# GENERAL NOTES: (SEE INDEX OF SHEETS ON SHEET 2)

1. 40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM SHOWN ON THIS PRODUCT EVALUATION DOCUMENT (P.E.D.) HAS BEEN VERIFIED FOR COMPLIANCE IN ACCORDANCE WITH THE **2023 (8th EDITION)** OF THE FLORIDA BUILDING CODE. THIS PRODUCT MAY BE INSTALLED AT HIGH VELOCITY HURRICANE ZONES.

   DESIGN WIND LOADS SHALL BE DETERMINED AS PER SECTION **1620** OF THE ABOVE MENTIONED CODE, USING **ASCE 7-22** AND SHALL NOT EXCEED THE MAXIMUM (A.S.D.) DESIGN PRESSURE RATINGS INDICATED ON SHEETS 7, 17 THRU 29.

   ORDER TO VERIFY THE ABOVE CONDITION, ULTIMATE DESIGN WIND LOADS DETERMINED PER **ASCE 7-22** SHALL BE FIRST REDUCED TO A.S.D. DESIGN WIND LOADS BY MULTIPLYING THEM BY 0.6 IN ORDER TO COMPARE THESE W/ MAX. (A.S.D.) DESIGN PRESSURE RATINGS INDICATED ON SHEETS 7, 17 THRU 29.

   IN ORDER TO VERIFY THAT COMPONENTS AND ANCHORS ON THIS P.E.D. AS TESTED, WERE NOT OVER STRESSED, A 33% INCREASE IN ALLOWABLE STRESS FOR WIND LOADS WAS NOT USED IN THEIR ANALYSIS. FASTENERS SPACING TO WOOD HAS BEEN DETERMINED IN ACCORDANCE WITH N.D.S. 2018.

   40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM'S ADEQUACY FOR IMPACT AND FATIGUE RESISTANCE HAS BEEN VERIFIED IN ACCORDANCE WITH SECTION **1626** OF THE ABOVE MENTIONED CODE AS PER:

   – AMERICAN TESTING LAB OF SOUTH FLORIDA REPORTS # 0730.01-13 WITH ADDENDUM #1, DATED 8/5/14 , 0404.01-08, 0612.01-14, 0530.01-14 WITH ADDENDUM #1, DATED 10/12/14, 0917.01-14 & 1211.01-14.

2. ALL ALUMINUM EXTRUSIONS SHALL BE ALUMINUM ASSOCIATION 6063-T6 ALLOY & TEMPER (UNLESS OTHERWISE NOTED). ALL ALUMINUM EXTRUSIONS IN CONTACT WITH DISSIMILAR MATERIALS SHALL COMPLY WITH SECTION III-6 OF THE 2020 ALUMINUM DESIGN MANUAL.

3. ALL SELF DRILL SCREWS (EXCEPT COMPONENT (11) ) TO BE CORROSION RESISTANT STEEL AS PER DIN 50018 AND SHALL COMPLY W/ FLORIDA BUILDING CODE SECTION 2411.3.3.4. TEK SCREWS SHALL BE AS MANUFACTURED BY ITW/BUILDEX. ALL SCREWS SHALL BE HEX HD HWH.

4. BOLTS TO BE ASTM A-307, GALVANIZED OR AISI 304 OR 316 SERIES STAINLESS STEEL WITH 36 ksi MINIMUM YIELD STRENGTH.

5. ANCHORS TO WALL FOR (5) &(6)SIDE RAILS SHALL BE AS FOLLOWS: SEE NOTE 8 FOR SUBSTRATE LIMITATIONS.

## END RETENTION SYSTEM : SLATS (1) & (3)

**SUBSTRATE: POURED CONCRETE**

**ANCHOR TYPE & MANUFACTURER**

| 3/8"ø WEDGE BOLT/ DEWALT, INC. | | | 5/16" ø TAPCON XL/ ITW/BUILDEX | | | 5/16"ø TAPPER+XTREME/ DEWALT, INC. * | | | 5/16" ø ULTRACON/ DE WALT INC. * | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MIN. E.D. | MIN. EMBED. | MIN. f'c | MIN. E.D. | MIN. EMBED. | MIN. f'c | MIN. E.D. | MIN. EMBED. | MIN. f'c | MIN. E.D. | MIN. EMBED. | MIN. f'c |
| 4 1/2" | 3 1/2" | 3 ksi | 2 1/2" | 2 1/4" | 3 ksi | 3 5/16" | 2 1/2" | 3 ksi | 3 1/8" | 2" | 3.5 ksi |

* THIS ANCHOR SHALL NOT BE USED W/ SLAT (3)

**SUBSTRATE: WOOD (G=0.46)**

**ANCHOR TYPE & MANUFACTURER**

| 1/4" ø MAXI SET/ ITW/BUILDEX | |
|---|---|
| MIN. E.D. | MIN. EMBED. |
| 2 1/4" | 2 3/4" |

**SUBSTRATE: GROUTED CONCRETE BLOCK (ASTM C-90)**

**ANCHOR TYPE & MANUFACTURER**

| 3/8"ø KWIK HUS BOLT/ HILTI, INC. | | 5/16" ø TAPCON XL/ ITW/BUILDEX | | 5/16"ø TAPPER+XTREME/ DEWALT, INC. * | | 5/16" ø ULTRACON/ DE WALT INC. * | |
|---|---|---|---|---|---|---|---|
| MIN. E.D. | MIN. EMBED. | MIN. E.D. | MIN. EMBED. | MIN. E.D. | MIN. EMBED. | MIN. E.D. | MIN. EMBED. |
| 4" | 3 1/4" | 4" | 2 1/4" | 4" | 2 1/2" | 2 1/2" | 2 1/4" |

* THIS ANCHOR SHALL NOT BE USED W/ SLAT (3)

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

**ANCHORS NOTES:**

(1) NO EMBEDMENT INTO FINISH MATERIAL SHALL BE CONSIDERED AS PART OF THE REQUIRED EMBEDMENT.
(2) EDGE DISTANCE IS BEYOND ANY FINISH MATERIAL.
(3) ANCHORS SHALL BE INSTALLED FOLLOWING ALL OF THE RECOMMENDATIONS AND SPECIFICATIONS OF THE ANCHOR'S MANUFACTURER.

6. ANCHORS REQUIRED FOR MULLION CONNECTIONS SHALL BE AS SPECIFIED ON APPLICABLE SECTIONS SHOWN ON SHEETS 12 THRU 15.

   **-KWIK BOLT TZ EXPANSION ANCHOR MANUFACTURED BY HILTI, INC.**
   **-KWIK HUS-H SCREW ANCHOR MANUFACTURED BY HILTI, INC.**
   **-WEDGE-BOLT ANCHOR MANUFACTURED BY DEWALT, INC.**

   **MINIMUM EDGE DISTANCE AND SPACING FOR ABOVE MENTIONED ANCHORS SHALL BE AS INDICATED BELOW OR AT ABOVE MENTIONED SHEETS. EDGE DISTANCE AND EMBEDMENTS ARE BEYOND ANY FINISH MATERIAL.**

| ANCHOR | SPACING @ 100% | EDGE DISTANCE @ 100% | EMBEDMENT @ 100% | |
|---|---|---|---|---|
| | | | CONCRETE | CONCRETE BLOCK |
| 3/4"ø KWIK BOLT TZ | 27" | 9" | 4 3/4" (3000 psi) | NOT ALLOWED |
| 1/2"ø KWIK BOLT TZ | 22 1/2" | 7 1/2" | 3 1/4" (3000 psi) | NOT ALLOWED |
| 3/8"ø KWIK BOLT TZ | 6" | 4 3/8" | 2" (3000 psi) | NOT ALLOWED |
| 3/8"ø KWIK HUS-H SCREW | 4" | 5" | 2" (3000 psi) | NOT ALLOWED |
| 3/8"ø WEDGE-BOLT | 4 1/2" | 4 1/2" | 2 1/2" (3000 psi) | NOT ALLOWED |
| 1/2"ø KWIK HUS-H SCREW OR WEDGE BOLT | 6" | 6" | 3" (3000 psi) | NOT ALLOWED |
| 5/8"ø KWIK HUS-H SCREW | 7 1/2" | 7 1/2" | 2 1/2" (3000 psi) | NOT ALLOWED |

7. THE INSTALLATION CONTRACTOR IS TO SEAL/CAULK ALL PRODUCT COMPONENT EDGES WHICH REMAIN IN CONTINUOUS CONTACT WITH THE BUILDING TO PREVENT WIND/RAIN INTRUSION. CAULK AND SEAL PRODUCT TRACKS ALL AROUND FULL LENGTH.

8. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE SOUNDNESS OF THE STRUCTURE WHERE PRODUCT IS TO BE ATTACHED TO INSURE PROPER ANCHORAGE. THIS PRODUCT SHALL ONLY BE ATTACHED TO CONCRETE, GROUT FILLED CELL CONCRETE BLOCK OR WOOD FRAME BUILDINGS. SEE SHEETS 7 THRU 15 FOR LIMITATIONS FOR SUBSTRATE.

9. PRODUCTS INSTALLATION SHALL COMPLY WITH SPECS INDICATED IN THIS DRAWING PLUS ANY BUILDING AND ZONING REGULATIONS PROVIDED BY THE JURISDICTION WHERE PERMIT IS APPLIED TO.

10. PRODUCT LIFTING MECHANISM NOT PART OF THIS APPROVAL.

11. (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 REGISTERED ENGINEER OR ARCHITECT WHICH WILL BECOME THE ENGINEER OF RECORD (E.O.R.) FOR THE PROJECT AND WHO WILL BE RESPONSIBLE FOR THE PROPER USE OF THE P.E.D. ENGINEER OF RECORD, ACTING AS A DELEGATED ENGINEER TO THE P.E.D. ENGINEER, SHALL SUBMIT TO THIS LATTER THE SITE SPECIFIC DRAWINGS FOR REVIEW.

    (e) ORIGINAL P.E.D. SHALL BEAR THE DATE AND ORIGINAL SEAL AND SIGNATURE OF THE PROFESSIONAL ENGINEER OF RECORD THAT PREPARED IT.

12. SHUTTER MANUFACTURER'S LABEL SHALL BE LOCATED ON A READILY VISIBLE LOCATION ATPRODUCT IN ACCORDANCE WITH SECTION 1709.9.3 OF FLORIDA BUILDING CODE. ONE LABEL SHALL BE PLACED FOR EVERY OPENING. LABELING TO COMPLY WITH SECTION 1709.9.2 OF THE FLORIDA BUILDING CODE.

