BERTHA HV™
Accordion Shutter System

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

REV.No	DESCRIPTION	DATE	DRAWN BY:	W.H.
1	OLD 23-128	6/30/26	DATE:	6/30/2026
2				
3				
4				
5				
6				

DRAWING No
26-105

SHEET
10 OF 28



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

SHEET
11 OF 28

SCHEDULE #1

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

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

SCHEDULE #2

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

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

SCHEDULE #3

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

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

SCHEDULE #4

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

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

* NOTES:

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

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

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

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

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

FOR A GIVEN POSITIVE A.S.D. DESIGN
PRESSURE RATING:
DETERMINE:

L1+= MAX. SPAN FOR WALL MOUNTING
INSTALLATIONS.

L2+= MAX. SPAN FOR FLOOR/CEILING
MOUNTING INSTALLATIONS.

FOR A GIVEN NEGATIVE A.S.D. DESIGN
PRESSURE RATING:
DETERMINE:

L1-= MAX. SPAN FOR WALL MOUNTING
INSTALLATIONS.

L2-= MAX. SPAN FOR FLOOR/CEILING
MOUNTING INSTALLATIONS.

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

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

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

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

♦ SEPARATION TO GLASS REQUIREMENTS

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

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

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

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

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

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

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

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

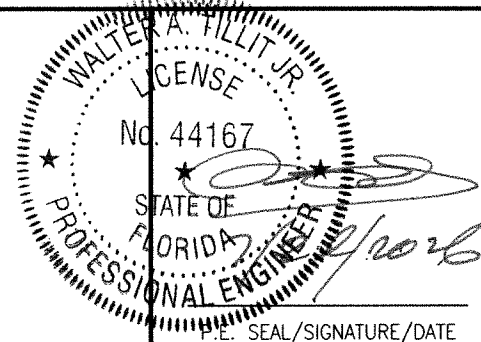
*** USE 4 1/8" FOR HV "T" LOCK (30) W/ (35)
USE INDICATED VALUES FOR HV CENTERMATES.

INSTALLATION LEGEND

	CONCRETE & MANSORY	WOOD
WALL MOUNTING	A, B, C, D, E, F, K & L.	M, N, O, P, Q, R, S & V.
FLOOR/CEILING MOUNTING	G, H, I, I1 & J.	T, U, W & X.

① HV BLADE

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

SHEET
12 OF 28

ANCHORS SPACING LEGEND

BLUE TAP

* SEE ANCHOR
SPECIFICATIONS
ON SHEET 14

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

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

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

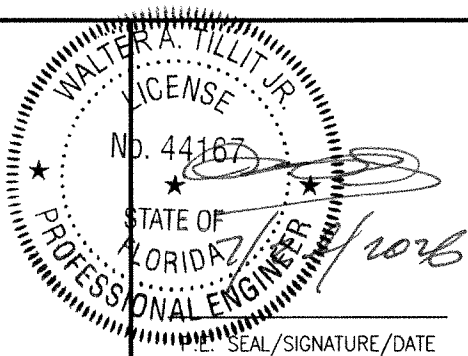
© 2026 EASTERN METAL SUPPLY, INC.

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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			SHEET 13 OF 28
6			

MAXIMUM SPAN (ft)	POURED CONCRETE																																																					
	(A) WALL HEADER MOUNTING W/ (12)									(A) WALL HEADER MOUNTING W/ (14)									(B) WALL HEADER MOUNTING									(D) WALL SILL MOUNTING W/ (12)									(D) WALL SILL MOUNTING W/ (14)									(C) & (F) WALL HEADER/SILL MOUNTING								
	A.S.D. DESIGN NEGATIVE LOAD (psf)									A.S.D. DESIGN NEGATIVE LOAD (psf)									A.S.D. DESIGN NEGATIVE LOAD (psf)									A.S.D. DESIGN NEGATIVE LOAD (psf)									A.S.D. DESIGN NEGATIVE LOAD (psf)									A.S.D. DESIGN NEGATIVE LOAD (psf)								
	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205						
3'-0" OR LESS	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	-	14	12	10	9	8	8	6	5.5	8	8	8	8	8	8	7	5.5	8	8	8	8	8	6.5
	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	3	14	12	10	9	8	8	6	6	8	8	8	8	8	8	8	8	7					
	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	-	14	12	10	9	8	8	6	6	8	8	8	8	8	8	8	8	7					
4'-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	7	-	-	14	12	10	9	8	7	5.5	-	8	8	8	8	8	8	7	5.5	4	8	8	8	8	7
	14	12	10	9	8	8	4.5	-	14	12	10	9	8	8	6	4	14	12	10	9	8	8	6	4	14	12	10	9	8	8	-	-	14	12	10	9	8	8	6	-	8	8	8	8	8	8	8	6.5	5	8	8	8	8	7
	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	-	-	14	12	10	9	8	8	6	-	8	8	8	8	8	8	7	5.5	5	8	8	8	8	7
5'-0"	14	12	10	9	8	8	4.5	-	14	12	10	9	8	8	6	3.5	14	12	10	9	8	8	6	6	14	12	10	9	7.5	-	-	-	14	12	10	9	7.5	5.5	-	-	8	8	8	8	8	7.5	5.5	4	3	8	8	8	8	7
	14	12	10	9	8	5.5	-	-	14	12	10	9	8	8	4.5	-	14	12	10	9	8	8	6	5	14	12	10	9	8	3	-	-	14	12	10	9	8	7	-	-	8	8	8	8	8	8	7	5	4	8	8	8	8	7
	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	3.5	14	12	10	9	8	8	6	6	14	12	10	9	8	-	-	-	14	12	10	9	8	7.5	-	-	8	8	8	8	8	8	7.5	5.5	4	8	8	8	8	7
6'-0"	14	12	10	9	8	5.5	3	-	14	12	10	9	8	8	4.5	-	14	12	10	9	8	8	6	6	14	12	9.5	7.5	4	-	-	-	14	12	9.5	7.5	6.5	3.5	-	-	8	8	8	7.5	6.5	4.5	3.5	-	8	8	8	8	7.5	
	14	12	10	9	8	3	-	-	14	12	10	9	8	8	-	-	14	12	10	9	8	8	-	-	14	12	10	9	8	4.5	-	-	14	12	10	9	7.5	4	-	-	8	8	8	8	7.5	5.5	4	3	8	8	8	8	7.5	
	14	12	10	9	8	5	-	-	14	12	10	9	8	8	4	-	14	12	10	9	8	8	6	5.5	14	12	10	9	5	-	-	-	14	12	10	9	8	4.5	-	-	8	8	8	8	8	6	4.5	-	8	8	8	8	6	
7'-0"	14	12	10	9	8	4	-	-	14	12	10	9	8	6.5	3	-	14	12	10	9	8	8	6	-	14	12	8	4.5	-	-	-	14	12	8	6.5	5.5	-	-	-	8	8	8	6.5	5.5	4	3	-	8	8	8	8	6.5		
	14	12	10	9	4.5	-	-	-	14	12	10	9	8	4	-	-	14	12	10	9	8	7	4	-	14	12	10	5.5	-	-	-	14	12	10	8	6.5	-	-	-	8	8	8	8	6.5	5	3.5	-	8	8	8	8	6.5		
	14	12	10	9	7.5	3.75	-	-	14	12	10	9	8	6	-	-	14	12	10	9	8	8	6	-	14	12	10	6	-	-	-	14	12	10	8.5	7	-	-	-	8	8	8	8	7	5	4	-	8	8	8	8	7		
8'-0"	14	12	10	9	5.5	3	-	-	14	12	10	9	8	4.5	-	-	14	12	10	9	8	8	-	-	14	11	7	-	-	-	-	14	11	7	5.5	3.5	-	-	-	8	8	7	5.5	4.5	3.5	-	-	8	8	7	5.5	4		
	14	12	10	5.5	3	-	-	-	14	12	10	9	8	-	-	-	14	12	10	9	8	5.5	-	-	14	12	8.5	3	-	-	-	14	12	8.5	7	4	-	-	-	8	8	8	7	5.5	4	3	-	8	8	8	8	7		
	14	12	10	9	5	-	-	-	14	12	10	9	8	4	-	-	14	12	10	9	8	8	-	-	14	12	9.5	-	-	-	-	14	12	9.5	7.5	4.5	-	-	-	8	8	8	7.5	6	4.5	-	-	8	8	8	8	7.5		
9'-0"	14	12	10	6.5	4.5	-	-	-	14	12	10	9	7.5	-	-	-	14	12	10	9	8	-	-	-	13	9.5	4	-	-	-	-	13	9.5	6.5	5	-	-	-	-	8	8	6.5	5	4	3	-	-	8	8	6.5	5	4		
	14	12	8.5	4	-	-	-	-	14	12	10	9	4.5	-	-	-	14	12	10	9	7.5	-	-	-	14	11.5	4.5	-	-	-	-	14	11.5	7.5	6	-	-	-	-	8	8	7.5	6	5	4	-	-	8	8	7.5	6	5		
	14	12	10	6	4	-	-	-	14	12	10	9	7	-	-	-	14	12	10	9	8	-	-	-	14	12	5	-	-	-	-	14	12	8	6.5	-	-	-	-	8	8	8	6.5	5.5	4	-	-	8	8	8	8	6.5		
10'-0"	14	12	9.5	5	3.5	-	-	-	14	12	10	9	5.5	-	-	-	14	12	10	9	8	-	-	-	11.5	8.5	-	-	-	-	-	11.5	8.5	5.5	-	-	-	-	-	8	8	5.5	4.5	3.5	-	-	-	8	8	5.5	4.5	3.5		
	14	12	5.5	3	-	-	-	-	14	12	10	6	3	-	-	-	14	12	10	9	6	-	-	-	14	10.5	3	-	-	-	-	14	10.5	7	3.5	-	-	-	-	8	8	7	5.5	4.5	3.5	-	-	-	8	8	7	5.5	4.5	
	14	12	9	4.5	3	-	-	-	14	12	10	9	5	-	-	-	14	12	10	9	8	-	-	-	14	11	7.5	-	-	-	-	14	11	7.5	-	-	-	-	-	8	8	7.5	6	5	-	-	-	8	8	7.5	6	5		
11'-0"	14	12	7	-	-	-	-	-	14	12	10	-	-	-	-	-	14	12	10	-	-	-	-	10.5	8	-	-	-	-	-	10.5	8	5	-	-	-	-	-	8	8	5	4	3.5	-	-	-	8	8	5	4	3.5			
	14	12	4	-	-	-	-	-	14	12	10	-	-	-	-	-	14	12	10	-	-	-	-	12.5	9.5	-	-	-	-	-	12.5	9.5	6	-	-	-	-	-	8	8	6	5	4	3	-	-	-	8	8	6	5	4		
	14	12	6.5	-	-	-	-	-	14	12	10	-	-	-	-	-	14	12	10	-	-	-	-	13.5	10	-	-	-	-	-	14	10	7	-	-	-	-	-	8	8	7	5.5	4.5	-	-	-	8	8	7	5.5	4.5			
12'-0"	14	12	5.5	-	-	-	-	-	14	12	10	-	-	-	-	-	14	12	10	-	-	-	-	9.5	7	-	-	-	-	-	9.5	7	3.5	-	-	-	-	-	8	7	4.5	3.5	3	-	-	-	8	7	4.5	3.5	3			
	14	12	3	-	-	-	-	-	14	12	8	-	-	-	-	3	14	12	10	-	-	-	-	11.5	8.5	-	-	-	-	-	11.5	8.5	4	-	-	-	-	-	8	8	5.5	4.5	4	-	-	-	8	8	5.5	4.5	4			
	14	12	5	-	-	-	-	-	14	12	10	-	-	-	-	-	14	12	10	-	-	-	-	12.5	9.5	-	-	-	-	-	13.5	9.5	4.5	-	-	-	-	-	8	8	6	5	4	-	-	-	8	8	6	5	4			
13'-0"	14	12	-	-	-	-	-	-	14	12	-	-	-	-	-	-	14	12	-	-	-	-	-	9	4.5	-	-	-	-	-	9	6.5	-	-	-	-	-	-	8	6.5	4.5	3.5	3	-	-	-	8	6.5	4.5	3.5	3			
	14	10	-	-	-	-	-	-	14	12	-	-	-	-	-	-	14	12	-	-	-	-	-	10.5	5.5	-	-	-	-	-	10.5	8	-	-	-	-	-	-	8	8	5	4	3.5	-	-	-	8	8	5	4	3.5			
	14	12	-	-	-	-	-	-	14	12	-	-	-	-	-	-	14	12	-	-	-	-	-	11.5	6	-	-	-	-	-	11.5	8.5	-	-	-	-	-	-	8	8	5.5	4.5	-	-	-	-	8	8	5.5	4.5	-			
14'-0"	14	12	-	-	-	-	-	-	14	12	-	-	-	-	-	-	14	12	-	-	-	-	-	8	3	-	-	-	-	-	8	6	-	-	-	-	-	-	8	6	4	3	-	-	-	-	8	6	4	3	-			
	14	7	-	-	-	-	-	-	14	12	-	-	-	-	-	-	14	12	-	-	-	-	-	10	4	-	-	-	-	-	10	7.5	-	-	-	-	-	-	8	7.5	5	4	3	-	-	-	8	7.5	5	4	3			
	14	11.5	-	-	-	-	-	-	14	12	-	-	-	-	-	-	14	12	-	-	-	-	-	10.5	4	-	-	-	-	-	10.5	8	-	-	-	-	-	-	8	8	5	4	-	-	-	-	8	8	5	4	-			
15'-0"	14</																																																					



