User: Public User - Not Associated with Organization -

Need Help ?

Application #:	FL389-R1
Date Submitted:	08/05/2005
Code Version:	2004
Product Manufacturer:	American Shutter Systems Association, Inc
Address/Phone/email:	4268 Westroads Drive West Palm Beach, FL 33407 (561) 841-5480
Category:	Shutters
Subcategory:	Accordion
Evaluation Method:	Evaluation Report from a Florida Registered Architect or Florida Professional Engineer

Referenced Standards from the Florida Building Code:

Section	Standard	Year
1609.1.4	ASTM E-1996	2002
1609.1.4	ASTM E-1886	2002

Florida Engineer or Architect Name:	Walter A. Tillit, Jr. P.E.
Florida License:	PE-44167
Quality Assurance Entity:	National Accreditation and Management Institute
Validation Entity:	John Henry Kampmann Jr
Authorized Signature:	Bill Feeley bfeeley@easternmetal.com
Evaluation/Test Reports Uploaded:	PTID_389_R1_T_CERT_INDEPENDENCE 05-0715.01.pdf PTID_389_R1_T_Drawing No.05-196.pdf PTID_389_R1_T_PROD_EVALUATION REPORT 05-0715.01.pdf

Installation Documents Uploaded:

Product Approval Method: Method 1 Option D

Application Status: Approved
Date Validated: 09/23/2005
Date Approved: 10/11/2005
Date Certified to the 2004 Code:

Page: Go

Page 1 / 1

App/Seq #	Product Model # or Name	Model Description	Limits of Use
389.1	Bertha HV Accordion Shutter (Non-HVHZ)-Drwg #05-196	Extruded aluminum interlocking blades retained by tracks (top and bottom) for storm protection	This product shall not be installed within High Velocity Hurricane Zone as defined on section 1620.2 of the Florida Building Code.

Next

VeriSign Secured VERIFY

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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.
THIS ACCORDION SHUTTER SYSTEM SHALL NOT BE INSTALLED AT HIGH VELOCITY HURRICANE ZONES.
DESIGN WIND LOADS SHALL BE DETERMINED AS PER SECTION 1609 OF THE ABOVE MENTIONED CODE FOR A BASIC WIND SPEED AS REQUIRED BY THE JURISDICTION WHERE SHUTTER WILL BE INSTALLED, AND FOR A DIRECTIONALITY FACTOR Kd=0.85, IN ACCORDANCE WITH ASCE 7-98 STANDARD. IN ORDER TO VERIFY THAT ANCHORS ON THIS P.A.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 IMPACT LOAD HAS BEEN VERIFIED IN ACCORDANCE WITH SECTION 1609.1.4 OF THE ABOVE MENTIONED CODE AS PER ATL REPORTS #0214.01-03 AND #0715.01-03 AS PER TAS-201, TAS-202 AND TAS-203 PROTOCOLS AND ASTM E-1886 AND E-1996 STANDARDS.

2. 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 STREGHT. 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.

3. ALL ALUMINUM EXTRUSIONS SHALL BE ALUMINUM ASSOCIATION 6063-T6 ALLOY AND TEMPER, WITH Fy = 25.0 ksi MINIMUM (UNLESS OTHERWISE NOTED).

4. ALL SCREWS TO BE STAINLESS STEEL 304 OR 316 AISI SERIES OR CORROSION RESISTANT COATED CARBON STEEL AS PER DIN 50018 WITH 50 ksi YIELD STRENGTH AND 90 ksi TENSILE STRENGTH

5. BOLTS TO BE ALUMINUM ASSOCIATION 2024-T4 ALLOY AND TEMPER, ASTM A-307 GALVANIZED STEEL, OR AISI 304 SERIES STAINLESS STEEL WITH 35 ksi MINIMUM YIELD STRENGTH

6. SEE SHEETS 10, 11 AND 12 FOR ANCHORS SPECIFICATIONS.

7. THIS BERTHA H.V. ACCORDION SHUTTER SYSTEM IS PATENT PENDING. COMPONENTS OF THIS APPROVAL ARE COVERED IN WHOLE OR IN PART BY U.S. PATENT 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 A PERMANENT LABEL IN A VISIBLE PLACE WITH WARNING NOTE INSTRUCTING THE TENANT OR HOME OWNER THAT THE H.V. LOCK (W) OR ALTERNATE LOCK (W) MUST BE PROPERLY LOCKED DURING PERIODS OF HURRICANE WARNING. FOR EGRESS CONDITIONS, AN INSIDE HV LOCK (W) (WHERE KEY MUST REMAIN IN THE LOCK), AN INSIDE ALTERNATE LOCK (W) , OR AN EGRESS H.V. LOCK (W) SHALL BE USED.

10. SHUTTER'S MANUFACTURER LABEL SHALL BE PLACED ON A READILY VISIBLE LOCATION.
ONE LABEL SHALL BE PLACED FOR EVERY OPENING. LABEL SHALL READ AS FOLLOWS:
AMERICAN SHUTTER SYSTEMS ASSOCIATION INC.
WEST PALM BEACH, FL.
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.

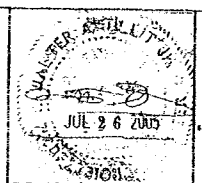
(b) CONTRACTOR TO BE RESPONSIBLE FOR THE SELECTION, PURCHASE AND INSTALLATION INCLUDING LIFE SAFETY OF THIS PRODUCT, BASED ON THIS P.E.D., PROVIDED HE/SHE DOES NOT DEVIATE FROM THE CONDITIONS DETAILED ON THIS DOCUMENT. CONSTRUCTION SAFETY AT SITE IS THE CONTRACTOR'S RESPONSIBILITY.

(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.

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



P.E. SEAL/SIGNATURE/DATE

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
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EB-0005719
WALTER A. TILLIT Jr. P. E.
FLORIDA Lic. # 44167

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

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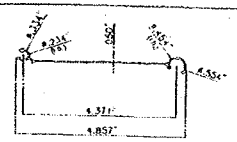
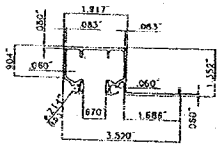
BERTHA HV™
Accordion Shutter System

REV. No	DESCRIPTION	DATE	Drawn by: J.A.S.
1	ALT 05-624	7/13/05	DATE: 7/13/05
2			
3			DRAWING No 05-196
4			
5			SHEET 1 OF 14
6			

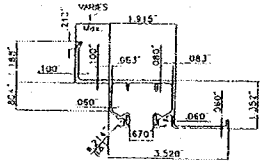
OFFICE COPY



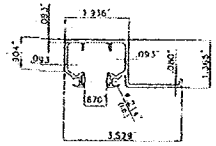
Ⓐ HV BLADE # 1
COVERED UNDER US PATENT # 5458179



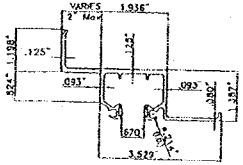
Ⓑ HV CEILING HEADER # 1



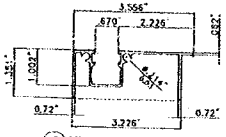
Ⓒ HV 1" (Max.) B/O HEADER/SILL # 1



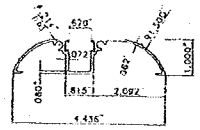
Ⓔ HD CEILING HEADER/SILL # 2



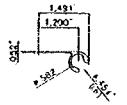
Ⓕ HD 2" (Max.) B/O HEADER/SILL # 2



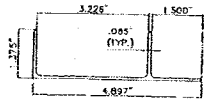
Ⓘ HV ADJ. TRACK



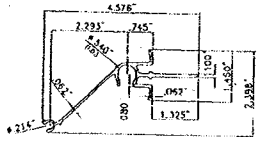
Ⓙ HV WALK-OVER TRACK



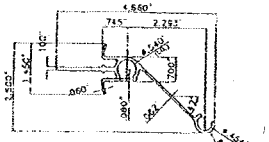
Ⓚ HV 90°/180° STARTER



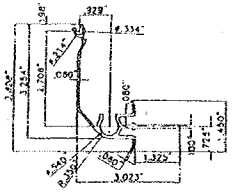
Ⓗ HV ADJ. ADAPTER W/LIP



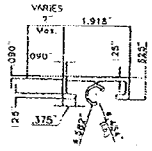
Ⓛ HV CENTERMATE # 1
(SELF MATING)



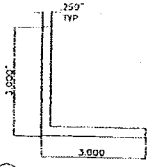
Ⓜ HV FLOATING CENTERMATE # 2



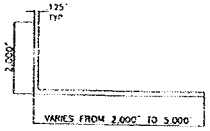
Ⓧ HV CORNER CENTERMATE # 3



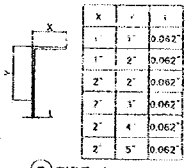
Ⓝ H.V. 2" (Max.) DIRECT MOUNT



Ⓞ 3" FLOOR ANGLE

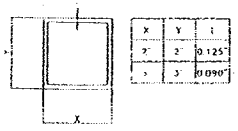


Ⓠ B.O. WALL ANGLE



X	Y	t
1"	1"	0.062"
1"	2"	0.062"
2"	2"	0.062"
2"	3"	0.062"
2"	4"	0.062"
2"	5"	0.062"