**FLORIDA BUILDING CODE (High Velocity Hurricane Zone)**

7/28/2023
P.E. SEAL/SIGNATURE/DATE

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FLORIDA Lic. # 44167

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

AMERICAN SHUTTER SYSTEMS ASSOC., INC.
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.
7/28/2023 DATE
23-137 DRAWING No
SHEET 1 OF 29

# INDEX OF SHEETS

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| 2 | INDEX OF SHEETS |
| 3 | COMPONENTS |
| 4 | BOX STRUCTURAL COMPONENTS AND ASSEMBLY DETAILS |
| 5 | ELEVATIONS FOR INSTALLATION INTO CONCRETE AND GROUTED CONCRETE BLOCK |
| 6 | Vx & Vy FORCES SCHEDULES FOR SLATS ① & ③ |
| 7 | INSTALLATION INTO WOOD FRAME STRUCTURES W/ SLATS ① & ③ & SLAT SCREW ⑪ |
| 8 | INSTALLATION INTO WOOD FRAME STRUCTURES W/ SLATS ① & ③ & SLAT SCREW ⑪ , SECTIONS D, E, D', E' |
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| 26 | SLAT ① MULLION SCHEDULES, FLOOR TO CEILING & WALL MOUNTING, SCHEDULES 1b & 2b |
| 27 | SLAT ① MULLION SCHEDULES, FLOOR TO CEILING & WALL MOUNTING, SCHEDULES 1b' & 2b' |
| 28 | SLAT ③ MULLION SCHEDULES, FLOOR TO CEILING & WALL MOUNTING, SCHEDULES 1a, 2a, 1c & 2c |
| 29 | SLAT ③ MULLION SCHEDULES, FLOOR TO CEILING & WALL MOUNTING, SCHEDULES 1b' & 2b' |

FLORIDA BUILDING CODE (High Velocity Hurricane Zone

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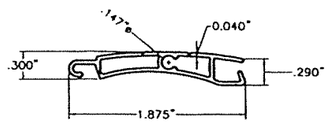
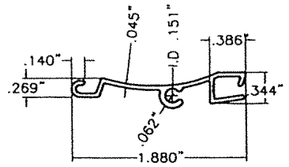
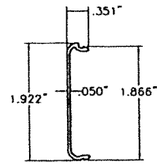
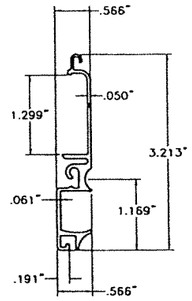



(1) CLOSED SLAT
6063–T6 ALUMINUM ALLOY
SCALE 1 1/2"=1"

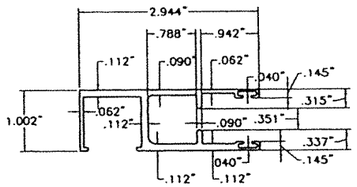



(3) SLAT W/OPEN BACK W/SCREW BOSS
6063–T6 ALUMINUM ALLOY
SCALE 1 1/2"=1"

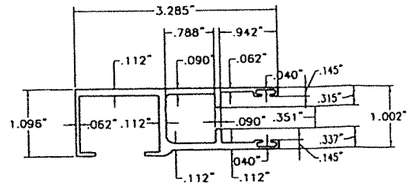


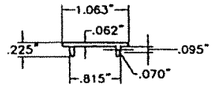

(4) BASE SLAT
6063–T6 ALUMINUM ALLOY



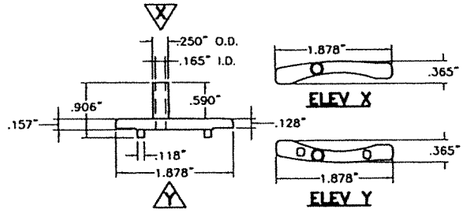

(5) SIDE RAIL TYPE 1
6063–T6 ALUMINUM ALLOY



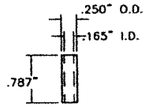

(6) SIDE RAIL TYPE 2
6063–T6 ALUMINUM ALLOY



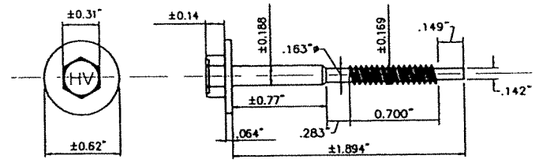

(7) SNAP CAP
6063–T6 ALUMINUM ALLOY




(8) END CAP W/MONOLITHIC SCREW SLEEVE (LEFT SHOWN, RIGHT IS MIRROR)
RIGID NYLON, 76–78 TYPE "D" SHORE HARDNESS

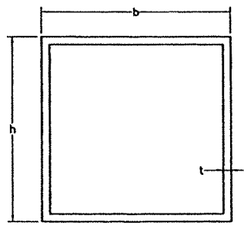



(9) EXTENDED SCREW SLEEVE W/O END CAP
RIGID NYLON, 76–78 TYPE "D" SHORE HARDNESS



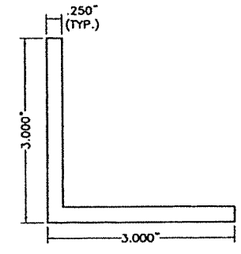

#8–32 x 1.894" AISI 410 S.S. SCREW W/ 0.31" ø HV MARKED HEAD & t= 0.064"x 0.620" ø MONOLITHIC WASHER W/ BERTHA H.V. DACROSHIELD COATING SYSTEM AS MANUFACTURED BY APPROVED COATING APPLICATORS REGISTERED WITH AMERICAN SHUTTER SYSTEM ASSOCIATION

(11) SCREW ● EVERY OTHER SLAT, INCLUDING BASE SLAT FOR POURED CONCRETE, GROUTED BLOCK & WOOD INSTALLATIONS

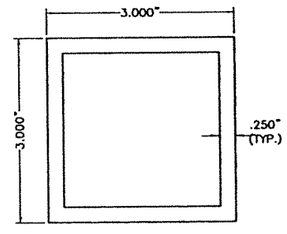



BUILD–OUT MOUNTED TUBES
6063–T6 ALUMINUM ALLOY

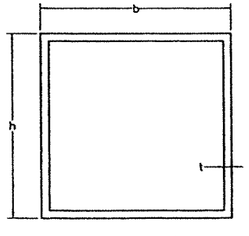
| B.O TUBES | b | h | t |
|---|---|---|---|
| (12) WOOD | 3" | 2" MAX. | 0.125" |
| (12A) CONC./ BLOCK | 3" | 4" MAX. | 0.125" |
| (15) CONC./ BLOCK | 4" | 4" MAX. | 0.25" |




(13) TRAPPED ANGLE
6063–T6 ALUMINUM ALLOY




(14) OPTIONAL TRAPPED MOUNTED TUBE TO (13)
6063–T6 ALUMINUM ALLOY




MULLIONS
6061–T6 ALUMINUM ALLOY

| MULLIONS | b | h | t |
|---|---|---|---|
| (24) | 4" | 6" | 0.25" |
| (25) | 4" | 8" | 0.25" |

# COMPONENTS

N.T.S.

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

P.E. SEAL/SIGNATURE/DATE

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DRAWN BY: Y.M.
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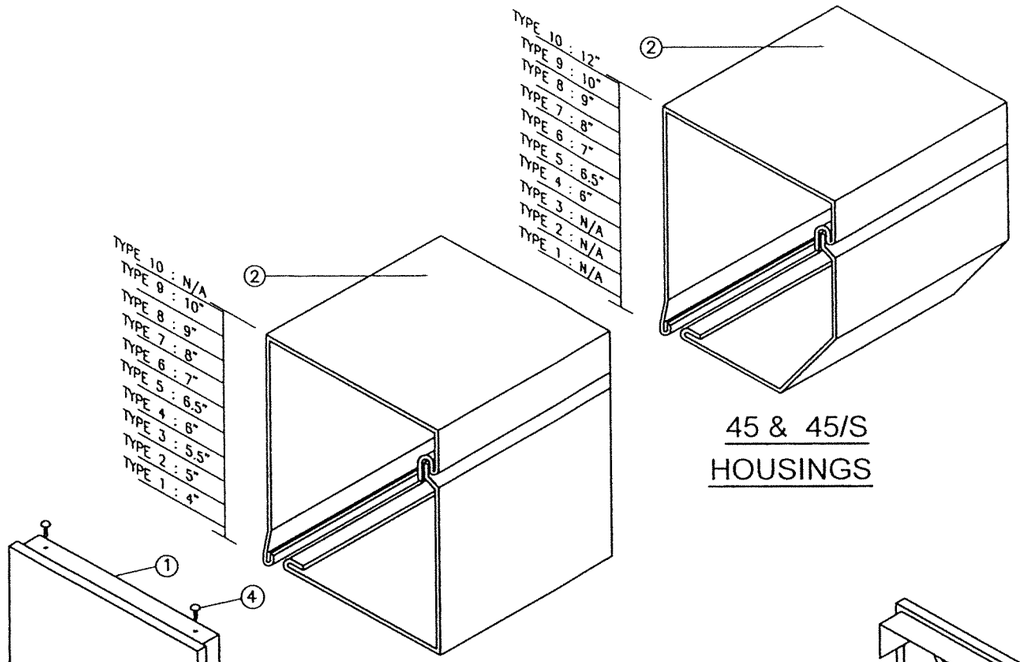
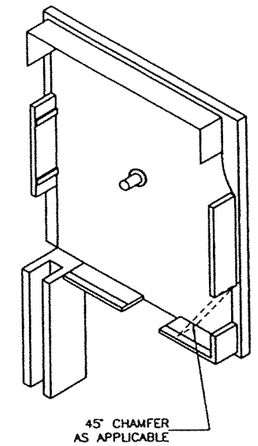
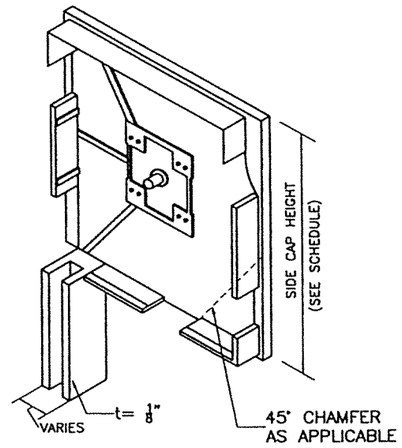
23–137 DRAWING No