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

BERTHA HV

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

MAXIMUM SPAN (ft)	POURED CONCRETE																										
	Ⓔ WALL SILL MOUNTING									Ⓖ CEILING MOUNTING									Ⓗ 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	5			
4'-0"	14	12	10	9	8	8	6	7	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6			
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	12	10	9	8	8	6	5.5			
	14	12	10	9	8	8	6	4	14	12	10	9	8	8	6	4.5	14	12	10	9	8	6	4	3.5			
5'-0"	14	12	10	9	8	8	6	4.5	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	4.5			
	—	—	—	9	7.5	5.5	3.5	—	14	12	10	9	8	8	6	5	14	12	10	9	8	7	5.5	4			
	14	12	10	9	8	7	4	—	14	12	10	9	8	6.5	5	3.5	14	12	10	8	6.5	5	3.5	3			
6'-0"	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	10	9	8	7.5	5.5	4	14	12	10	9	8	6	4.5	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	—			
7'-0"	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	10	9	8	6.5	4.5	3.5	14	12	10	8	7	5	3.5	3			
	14	12	10	8	6.5	4	—	—	14	12	9	7.5	6	4.5	3.5	—	14	12	10	9	7.5	5.5	4	3			
8'-0"	14	12	10	8.5	7	4	—	—	14	12	10	9	7.5	5.5	4	—	14	12	9	7	7.5	4.5	—	—			
	—	—	7	5.5	4.5	—	—	—	14	12	10	9	7.5	5.5	4	—	14	12	9	7	6	4.5	3	—			
	14	11	7	5.5	4.5	—	—	—	14	12	10	9	7.5	5.5	4	—	14	12	10	8	6.5	5	3.5	—			
9'-0"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	12	10	7	6	4.5	3	—			
	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	—	—			
10'-0"	13	9.5	6.5	5	3.5	—	—	—	14	12	10	8	6.5	5	—	—	14	12	8	6.5	5	4	—	—			
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	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	—	—	—			
11'-0"	14	12	8	6.5	4.5	—	—	—	14	12	8.5	7	5.5	4	—	—	14	10.5	7	5.5	6	4.5	—	—			
	—	—	—	—	—	—	—	—	14	12	9	7	6	4.5	—	—	14	11	7	5.5	4.5	3.5	—	—			
	11.5	8.5	5.5	4	—	—	—	—	14	12	9	7	6	4.5	—	—	14	11	7	5.5	4.5	3.5	—	—			
12'-0"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	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	—	—			
13'-0"	10.5	8	5	—	—	—	—	—	14	12	8	6.5	5.5	4	—	—	13	10	6.5	5	4	3	—	—			
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	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'-0"	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	—	—	—			
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	10	6.5	5	4	—	—	—			
15'-0"	11.5	8.5	4.5	—	—	—	—	—	11	8	5.5	4	3.5	—	—	—	8	6	4	3	—	—	—	—			
	13.5	9.5	6	—	—	—	—	—	13	9.5	6.5	5	4	—	—	—	10.5	8	5	4	—	—	—	—			
	9	6.5	—	—	—	—	—	—	14	10.5	7	5.5	4.5	—	—	—	11	8.5	5.5	4.5	3.5	—	—	—			
16'-0"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	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	—	—	—	—			
17'-0"	8	6	—	—	—	—	—	—	13	9.5	6.5	5	—	—	—	—	10.5	7.5	5	4	—	—	—	—			
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	8.5	5.5	4.5	—	—	—	—			
	10	7.5	—	—	—	—	—	—	9	7	4.5	3.5	—	—	—	—	7	5	3.5	3	—	—	—	—			
18'-0"	11.5	8	—	—	—	—	—	—	11	8	5.5	4.5	—	—	—	—	9	6.5	4.5	—	—	—	—	—			
	7.5	—	—	—	—	—	—	—	12	9	6	—	—	—	—	—	9.5	7	4.5	—	—	—	—	—			
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10.5	8	5	—	—	—	—	—			
19'-0"	9	—	—	—	—	—	—	—	8.5	6.5	4	—	—	—	—	—	6.5	5	3	—	—	—	—	—			
	10	—	—	—	—	—	—	—	10.5	8	5	—	—	—	—	—	8.5	6	4	—	—	—	—	—			
	7	—	—	—	—	—	—	—	11.5	8.5	5.5	—	—	—	—	—	9	6.5	4.5	—	—	—	—	—			
20'-0"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	7.5	5	—	—	—	—	—			
	8	—	—	—	—	—	—	—	8	6	4	—	—	—	—	—	6	4.5	3	—	—	—	—	—			
	9.5	—	—	—	—	—	—	—	9.5	7	5	—	—	—	—	—	8	6	—	—	—	—	—	—			

ANCHORS SPACING LEGEND

410 SS TAPCON OR ULTRACON+ OR ULTRACON SS4
ELCO FEMALE PANEL MATE
BLUE TAP W/ CAP

♦ SEE LIMITATIONS OF USE FOR
BLADE Ⓐ ON SHEET 28

① HV BLADE OR
① HV BLADE W/
Ⓐ 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 410 SS TAPCON ANCHORS, OR 1/4"Ø ULTRACON+ OR 1/4"Ø ULTRACON SS4 ANCHORS AS MANUFACTURED BY I.T.W. BUILDDEX OR DEWALT RESPECTIVELY. (Min. f'c = 3 ksi)
- 1/4"Ø ELCO FEMALE PANEL MATE BY ELCO CONSTRUCTIONS PRODUCTS. (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)
- NOTES:
- A.1) MINIMUM EMBEDMENT INTO POURED CONCRETE OF ANCHORS IS 1 3/4".
- A.2) 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 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 410 SS TAPCON ANCHORS, OR 1/4"Ø ULTRACON+ OR 1/4"Ø ULTRACON SS4 ANCHORS AS MANUFACTURED BY I.T.W. BUILDDEX OR DEWALT RESPECTIVELY.
- 1/4"Ø BLUE TAP CONCRETE ANCHORS W/ CAP AS MANUFACTURED BY FLORIDA FASTENERS DIRECT, INC.
- NOTES:
- B.1) MINIMUM EMBEDMENT INTO CONCRETE BLOCK ANCHORS IS 1 1/4".
- B.2) 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 B.1) 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.
- (C) ANCHORS SHALL BE INSTALLED FOLLOWING ALL OF THE RECOMMENDATIONS AND SPECIFICATIONS OF THE ANCHOR'S MANUFACTURER.
- (D) SEE SCHEDULE BELOW FOR EDGE DISTANCE (E.D.) VERSUS SPACING RELATIONSHIP FOR ANCHORS.

EDGE DISTANCE VERSUS SPACING SCHEDULE FOR ANCHORS:				
MAXIMUM ANCHOR SPACINGS ARE VALID FOR EDGE DISTANCES INDICATED BELOW. FOR E. D. LESS THAN THE INDICATED, REDUCE ANCHOR SPACING BY MULTIPLYING SPACING SHOWN ON SCHEDULE BY THE FOLLOWING FACTORS. REDUCED SPACING OBTAINED USING FACTOR SHALL NOT BE LESS THAN MINIMUM SPACING INDICATED FOR EACH ANCHOR TYPE.				
ACTUAL EDGE DISTANCE E.D.	FACTOR			
	TAPCON OR ULTRACONS		ELCO FEMALE PANEL MATE	BLUE TAP W/ CAP
	MIN. SPACING		MIN. SPACING = 3 1/2"	MIN. SPACING = 3"
	3"	4"	POURED CONCRETE MIN. E.D. = 3 1/2"	POURED CONCRETE & CONCRETE BLOCK MIN. E.D. = 3"
3"	0.90	1.0	0.78	1.0
2 1/2"	0.81	1.0	—	—
2"	0.71	—	—	—
1 3/4"	0.91 (Ⓐ & Ⓑ MOUNTINGS ONLY)	—	—	—

*ONLY STAINLESS STEEL ANCHORS ARE ALLOWED AT INSTALLATIONS WITHIN 300 ft FROM COASTAL SHORELINE.

