

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 2004 EDITION OF THE FLORIDA BUILDING CODE WITH THE 2004 AND 2006 SUPPLEMENTS.
2. THIS ACCORDION SHUTTER SYSTEM SHALL BE INSTALLED IN HIGH WIND VELOCITY HURRICANE ZONES. DESIGN WIND LOADS SHALL BE DETERMINED AS PER SECTION 1609 OF THE ABOVE MENTIONED CODE FOR A SYSTEM SPEED AS REQUIRED BY THE JURISDICTION WHERE SHUTTER WILL BE INSTALLED, AND FOR A DIRECTIONALITY FACTOR K_d=0.85, IN ACCORDANCE WITH ASCE 7-02 STANDARDS FOR AN ORDER TO VERIFY THAT ANCHORS ON THIS P.E.D. AS TESTED, WERE NOT OVERSTRESSED. A 33 % INCREASE IN ALLOWABLE LOADS FOR WIND LOADS WAS **NOT** USED IN THEIR ANALYSIS. BERTHA H.V. ACCORDION SHUTTER SYSTEM'S ADEQUACY FOR WIND AND LARGE MISSILE IMPACT LOAD HAS BEEN VERIFIED IN ACCORDANCE WITH SECTION 1609.1.4 OF THE ABOVE MENTIONED CODE AS PER ALL REPORTS:
 - HV BLADE ① #0214.01-03, #0715.01-03, #1004.01-05, #1214.01-05 AND 0317.02-08 AS PER TAS-201, TAS-202 AND TAS-203 PROTOCOLS
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-HIT MINIMUM SERIES STAINLESS STEEL SCREWS WITH 135.0 ksi YIELD STRENGTH AND 180 ksi TENSILE STRENGTH, PINS SHALL BE COATED WITH BERTHA HV DIACRYLATE COATING SYSTEM AS MANUFACTURED BY APPROVED COATING APPLICATIONS, 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 SHEET 2. MINIMUM YIELD STRENGTH FOR 6063-T6 ALLOY IS 30.0 ksi.
5. BOLTS TO BE ASTM A-307 GALVANIZED STEEL, OR A31 304 OR 316 SERIES STAINLESS STEEL WITH 35 ksi MINIMUM YIELD STRENGTH.
6. SEE THE FOLLOWING SHEETS FOR ANCHOR SPECIFICATIONS: HV BLADE ① : 7, 8 AND 9.
7. THIS BERTHA H.V. ACCORDION SHUTTER SYSTEM BEAMS 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.
8. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE SOUNDNESS OF THE STRUCTURE WHERE SHUTTER IS TO BE ATTACHED TO INSURE PROPER ANCHORAGE. CONTRACTOR TO SEAL/CAULK ALL SHUTTER COMPONENT EDGES WHICH REMAIN, THRU FASTENING IN CONTINUOUS CONTACT WITH THE BUILDING TO PREVENT WIND/RAIN INTRUSION.
9. EACH UNIT MUST BEAR PERMANENT LABEL IN A VISIBLE PLACE WITH WARNING NOTE: DURING PERIODS OF HURRICANE WARNINGS HOME OWNER, TENANT, OR OTHERS, MUST PROPERLY CLOSE ALL HV GENERATORS AND ENGAGE OR LOCK ALL HV LOCKS.
10. SHUTTERS MANUFACTURER LABEL SHALL BE PLACED ON A READILY VISIBLE LOCATION. ONE LABEL SHALL BE PLACED FOR EVERY OPENING. LABEL SHALL READ AS FOLLOWS:
EASTERN METAL SUPPLY, INC.
 LAKEWORTH, FLORIDA
 FLORIDA STATEWIDE PRODUCT APPROVED.
11. BERTHA H.V. ACCORDION SHUTTER SYSTEM'S INSTALLATION SHALL COMPLY WITH SPECS INDICATED IN THIS DRAWING PLUS ANY BUILDING AND ZONING REGULATIONS PROVIDED BY THE JURISDICTION WHERE PERMIT IS APPLIED TO.
12. (a) THIS P.E.D. PREPARED BY THIS ENGINEER IS GENERIC AND DOES NOT PROVIDE INFORMATION FOR A SITE SPECIFIC PROJECT; I.E. WHERE THE SITE CONDITIONS DEVIATE FROM THE P.E.D.
- (b) CONTRACTOR TO BE RESPONSIBLE FOR THE SELECTION, PURCHASE AND INSTALLATION INCLUDING LIFE SAFETY OF THIS PRODUCT, BASED ON THIS P.E.D., PROVIDED HE/SHE DOES NOT DEVIATE FROM THE CONDITIONS DETAILED ON THIS DOCUMENT. CONSTRUCTION SAFETY AT SITE IS THE CONTRACTOR'S RESPONSIBILITY.
- (c) THIS P.E.D. WILL BE CONSIDERED INVALID IF ALTERED BY ANY MEANS.
- (d) SITE SPECIFIC PROJECTS SHALL BE PREPARED BY A FLORIDA REGISTERED ENGINEER OR ARCHITECT WHICH WILL BECOME THE ENGINEER OF RECORD (E.O.R.) FOR THE PROJECT AND WHO WILL BE RESPONSIBLE FOR THE PROPER USE OF THE P.E.D. ENGINEER OF RECORD, ACTING AS A DELEGATED ENGINEER TO THE P.E.D. ENGINEER SHALL SUBMIT TO THIS LATTER THE SITE SPECIFIC DRAWINGS FOR REVIEW.
- (e) THIS P.E.D. SHALL BEAR THE DATE AND ORIGINAL SEAL AND SIGNATURE OF THE PROFESSIONAL ENGINEER OF RECORD THAT PREPARED IT.