① END CAPS:

STRUCTURAL COMPONENTS FOR OPERATING SYSTEM

① – SIDE/END CAP (CAST ALUMINUM) *
② – HOUSING, 0.040" THICK SHEET METAL (3105–H14 OR STRONGER)
③ – SIDE RAIL

FASTENERS

④ – 3/16" ALUMINUM POP RIVETS(6 REQ'D EA. SIDE CAP) : 2 @ TOP, 2 @ REAR, 2@ BOTTOM

* SHALL BE CAPABLE TO SUSTAIN SLAT'S WEIGHT AND ASSURE LIFTING MECHANISM (SEE NOTES 10/1 & 11(b)/1)

BOX STRUCTURAL COMPONENTS AND ASSEMBLY DETAIL

(SEE NOTES 10 & 11(b) ON SHEET 1)

WALTER A. TILLIT JR. LICENSE No. 44167 STATE OF FLORIDA PROFESSIONAL ENGINEER 7/28/2023

P.E. SEAL/SIGNATURE/DATE

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

**AMERICAN SHUTTER SYSTEMS ASSOC., INC.**
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999–2772
FAX: (561)209–8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
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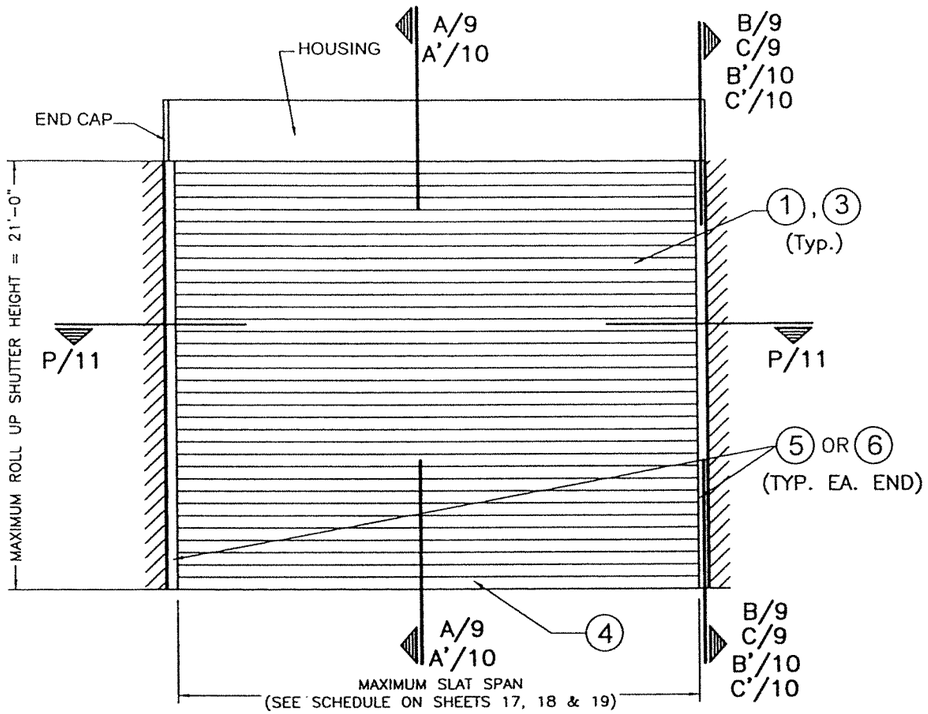
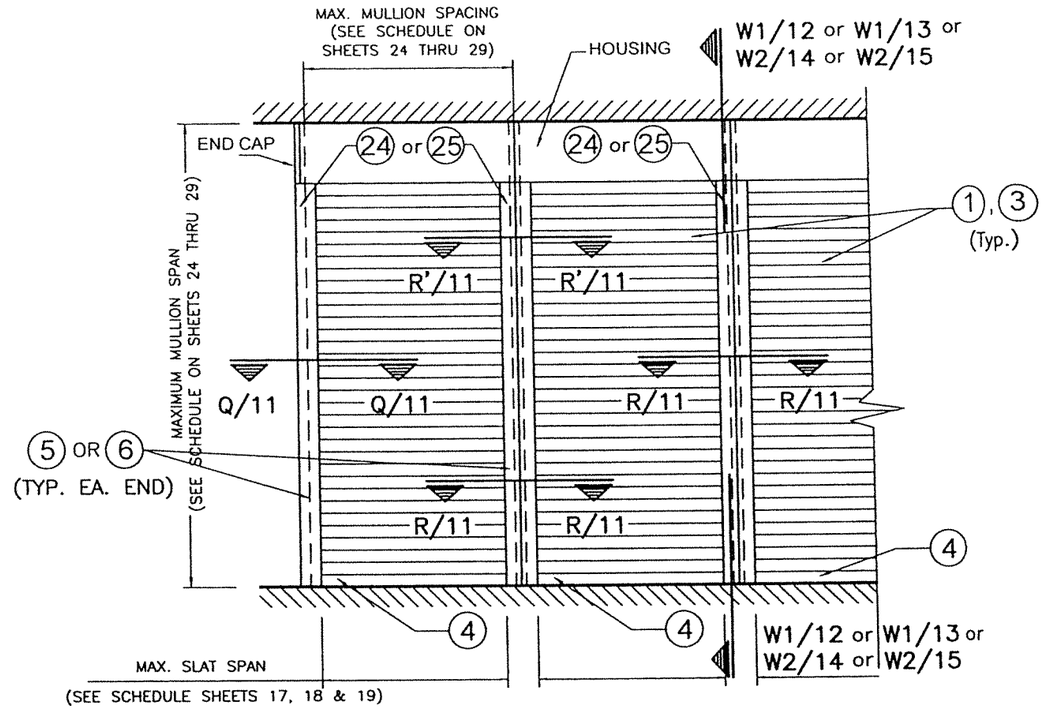
7/28/2023 DATE
23–137 DRAWING No
SHEET 4 OF 29




TYPICAL SINGLE UNIT ELEVATION W/O MULLIONS

NOTE: SEE SHEETS 3 & 4 FOR COMPONENTS NOMENCLATURE.




TYPICAL CONSECUTIVE SINGLE UNIT ELEVATION W/ MULLIONS

NOTE: SEE SHEET 3 & 4 FOR COMPONENTS NOMENCLATURE.

# END RETENTION SYSTEM

# INSTALLATION INTO CONCRETE/GROUTED CONCRETE BLOCK BUILDINGS

WALTER A. TILLIT JR. LICENSE No. 44167 STATE OF FLORIDA PROFESSIONAL ENGINEER 7/28/2023

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## Vx FORCES (Lb/FT) & Vy FORCES (Lb/FT) ACTING AT JAMBS FOR AN A.S.D. DESIGN LOAD RANGE, SLAT SPAN RANGE FOR POURED CONCRETE OR GROUTED CONCRETE BLOCK WALL BUILDINGS APPLICABLE TO INSTALLATIONS W/ SLATS ① & ③*

**(USE MAXIMUM VALUE BETWEEN POSITIVE AND NEGATIVE A.S.D. LOAD)**

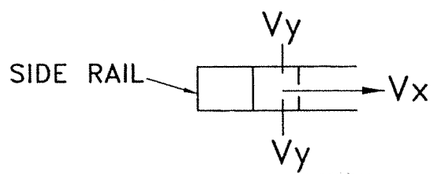
### SLAT TYPE ①

| A.S.D. DESIGN PRESSURE RATING (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' | | > 4'–5' | | > 5'–6' | | > 6'–7' | | > 7'–9' | | > 9'–12' | | > 12'–16' | |
| | Vx | Vy | Vx | Vy | Vx | Vy | Vx | Vy | Vx | Vy | Vx | Vy | Vx | Vy |
| ≤ 30.0 | 1164 | 60 | 1164 | 75 | 1164 | 90 | 1164 | 105 | 1164 | 135 | 1164 | 180 | 1164 | 240 |
| >30–40 | 1524 | 80 | 1524 | 100 | 1524 | 120 | 1524 | 140 | 1524 | 180 | 1524 | 240 | 1524 | 320 |
| >40–60 | 1909 | 120 | 1909 | 150 | 1909 | 180 | 1909 | 210 | 1909 | 270 | 1909 | 360 | 1909 | 429 |
| >60–80 | 1972 | 160 | 1972 | 200 | 1972 | 240 | 1972 | 280 | 1972 | 360 | 1972 | 480 | – | – |
| >80–105 | 1634 | 210 | 1634 | 263 | 1634 | 315 | 1634 | 368 | 1634 | 460 | – | – | – | – |
| >105–120 | 1248 | 240 | 1248 | 300 | 1248 | 360 | 1248 | 410 | – | – | – | – | – | – |

### SLAT TYPE ③

| A.S.D. DESIGN PRESSURE RATING (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' | | > 4'–5' | | > 5'–6' | | > 6'–7' | | >7'–(8'–4") | |
| | Vx | Vy | Vx | Vy | Vx | Vy | Vx | Vy | Vx | Vy |
| ≤ 30.0 | 434 | 125 | 434 | 125 | 434 | 125 | 434 | 125 | 434 | 125 |
| >30–40 | 587 | 167 | 587 | 167 | 587 | 167 | 587 | 167 | 587 | 167 |
| >40–60 | 883 | 250 | 883 | 250 | 883 | 250 | 883 | 250 | 883 | 250 |
| >60–80 | 860 | 273 | 860 | 273 | 860 | 273 | 860 | 273 | – | – |

* NOTE:
IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR OR PERMIT HOLDER TO VERIFY THAT EXISTING STRUCTURE IS DESIGNED TO SUPPORT Vx AND Vy FORCES IN POUNDS PER UNIT FOOT OF PRODUCT HEIGHT AT BOTH JAMBS. SEE THIS SHEET FOR Vx & Vy VALUES.