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

MAXIMUM SPAN (ft)	POURED CONCRETE																																	
	(I) WALK OVER & (II) TRENCH MOUNTINGS ◇								(J) RAINGUARD MOUNTING								(K) WALL/FLOOR MOUNTING								(L) 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	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	5		
	14	12	10	9	8	8	6	6	12	12	12	12	12	10.5	8	6	4.5	7	7	7	7	7	7	6.5	5	5	5	5	5	5	5	5		
4'-0"	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	5		
	14	12	10	9	8	8	6	6	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	5	5	4		
	14	12	10	9	8	8	6	6	12	12	12	12	12	9.5	7	5.5	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5	5		
5'-0"	14	12	10	9	8	8	6	6	12	12	12	12	12	10	7.5	5.5	4	7	7	7	7	7	7	7	5.5	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	6	12	12	12	11	9	7	5	4	7	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	3.5	5	5	5	5	5	5	5	5	
6'-0"	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	7	5.5	4	5	5	5	5	5	5	5	4	
	14	12	10	9	8	8	6	6	12	12	11.5	9	7.5	5.5	4	3	7	7	7	7	7	7	4.5	3.5	5	5	5	5	5	5	4.5	3.5	5	
	14	12	10	9	8	8	6	6	12	12	12	8	6	4.5	3	3	7	7	7	7	7	7	5.5	4	3	5	5	5	5	5	5	4	3	
7'-0"	14	12	10	9	8	8	6	6	12	12	10	8	6.5	5	3.75	3	7	7	7	7	7	7	6	4.5	5	5	5	5	5	5	5	4.5	5	
	14	12	10	9	8	8	6	6	12	12	10	8	6.5	5	3.5	3	7	7	7	6.5	5.5	4	5	5	5	5	5	5	5	5	4	3	5	
	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	5	5	
8'-0"	14	12	10	9	8	8	6	6	12	10	6.5	5	4.5	3	3	3	7	7	7	7	6.5	5	3	5	5	5	5	5	5	5	5	3.5	3	
	14	12	10	9	8	8	6	6	12	12	8.5	7	5.5	4	3	3	7	7	7	7	5.5	4	5	5	5	5	5	5	5	5	5	4	3	
	14	12	10	9	8	8	6	6	12	11	7.5	6	5	3.75	3	3	7	7	7	7.5	6	4.5	5	5	5	5	5	5	5	5	4.5	3	5	
9'-0"	14	12	10	9	8	8	6	6	12	11.5	7.5	6	5	3.5	3	3	7	7	6.5	5	4	5	5	5	5	5	5	5	5	5	4	3	5	
	14	12	10	9	8	8	6	6	12	12	9.5	6.5	5.5	4	3	3	7	7	7	7	7	7	6	3	5	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	6	10.5	8	5	4	3.5	3	3	3	7	7	7	6	5	3.5	5	5	5	5	5	5	5	5	4	3	5	
10'-0"	14	12	10	9	8	8	6	6	12	10	6.5	5	4.5	3	3	3	7	7	7	6.5	5.5	5	5	5	5	5	5	5	5	5	4	3	5	
	14	12	10	9	8	8	6	6	12	11	8.5	6	5	3.5	3	3	7	7	7	7	7	7	4.5	5	5	5	5	5	5	5	5	5	4.5	
	14	12	10	9	8	8	6	6	9.5	7	4.5	3.5	3	3	3	3	7	7	7	5.5	4.5	5	5	5	5	5	5	5	5	4.5	3.5	5	5	
11'-0"	14	12	10	9	8	8	6	6	12	9	6	5	4	3	3	3	7	7	7	6	5	5	5	5	5	5	5	5	5	5	5	5	5	
	14	12	10	9	8	8	6	6	12	9.5	6	5	4	3	3	3	7	7	5	4	3	5	5	5	5	5	5	5	5	5	5	5	4	
	14	12	10	9	8	8	6	6	8.5	6.5	4	3.5	3	3	3	3	7	7	6	5	4	5	5	5	5	5	5	5	5	5	4	3	5	
12'-0"	14	12	10	9	8	8	6	6	11	8	5.5	4	3	3	3	3	7	7	7	5.5	4.5	5	5	5	5	5	5	5	5	5	4.5	3	5	
	14	12	10	9	8	8	6	6	11.5	8.5	5.5	4.5	3.5	3	3	3	7	7	4.5	3.5	5	5	5	5	5	5	5	5	5	5	4.5	3	5	
	14	12	10	9	8	8	6	6	12	9.5	6.5	5	4	3	3	3	7	7	7	7	7	6	3	5	5	5	5	5	5	5	4.5	3.5	5	
13'-0"	14	12	10	9	8	8	6	6	10	7.5	5	4	3	3	3	3	7	7	5.5	4.5	3.5	5	5	5	5	5	5	5	5	5	4	3	5	
	14	12	10	9	8	8	6	6	8	6	4	3	3	3	3	3	7	7	6	5	4	5	5	5	5	5	5	5	5	5	4	3	5	
	14	12	10	9	8	8	6	6	10.5	8	5	4	3.5	3	3	3	7	7	5	4	3	5	5	5	5	5	5	5	5	5	4.5	3	5	
14'-0"	14	12	10	9	8	8	6	6	9	7	4.5	3.75	3	3	3	3	7	7	5.5	4.5	5	5	5	5	5	5	5	5	5	5	4.5	4	3	5
	14	12	10	9	8	8	6	6	10	7.5	5	4	3	3	3	3	7	7	6	4	3	5	5	5	5	5	5	5	5	5	5	5	4	3
	14	12	10	9	8	8	6	6	10.5	8	5.5	4	3.5	3	3	3	7	7	7	7	7	4	5	5	5	5	5	5	5	5	5	4	3	5
15'-0"	14	12	10	9	8	8	6	6	6.5	5	3	3	3	3	3	3	7	7	5	3.5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
	14	12	10	9	8	8	6	6	8.5	6.5	4	3	3	3	3	3	7	7	5	4	3	5	5	5	5	5	5	5	5	5	5	5	5	4
	14	12	10	9	8	8	6	6	9	7	4.5	3.5	3	3	3	3	7	7	5.5	3.5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
16'-0"	14	12	10	9	8	8	6	6	10	7.5	5	4	3	3	3	3	7	7	7	7	7	7	3.5	5	5	5	5	5	5	5	5	5	4	3
	14	12	10	9	8	8	6	6	6	4.5	3	3	3	3	3	3	7	7	4.5	3	5	5	5	5	5	5	5	5	5	5	4.5	3.5	5	
	14	12	10	9	8	8	6	6	7	5	4	3	3	3	3	3	7	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	3
16'-0"	14	12	10	9	8	8	6	6	8	6	4	3	3	3	3	3	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	14	12	10	9	8	8	6	6	8.5	6.5	4	3.5	3	3	3	3	7	7	5.5	3.5	5	5	5	5	5	5	5	5	5	5	5	4.5	3.5	5
	14	12	10	9	8	8	6	6	9.5	7	4.5	3.5	3	3	3	3	7	7	7	7	7	6	3	5	5	5	5	5	5	5	4.5	3.5	5	
16'-0"	14	12	10	9	8	8	6	6	6	4.5	3	3	3	3	3	3	7	7	6.5	4	5	5	5	5	5	5	5	5	5	5	5	4.5	3.5	5
	14	12	10	9	8	8	6	6	7.5	5.5	3.75	3	3	3	3	3	7	7	4.5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	3
	14	12	10	9	8	8	6	6	8	6	4	3	3	3	3	3	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	

ANCHORS SPACING LEGEND

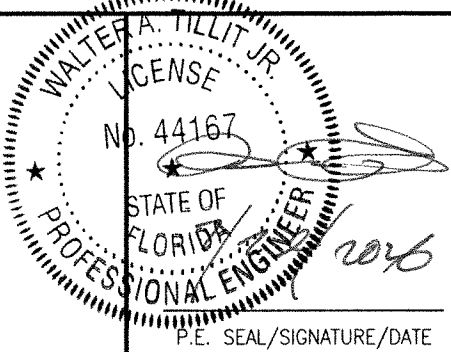
410 SS TAPCON OR ULTRACON+ OR ULTRACON SS4
ELCO FEMALE PANEL MATE
BLUE TAP

* SEE ANCHOR
SPECIFICATIONS
ON SHEET 14

◇ VALID ONLY FOR UP TO +70, -75
PSF A.S.D. DESIGN PRESSURE
RATING & FOR SPANS PER
SCHEDULE #4, SHEET 12

① HV BLADE ONLY

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			
			DRAWING No 26-105
			SHEET 15 OF 28

(SEE MOUNTINGS A, B, C, D AND F ON SHEET 6)

ANCHORS SPACING LEGEND

BLUE TAP

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

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

© 2026 EASTERN METAL SUPPLY, INC.

REV.No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			SHEET 15A OF 28
6			

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	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	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	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"Ø 410 SS TAPCON ANCHORS, OR 1/4"Ø ULTRA CON+ OR ULTRA CON SS4 ANCHORS AS MANUFACTURED BY I.T.W. BUILDEX OR DEWALT RESPECTIVELY, 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 ANSI/AWC NDS-24 SPECIFICATIONS. OR 1/4"Ø ULTRA CON SS4 OR 5/16"Ø SS LAG SCREWS.
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. ONLY STAINLESS STEEL ANCHORS ARE ALLOWED AT INSTALLATIONS WITHIN 300 ft FROM COASTAL SHORELINE.

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

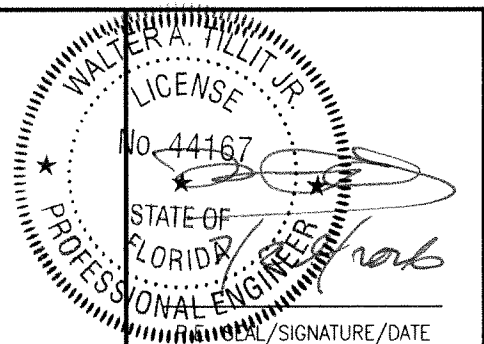
◆ SEE LIMITATIONS OF USE OF
BLADE (1A) ON SHEET 28

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

© 2026 EASTERN METAL SUPPLY, INC.

BERTHA HV™ Accordion Shutter System

REV.No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			
6			SHEET 16 OF 28



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

BERTHA HV™

Accordion Shutter System

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	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	-

① HV BLADE ONLY

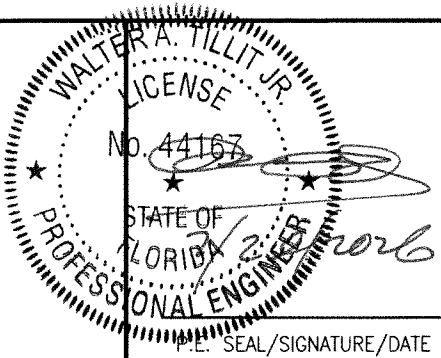
+ NOTES ON ANCHORS REQUIREMENTS: WOOD SUBSTRATES.

1. ANCHORS TO WALL, FLOOR OR SOLID WOOD SOFFIT SHALL BE AS FOLLOWS:

- 1/4"Ø 410 SS TAPCON ANCHORS, OR 1/4"Ø ULTRACON+ OR ULTRACON SS4 ANCHORS AS MANUFACTURED BY I.T.W. BUILDDEX OR DEWALT RESPECTIVELY, 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 NDS 2024 SPECIFICATIONS. OR 1/4"Ø ULTRACON+ OR ULTRACON SS4.
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. ONLY STAINLESS STEEL ANCHORS ARE ALLOWED AT INSTALLATIONS WITHIN 300 ft FROM COASTAL SHORELINE.

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 EASTERN METAL SUPPLY, INC.

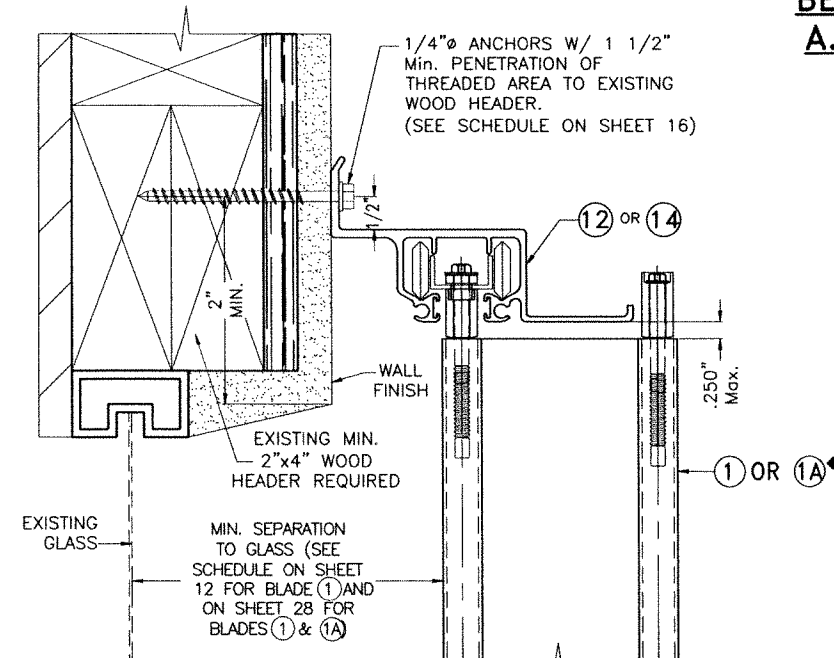
BERTHA HV™
Accordion Shutter System
H.V. BLADE #1 W/ OR W/O H.V. WINDOW BLADE & H.V. BLADE #2