Ⓡ SIDE ANGLE



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

Ⓢ CORNER POST

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

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TILLECO INC.
TILLIT TESTING & ENGINEERING COMPANY
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FLORIDA Lic. # 44167

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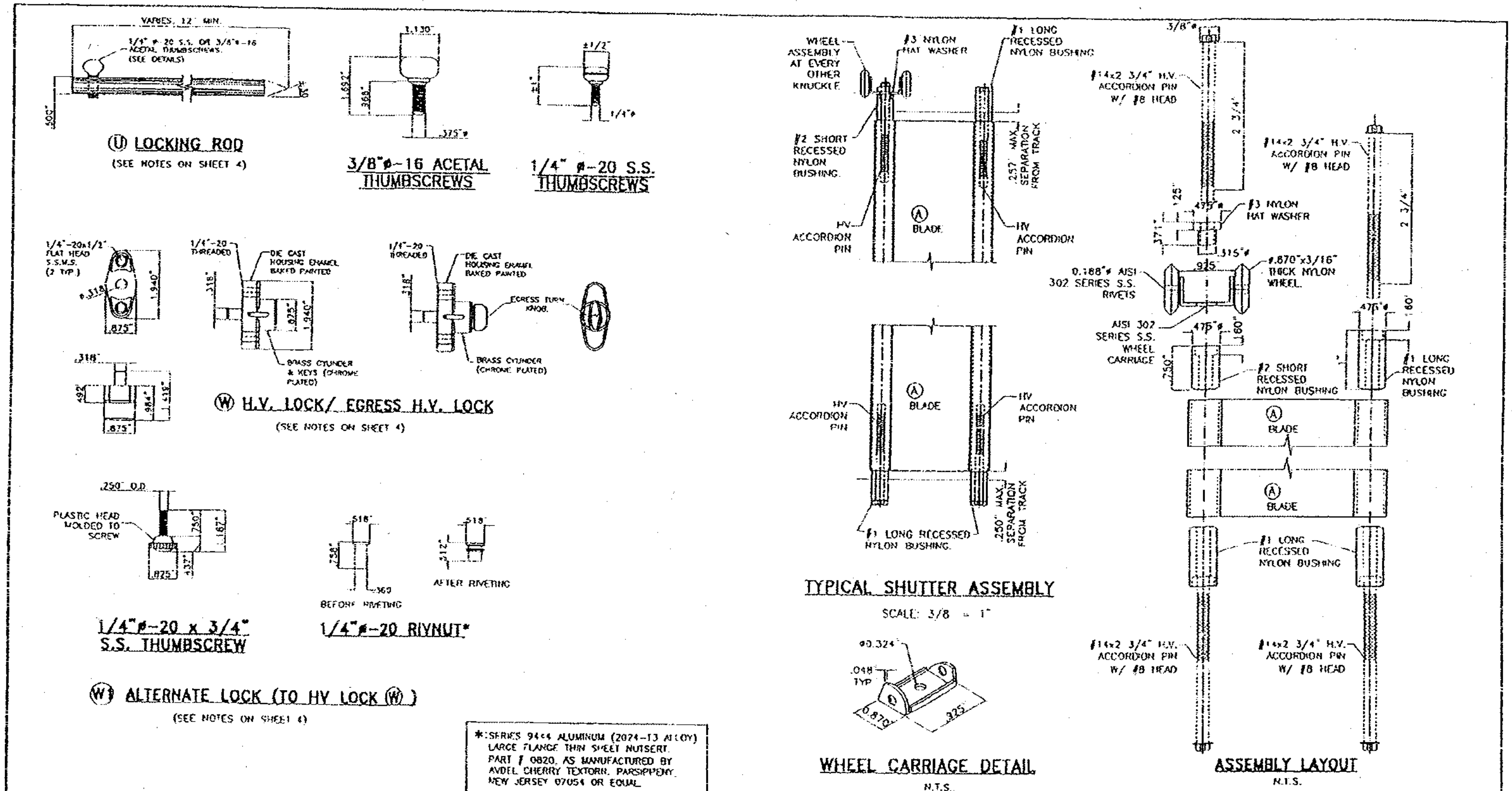
4268 Westroods Drive
West Palm Beach, Fl 33407

BERTHA HV™
Accordion Shutter System

REV. No	DESCRIPTION	DATE	Drawn by: J.A.S.
1	REVISED	7/13/05	DATE: 7/13/05
2			DRAWING No 05-196
3			
4			SHEET 2 OF 14



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

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

P.E. SEAL/SIGNATURE/DATE

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TILLIT TESTING & ENGINEERING COMPANY
5355 N.W. 39th St., Ste. 305, VIRGINIA GARDENS, FLORIDA 33195
Phone : (305)871-1530 , Fax : (305)871-1531
e-mail: tiltcco@aol.com
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WALTER A. TILLIT Jr. P. E.
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REV. No	DESCRIPTION	DATE	
1		7/13/05	Drawn by: J.A.S. DATE: 7/13/05
2			DRAWING No 05-196
3			
4			SHEET 3 OF 14
5			
6			

* NOTES ON LOCKING RODS Ⓤ , HV LOCK Ⓦ AND ALTERNATE Ⓦ1 LOCK:

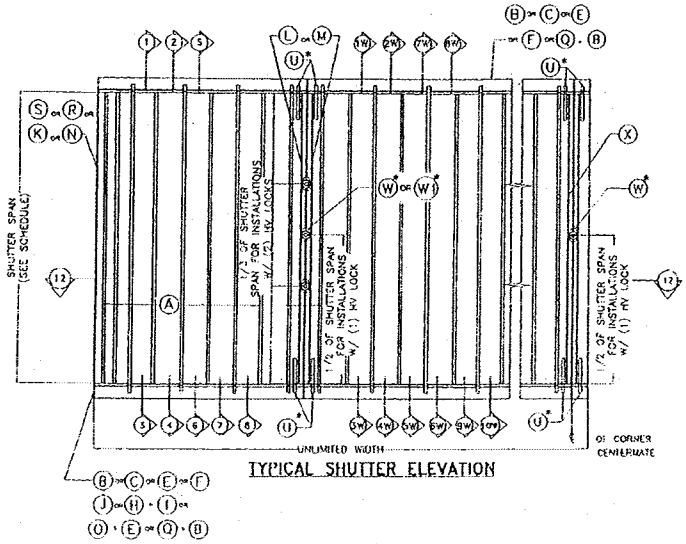
1. **MANDATORY CONDITION #1:** ONE HV LOCK Ⓦ SHALL BE USED FOR ANY SPAN AND INSTALLATIONS AT ANY ELEVATION. HV LOCK Ⓦ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. ATTACHED TO Ⓘ OR Ⓜ CENTERMATES W/(2) 1/4"ø-20 x 1/2" LONG FLAT HEAD S.S. M.S. LOCATION OF LOCK SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION.

2. **OPTIONAL CONDITION #1:** IF DESIRED, FOR BETTER PERFORMANCE OR FOR SECURITY PURPOSES, UP TO TWO HV LOCKS Ⓦ MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. CONNECTION OF LOCKS TO CENTERMATES Ⓛ OR Ⓜ SHALL BE AS INDICATED ON NOTE (1) ABOVE.
LOCATION OF LOCKS SHALL BE AS INDICATED ON TYPICAL SHUTTER ELEVATION.

3. **OPTIONAL CONDITION #2:** LOCKING RODS Ⓤ ARE NOT REQUIRED AT HURRICANE POSITION, BUT MAY BE USED IF DECIDED TO ENHANCE SHUTTER PERFORMANCE. LOCKING RODS Ⓤ OR AN ALTERNATIVE DEVICE MAY ALSO BE USED AT STACKING POSITION (NON HURRICANE POSITION).

4. **MANDATORY CONDITION #2:** ONE HV LOCK Ⓦ SHALL BE USED AT CORNER CENTERMATES FOR ANY SPAN AND INSTALLATIONS AT ANY ELEVATION. HV LOCK Ⓦ SHALL BE USED AS AN OUTSIDE OR INSIDE LOCK. ATTACHED TO Ⓧ CORNER CENTERMATE W/(2) 1/4"ø-20 x 1/2" LONG FLAT HEAD S.S. M.S. TWO LOCKING RODS Ⓤ 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 9.

5. **ALTERNATE TO MANDATORY CONDITION #1 VALID ONLY FOR SYMMETRICAL CENTERMATES:** ONE ALTERNATE LOCK (Ⓦ1) MAY BE USED IN LIEU OF HV LOCK Ⓦ FOR ANY SPAN AND INSTALLATIONS AT ANY ELEVATION. ALTERNATE LOCK (Ⓦ1) MAY BE USED AS AN INSIDE OR OUTSIDE LOCK. ATTACHMENT OF 1/4"ø-20x3/4" S.S. THUMBSCREW TO Ⓘ OR Ⓜ CENTERMATES SHALL BE MADE W/ 1/4"ø-20x3/4" ALUM. RIVNUT AS SHOWN ON ALTERNATE SECTION 12, SHEET 7.