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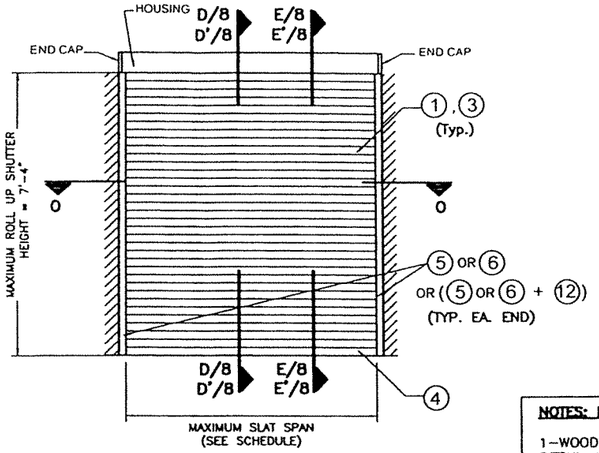
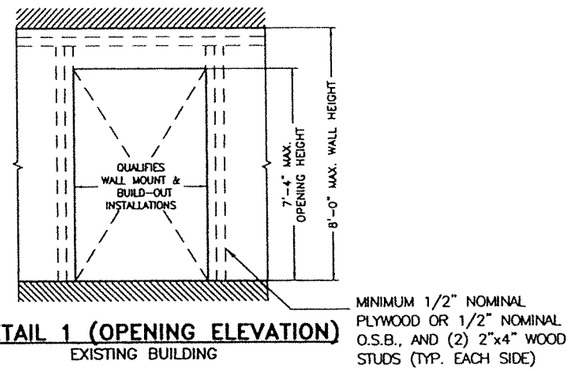



## TYPICAL SINGLE UNIT ELEVATION W/O MULLIONS

NOTE: SEE SHEETS 3 & 4 FOR COMPONENTS NOMENCLATURE.




## DETAIL 1 (OPENING ELEVATION)

EXISTING BUILDING

**NOTES: FOR DETAIL 1**

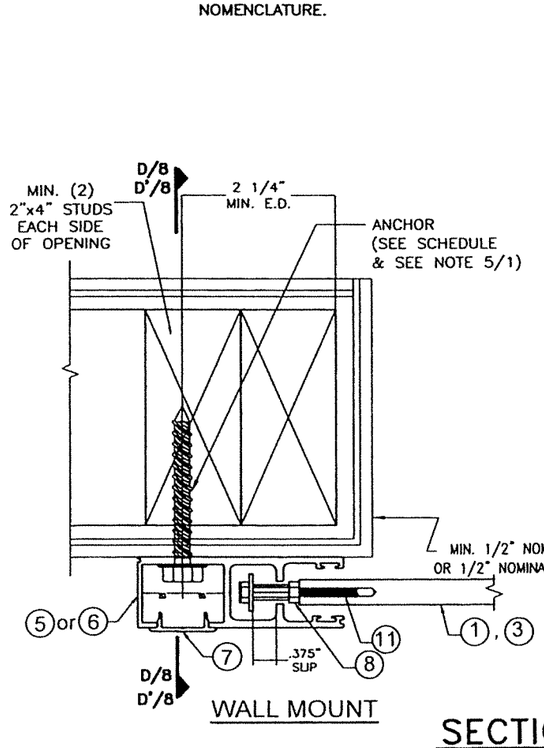
1–WOOD FRAME WALL TO BE STRICTLY BUILT IN ACCORDANCE WITH SPECS GIVEN ON DETAIL 1 AND PROVISIONS FROM CHAPTER 23 OF THE FLORIDA BUILDING CODE. MINIMUM LENGTH OF WALL AT EITHER SIDE OF OPENING SHALL BE 33".

2–VALID ONLY FOR INSTALLATIONS INTO WOOD STUDS W/ (G=0.46 MIN.) STRUCTURES.

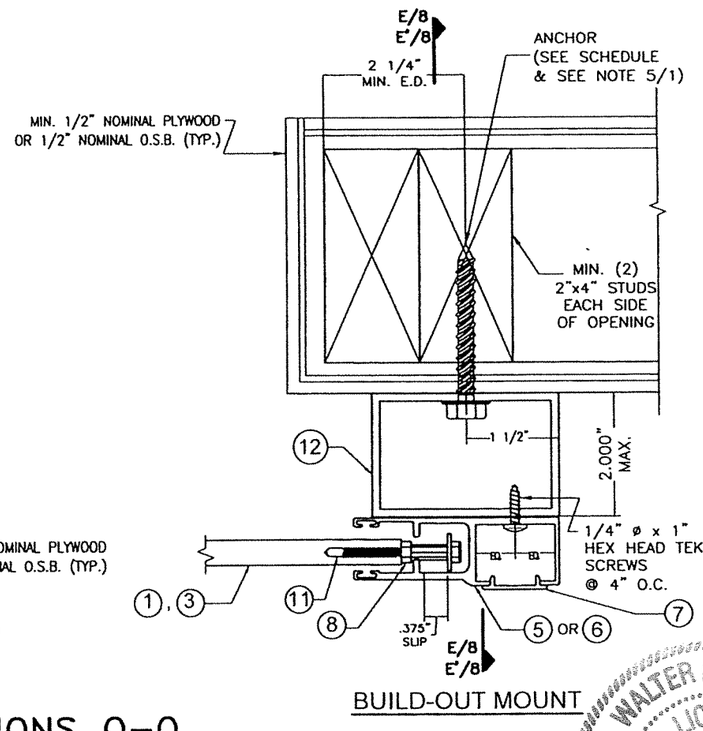
## SLAT PERFORMANCE CHART IN WOOD

FOR A GIVEN MAXIMUM A.S.D. DESIGN PRESSURE RATING (p.s.f) AND PRODUCT MOUNT CONDITION FOR INSTALLATIONS W/O STORM BARS PER TYPICAL ELEVATION

| MAX. A.S.D. DESIGN PRESSURE RATING (p.s.f.) | MAX. SLAT ① SPAN "L MAX." (ft) | | REQUIRED MIN. SEPARATION TO GLASS MESURED TO BACK OF SLAT (in) | MAX. SLAT ③ SPAN "L MAX." (ft) | | REQUIRED MIN. SEPARATION TO GLASS MESURED TO BACK OF SLAT (in) |
|---|---|---|---|---|---|---|
| | SLAT ① | | | SLAT ③ | | |
| | WALL MOUNT | BUILD-OUT MOUNT W/ ⑫ | | WALL MOUNT | BUILD-OUT MOUNT W/ (12A) | |
| ±30.0 | 12'–0" | 12'–0" | 8 1/2" | 8'–4" | 8'–4" | 7 1/8" |
| ±40.0 | 10'–0" | 10'–0" | 8 1/2" | 8'–4" | 8'–4" | 7 1/8" |
| ±45.0 | 9'–0" | 9'–0" | 8 1/2" | 8'–4" | 8'–4" | 7 1/8" |
| ±55.0 | 8'–0" | 8'–0" | 7 1/8" | 8'–4" | 8'–4" | 7 1/8" |




WALL MOUNT




BUILD-OUT MOUNT

## SECTIONS O–O

N.T.S.

| 1/4" Ø MAXI SET ANCHORS | | |
|---|---|---|
| MAX. ANCHORS SPACING SCHEDULE SLATS ① & ③ | | |
| MAX. A.S.D. DESIGN PRESSURE RATING (p.s.f.) | SIDE RAILS ⑤ & ⑥ | |
| | WALL MOUNT | BUILD–OUT MOUNT W/ 2" B.O ⑫ |
| ± 30.0 psf | 3" | 3" |
| >± 30.0 TO ±55.0 | 3" | 3" |

# END RETENTION SYSTEM

# INSTALLATION INTO WOOD FRAME STRUCTURES

(SEE DETAIL 1)

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

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DRAWN BY: Y.M.

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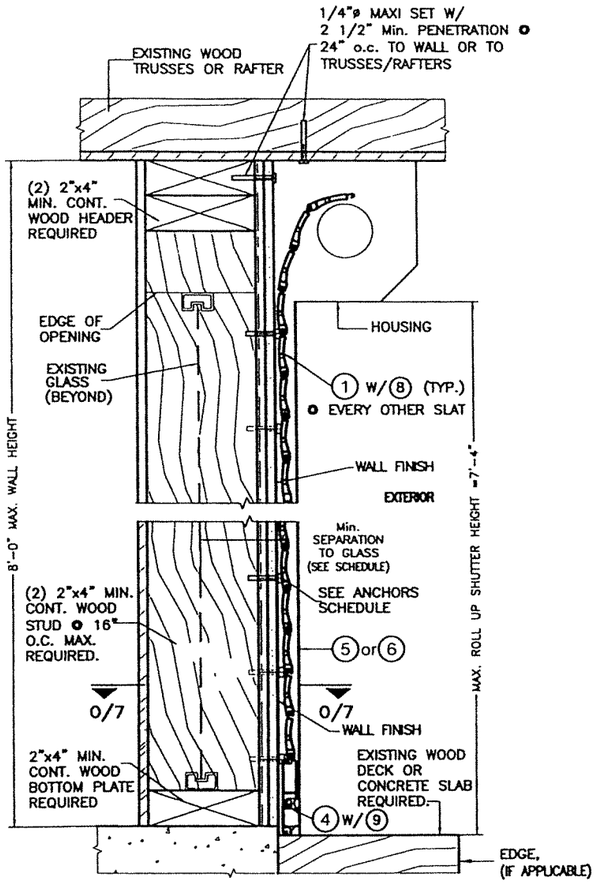
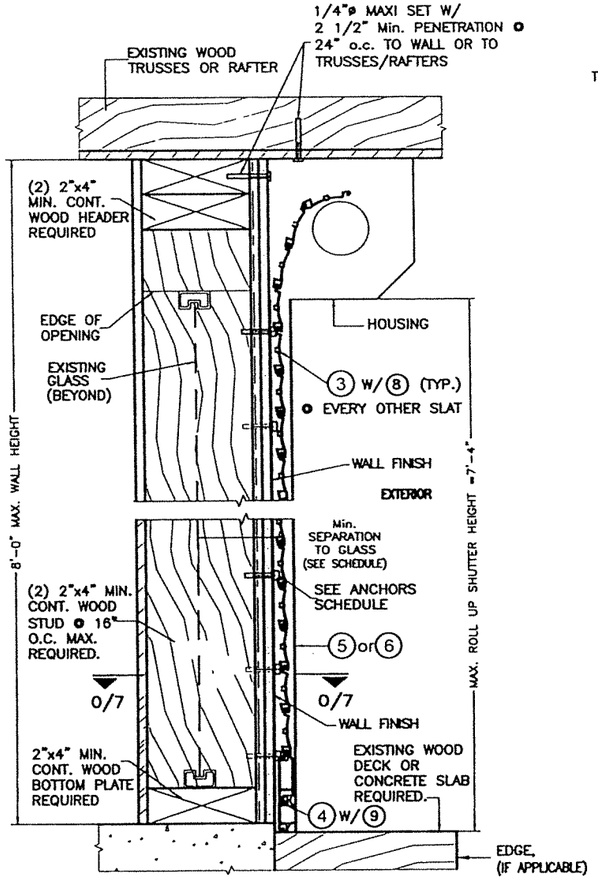
SHEET 7 OF 29