REV.No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

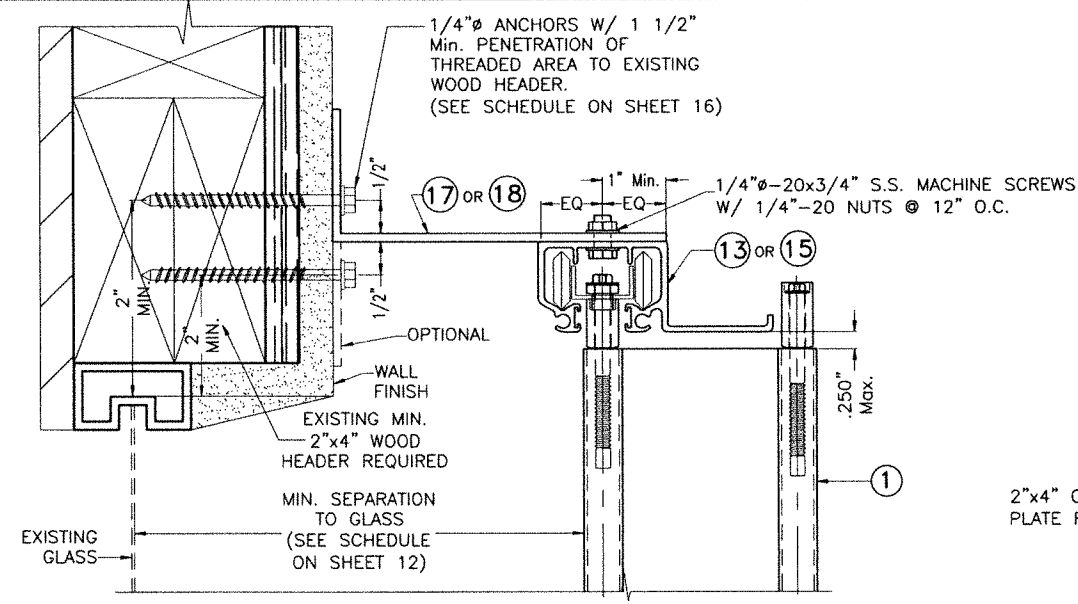
DRAWING No
26-105
SHEET
17 OF 28

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

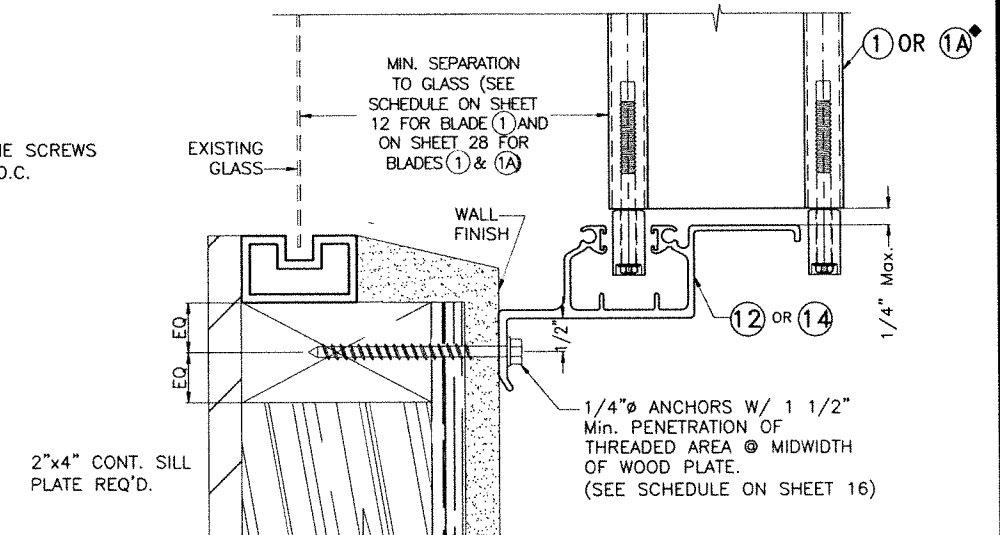
MAX. SHUTTER SPAN L+ OR L- FOR INSTALLATIONS INTO WOOD WITH HV BLADE (1) ONLY SHALL BE LIMITED TO 105.0 psf. A.S.D. DESIGN PRESSURE RATING, SEE SHEET 28 FOR MAX SPAN & A.S.D. DESIGN PRESSURE RATING FOR INSTALLATION WITH BLADE (1) & (1A) WORKING IN UNISON



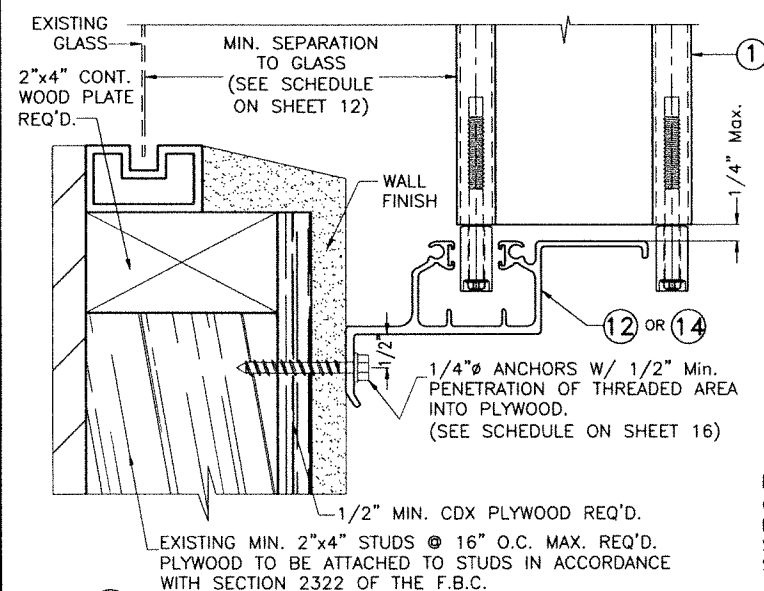
(M) HV WALL HEADER INSTALLATION



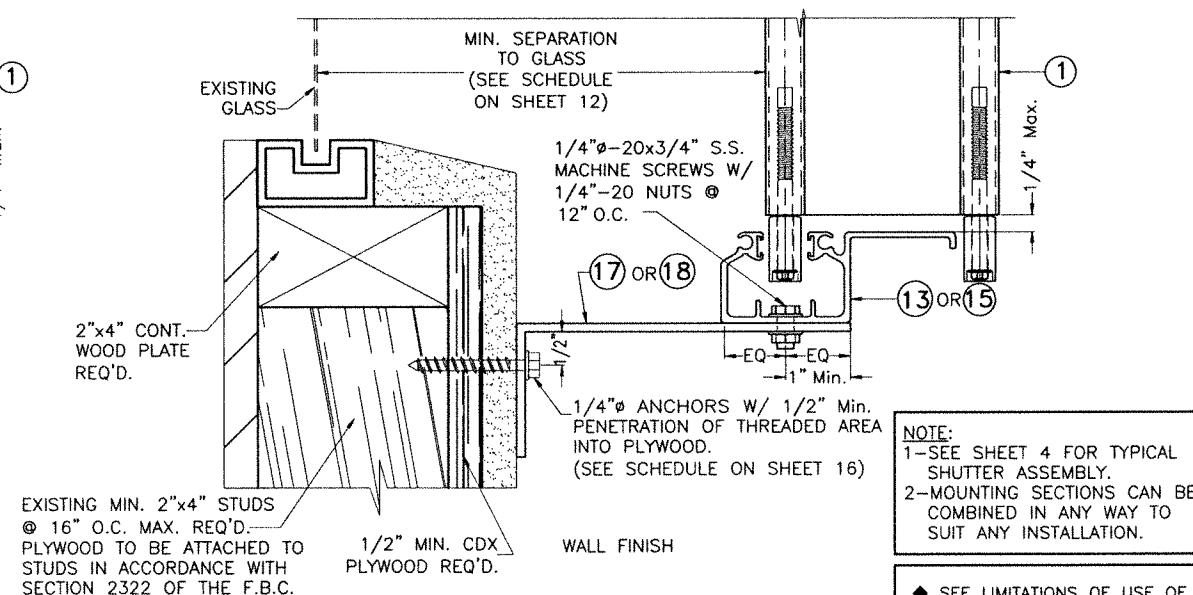
(N) HV WALL HEADER INSTALLATION



0 HV WALL SILL INSTALLATION



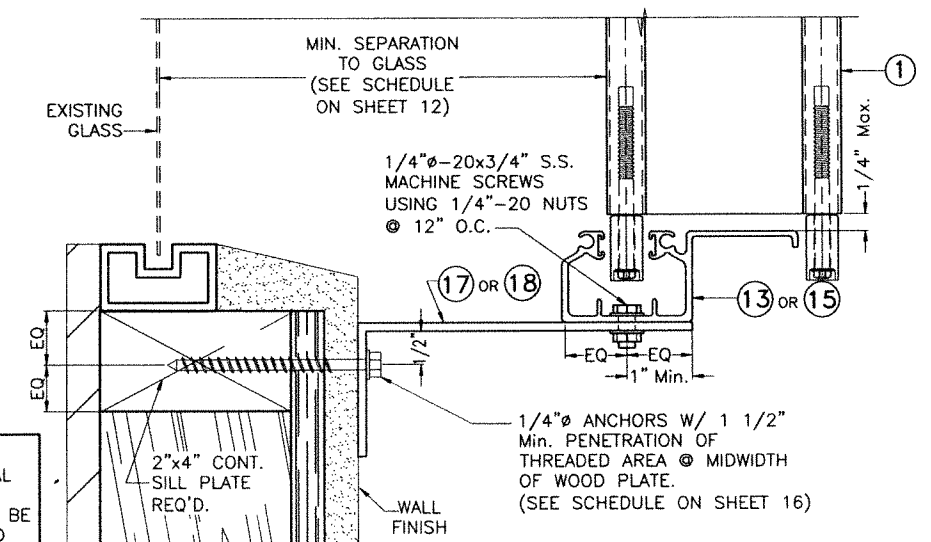
(P) HV WALL SILL INSTALLATION



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

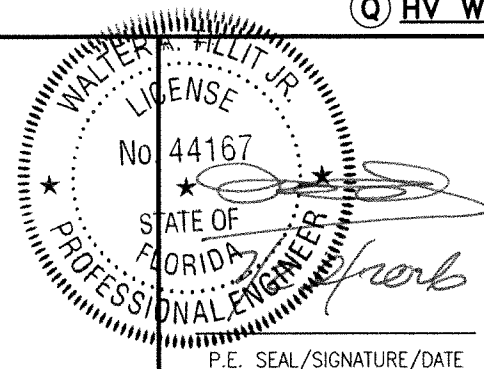
◆ SEE LIMITATIONS OF USE OF
BLADE 1A ON SHEET (28)

Q HV WALL SILL INSTALLATION



⑧ HV WALL SILL INSTALLATION

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 EASTERN METAL SUPPLY, INC.

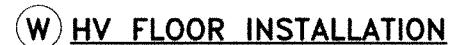
BERTHA HV™ Accordion Shutter System

REV.No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			SHEET 18 OF 28
6			

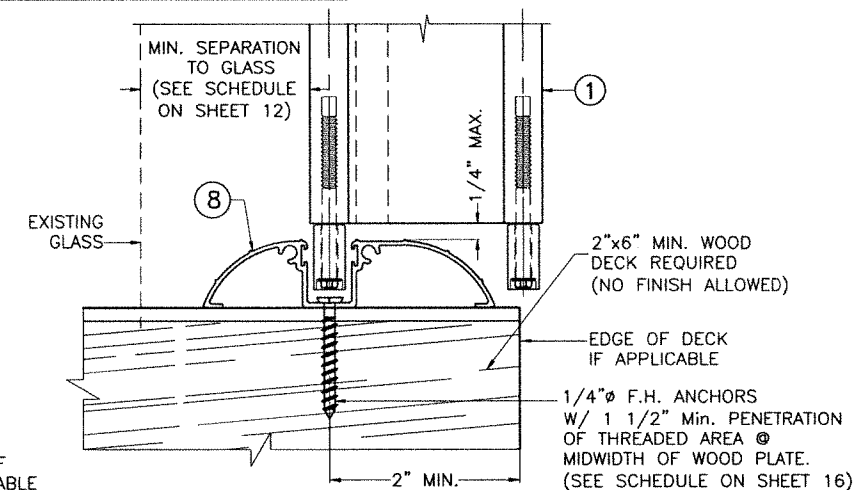
MAX. SHUTTER SPAN L+ OR L- FOR INSTALLATIONS INTO WOOD WITH HV BLADE ① ONLY SHALL BE LIMITED TO 105.0 psf. A.S.D. DESIGN PRESSURE RATING, SEE SHEET 28 FOR MAX SPAN & A.S.D. DESIGN PRESSURE RATING FOR INSTALLATION WITH BLADE ① & ①A WORKING IN UNISON



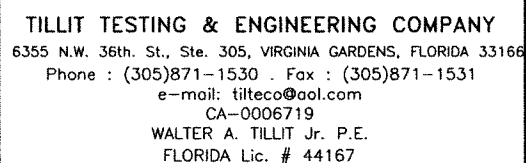
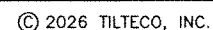
NOTES:
1—SEE SHEET 4 FOR TYPICAL SHUTTER ASSEMBLY.
2—MOUNTING SECTIONS CAN BE COMBINED
IN ANY WAY TO SUIT ANY INSTALLATION.