TYPICAL SHUTTER ELEVATION

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

P.E. SEAL/SIGNATURE/DATE

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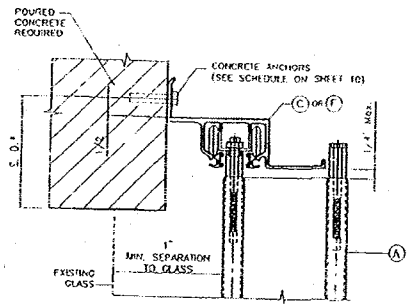
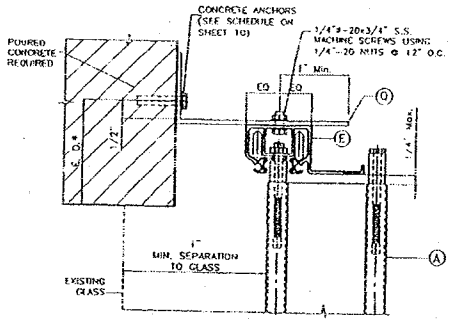
BERTHA HV™
Accordion Shutter System

REV. NO.	DESCRIPTION	DATE	Drawn/Ck: SW/WH
1	[illegible]	[illegible]	DATE: 7/13/05
2			DRAWING No 05-196
3			
4			
5			SHEET 4 OF 14
6			



① WALL MOUNTING INSTALLATION

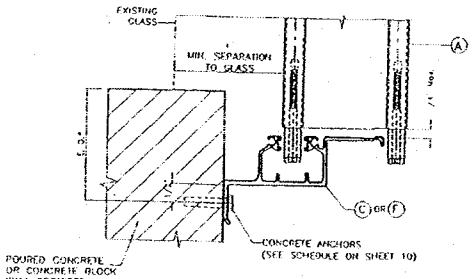


② WALL MOUNTING INSTALLATION

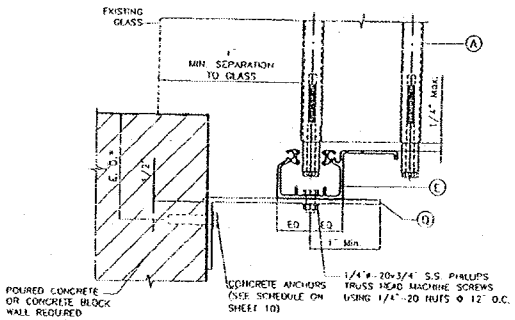
NOTE FOR COMBINATION OF SECTIONS:

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

* C. D. = EDGE DISTANCE (SEE NOTES & SCHEDULE ON SHEET 11)



③ WALL MOUNTING INSTALLATION



④ WALL MOUNTING INSTALLATION

INSTALLATION DETAILS

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

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P.E. SEAL/SIGNATURE/DATE

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TILLIE TESTING & ENGINEERING COMPANY
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West Palm Beach FL 33407

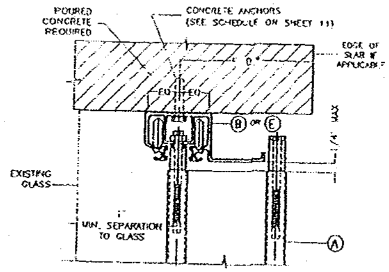
BERTHA HV™
Accordion Shutter System

REV. No	DESCRIPTION	DATE	Drawn by: E.A.S.
1	SUB 01-054	7/13/05	DATE: 7/13/05
2			DRAWING No 05-196
3			
4			
5			SHEET 5 OF 14
6			

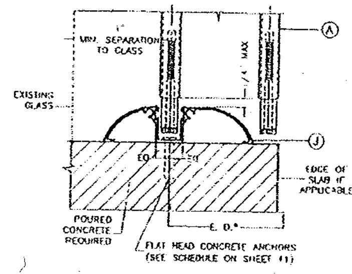
NOTE FOR COMBINATION OF SECTIONS:

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

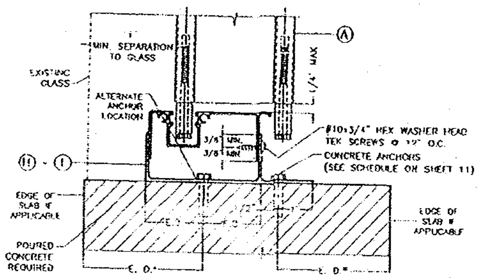
* E. D. = EDGE DISTANCE (SEE NOTES & SCHEDULE ON SHEET 11)



⑤ CEILING MOUNTING INSTALLATION

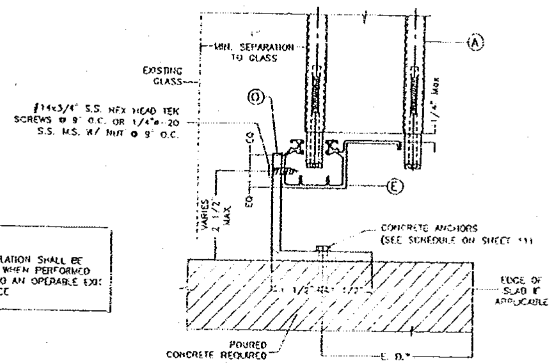


⑥ WALK-OVER MOUNTING INSTALLATION



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

⑦ FLOOR MOUNTING INSTALLATION †



⑧ FLOOR MOUNTING INSTALLATION †

INSTALLATION DETAILS

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

JUL 18, 2005
P.E. SEAL/SIGNATURE/DATE

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

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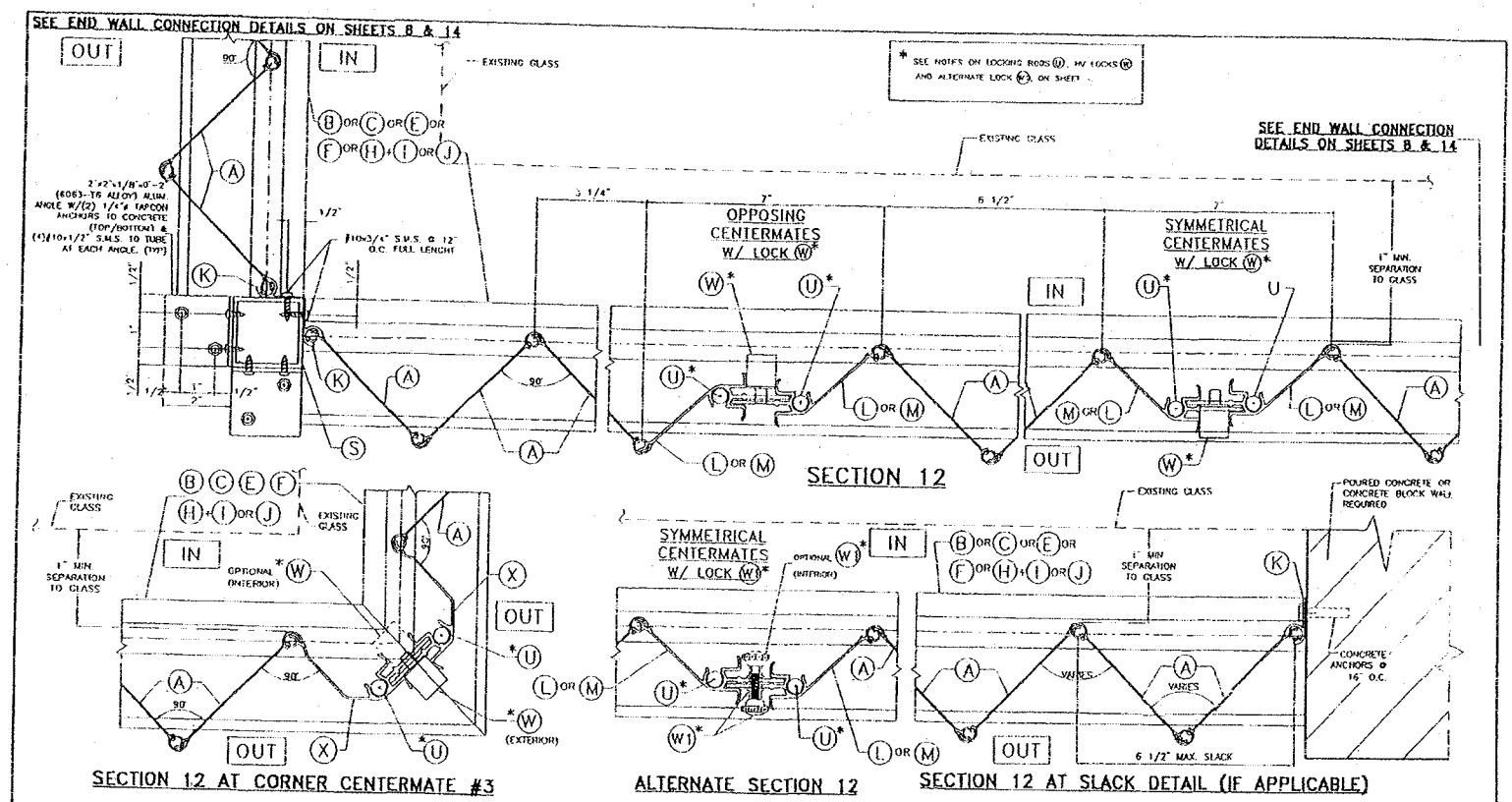
BERTHA HV™
Accordion Shutter System