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F.B.C.(Non High Velocity Hurricane Zone)

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BERTHA HV™

Accordion Shutter System

REV. No	DESCRIPTION	DATE	Drawn By: P.E.
1			DATE: 04/18/07
2			DRAWING No
3			07-086
4			
5			
6			SHEET 1 OF 10

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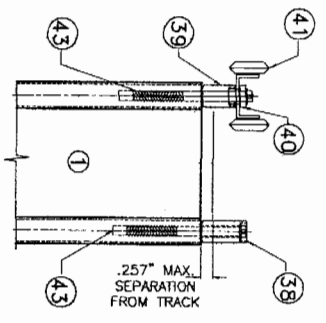
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**SHUTTER ASSEMBLY SCHEDULE
FOR HV ① AND HV ② BLADES.**

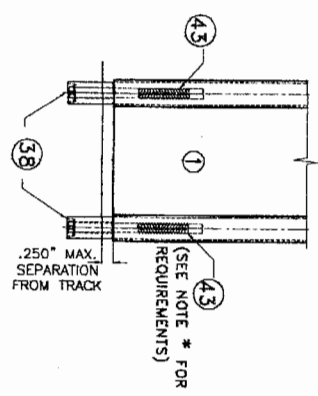
①	HV BLADE 1
③⑧	HV LONG RECESSED NYLON BUSHING
③⑨	HV SHORT RECESSED NYLON BUSHING
④①	HV NYLON HAT WASHER
④②	HV WHEEL CARRIAGE AISI 302-303 SERIES Ø.870" x 3/16" THICK NYLON WHEEL. 0.188" Ø AISI 302 SERIES S.S. RIVETS
④③	HV 1 3/4" ACCORDION PIN W/ #8 HEAD *
④④	HV 2 3/4" ACCORDION PIN W/ #8 HEAD *

*** HV PIN REQUIREMENTS AT EXTERIOR BLADE KNUCKLE**

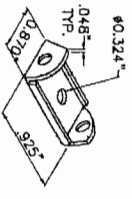
- (1) HV PIN ④ SHALL ALWAYS BE USED AT ALL EXTERIOR BOTTOM KNUCKLES.
- (2) HV PIN ④ OR ④ W/ 1/2" O.D. 1/16" THICK S.S. WASHER SHALL BE USED FOR DIRECT MOUNT INSTALLATION PER DETAIL X, SHEETS 6 AND 10.



EXTERIOR

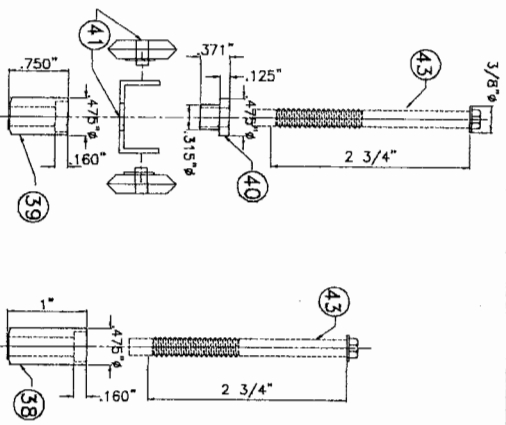


TYPICAL SHUTTER ASSEMBLY



WHEEL CARRIAGE DETAIL

N.T.S.