☒ HV WALK-OVER INSTALLATION



FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

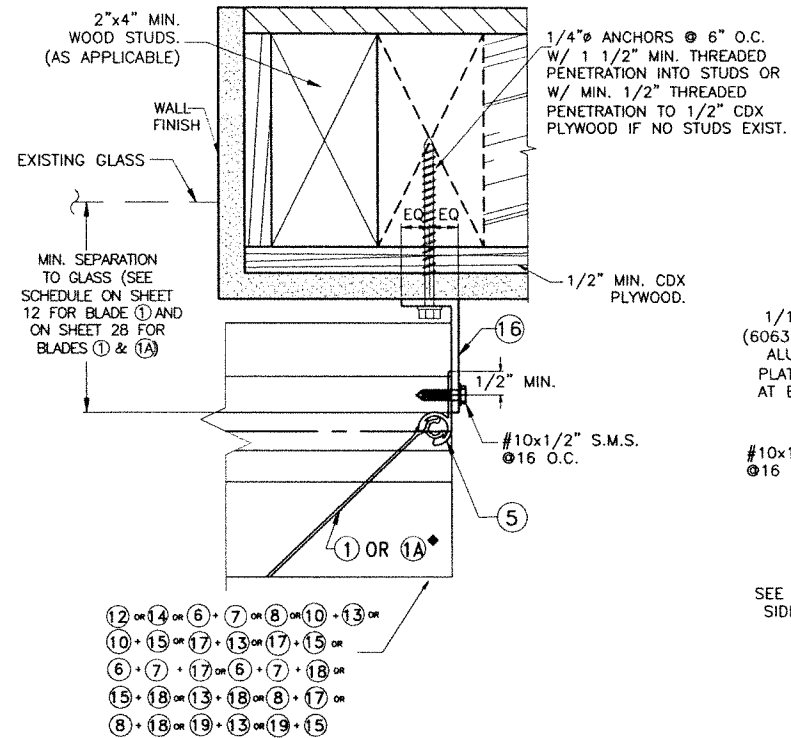


4268 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

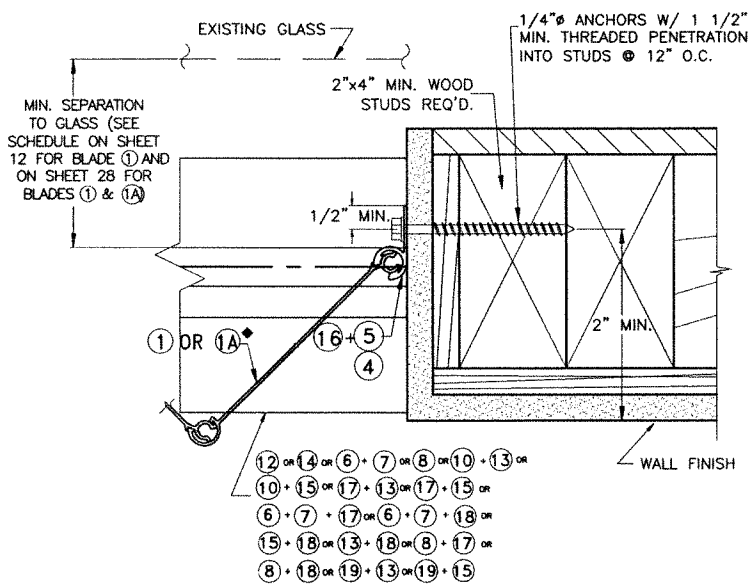
© 2026 EASTERN METAL SUPPLY, INC.

REV. No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			
6			SHEET 19 OF 28

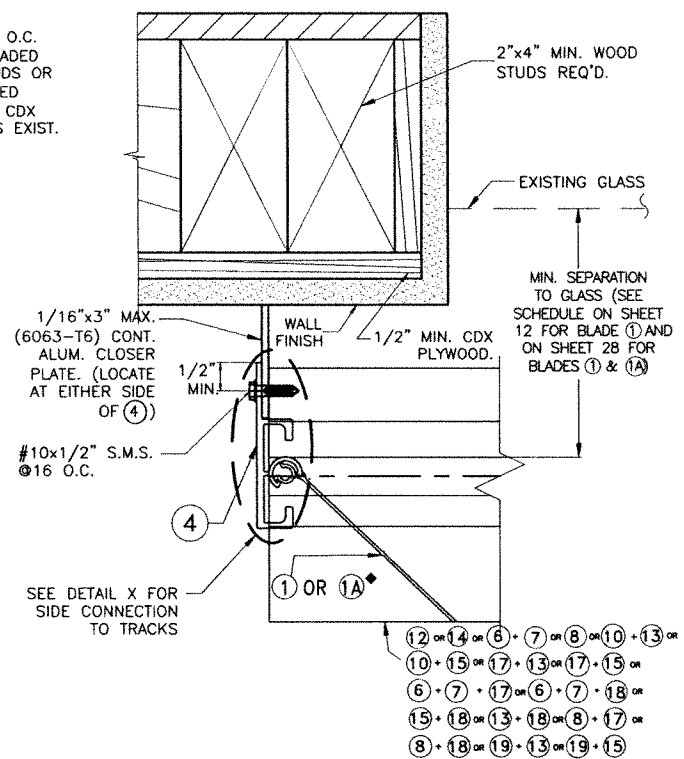
END INSTALLATIONS ① HV & ①A HV ♦ BLADES INTO 2"x4" MIN. WOOD STUDS.



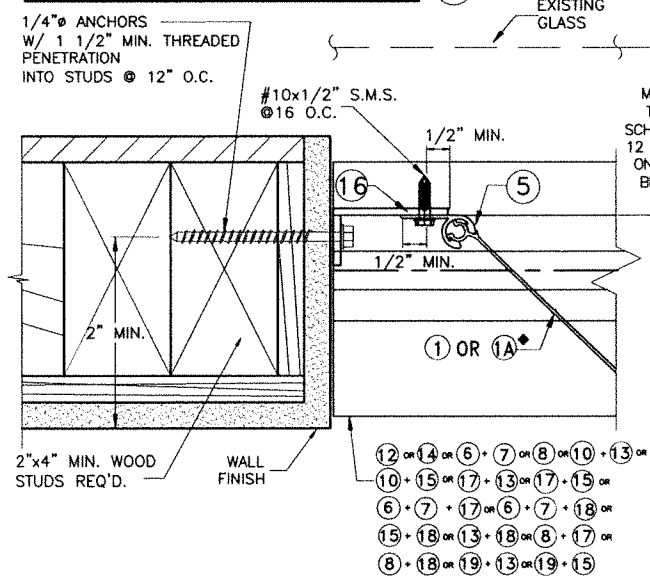
END CONNECTION DETAIL ⑦



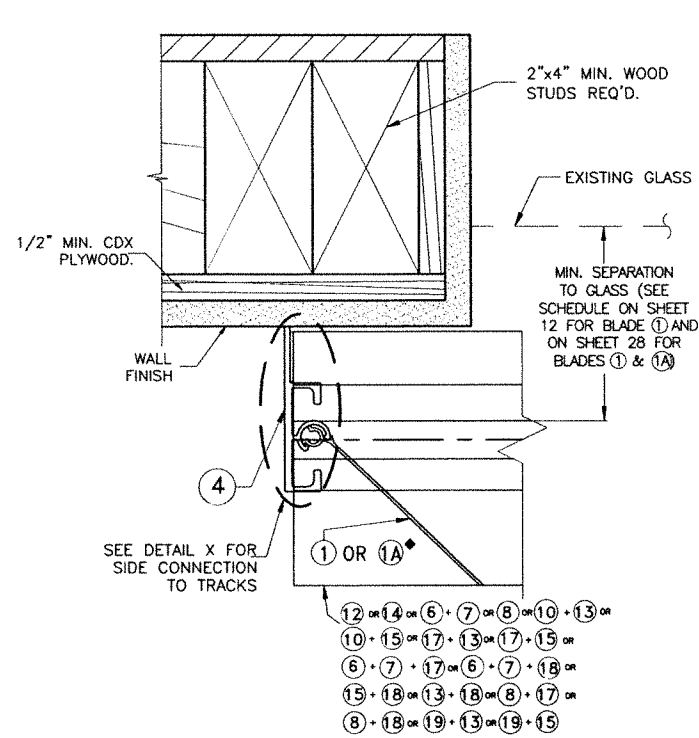
END CONNECTION DETAIL (11)



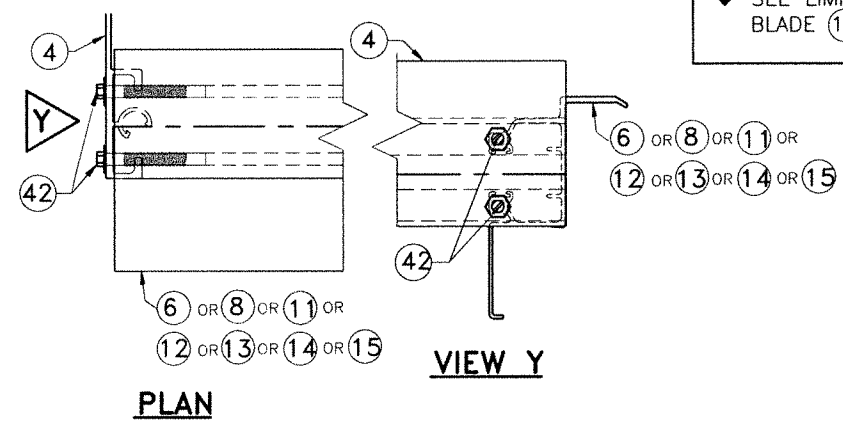
END CONNECTION DETAIL (8)



END CONNECTION DETAIL (12)



END CONNECTION DETAIL 9



DETAIL X

END CONNECTION DETAIL 10

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

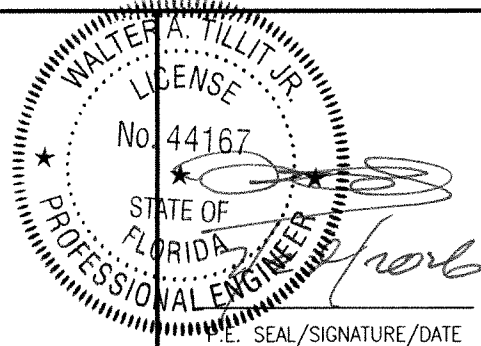
◆ SEE LIMITATIONS OF USE OF
BLADE (1A) ON SHEET 28

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			SHEET 20 OF 28
6			



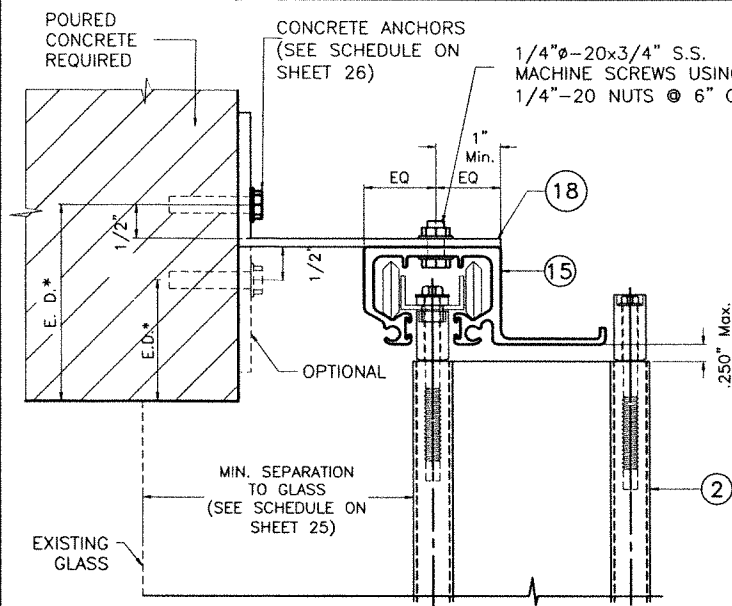
© 2026 TILTECO, INC.