REV. No	DESCRIPTION	DATE	
1	OLD 02-436	7/13/05	Drawn by: J.A.S. DATE: 7/13/05
2			DRAWING No 05-196
3			
4			
5			SHEET 6 OF 14
6			



JUL 13 2005

P.E. SEAL/SIGNATURE/DATE

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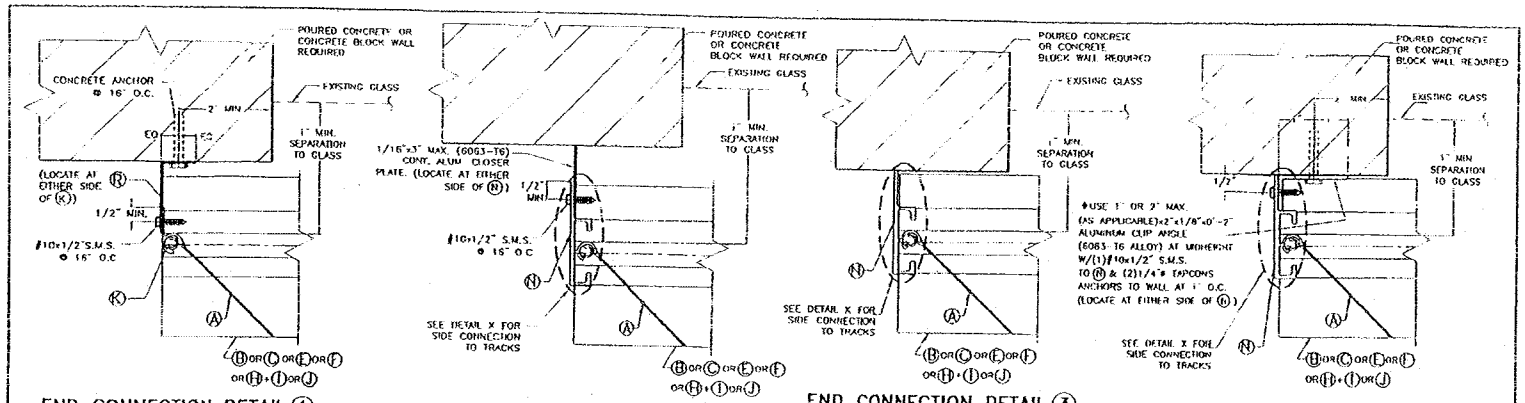
BERTHA HV™
Accordion Shutter System

REV. No	DESCRIPTION	DATE	Drawn by: J.A.S.
1	PER 43-654	7/13/05	DATE: 7/13/05
2			DRAWING No 05-196
3			
4			
5			SHEET 7 OF 14
6			



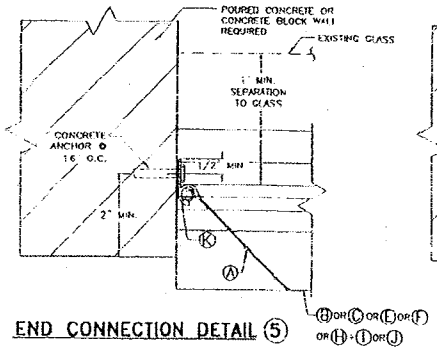
END CONNECTION DETAIL (1)

END CONNECTION DETAIL (2)

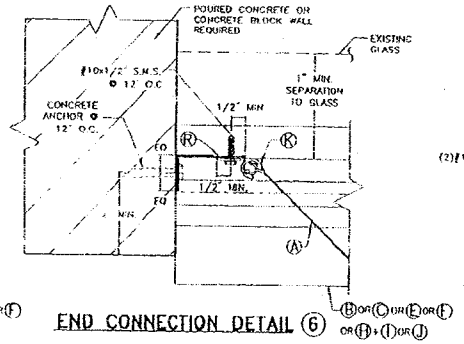
END CONNECTION DETAIL (3)

END CONNECTION DETAIL (4)

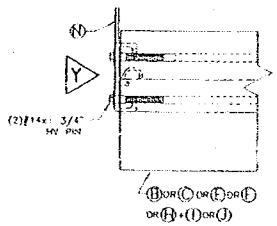
♦ REQUIRED ONLY FOR SPANS GREATER THAN 12'-0"



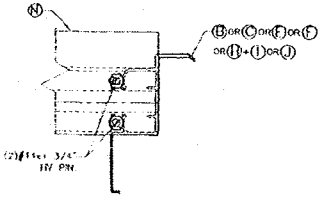
END CONNECTION DETAIL (5)



END CONNECTION DETAIL (6)



PLAN



VIEW Y

DETAIL X

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

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P.E. SEAL/SIGNATURE/DATE

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

BERTHA HV™
Accordion Shutter System

REV. NO.	DESCRIPTION	DATE	Drawn by: J.A.S.
1			DATE: 7/13/05
2			DRAWING No 05-196
3			
4			
5			SHEET 8 OF 14
6			

MAXIMUM SHUTTER SPAN
"L+" OR "L−" (ft.) INSTALLATIONS
W/ SYMMETRICAL CENTERMATES,
ONE HV LOCK & NO LOCKING RODS *
(SEE NOTE †)

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

MAXIMUM SHUTTER SPAN
"L+" OR "L−" (ft.)
INSTALLATIONS W/
OPPOSING CENTERMATES,
ONE HV LOCK & NO
LOCKING RODS *
(SEE NOTE †)

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

INSTALLATION LEGEND		
	CONCRETE & MANSORY	WOOD
WALL MOUNTING	1, 2, 3 & 4	1W, 2W, 3W, 4W, 5W & 6W
FLOOR/CEILING MOUNTING	5, 6, 7 & 8	8W, 9W & 10W

A MAXIMUM SHUTTER SPAN "L+" OR "L−" FOR INSTALLATIONS INTO WOOD SHALL BE LIMITED TO 110 psf. DESIGN LOAD.

† CORNER CENTERMATE #3 MAY BE USED AT ALL MOUNTING INSTALLATIONS. LOCKING SPECIFICATIONS SHALL BE AS INDICATED ON MANDATORY CONDITION #2 NOTE #4, SHEET 4 OF 14.

* NOTES:

(1) L+: MAXIMUM ALLOWABLE SPAN FOR A GIVEN POSITIVE DESIGN LOAD.
L−: MAX. ALLOWABLE SPAN FOR A GIVEN NEGATIVE DESIGN LOAD.

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

GIVEN A POSITIVE DESIGN LOAD, DETERMINE MAXIMUM SPAN "L+" FROM SCHEDULE.
GIVEN A NEGATIVE DESIGN LOAD, DETERMINE MAXIMUM SPAN "L−" FROM SCHEDULE.

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

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

FOR A GIVEN POSITIVE DESIGN LOAD:
DETERMINE:
L1+= MAX. SPAN FOR WALL MOUNTING INSTALLATIONS.
L2+= MAX. SPAN FOR FLOOR/CEILING MOUNTING INSTALLATIONS.

FOR A GIVEN NEGATIVE DESIGN LOAD:
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 DESIGN LOAD TO DETERMINE MAXIMUM ANCHOR SPACING.