EXTERIOR

HV PIN ④ AT EXTERIOR BLADE'S KNUCKLE. (SEE NOTE * FOR REQUIREMENTS)

ASSEMBLY LAYOUT

N.T.S.

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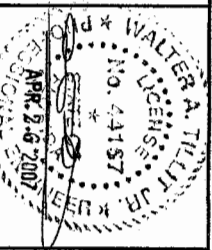
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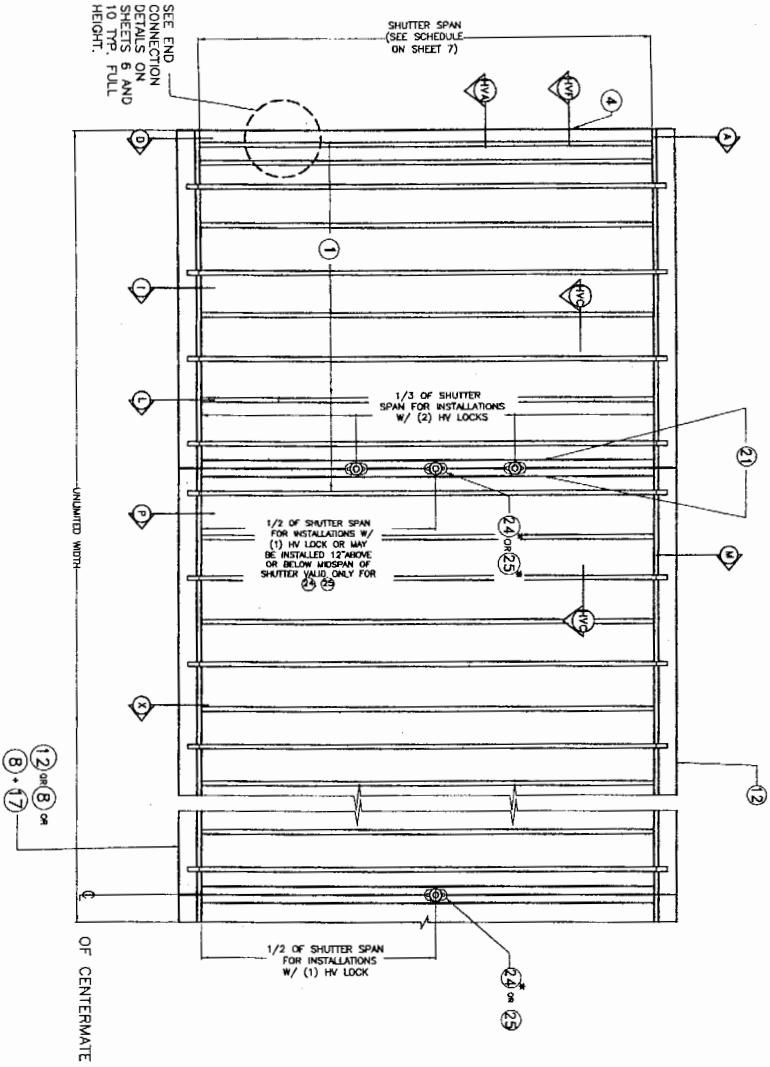
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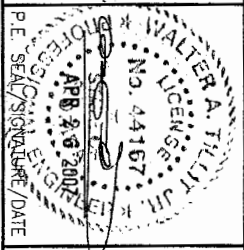


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TYPICAL SHUTTER ELEVATION
N.T.S.