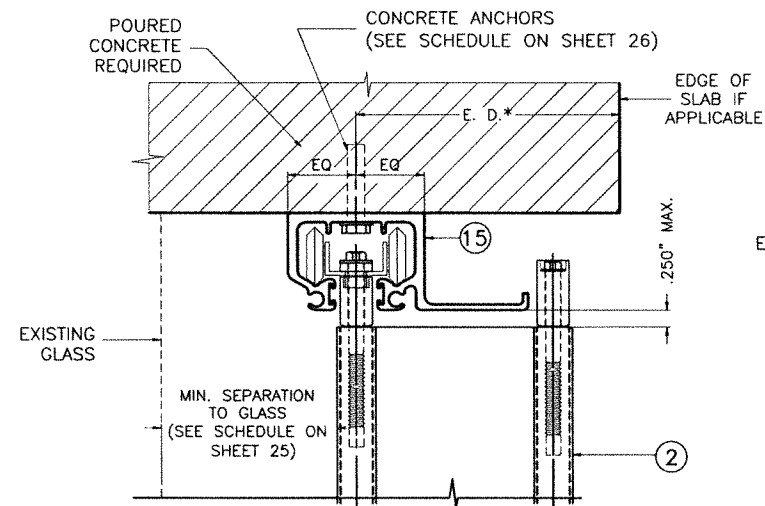
TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th. St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1530 . Fax : (305)871-1531
e-mail: tilteco@aol.com
CA-0006719
WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

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

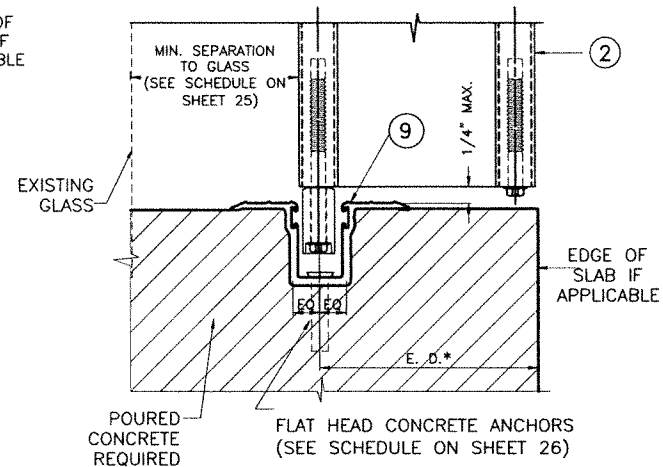
4268 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380



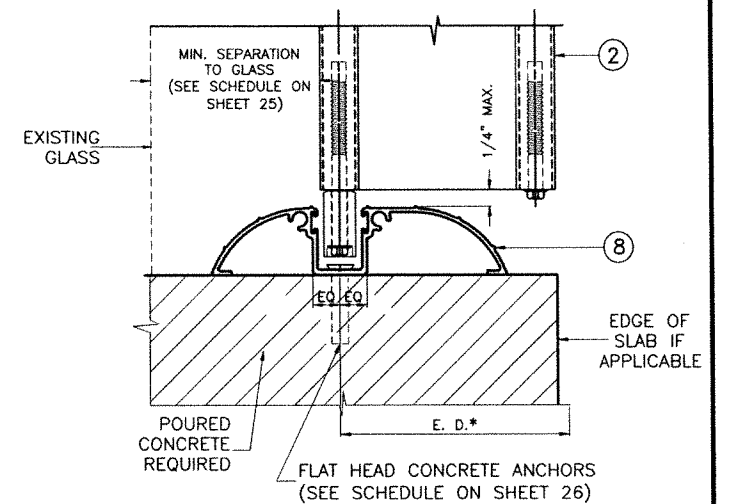
AA HD WALL HEADER INSTALLATION



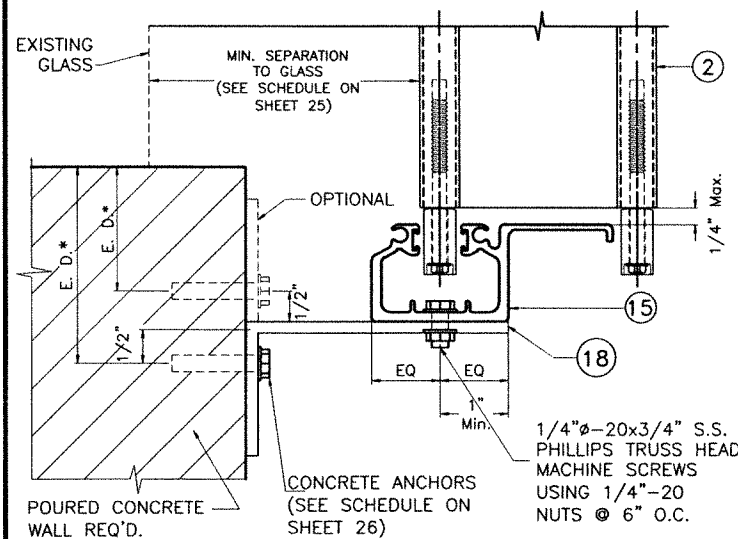
BB HD CEILING INSTALLATION



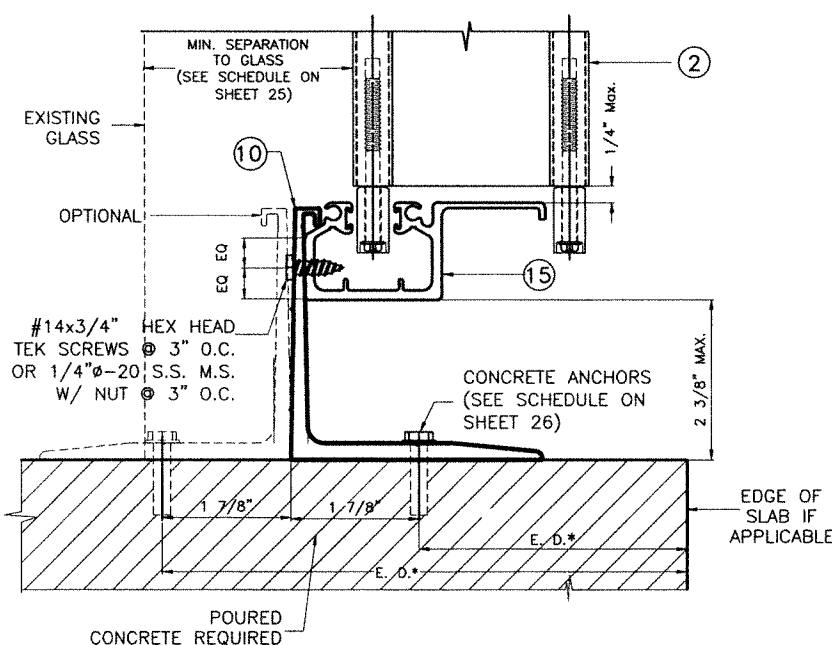
CC HD TRENCH INSTALLATION



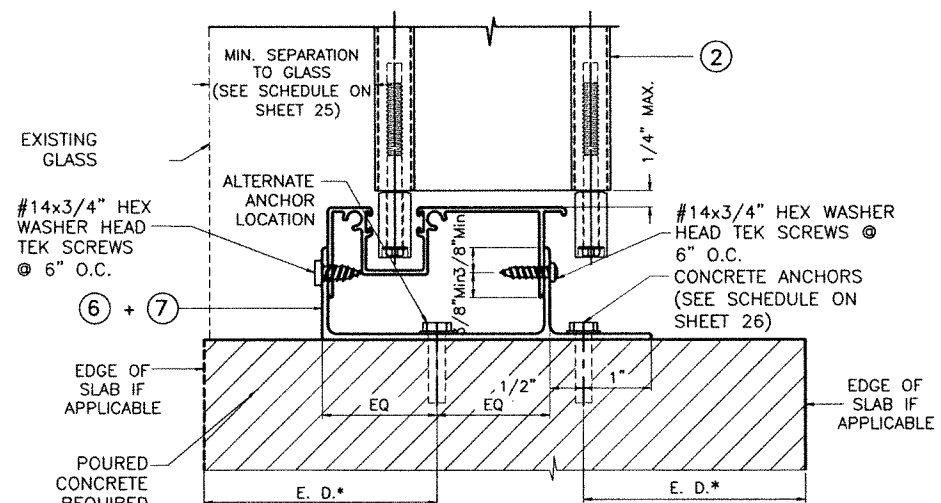
DD HD WALK-OVER INSTALLATION



EE HD WALL SILL INSTALLATION



FF HD RAINGUARD INSTALLATION



GG HD FLOOR INSTALLATION

NOTE FOR COMBINATION OF SECTIONS:

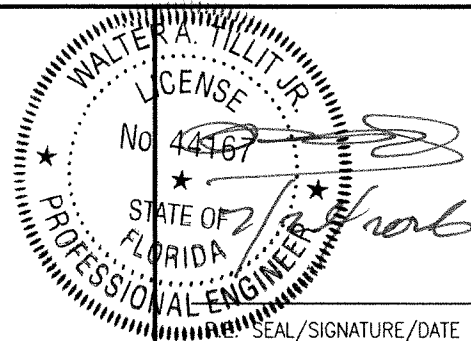
- 1- SEE SHEET 21 FOR TYPICAL SHUTTER ASSEMBLY
- 2- MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.

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

INSTALLATION DETAILS W/ ② HV BLADE

SCALE: 3/8"=1"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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:	W.H.
1	OLD 23-128	6/30/26	DATE:	6/30/2026
2				
3				
4				
5				
6				

DRAWING No
26-105

SHEET
22 OF 28

OUT

IN

EXISTING GLASS

* SEE NOTES ON LOCKING RODS (35) & HD (34) LOCKS ON SHEET 21

INSTALLATION

② HV BLADE

— EXISTING GLASS

MIN. SEPARATION
TO GLASS
(SEE SCHEDULE
ON SHEET 25)

(4) H.V.
PINS (TYP.)

IN

(4) H.V.
PINS (TY

HVC-HDC

SYMMETRICAL HD CENTERMATES
W/ (34)* LOCK (INTERIOR)

(OPTIONAL) **HVB-HDB**
SYMMETRICAL HD CENTERMATES
W/ 34* LOCK (EXTERIOR)

OUT

9 OR 8 OR 6 + 7 OR
 10 + 15 OR 18 + 15

HVE-HDE

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			
6			SHEET 23 OF 28

HVD-HDD

© 2026 TILTECO, INC.



TILTECO INC.

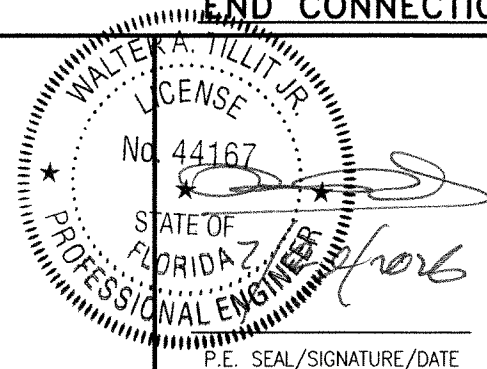
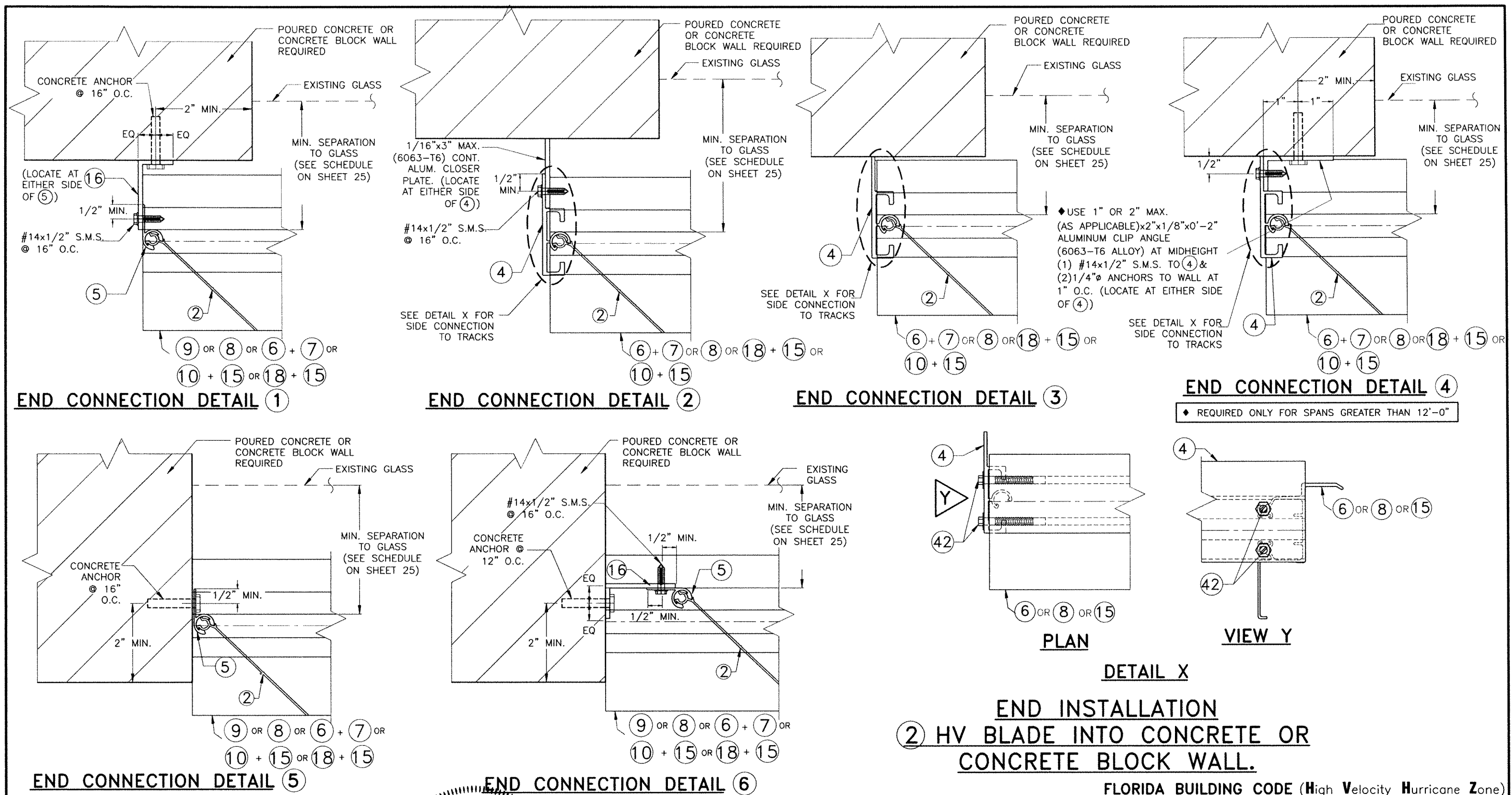
TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th. St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1530 . Fax : (305)871-1531
e-mail: titeco@aol.com
CA-0006719
WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

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

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

WALTER A. TILLIT JR.
LICENSE
No. 44167
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Seal / Signature / Date



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

SHEET
24 OF 28

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

MAXIMUM A.S.D. DESIGN PRESSURE RATING (p.s.f.) (+ OR -)	POURED CONCRETE INSTALLATIONS	
	ALL MOUNTING CONDITIONS	
	L + (ft)	L - (ft)
30 OR LESS	15'-5"	18'-0"
35	14'-10"	18'-0"
40	14'-4"	17'-10"
45	13'-11"	17'-6"
50	13'-6"	17'-0"
55	13'-3"	16'-10"
60	12'-11"	16'-2"
65	12'-8"	15'-6"
70	12'-6"	14'-11"
75	12'-3"	14'-5"
80	12'-0"	14'-0"
85	11'-10"	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.