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

P.E. SEAL/SIGNATURE/DATE

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West Palm Beach, FL 33407

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BERTHA HV™
Accordion Shutter System

REV. No	DESCRIPTION	DATE	Drawn by: J.A.S.
1	PER COMMENTS	7/13/05	DATE: 7/13/05
2			DRAWING No 05−196
3			
4			
5			SHEET 9 OF 14
6			

ANCHORS SPACING LEGEND

TAPCON
ALL POINTS SOLID-SET
WEDGE-BOLT

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 1, 2, 3 & 4 ON SHEET 5)

* SEE ANCHOR SPECIFICATIONS ON SHEET 11

POURED CONCRETE

WALL MOUNTING 1 W/ Ⓒ HV — 1" (Max.)B/O HEADER/ SILL #1

MAXIMUM SPAN (ft)	NEGATIVE DESIGN LOAD (psf)							
	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	3.5
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
5'-0"	14	12	10	9	8	8	4	3
	14	12	10	9	8	8	5.5	–
	14	12	10	9	8	8	6	4.5
6'-0"	14	12	10	9	8	5	3	–
	14	12	10	9	8	5.5	–	–
	14	12	10	9	8	8	5	3.5
7'-0"	14	12	10	9	7	3.5	–	–
	14	12	10	9	8	4	–	–
	14	12	10	9	8	6.5	4	–
8'-0"	14	12	10	8	5	3	–	–
	14	12	10	9	5.5	–	–	–
	14	12	10	9	8	5	–	–
9'-0"	14	12	10	5.5	3.5	–	–	–
	14	12	10	6.5	4	–	–	–
	14	12	10	9	7	4	–	–
10'-0"	14	12	8	4.5	3	–	–	–
	14	12	9.5	5	3.5	–	–	–
	14	12	10	6.5	5.5	–	–	–
11'-0"	14	12	6	3.5	–	–	–	–
	14	12	7	4	–	–	–	–
	14	12	10	7	–	–	–	–
12'-0"	14	12	5	–	–	–	–	–
	14	12	5.5	–	–	–	–	–
	14	12	9	–	–	–	–	–
13'-0"	14	12	4	–	–	–	–	–
	14	12	4.5	–	–	–	–	–
	14	12	7.5	–	–	–	–	–
14'-0"	14	10.5	3.5	–	–	–	–	–
	14	12	4	–	–	–	–	–
	14	12	6.5	–	–	–	–	–
15'-0"	14	8.5	–	–	–	–	–	–
	14	9.5	–	–	–	–	–	–
	14	12	–	–	–	–	–	–
16'-0"	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–

WALL MOUNTING 1 W/ Ⓕ HV — 2" (Max.)B/O HEADER/ SILL #2

MAXIMUM SPAN (ft)	NEGATIVE DESIGN LOAD (psf)							
	30	40	60	75	90	120	160	205
3'-0" OR LESS	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
4'-0"	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
5'-0"	14	12	10	9	8	8	6	3
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
6'-0"	14	12	10	9	8	8	3.5	–
	14	12	10	9	8	8	4.5	–
	14	12	10	9	8	8	6	6
7'-0"	14	12	10	9	8	6.5	–	–
	14	12	10	9	8	6.5	3	–
	14	12	10	9	8	8	5	–
8'-0"	14	12	10	8	8	3.5	–	–
	14	12	10	9	8	4.5	–	–
	14	12	10	9	8	7	–	–
9'-0"	14	12	10	9	9	6.5	–	–
	14	12	10	9	9	7.5	3	–
	14	12	10	9	8	5.5	–	–
10'-0"	14	12	10	9	9	4.5	–	–
	14	12	10	9	9	5.5	–	–
	14	12	10	9	8	–	–	–
11'-0"	14	12	10	9	7	–	–	–
	14	12	10	9	9	–	–	–
	14	12	10	9	9	–	–	–
12'-0"	14	12	10	9	–	–	–	–
	14	12	10	9	–	–	–	–
	14	12	10	9	–	–	–	–
13'-0"	14	12	7.5	9	–	–	–	–
	14	12	9	9	–	–	–	–
	14	12	10	9	–	–	–	–
14'-0"	14	12	5.5	9	–	–	–	–
	14	12	6.5	9	–	–	–	–
	14	12	10	9	–	–	–	–
15'-0"	14	12	–	9	–	–	–	–
	14	12	–	9	–	–	–	–
	14	–	–	–	–	–	–	–
16'-0"	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–

WALL MOUNTING 2

MAXIMUM SPAN (ft)	NEGATIVE DESIGN LOAD (psf)							
	30	40	60	75	90	120	160	205
3'-0" OR LESS	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
4'-0"	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
5'-0"	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
6'-0"	14	12	10	9	8	8	6	5
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
7'-0"	14	12	10	9	8	8	6	4
	14	12	10	9	8	8	6	5
	14	12	10	9	8	8	6	6
8'-0"	14	12	10	9	8	8	6	5
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
9'-0"	14	12	10	9	8	8	6	–
	14	12	10	9	8	8	6	–
	14	12	10	9	8	8	6	–
10'-0"	14	12	10	9	9	–	–	–
	14	12	10	9	8	–	–	–
	14	12	10	9	8	–	–	–
11'-0"	14	12	10	9	–	–	–	–
	14	12	10	9	–	–	–	–
	14	12	10	9	–	–	–	–
12'-0"	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
13'-0"	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
14'-0"	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
15'-0"	14	12	–	–	–	–	–	–
	14	12	–	–	–	–	–	–
	14	–	–	–	–	–	–	–
16'-0"	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–

POURED CONCRETE/CONCRETE BLOCK

WALL MOUNTING 3 W/ Ⓒ HV — 1" (Max.)B/O HEADER/ SILL #1

MAXIMUM SPAN (ft)	NEGATIVE DESIGN LOAD (psf)							
	30	40	60	75	90	120	160	205
3'-0" OR LESS	14	12	10	9	8	8	6	3
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	4.5
	14	12	10	9	8	7.5	5	–
4'-0"	14	12	10	9	8	8	5	–
	14	12	10	9	8	8	5.5	–
	14	12	10	9	8	8	6	4
5'-0"	14	12	10	9	8	7	–	–
	14	12	10	9	8	8	6	–
	14	12	10	9	8	8	6	6
6'-0"	14	12	10	9	8	4	–	–
	14	12	10	9	8	8	4	–
	14	12	10	9	8	8	6	6
7'-0"	14	12	10	9	7.5	3	–	–
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
8'-0"	14	12	10	9	8	8	6	6
	14	11.5	7	3	–	–	–	–
	14	12	10	7	4	–	–	–
9'-0"	14	12	10	9	7	–	–	–
	13.5	10	4	–	–	–	–	–
	14	12	10	9	8	8	6	–
10'-0"	14	12	10	9	8	8	–	–
	14	12	7	3.5	–	–	–	–
	14	12	10	9	8	–	–	–
11'-0"	14	12	10	9	–	–	–	–
	14	12	9	3.5	–	–	–	–
	14	12	10	9	–	–	–	–
12'-0"	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
13'-0"	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
14'-0"	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
	14	12	10	–	–	–	–	–
15'-0"	14	12	–	–	–	–	–	–
	14	12	–	–	–	–	–	–
	14	–	–	–	–	–	–	–
16'-0"	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–

WALL MOUNTING 3 W/ Ⓕ HV — 2" (Max.)B/O HEADER/ SILL #2

MAXIMUM SPAN (ft)	NEGATIVE DESIGN LOAD (psf)							
	30	40	60	75	90	120	160	205
3'-0" OR LESS	14	12	10	9	8	8	6	3
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
4'-0"	14	12	10	9	8	7.5	5.5	–
	14	12	10	9	8	8	6	5
	14	12	10	9	8	8	6	3.5
5'-0"	14	12	10	9	8	8	6	–
	14	12	10	9	8	8	6	–
	14	12	10	9	8	8	6	6
6'-0"	14	12	10	9	8	6.5	3.5	–
	14	12	10	9	8	8	7	–
	14	12	10	9	8	8	6	6
7'-0"	14	12	8	7	5.5	–	–	–
	14	12	10	9	8	6	5	–
	14	12	10	9	8	8	6	6
8'-0"	14	11.5	7	6	3.5	–	–	–
	14	12	10	9	8	3	–	–
	14	12	10	9	7	–	–	–
9'-0"	13.5	10	6.5	5	–	–	–	–
	14	12	10	9	5.5	–	–	–
	14	12	10	9	9	–	–	–
10'-0"	12	9	6	3	–	–	–	–
	14	12	10	8	4	–	–	–
	14	12	10	5.5	–	–	–	–
11'-0"	11	8	5.5	–	–	–	–	–
	14	12	10	5	–	–	–	–
	14	12	10	8	9	–	–	–
12'-0"	10	7.5	5	–	–	–	–	–
	14	12	10	8	6	3	–	–
	14	12	10	9	7	–	–	–
13'-0"	9.5	7	4	–	–	–	–	–
	14	12	10	9	9	–	–	–
	14	12	10	9	7.5	–	–	–
14'-0"	8.5	6.5	3.5	–	–	–	–	–
	14	12	6	–	–	–	–	–
	14	12	10	3.5	–	–	–	–
15'-0"	8	6	–	–	–	–	–	–
	14	12	–	–	–	–	–	–
	14	11.5	–	–	–	–	–	–
16'-0"	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–
	14	–	–	–	–	–	–	–

WALL MOUNTING 4

MAXIMUM SPAN (ft)	NEGATIVE DESIGN LOAD (psf)							
	30	40	60	75	90	120	160	205
3'-0" OR LESS	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
4'-0"	14	12	10	9	8	7.5	5.5	3.5
	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6
5'-0"	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	4
	14	12	10	9	8	8	6	6
6'-0"	14	12	10	8	7	5	–	–
	14	12	10	9	8	8	6	4.5
	14	12	10	9	8	8	6	6
7'-0"	14	12	9	7	5.5	–	–	–
	14	12	10	9	8	6	5	–
	14	12	10	9	8	8	6	6
8'-0"	14	11.5	7.5	6	5	–	–	–
	14	12	10	9	8	6.5	4	–
	14	12	10	9	8	8	6	6
9'-0"	13.5	10	7	5.5	4	–	–	–
	14	12	10	9	8	8	6	–
	14	12	10	9	8	8	6	–
10'-0"	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
11'-0"	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
12'-0"	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
13'-0"	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
14'-0"	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
15'-0"	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
16'-0"	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–
	14	12	10	9	8	8	–	–

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

P.E. SEAL/SIGNATURE/DATE

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BERTHA HV™
Accordion Shutter System

REV. No.	DESCRIPTION	DATE
1	OLD 65-434	7/13/05
2		
3		
4		
5		
6		

Drawn by: J.A.S.
DATE: 7/13/05
DRAWING No. 05-196
SHEET 10 OF 14

ANCHORS SPACING LEGEND

TAPCON
ALL POINTS SOLID-SET
WEDGE-BOLT

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 INSTALLATIONS

(SEE MOUNTINGS 5, 6, 7, & 8 ON SHEET 6).