- * NOTES ON HV LOCKS AND CENTERMATES:**
- MANDATORY CONDITION #1: ONE HV LOCK (2) or (3) SHALL BE USED AT 1/2 OF SHUTTER SPAN FOR ANY SPAN OR 1/2 ABOVE OR BELOW 1/2 OF SHUTTER SPAN FOR SPANS UP TO 90', AND FOR INSTALLATIONS AT ANY ELEVATION. HV LOCK (2) or (3) MAY BE USED AS AN INSIDE OR OUTSIDE LOCK, ATTACHED TO (2) CENTERMATE W/ (2) 1/4" x 20 x 1/2" LONG FLAT HEAD S.S. W.S. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION.
 - OPTIONAL CONDITION #1: IF DESIRED, FOR BETTER PERFORMANCE OR FOR SECURITY PURPOSES, UP TO TWO HV LOCKS (2) OR (3) MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. CONNECTION OF LOCKS TO CENTERMATES (2) SHALL BE AS INDICATED ON NOTE (1) ABOVE. LOCATION OF LOCKS SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION.



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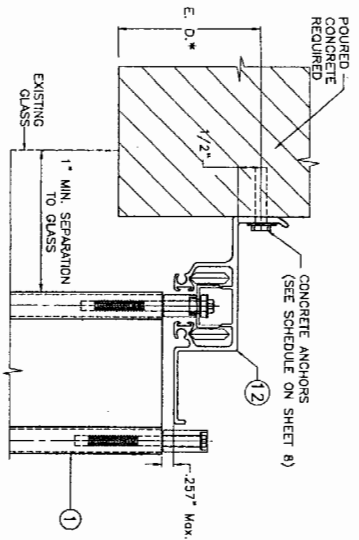
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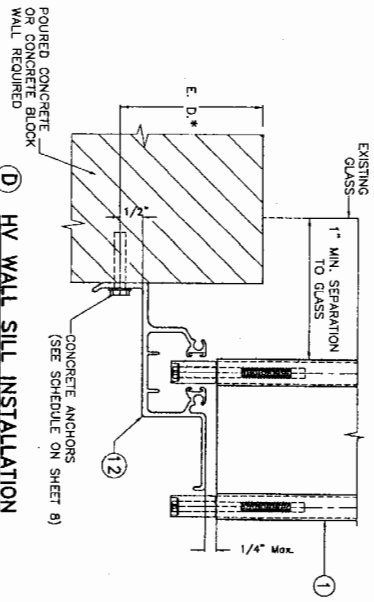
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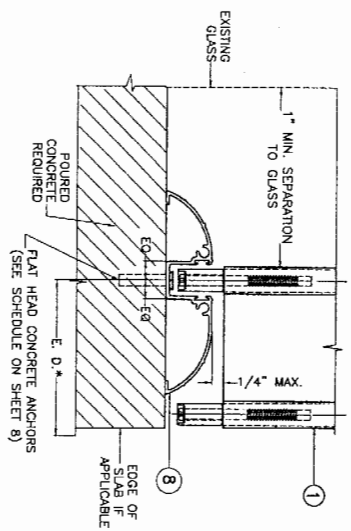
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SHEET 4 OF 10



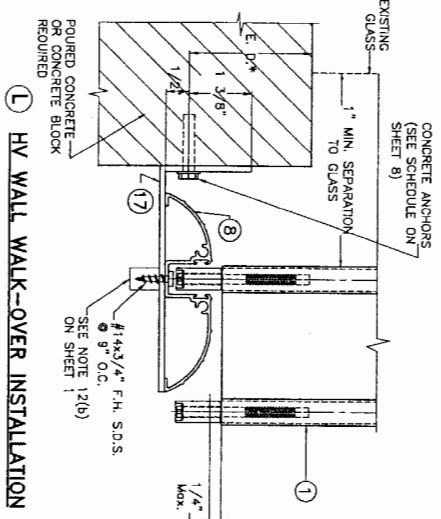
A HV WALL HEADER INSTALLATION



D HV WALL SILL INSTALLATION



I HV WALK-OVER INSTALLATION



L HV WALL WALK-OVER INSTALLATION

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

* E. D. = EDGE DISTANCE (SEE SPECIFICATIONS ON SHEET 7)