♦ SEPARATION TO GLASS REQUIREMENTS

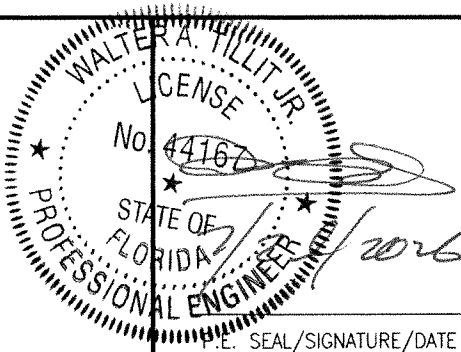
MINIMUM SEPARATION TO GLASS FOR SHUTTERS INSTALLED AT ALL ELEVATIONS OF BUILDING IS 3".

INSTALLATION LEGEND

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

2 HV BLADE

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 EASTERN METAL SUPPLY, INC.

BERTHA HV™
Accordion Shutter System

REV.No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			SHEET 25 OF 28
6			

ANCHORS SPACING LEGEND

1/4"Ø 410 SS TAPCON
5/16"Ø TAPCON XL OR
3/8"Ø SS KWIK BOLT 3

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

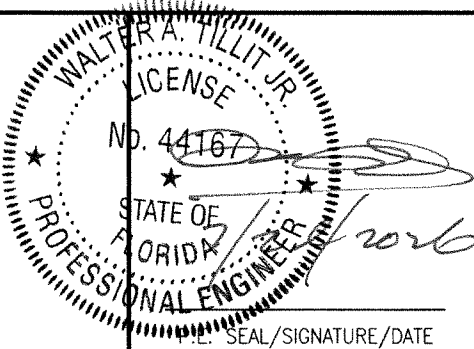
- (A) ANCHORS TO WALL SHALL BE AS FOLLOWS:
- A.1) TO EXISTING POURED CONCRETE: (Min. f'c = 3192 psi)
- 1/4"Ø 410 SS TAPCON ANCHORS, AS MANUFACTURED BY I.T.W. BUILDEX, OR 1/4"Ø ULTRACON+ OR ULTRACON SS4 ANCHORS AS MANUFACTURED BY DEWALT.
MINIMUM EMBEDMENT INTO POURED CONCRETE IS 1 3/4".
- A.2) TO EXISTING POURED CONCRETE: (Min. f'c = 2899 psi)
- 5/16"Ø TAPCON XL ANCHORS, AS MANUFACTURED BY I.T.W. BUILDEX. OR 3/8"Ø KWIK BOLT 3 BY HILTI, INC. W/ 3" EMBEDMENT.
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.
- (D) ONLY STAINLESS STEEL ANCHORS ARE ALLOWED AT INSTALLATIONS WITHIN 300 ft FROM COASTAL SHORELINE.

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. OR
3/8"Ø KWIK BOLT 3

② HV BLADE ONLY

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 TILTECO, INC.

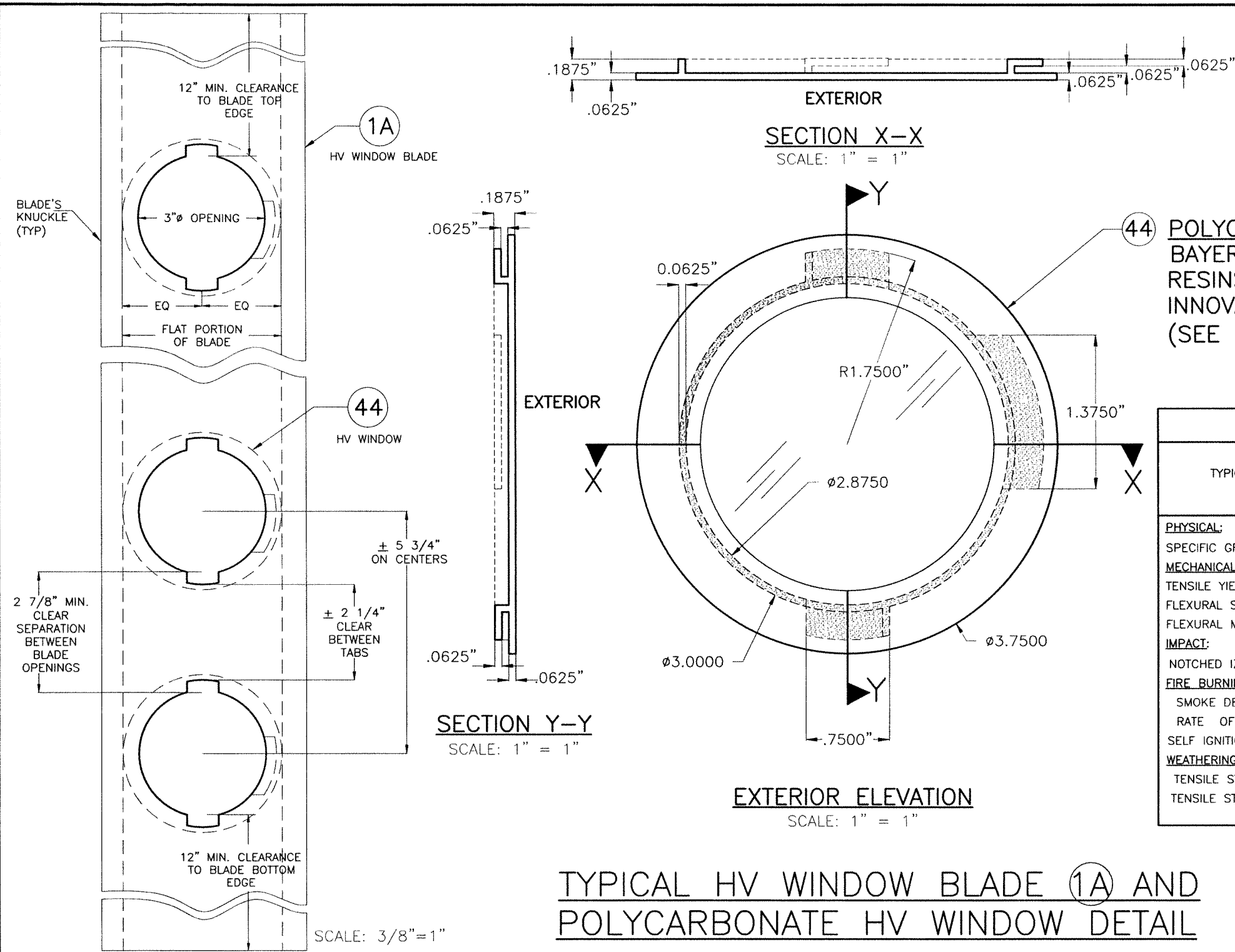


TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th. St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1530 . Fax : (305)871-1531
e-mail: tilteco@aol.com
CA-0006719
WALTER A. TILLIT Jr. P.E.
FLORIDA Lic. # 44167

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

© 2026 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:	W.H.
1	OLD 23-128	6/30/26	DATE:	6/30/2026
2				
3				
4				
5				
6				
DRAWING No				26-105
SHEET				26 OF 28



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

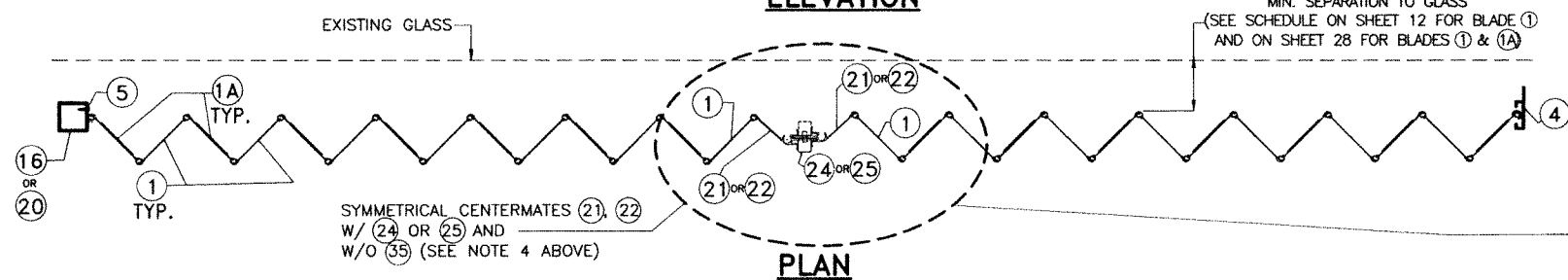
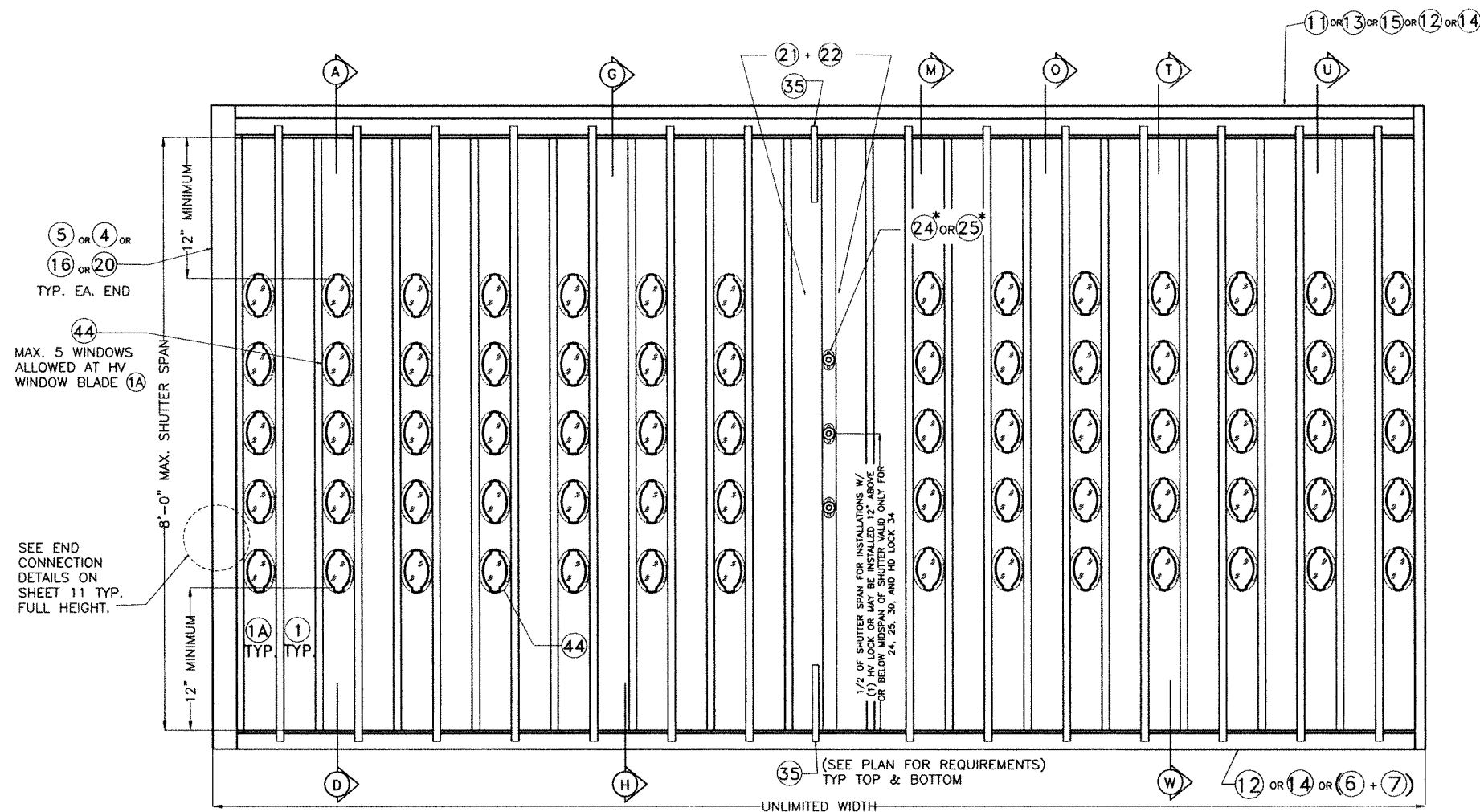
FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			DRAWING No 26-105
3			
4			
5			SHEET 27 OF 28
6			