POURED CONCRETE

MAXIMUM SPAN (ft)	CEILING MOUNTING 5								FLOOR MOUNTING 6							
	NEGATIVE DESIGN LOAD (psf)								NEGATIVE DESIGN LOAD (psf)							
	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205
	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
3'-0" OR LESS	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
4'-0"	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	5	14	12	10	9	8	8	6	6
5'-0"	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	7.5	5.5	4	14	12	10	9	8	8	6	6
6'-0"	14	12	10	9	8	8	6	5	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	6	4.5	3.5	14	12	10	9	8	8	6	6
7'-0"	14	12	10	9	8	7	5	4	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	5	6	14	12	10	9	8	8	6	6
	14	12	10	9	7.5	5.5	4	–	14	12	10	9	8	8	6	–
8'-0"	14	12	10	9	8	6	4.5	–	14	12	10	9	8	8	6	–
	14	12	10	9	8	8	6	–	14	12	10	9	8	8	6	–
	14	12	10	8	6.5	5	–	–	14	12	10	9	8	8	–	–
9'-0"	14	12	10	9	7.5	5.5	–	–	14	12	10	9	8	8	–	–
	14	12	10	9	8	8			14	12	10	9	8	8	–	–
	14	12	9	7	6	4.5	–	–	14	12	10	9	8	8		–
10'-0"	14	12	10	8	6.5	5	–	–	14	12	10	9	8	8	–	–
	14	12	10	9	8	7			14	12	10	9	8	8	–	–
	14	12	8	6.5	5	4		–	14	12	10	9	8	8	–	–
11'-0"	14	12	9	7	6	4.5		–	14	12	10	9	8	8	–	–
	14	12	10	9	8	6.5	–	–	14	12	10	9	8	6	–	–
	14	11	7.5	6	5	–	–	–	14	12	10	9	8	–	–	–
12'-0"	14	12	8	6.5	5.5	–	–	–	14	12	10	9	8		–	
	14	12	10	9	8	–	–	–	14	12	10	9	8	–	–	
	13.5	10	6.5	5.5	4.5	–		–	14	12	10	9	8		–	–
13'-0"	14	11.5	7.5	6	5	–		–	14	12	10	9	8		–	–
	14	12	10	8.5	7	–	–	–	14	12	10	9	8		–	–
	12.5	9.5	6	5	–	–	–	–	14	12	10	9	–	–	–	–
14'-0"	14	10.5	7	5.5		–	–	–	14	12	10	9	–	–	–	–
	14	12	10	8			–	–	14	12	10	9	–	–	–	–
	12	9	6			–	–	–	14	12	10	–	–	–	–	–
15'-0"	13.5	10	6.5	–				–	14	12	10	–	–	–		–
	14	12	9.5	–	–	–	–	–	14	12	10					
	11	8	5.5	–	–	–	–	–	14	12	10				–	–
16'-0"	12.5	9.5	6	–	–	–	–	–	14	12	10					–
	14	12	9		–				14	12	10	–	–	–	–	–

MAXIMUM SPAN (ft)	FLOOR MOUNTING 7								FLOOR MOUNTING 8							
	NEGATIVE DESIGN LOAD (psf)								NEGATIVE DESIGN LOAD (psf)							
	30	40	60	75	90	120	160	205	30	40	60	75	90	120	160	205
	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
3'-0" OR LESS	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	8	8	6	5	14	12	10	9	8	7.5	5.5	4.5
4'-0"	14	12	10	9	8	8	6	5.5	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	7	5	4	14	12	10	9	8	6	4.5	3.5
5'-0"	14	12	10	9	8	8	6	4.5	14	12	10	9	8	7	5	4
	14	12	10	9	8	8	6	6	14	12	10	9	8	8	6	6
	14	12	10	9	7.5	5.5	4	3	14	12	10	8	7	5	3.5	3
6'-0"	14	12	10	9	8	6.5	5	3.5	14	12	10	9	8	6	4.5	3.5
	14	12	10	9	8	8	6	5.5	14	12	10	9	8	8	6	5
	14	12	10	8	6.5	5	3.5	–	14	12	9	7	6	4.5	3	–
7'-0"	14	12	10	9	7.5	5.5	4	3	14	12	10	8	6.5	5	3.5	3
	14	12	10	9	8	8	6	4.5	14	12	10	9	8	7.5	5.5	[illegible]
	14	12	8.5	7	5.5	4	3	–	14	11.5	7.5	6	5	4	3	–
8'-0"	14	12	10	8	6.5	5	3.5	–	14	12	9	7	6	4.5	3	–
	14	12	10	9	8	7	5	–	14	12	10	9	8	6.5	5	–
	14	11.5	7.5	6	5	3.5	–	–	14	10.5	7	5.5	4.5	3.5	–	–
9'-0"	14	12	8.5	7	5.5	4	–	–	14	12	8	6	5	4	–	–
	14	12	10	9	8	6	–	–	14	12	10	9	7.5	5.5	–	–
	14	10.5	7	5.5	4.5	3.5	–		12.5	9.5	6	5	4	3	–	–
10'-0"	14	12	8	6	5	4	–	–	14	10.5	7	5.5	4.5	3.5	–	–
	14	12	10	9	7.5	5.5	–		14	12	10	8.5	7	5	–	–
	12.5	9.5	6	5	4	3	–		11.5	8.5	5.5	4.5	3.5	2.5	–	–
11'-0"	14	10.5	7	5.5	4.5	3.5	–		13	9.5	6.5	5	4	3	–	–
	14	12	10	8	7	5	–		14	12	9.5	7.5	6	4.5	–	
	11.5	8.5	5.5	4.5	3.5	–			10.5	7.5	5	4	3.5	–	–	–
12'-0"	13	10	6.5	5	4	–	–		12	9	6	4.5	4	–	–	–
	14	12	9.5	7.5	6	–	–	–	14	12	8.5	7	5.5	–	–	–
	10.5	8	5	4	3.5	–		–	9.5	7	4.5	3.5	3			–
13'-0"	12	9	6	4.5	4	–		–	11	8	5.5	4	3.5	–	–	–
	14	12	8.5	7	6	–	–	–	14	12	8	6.5	5			–
	10	7.5	5	4	–	–	–	–	9	6.5	4.5	3.5	–			
14'-0"	11	8.5	5.5	4.5	–	–	–	–	10	7.5	5	4	–	–	–	–
	14	12	8	6.5	–	–	–	–	14	11	7.5	6	–	–	–	–
	9	7	4.5	–	–	–	–	–	8	6	4	–	–	–	–	–
15'-0"	10.5	8	5			–		–	9.5	7	4.5	–	–	–	–	–
	14	11.5	7.5	–	–	–	–	–	14	10.5	7	–	–	–	–	–
	8.5	6.5	4	–	–	–		–	7.5	5.5	4	–	–	–	–	–
16'-0"	10	7.5	5			–	–	–	9	6.5	4.5	–	–	–	–	–
	14	10.5	7	–	–	–	–	–	13	9.5	6.5	–	–	–	–	–

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

1. ANCHORS TO WALL SHALL BE AS FOLLOWS:

(A) TO EXISTING POURED CONCRETE: (Min. f'c = 3 ksi)
- 1/4"ø TAPCON ANCHORS, AS MANUFACTURED BY I.T.W. RAMSET/ RED HEAD.
- 1/4"ø x 3/4" ALL POINTS SOLID-SET ANCHORS AS DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY.
- 1/4"ø WEDGE-BOLT ANCHORS AS MANUFACTURED BY POWERS FASTENING, INC.

NOTES:

A.1) MINIMUM EMBEDMENT INTO POURED CONCRETE OF TAPCON ANCHORS IS 1 3/4", AND 2" FOR WEDGE-BOLT ANCHORS

A.2) MINIMUM EMBEDMENT OF 1/4"ø x 3/4" ALL POINTS SOLID-SET ANCHORS SHALL BE 7/8" INTO THE POURED CONCRETE. NO EMBEDMENT INTO STUCCO SHALL BE PERMITTED. 1/4" #-20 S.S. MACHINE SCREW USED SHALL BE 1 1/2" LONG MINIMUM SHOULD STUCCO EXIST AND 1" MINIMUM FOR WALLS WITH NO STUCCO.