## WALL MOUNTING
## SECTION D–D
N.T.S.




## WALL MOUNTING
## SECTION D'–D'
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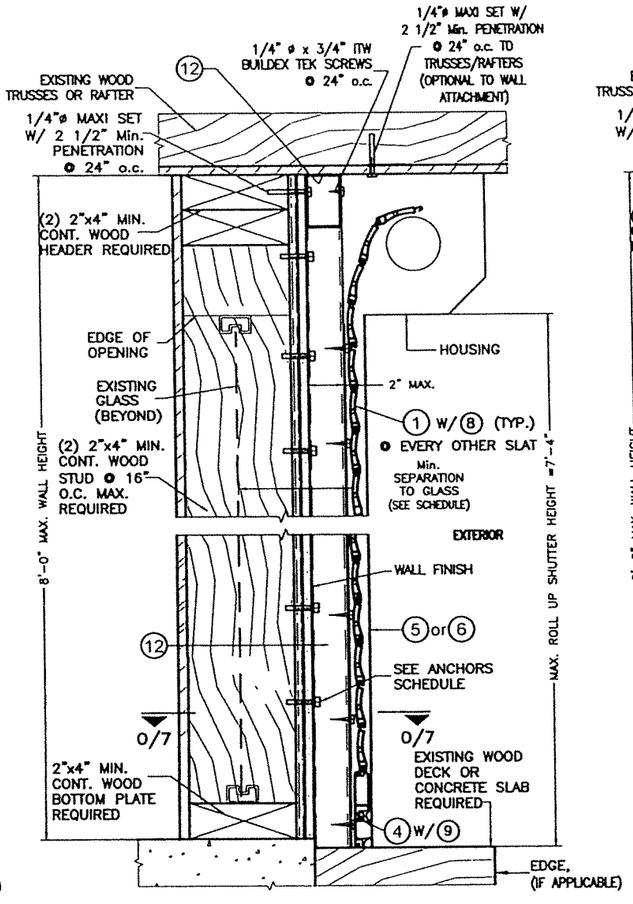


## BUILD–OUT MOUNTING
## SECTION E–E
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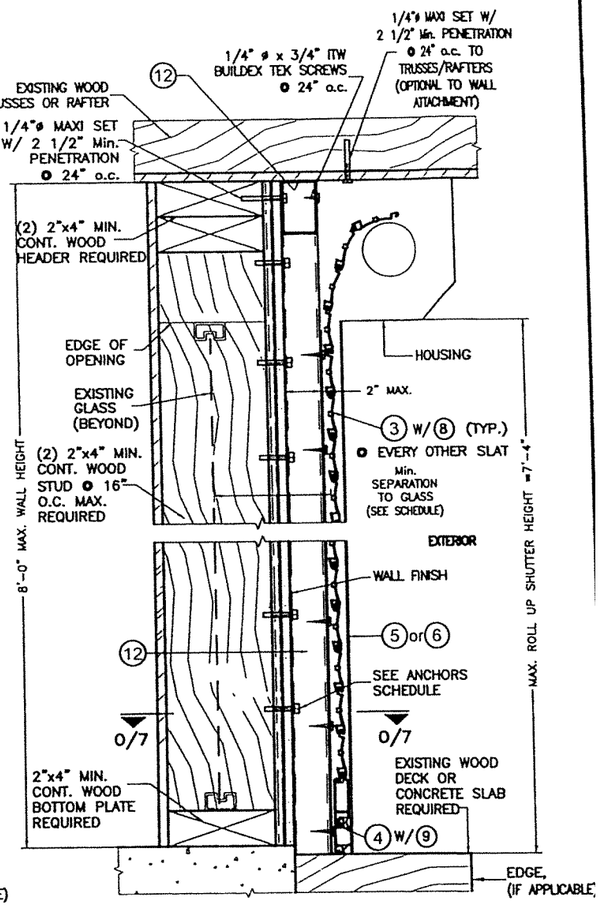


## BUILD–OUT MOUNTING
## SECTION E'–E'
N.T.S.

# END RETENTION SYSTEM
# INSTALLATION INTO WOOD FRAME STRUCTURES

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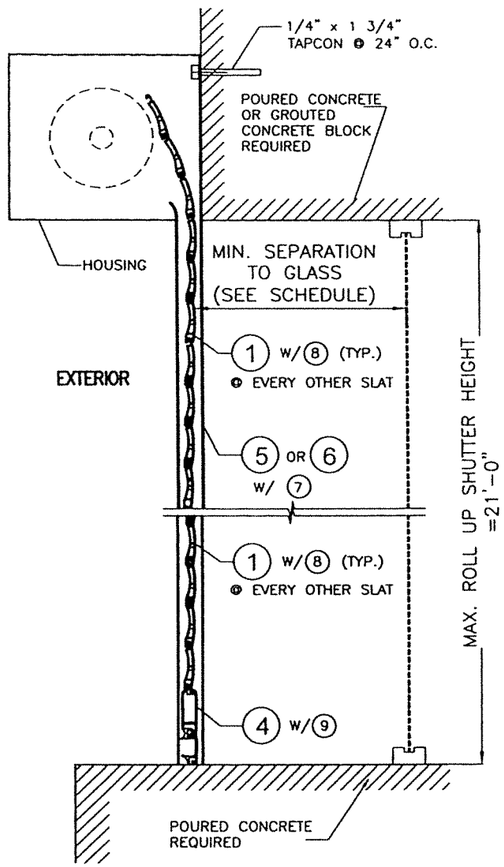
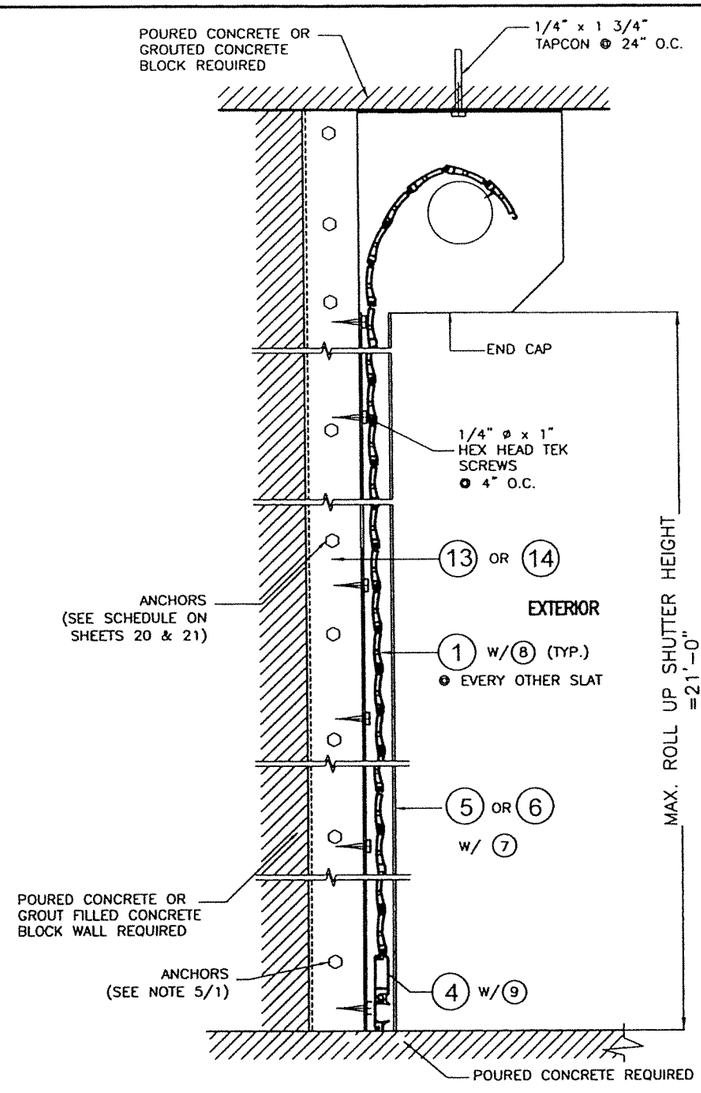


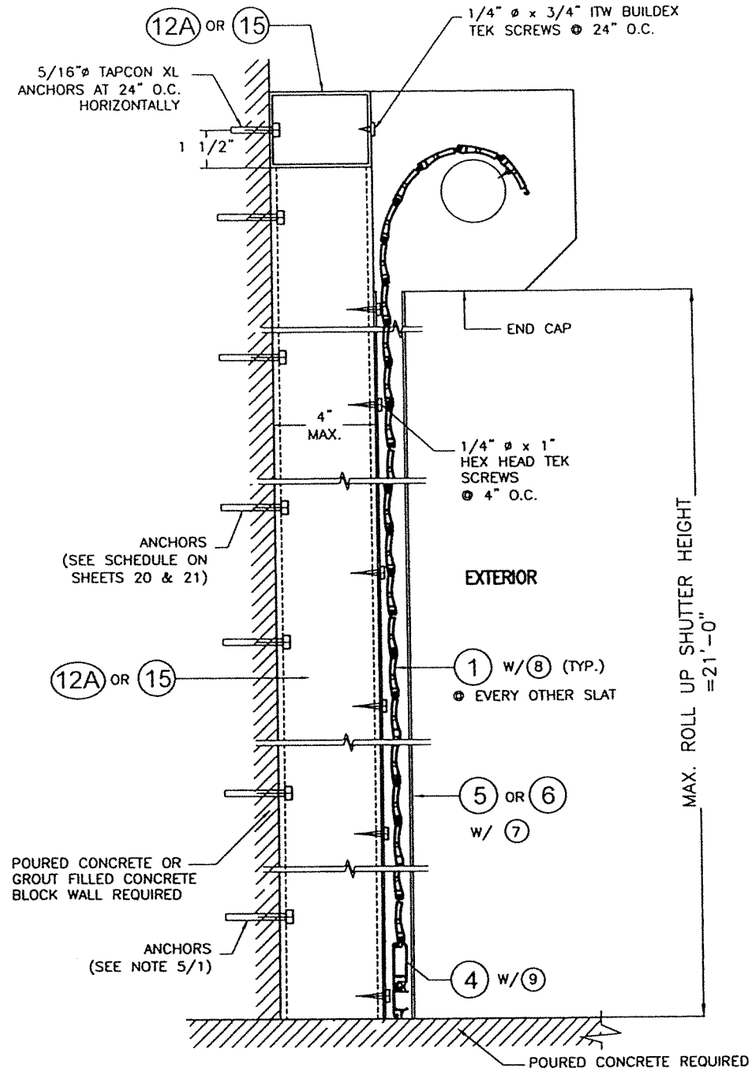

WALL MOUNTED

## SECTION A–A




FLOOR/CEILING / TRAPPED MOUNTED

## SECTION B–B




BUILD-OUT MOUNTED

## SECTION C–C

# INSTALLATION DETAILS ON EXISTING POURED CONCRETE OR GROUT FILLED CELL CONCRETE BLOCK BUILDINGS FOR SINGLE UNIT END RETENTION SYSTEM AS APPLICABLE

N.T.S.