INSTALLATION DETAILS



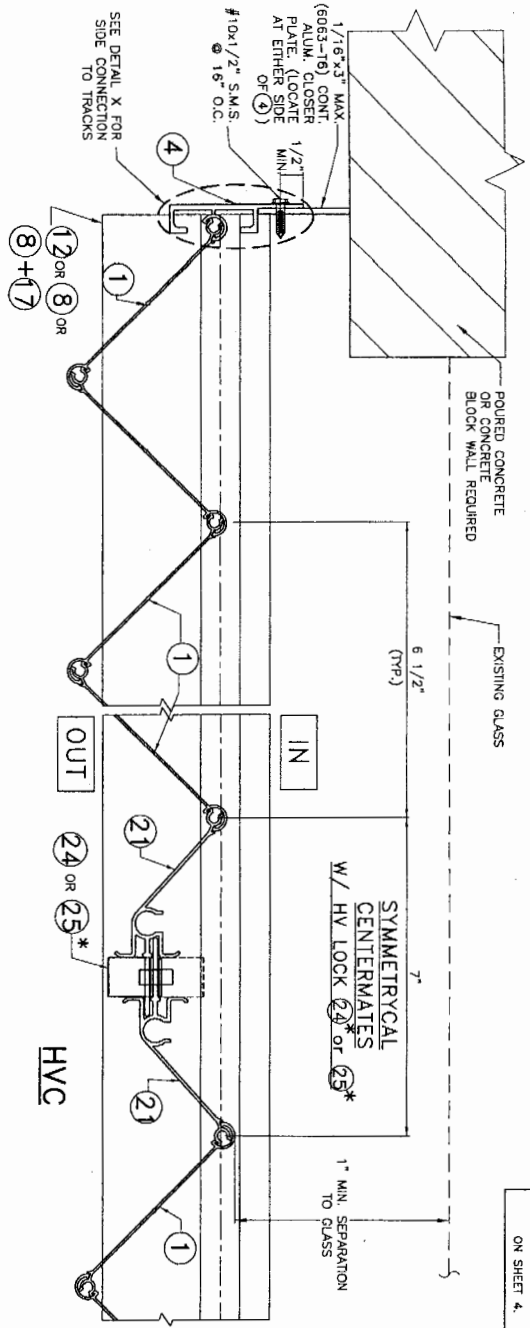
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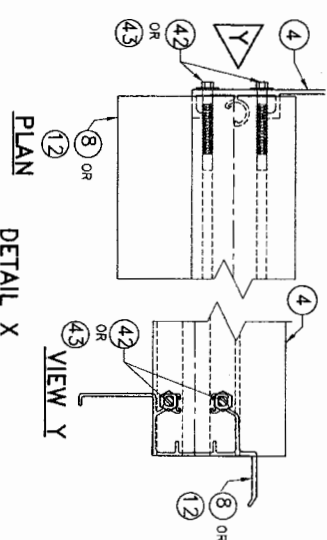
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 DRAWING No **07-086**
 SHEET **5** OF **10**

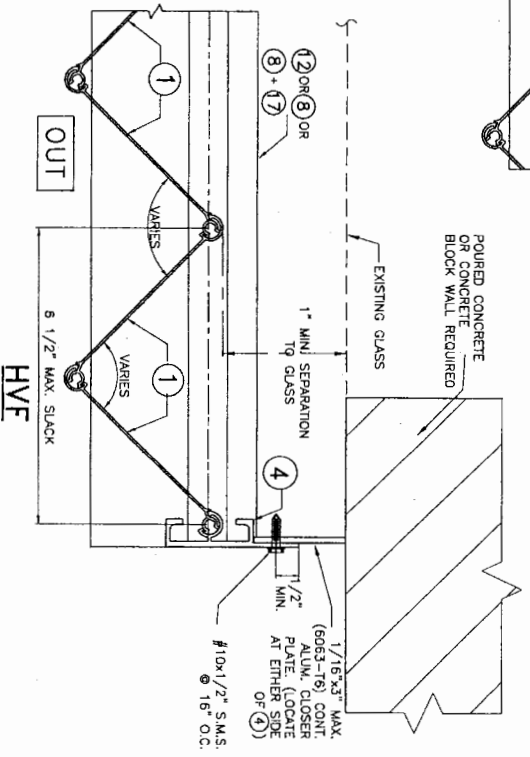


* SEE NOTES ON HV LOCKS 24 OR 25 ON SHEET 4.



END CONNECTION DETAIL

INSTALLATIONS W/ ① HV BLADE W/ HV CENTERMATE ②① INTO CONCRETE OR CONCRETE BLOCK WALL.