A.3) IN CASE THAT PRECAST STONE, PRECAST CONCRETE PANELS, PAVERS OR ANY VENEER BE FOUND ON THE EXISTING WALL OR FLOOR, ANCHORS SHALL BE LONG ENOUGH TO REACH THE MAIN STRUCTURE BEHIND SAID WALL FINISHES. ANCHORAGE SHALL BE AS INDICATED ON NOTES A.1) & A.2) ABOVE. FOR INSTALLATIONS ON VINYL SIDING OR EIFS CONSULT THIS ENGINEER.

(B) TO EXISTING CONCRETE BLOCK WALL:
- 1/4"ø TAPCON ANCHORS, AS MANUFACTURED BY I.T.W. RAMSET/ RED HEAD.
- 1/4"ø x 3/4" ALL POINTS SOLID-SET ANCHORS AS DISTRIBUTED BY ALL POINTS SCREW, BOLT & SPECIALTY COMPANY
- 1/4"ø WEDGE-BOLT W/ 1/4"ø BLOCK-PLUG ANCHORS AS MANUFACTURED BY POWERS FASTENING, INC.

NOTES:

B.1) MINIMUM EMBEDMENT INTO CONCRETE BLOCK OF TAPCON & WEDGE-BOLT ANCHORS IS 1 1/4".

B.2) MINIMUM EMBEDMENT OF 1/4"ø x 3/4" ALL POINTS SOLID-SET ANCHORS SHALL BE ENTIRELY EMBEDDED INTO THE CONCRETE BLOCK. NO EMBEDMENT INTO STUCCO SHALL BE PERMITTED. 1/4" #-20 S.S. MACHINE SCREW USED SHALL BE 1 1/2" LONG MINIMUM SHOULD STUCCO EXIST, AND 1" MINIMUM FOR WALLS WITH NO STUCCO.

B.3) IN CASE THAT PRECAST STONE, PRECAST CONCRETE PANELS, PAVERS OR ANY VENEER BE FOUND ON THE EXISTING WALL OR FLOOR, ANCHORS SHALL BE LONG ENOUGH TO REACH THE MAIN STRUCTURE BEHIND SAID WALL FINISHES. ANCHORAGE SHALL BE AS INDICATED ON NOTES B.1) & B.2) ABOVE. FOR INSTALLATIONS ON VINYL SIDING OR EIFS 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 ANCHORS.

EDGE DISTANCE VERSUS SPACING FOR ANCHORS

MAXIMUM ANCHOR SPACINGS ARE VALID FOR 3 1/2" EDGE DISTANCE FOR 1/4"ø TAPCON AND SOLID SET AND WEDGE-BOLT. FOR E. D. LESS THAN THE ABOVE MENTIONED, REDUCE ANCHOR SPACING BY MULTIPLYING SPACING SHOWN ON SCHEDULE BY THE FOLLOWING FACTORS. (NOTE : Min. E. D. FOR ALL POINT SOLID SET ANCHORS IS 3"). REDUCED SPACING OBTAINED USING FACTOR SHALL NOT BE LESS THAN MINIMUM SPACING INDICATED FOR EACH ANCHOR TYPE.

ACTUAL E. D.	FACTOR		
	WEDGE-BOLT	1/4"ø TAPCON	SOLID SET
	MIN. SPACING = 3"	MIN. SPACING = 3"	MIN. SPACING = 3.5"
3"	0.83	0.83	0.78
2 1/2"	0.66	0.66	–
2"	0.50	0.50	–

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

P.E. SEAL/SIGNATURE/DATE

JUL 2 6 2005

TILTECO INC.

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West Palm Beach, FL 33407

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BERTHA HV™
Accordion Shutter System

REV. No	DESCRIPTION	DATE	
1	[illegible]	[illegible]	Drawn by: J.A.S.
2			DATE: 7/13/05
3			DRAWING No
4			05-196
5			SHEET
6			11 OF 14

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 SHEETS 13 & 14)

SUBSTRATE

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 1W, 2W, 3W & 6W						CEILING MOUNT 8W FLOOR MOUNTINGS 9W & 10W						WALL MOUNTINGS 1W, 2W, 3W & 6W						CEILING MOUNT 8W FLOOR MOUNTINGS 9W & 10W						WALL MOUNTINGS 1W, 2W, 3W & 6W						CEILING MOUNT 8W FLOOR MOUNTINGS 9W & 10W						WALL MOUNTINGS 4W & 5W					
	NEGATIVE DESIGN LOAD (psf)						NEGATIVE DESIGN LOAD (psf)						NEGATIVE DESIGN LOAD (psf)						NEGATIVE DESIGN LOAD (psf)						NEGATIVE DESIGN LOAD (psf)						NEGATIVE DESIGN LOAD (psf)						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	6	12	10	10	9	8	8	6	6	6	6	6	6	12	10	10	9	8	8	6	6	6	6	6	6	6	5	4	4	4	3
4'-0"	12	10	10	9	8	8	6	6	6	6	6	6	12	10	10	9	8	8	6	6	6	6	6	6	12	10	10	9	8	8	6	6	6	6	6	6	6	5	4	4	4	3
5'-0"	12	10	10	9	8	8	6	6	6	6	6	5.5	12	10	10	9	8	8	6	6	6	6	6	5	12	10	10	9	8	7	6	6	6	6	6	5	6	5	4	4	4	3
6'-0"	12	10	10	9	8	6.5	6	6	6	6	5.5	4.5	12	10	10	9	8	5	6	6	6	5.5	5	4.5	12	10	10	9	6	3.5	6	6	6	6	5	4.5	6	5	4	4	3.5	–
7'-0"	12	10	10	9	6.5	4	6	6	6	5.5	4.5	4	12	10	10	9	5	3	6	6	6	5	4	3.5	12	10	10	7	3.5	–	6	6	6	5	4	3.5	6	5	4	4	–	–
8'-0"	12	10	10	7.5	4.5	3	6	6	6	5	4	3.5	12	10	10	6	3.5	–	6	6	5	4.5	3.5	3	12	10	10	4	–	–	6	6	5	4.5	3.5	3	6	5	4	–	–	–
9'-0"	12	10	10	5	3.5	–	6	6	5.5	4.5	3.5	3	12	10	9	4	–	–	6	6	4.5	4	3	3	12	10	4	3	–	–	6	6	4.5	4	3	3	6	5	3.5	–	–	–
10'-0"	12	10	7.5	4	–	–	6	6	5	4	3	–	12	10	6	3	–	–	6	6	4	3.5	3	–	12	10	3	–	–	–	6	6	4	3.5	3	–	6	5	–	–	–	–
11'-0"	12	10	5.5	–	–	–	6	6	4.5	–	–	–	12	10	4.5	–	–	–	6	5.5	3.5	–	–	–	12	10	–	–	–	–	6	5.5	4	–	–	–	6	5	–	–	–	–
12'-0"	12	10	4.5	–	–	–	6	6	4	–	–	–	12	10	3.5	–	–	–	6	5	3.5	–	–	–	12	10	–	–	–	–	6	5	3.5	–	–	–	6	5	–	–	–	–
13'-0"	12	10	–	–	–	–	6	6	–	–	–	–	12	10	–	–	–	–	6	4.5	–	–	–	–	12	7.5	–	–	–	–	6	4.5	–	–	–	–	6	4.5	–	–	–	–
14'-0"	12	10	–	–	–	–	6	5.5	–	–	–	–	12	7	–	–	–	–	5.5	4.5	–	–	–	–	12	7	–	–	–	–	5.5	4.5	–	–	–	–	6	3	–	–	–	–
15'-0"	12	–	–	–	–	–	6	–	–	–	–	–	12	–	–	–	–	–	5	–	–	–	–	–	12	–	–	–	–	–	5	–	–	–	–	–	6	–	–	–	–	–
16'-0"	12	–	–	–	–	–	6	–	–	–	–	–	12	–	–	–	–	–	5	–	–	–	–	–	11.5	–	–	–	–	–	5	–	–	–	–	–	6	–	–	–	–	–

+ NOTES ON ANCHORS REQUIREMENTS: WOOD SUBSTRATES.

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

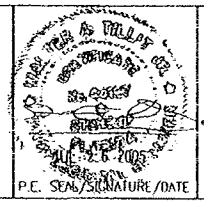
– 1/4"ø TAPCON ANCHORS, AS MANUFACTURED BY ITW BUILDEX W/ MINIMUM EMBEDMENT AS INDICATED AT EACH SECTION ON SHEETS 13 & 14.
EXCEPTION: SEE NOTE 2 BELOW.

2. ANCHORS TO HOLLOW CEILING SHALL BE AS PER MOUNTING TYPE 7W, SHEET 14 AND SHALL CONSIST OF LAG SCREWS AS PER NDS 1997 SPECIFICATIONS.