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

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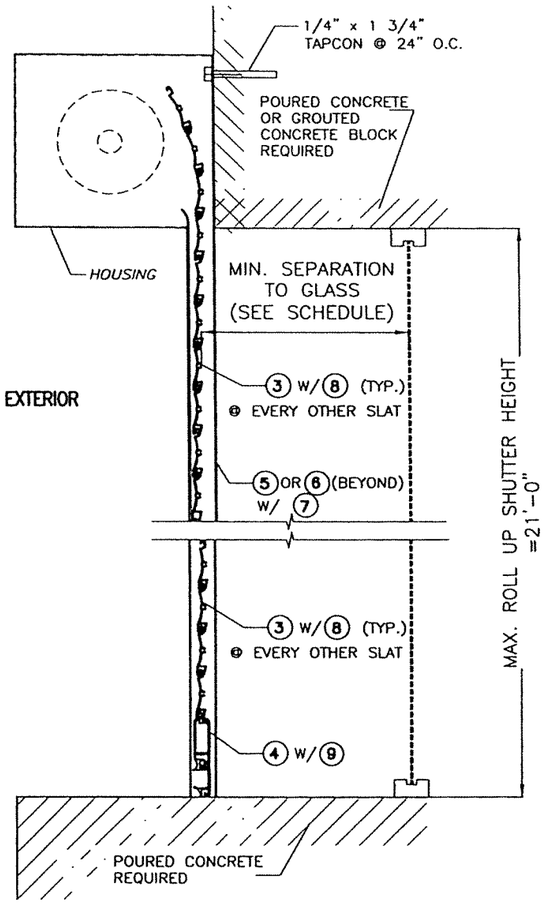
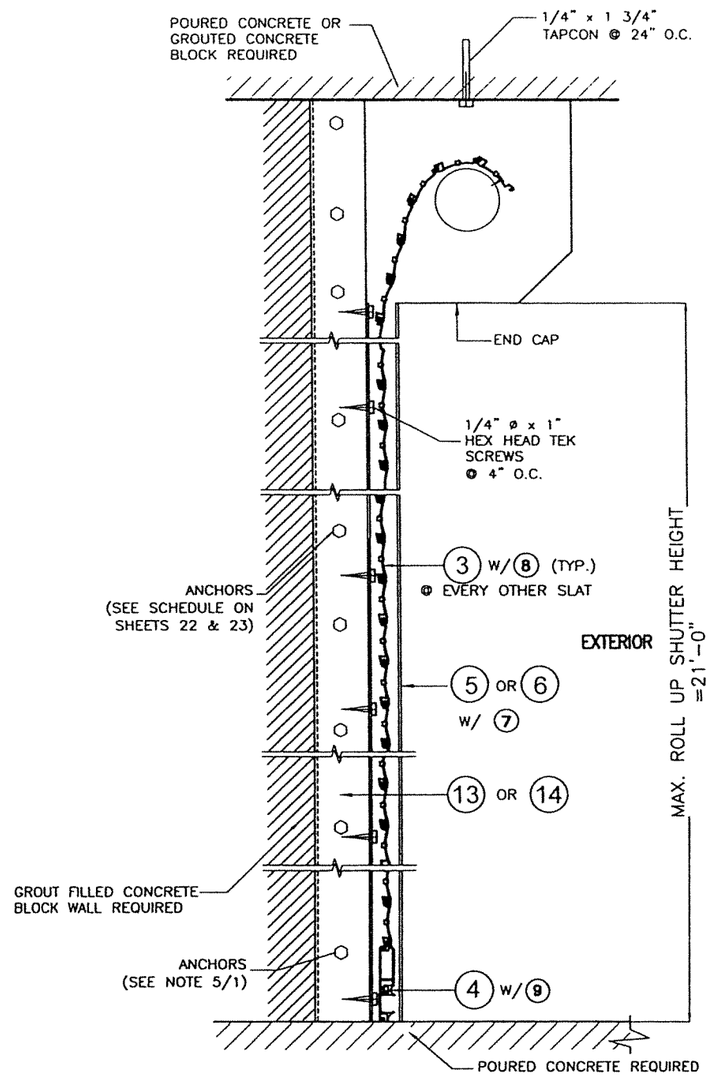


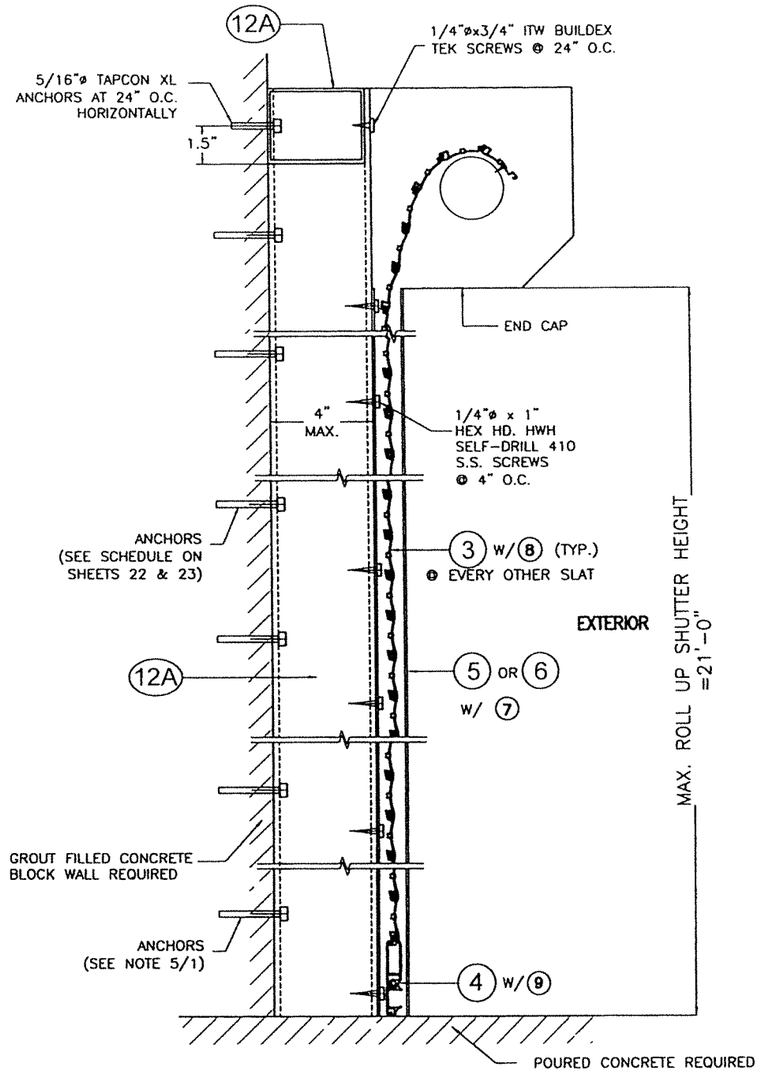

WALL MOUNTED

## SECTION A'–A'




FLOOR/CEILING / TRAPPED MOUNTED

## SECTION B'–B'




BUILD-OUT MOUNTED

## SECTION C'–C'

## INSTALLATION DETAILS ON EXISTING POURED CONCRETE OR GROUT FILLED CELL CONCRETE BLOCK BUILDINGS FOR SINGLE UNIT END RETENTION SYSTEM AS APPLICABLE

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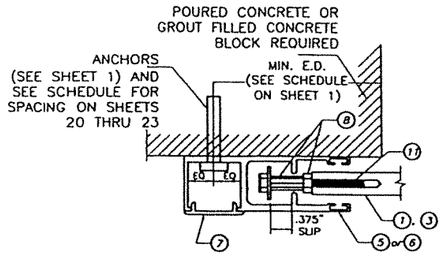


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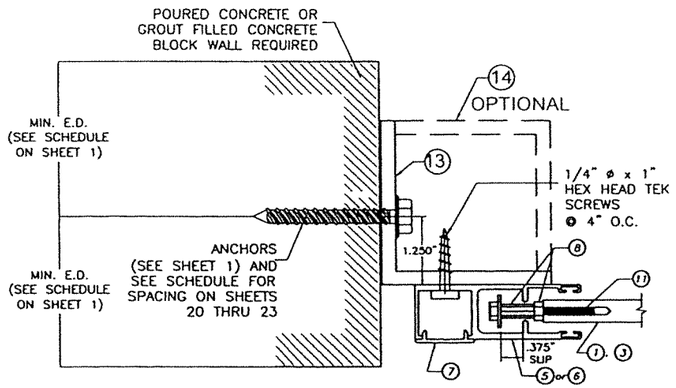
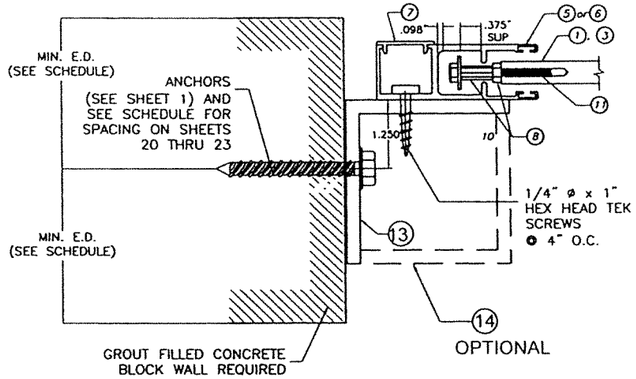
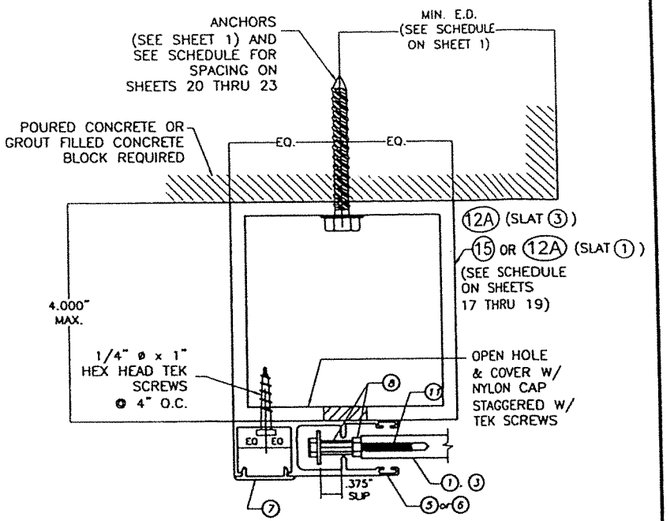