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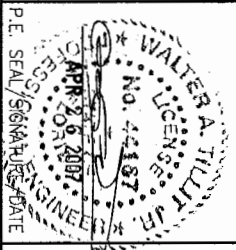
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DRAWING No 07-086
 SHEET 6 OF 10



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SCHEDULE #1

MAXIMUM SHUTTER SPAN "L" (ft.)
FOR INSTALLATIONS W/
SYMMETRICAL CENTERMATES, (21)
W/ ONE HV LOCK (22) or (23) ◆

MAXIMUM DESIGN LOAD (G.S.A.1) (+ OR -)	CONCRETE & WOOD INSTALLATIONS ▲
75	WALL MOUNTING OR WALL/FLOOR MOUNTING
	1" (N)
	7'-6"

▲ MAXIMUM SHUTTER SPAN "L" FOR INSTALLATIONS INTO WOOD SHALL BE LIMITED TO 75 P.S.I. DESIGN LOAD.

INSTALLATION LEGEND	
CONCRETE & MASONRY	WOOD
WALL MOUNTING	A & L
FLOOR/CEILING MOUNTING	M & P
	X

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

- 1. ANCHORS TO WALL SHALL BE AS FOLLOWS:
 - (A) TO EXISTING POURED CONCRETE: MIN. Fc = 3 ksi
 - 1/4" TAPCON ANCHORS, AS MANUFACTURED BY ITW, RAUSEY/ RED HEAD.

NOTES:

- A.1) MINIMUM EMBEDMENT INTO POURED CONCRETE OF TAPCON 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 CONSULT THIS ENGINEER.

- (B) TO EXISTING CONCRETE BLOCK WALL: ASTM C-90
- 1/4" TAPCON ANCHORS, AS MANUFACTURED BY ITW, RAUSEY/ RED HEAD.

NOTES:

- B.1) MINIMUM EMBEDMENT INTO CONCRETE BLOCK OF TAPCON 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 CONSULT THIS ENGINEER.

- (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 ANCHOR.

EDGE DISTANCE VERSUS SPACING FOR ANCHORS	
MAXIMUM ANCHOR SPACINGS ARE VALID FOR 3 1/2" EDGE DISTANCE FOR 1/4" TAPCON FOR E. D. LESS THAN THE ABOVE MENTIONED. REDUCE ANCHOR SPACING BY MULTIFACTORS SHOWN ON SCHEDULE BY THE FOLLOWING FACTORS. REDUCED SPACING OBTAINED USING FACTOR SHALL NOT BE LESS THAN MINIMUM SPACING INDICATED BELOW:	
ACTUAL E. D.	FACTOR
3"	1/4" TAPCON
2 1/2"	MIN. SPACING = 3"
2"	0.83
	0.66
	0.50

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5			7 OF 10
6			

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MAXIMUM DESIGN PRESSURE RATING (p.s.f.) AND
 CORRESPONDING MAXIMUM ANCHOR* SPACING (in.) SCHEDULE
 FOR A GIVEN MAX. SHUTTER SPAN, DESIGN NEGATIVE LOAD
 AND A CORRESPONDING MOUNTING TYPE
 FOR CONCRETE OR CONCRETE BLOCK INSTALLATIONS

(SEE MOUNTINGS A, D, I AND L ON SHEET 5)

* SEE ANCHOR
 SPECIFICATIONS
 ON SHEET 7

MAXIMUM SPAN (ft)	POURED CONCRETE				POURED CONCRETE/CONCRETE BLOCK			
	② WALL HEADER MOUNTING				① WALL SILL MOUNTING			
	W/②				W/②			
	NEGATIVE DESIGN LOAD (psf)				NEGATIVE DESIGN LOAD (psf)			
3'-0" OR LESS	30	40	60	75	30	40	60	75
4'-0"	14	12	10	9	14	12	10	9
5'-0"	14	12	10	9	14	12	10	9
6'-0"	14	12	10	9	14	12	10	8
7'-0"	14	12	10	9	14	12	9	5
7'-6"	14	12	10	8	14	11.5	7	3

MAXIMUM SPAN (ft)	POURED CONCRETE				POURED CONCRETE/CONCRETE BLOCK			
	① WALL OVER MOUNTING				① WALL/WALK OVER MOUNTING			
	NEGATIVE DESIGN LOAD (psf)				NEGATIVE DESIGN LOAD (psf)			
3'-0" OR LESS	30	40	60	75	30	40	60	75
4'-0"	14	12	10	9	5	5	5	5
5'-0"	14	12	10	9	5	5	5	5
6'-0"	14	12	10	9	5	5	5	5
7'-0"	14	12	10	9	5	5	5	5
7'-6"	14	12	10	8	5	5	5	5