3. SUBSTRATE SHALL CONSIST OF THE FOLLOWING:
–SOUTHERN PINE No. 2 W/ G=0.55 (N.D.S.)
–DOUGLAS FIR W/ G=0.50 (N.D.S.)
–SPRUCE PINE FIR NORTH W/ G=0.43 (N.D.S.)
–SPRUCE PINE FIR SOUTH W/ G=0.36 (N.D.S.)
–MIN 1/2" COX PLYWOOD (1986 APA)

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

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



P.E. SEAL/SIGNATURE/DATE

TILLEY TESTING & ENGINEERING COMPANY
6355 W.P. 34th. St., Ste. 309, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1530 , Fax : (305)871-1531
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ER-0006719
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A.S.S.A.
American Shutter Systems Association, Inc.
4268 Westroads Drive
West Palm Beach, FL 33407

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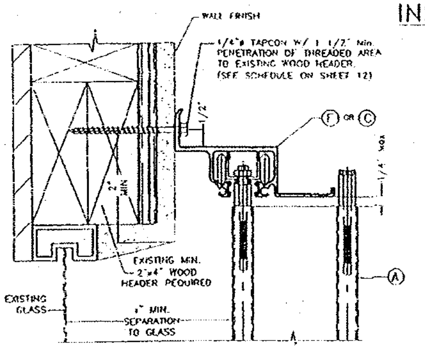
BERTHA HV™
Accordion Shutter System

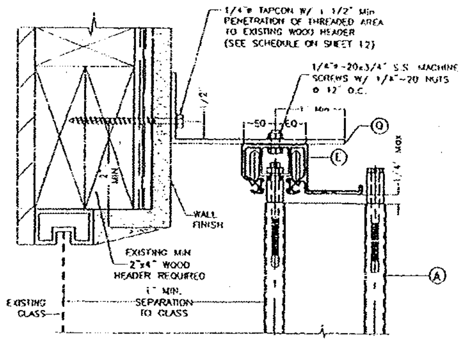
REV. No.	DESCRIPTION	DATE	Drawn By: A.A.S.
1	OLD 03-034	7/13/05	DATE: 7/13/05
2			DRAWING No 05-196
3			
4			
5			SHEET 12 OF 14
6			

INSTALLATION DETAILS ON EXISTING WOOD BUILDINGS

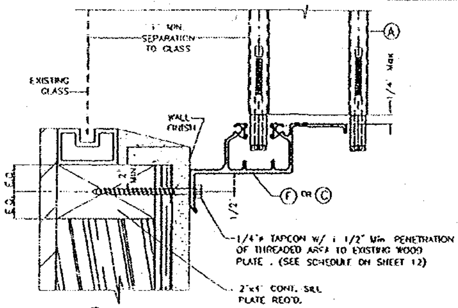
NOTE:
1-SEE SHEET 3 FOR TYPICAL SHUTTER ASSEMBLY
2-MOUNTING SECTIONS CAN BE COMBINED IN ANY WAY TO SUIT ANY INSTALLATION



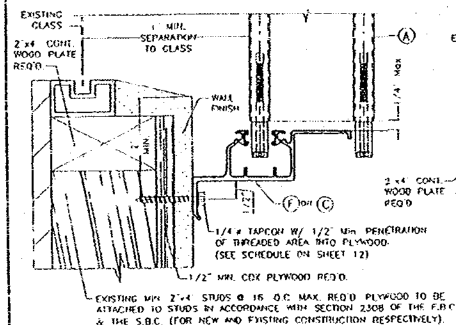
(1W) WALL CONNECTION AT TOP



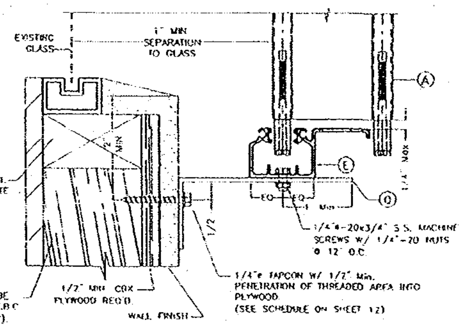
(2W) WALL CONNECTION AT TOP



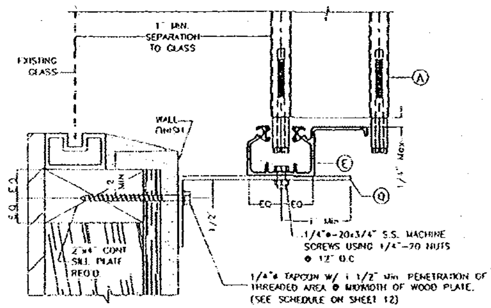
(3W) WALL CONNECTION AT BOTTOM



(4W) WALL CONNECTION AT BOTTOM



(5W) WALL CONNECTION AT BOTTOM



(6W) WALL CONNECTION AT BOTTOM

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

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TILLIT TESTING & ENGINEERING COMPANY
4355 N.W. 36th. St. Ste. 305, VIRGINIA GARDENS, FLORIDA 33166
Phone : (305)871-1550 , Fax : (305)871-1531
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West Palm Beach, FL 33407

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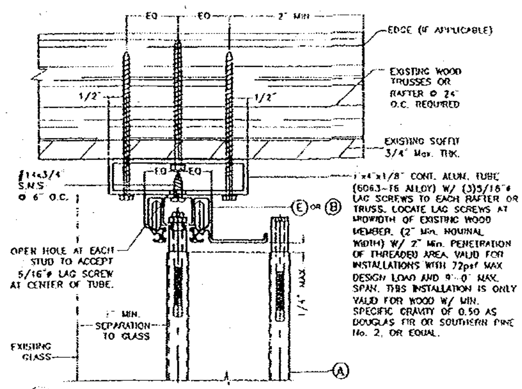
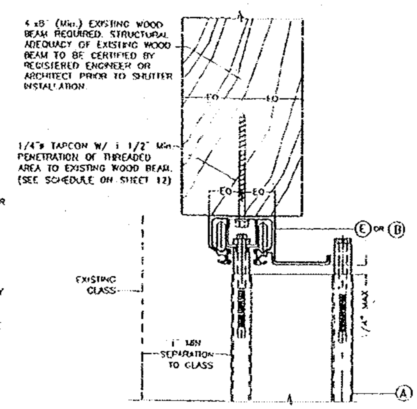
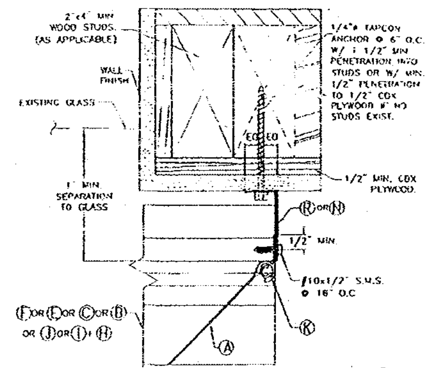
REV. No	DESCRIPTION	DATE	
1			DATE 7/13/05
2			DRAWING No 05-196
3			
4			
5			SHEET 13 OF 14
6			



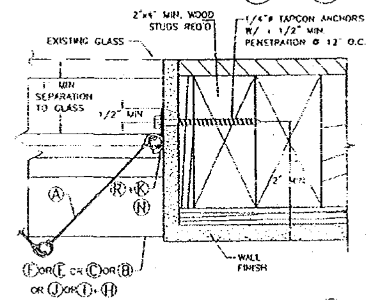
(7W) HOLLOW CEILING MOUNTING INSTALLATION



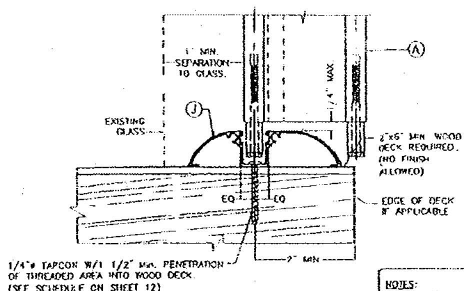
(8W) SOFFIT MOUNTING INSTALLATION



END CONNECTION DETAIL (1W) & (4W)

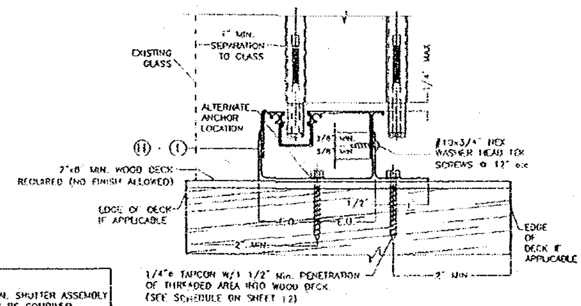


END CONNECTION DETAIL (5W)



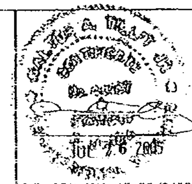
(9W) FLOOR CONNECTION

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



(10W) FLOOR CONNECTION

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



P.E. SEAL/SIGNATURE/DATE

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REV. No	DESCRIPTION	DATE
1	[illegible]	7/13/03
2		
3		
4		
5		
6		

Drawn by: J.A.S.
DATE: 7/13/03
DRAWING No 05-196
SHEET 14 OF 14