INSIDE/TRAPPED MOUNT




INSIDE/TRAPPED MOUNT
(REVERSED)

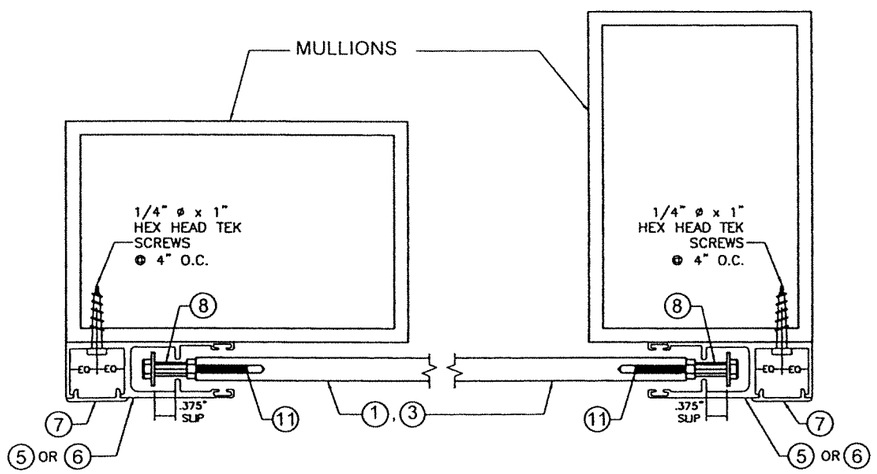



BUILD-OUT MOUNT

## SECTIONS P-P (PLAN)

SIDE RAIL CONNECTIONS INTO EXISTING POURED CONCRETE OR GROUT FILLED BLOCK (AS APPLICABLE)

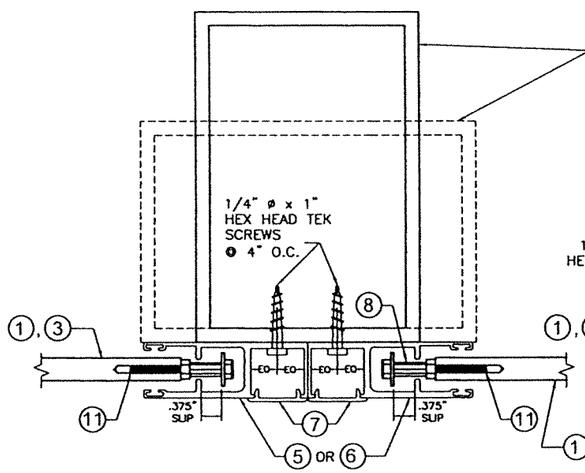
N.T.S.



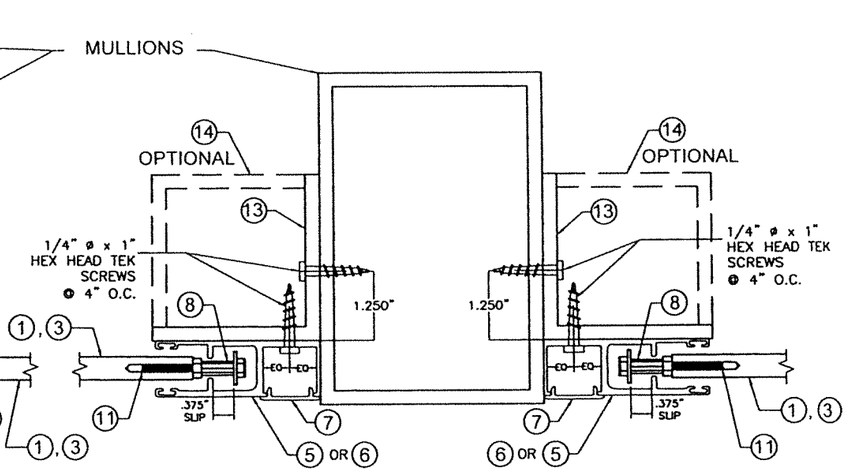

**SECTION Q-Q (PLAN)**
ORIENTATION #1
FACE MOUNT END MULLION




**SECTION Q-Q (PLAN)**
ORIENTATION #2
FACE MOUNT END MULLION




**SECTION R-R (PLAN)**
ORIENTATIONS #1 & #2
FACE MOUNT INTERIOR MULLION




**SECTION R'-R' (PLAN)**
ORIENTATION #2
TRAPPED MOUNT INTERIOR MULLION

SIDE RAIL CONNECTIONS INTO MULLIONS

N.T.S.

# END RETENTION SYSTEM

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

7/28/2023

P.E. SEAL/SIGNATURE/DATE

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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TILLIT TESTING & ENGINEERING COMPANY
8355 N.W. 36th. St., Ste. 305 – VIRGINIA GARDENS, FL 33166
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CA-0006719
WALTER A. TILLIT Jr., P.E.
FLORIDA Lic. # 44167

40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM

AMERICAN SHUTTER SYSTEMS ASSOC., INC.
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

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7/28/2023 DATE
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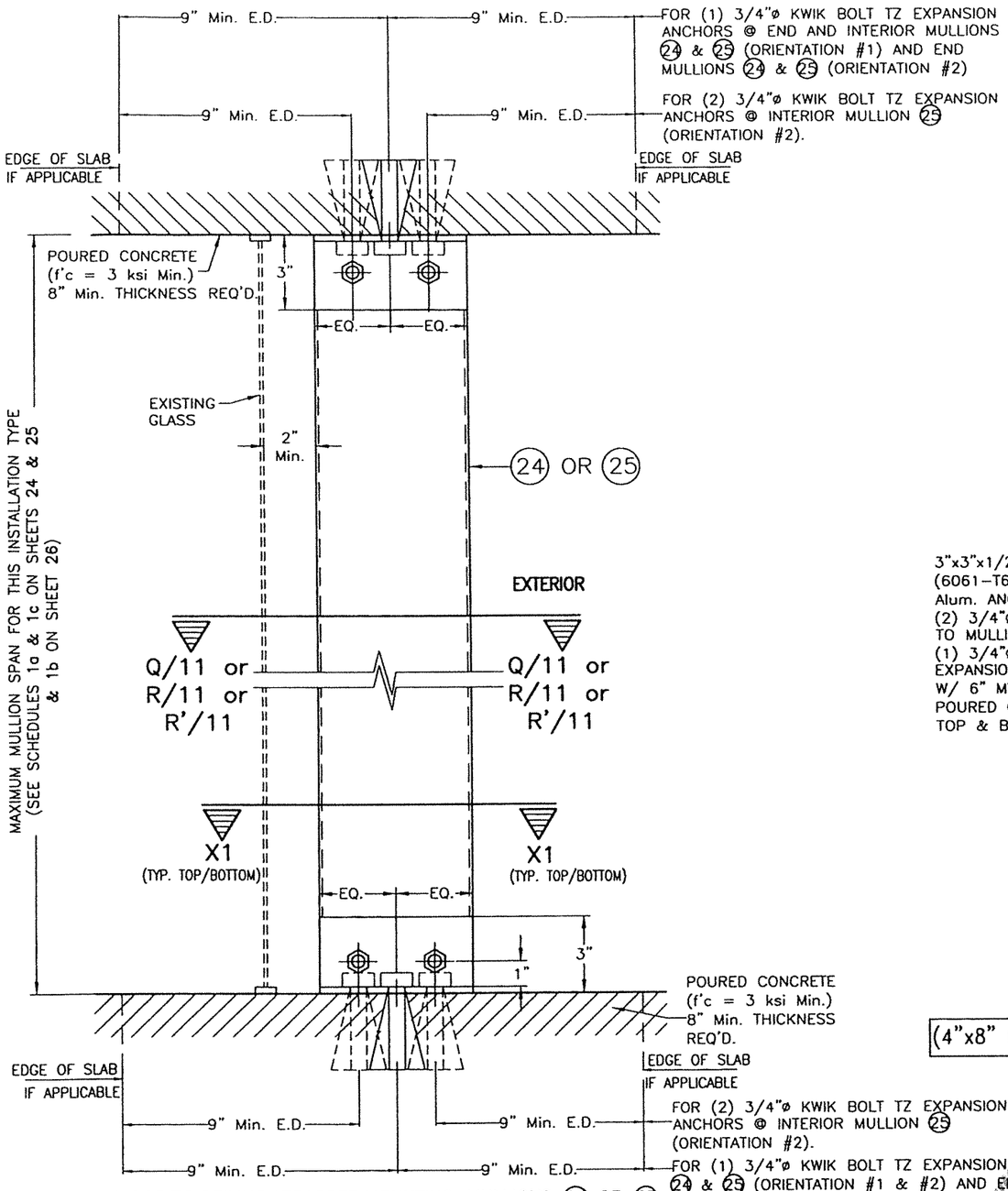
SHEET 11 OF 29



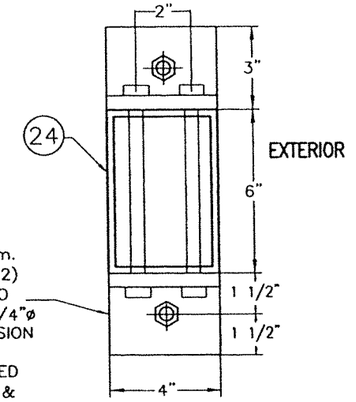

FLOOR TO CEILING / TRAPPED MOUNTING : MULLIONS (24) OR (25)