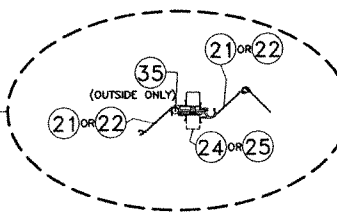
TYPICAL ① HV BLADE WORKING IN UNISON WITH HV WINDOW BLADE ①A SHUTTER*

*** GENERAL LIMITATIONS AND CONDITIONS OF USE FOR BERTHA
① HV BLADE ACCORDION SHUTTER SYSTEM WORKING IN
UNISON WITH HV WINDOW BLADE ①A**

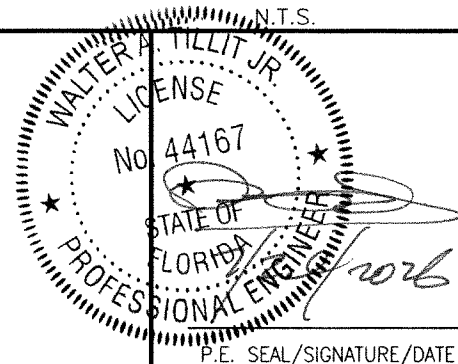
1. MAX. A.S.D. DESIGN PRESSURE RATING: +110, - 110 p.s.f.
2. MAX. SHUTTER SPAN: 96".
3. ALLOWED MOUNTINGS: A, D, G & H ON SHEETS 6, 7; AS WELL AS MOUNTINGS M, O, T, U & W ON SHEETS 18 & 19.
4. ONLY CENTERMATES ②①, ②② (BOTH W/ ②④ OR ②⑤) ARE ALLOWED WITH ②①, ②② ARRANGED IN A SYMMETRICAL OR OPPOSING LAYOUT.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

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

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



FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 EASTERN METAL SUPPLY, INC.

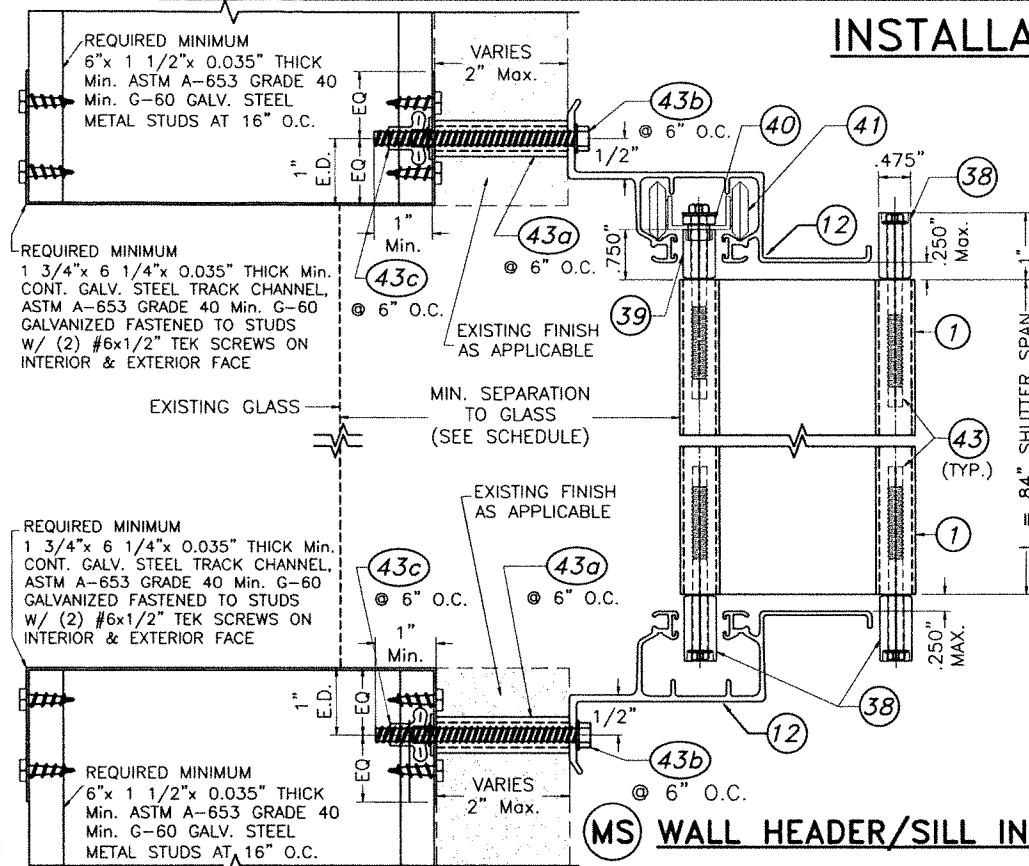
BERTHA HV™
Accordion Shutter System

REV.No	DESCRIPTION	DATE	DRAWN BY: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

SHEET
28 OF 28

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

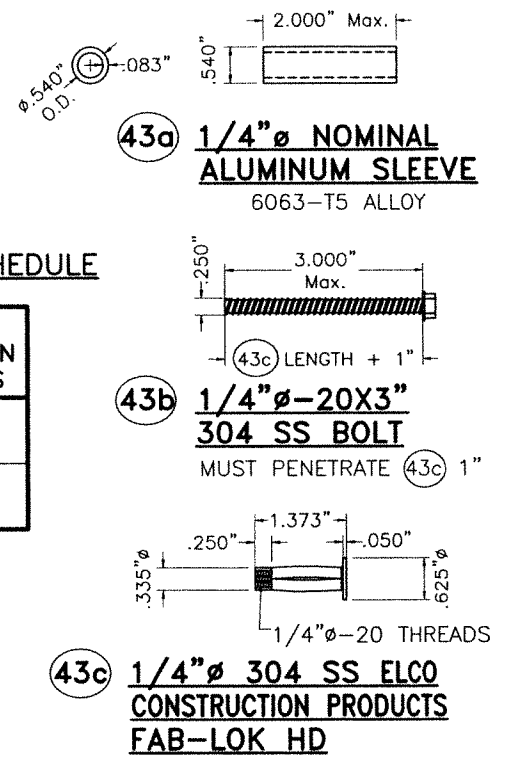


- * GENERAL LIMITATIONS AND CONDITIONS OF USE FOR BERTHA ① HV BLADE ACCORDION SHUTTER SYSTEM INSTALLATION TO METAL STUD WALLS
1. MAX. A.S.D. DESIGN PRESSURE RATING: +75, - 75 p.s.f.
 2. MAX. SHUTTER SPAN: 84"
 3. ALLOWED MOUNTING: (MS) ON THIS SHEET.
 4. ONLY CENTERMATE ②① W/ ②④ HV LOCK ARE ALLOWED WITH 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.

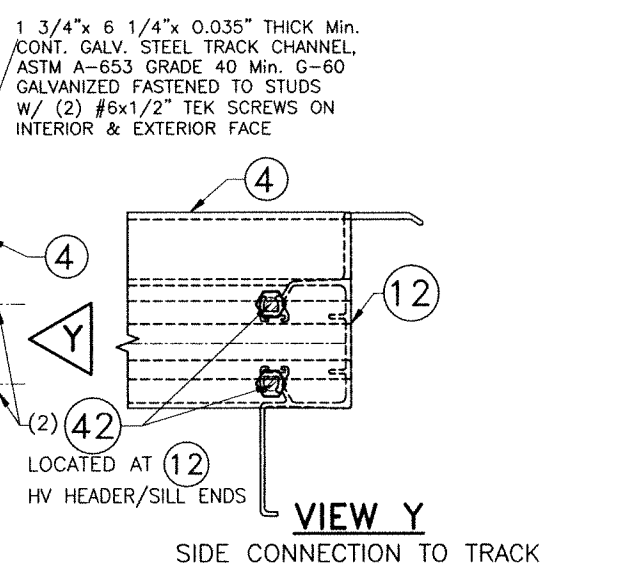
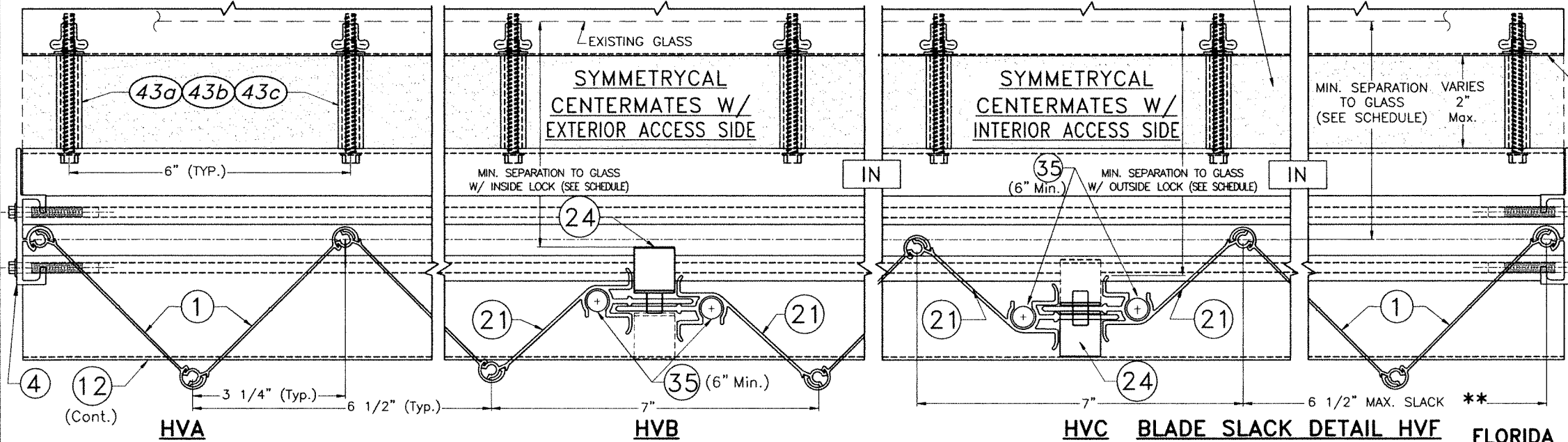
** BLADE SLACK DETAIL HVF IS VALID FOR CENTERMATE ②① APPLICATION WITH BLADE ①

SEPARATION TO GLASS SCHEDULE

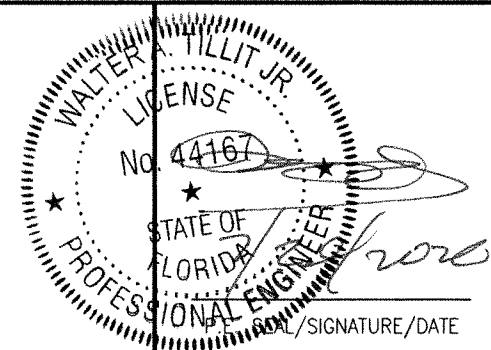
WIND ZONE ASTM E-1996	MINIMUM SEPARATION TO GLASS
1 THRU 3	1"
4	4"



COMPONENTS
SCALE: 3/8" = 1"



FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



© 2026 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 West Roads Drive
West Palm Beach, FL 33407
Phone: (800)432-2204 . Fax: (561)209-8380

© 2026 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: W.H.
1	OLD 23-128	6/30/26	DATE: 6/30/2026
2			
3			
4			
5			
6			

DRAWING No
26-105

SHEET
28A OF 28