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P.E. SIGNATURE/DATE

SHEET 8 OF 10

**MAXIMUM DESIGN PRESSURE RATING (p.s.f.) AND CORRESPONDING MAXIMUM ANCHOR⁺ SPACING (in.) SCHEDULE FOR
A GIVEN MAX. SHUTTER SPAN, NEGATIVE DESIGN LOAD AND A CORRESPONDING MOUNTING TYPE.**

(SEE MOUNTINGS ON SHEET 10).

S U B S T R A T E

MAXIMUM SPAN (ft)	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, O	FLOOR MOUNTINGS X	NEGATIVE DESIGN LOAD (psf)	WALL MOUNTINGS M, O	FLOOR MOUNTINGS X	NEGATIVE DESIGN LOAD (psf)	WALL MOUNTINGS M, O	FLOOR MOUNTINGS X	NEGATIVE DESIGN LOAD (psf)			
3'-0" OR LESS	30	40	60	75	30	40	60	75	30	40	60	75
4'-0"	12	10	10	9	6	6	6	6	12	10	10	9
5'-0"	12	10	10	9	6	6	6	6	12	10	10	9
6'-0"	12	10	10	9	6	6	6	6	12	10	10	9
7'-0"	12	10	10	9	6	6	6	6	12	10	10	9
7'-6"	12	10	10	9	6	6	6	6	12	10	10	9

+ NOTES ON ANCHORS REQUIREMENTS: WOOD SUBSTRATES.

1. ANCHORS TO WALL, FLOOR OR SOUD WOOD SORTI SHALL BE AS FOLLOWS:
- 1/4" TARBON ANCHORS, AS MANUFACTURED BY I.T.W. BULDEX W/ MINIMUM EMBEDMENT AS INDICATED AT EACH SECTION ON SHEET 10.
EXCEPTION: SEE NOTE 2 BELOW.
2. 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 (1988 APA)
3. ANCHORS SHALL BE INSTALLED FOLLOWING ALL OF THE RECOMMENDATIONS AND SPECIFICATIONS OF THE ANCHOR'S MANUFACTURER.



TILTECO INC.
TILT TESTING & ENGINEERING COMPANY
5385 N.W. 36th St., Ste. 205, VINCHIA GARDENS, FLORIDA 33166
Phone: (305)971-1530 Fax: (305)971-1531
e-mail: tilt@tilteco.com
WALTER A. TILT Jr., P. E.
FLORIDA Lic. # 44167

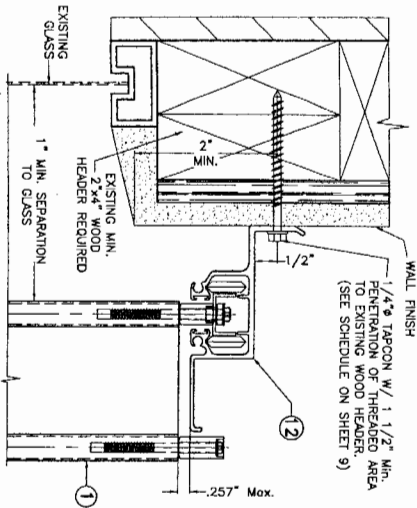
EASTERN METAL SUPPLY, INC.
(ASSA # 1)
3600 23 AVE. SOUTH
LAKEWORTH, FL 33461
PH: (561)533-6061 FAX: (561)588-4780

BERTHA HV™
Accordion Shutter System
DRAWING No. 07-086
SHEET 9 OF 10

F.B.C. (Non High Velocity Hurricane Zone)
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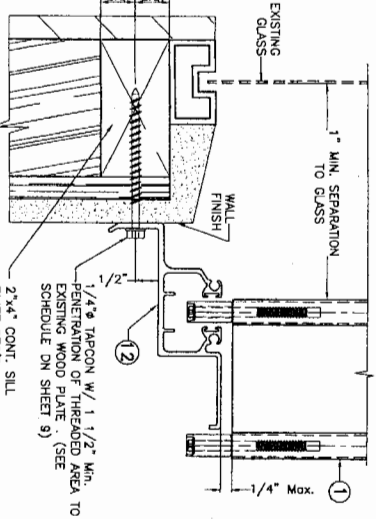
REV. NO.	DESCRIPTION	DATE	Drawn by: F.P.
1			DATE: 04/18/07
2			
3			
4			
5			
6			

**INSTALLATION DETAILS ON EXISTING WOOD BUILDINGS FOR ① HV BLADE
MAX. SHUTTER SPAN L FOR INSTALLATIONS INTO WOOD SHALL BE LIMITED
TO 75.0 psf. DESIGN LOAD**

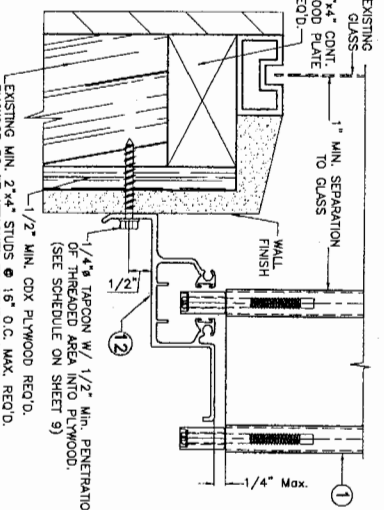


M HV WALL HEADER INSTALLATION

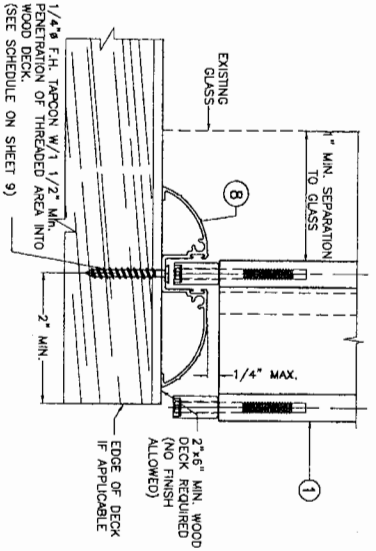
NOTE:
1-SEE SHEET 3 FOR TYPICAL SHUTTER ASSEMBLY
2-MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION.



O HV WALL SILL INSTALLATION

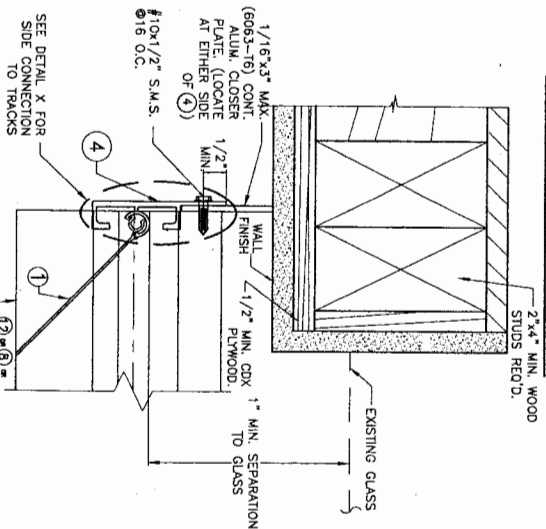


P HV WALL SILL INSTALLATION

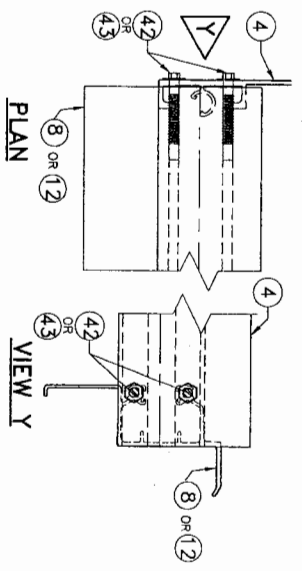


X HV WALK-OVER INSTALLATION

**END INSTALLATIONS FOR ① HV BLADE INTO
2\"/>**



8 END CONNECTION DETAIL



X DETAIL X

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BERTHA HV™
Accordion Shutter System

REV. NO.	DESCRIPTION	DATE	Drawn By: E.P.
1			
2			
3			
4			
5			
8			

DATE: 04/18/07
DRAWING No: 07-086
SHEET 10 OF 10

WALTER A. TILIT JR. LICENSE No. 44167
APR 28 2007
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