## SECTIONS W-1

## END & INTERIOR TRAPPED MOUNTED MULLION INSTALLATION *

APPLICABLE TO ALL INSTALLATIONS EXCEPT THOSE W/ LIMITATIONS COVERED ON SHEET 13

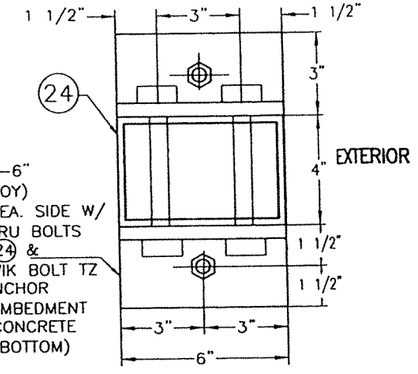
SCALE: 1/8" = 1"




3"x3"x1/2"x0'-4" (6061-T6 ALLOY) Alum. ANGLE EA. SIDE W/ (2) 3/4"ø THRU BOLTS TO MULLION (24) & (1) 3/4"ø KWIK BOLT TZ EXPANSION ANCHOR W/ 6" Min. EMBEDMENT TO POURED CONCRETE (Typ. TOP & BOTTOM)

SECTION X1-X1 W/ (24) *

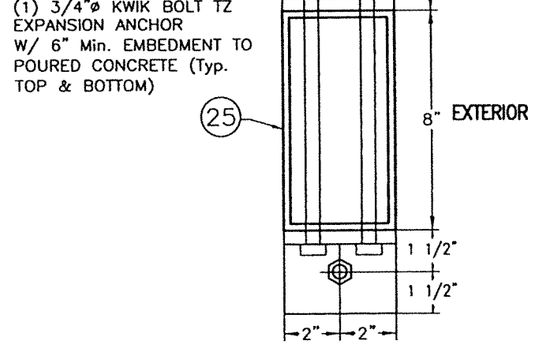
(4"x6" END & INTERIOR MULLION W/ ORIENTATION #1)




3"x3"x1/2"x0'-6" (6061-T6 ALLOY) Alum. ANGLE EA. SIDE W/ (2) 3/4"ø THRU BOLTS TO MULLION (24) & (1) 3/4"ø KWIK BOLT TZ EXPANSION ANCHOR W/ 6" Min. EMBEDMENT TO POURED CONCRETE (Typ. TOP & BOTTOM)

ALTERNATIVE SECTION X1-X1 W/ (24) *

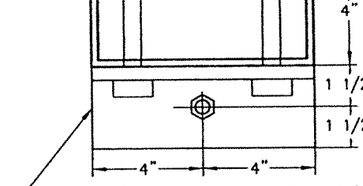
(4"x6" END & INTERIOR MULLION W/ ORIENTATION #2)




3"x3"x1/2"x0'-4" (6061-T6 ALLOY) Alum. ANGLE EA. SIDE W/ (2) 3/4"ø THRU BOLTS TO MULLION (25) & (1) 3/4"ø KWIK BOLT TZ EXPANSION ANCHOR W/ 6" Min. EMBEDMENT TO POURED CONCRETE (Typ. TOP & BOTTOM)

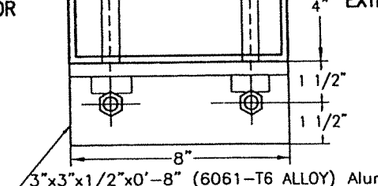
SECTION X1-X1 W/ (25) *

(4"x8" END & INTERIOR MULLION W/ ORIENTATION #1)




3"x3"x1/2"x0'-8" (6061-T6 ALLOY) Alum. ANGLE EA. SIDE W/ (2) 3/4"ø THRU BOLTS TO MULLION (25) & (1) 3/4"ø KWIK BOLT TZ EXPANSION ANCHOR W/ 6" Min. EMBEDMENT TO POURED CONCRETE (Typ. TOP & BOTTOM)

(END MULLION ONLY)




3"x3"x1/2"x0'-8" (6061-T6 ALLOY) Alum. ANGLE EA. SIDE W/ (2) 3/4"ø THRU BOLTS TO MULLION (25) & (2) 3/4"ø KWIK BOLT TZ EXPANSION ANCHOR W/ 6" Min. EMBEDMENT TO POURED CONCRETE (Typ. TOP & BOTTOM)

(INTERIOR MULLION ONLY)

ALTERNATIVES SECTION X1-X1 W/ (25) *

(4"x8" END & INTERIOR MULLION W/ ORIENTATION #2)

* SIDE RAILS (5) & (6) AND BOX NOT SHOWN FOR CLARITY.

# END RETENTION SYSTEM

**FLORIDA BUILDING CODE (High Velocity Hurricane Zone)**

WALTER A. TILLIT JR. STATE OF FLORIDA PROFESSIONAL ENGINEER NO. 44167

7/28/2023

P.E. SEAL/SIGNATURE/DATE

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WALTER A. TILLIT Jr., P.E.
FLORIDA Lic. # 44167

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

AMERICAN SHUTTER SYSTEMS ASSOC., INC.
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

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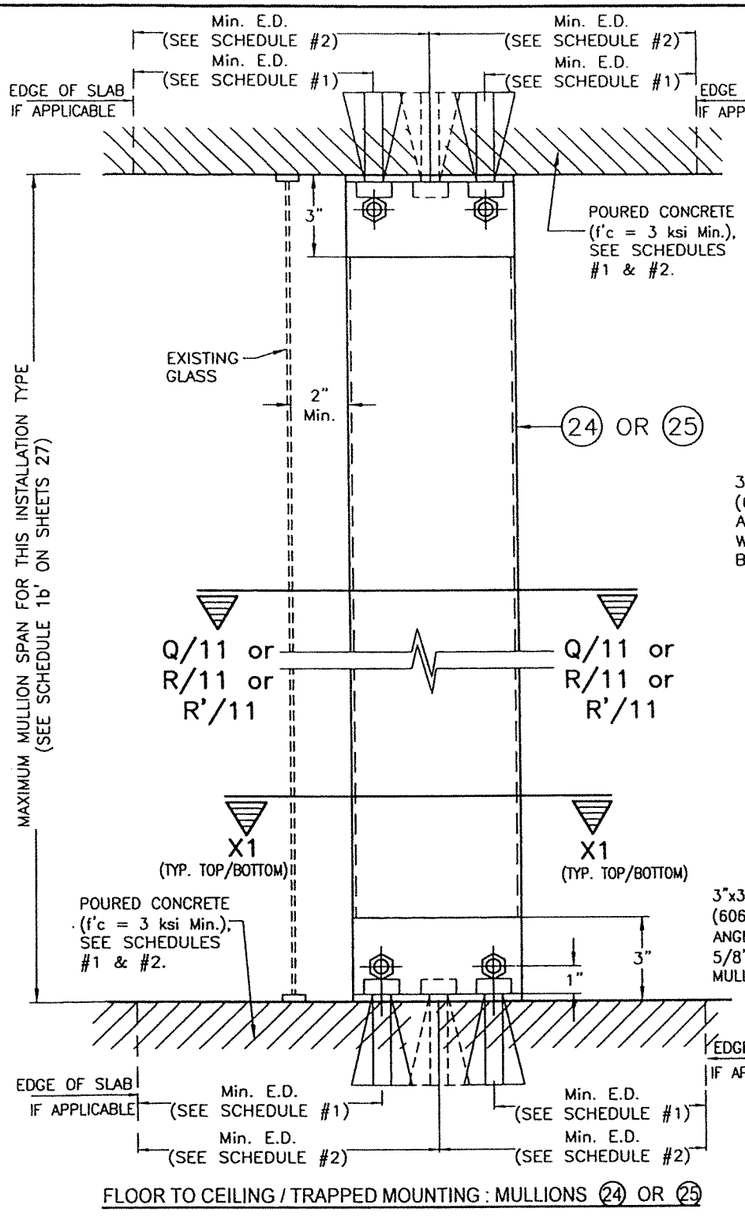
7/28/2023 DATE

23-137 DRAWING No



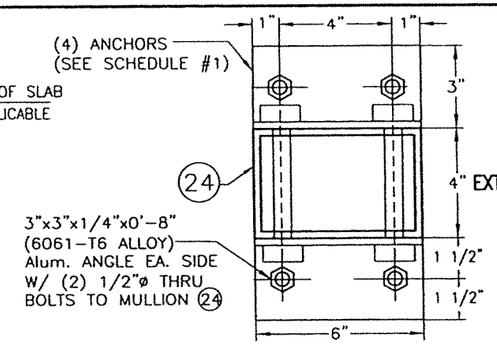

FLOOR TO CEILING / TRAPPED MOUNTING : MULLIONS (24) OR (25)

## SECTIONS W-1

# END RETENTION SYSTEM

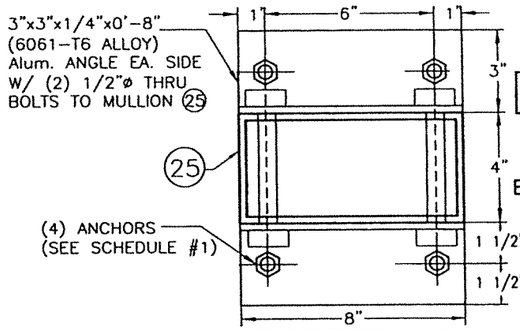
◊ END & INTERIOR TRAPPED MOUNTED MULLION INSTALLATION *
APPLICABLE TO A LIMITED LOAD, MULLION SPAN AND MULLION SPACING INSTALLATIONS

SCALE: 1/8" = 1"



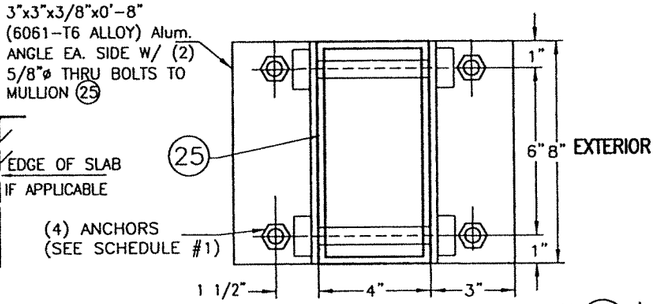

ALTERNATIVE SECTION X1-X1 W/ (24) *

(4"x6" INTERIOR MULLION ONLY W/ ORIENTATION # 2)



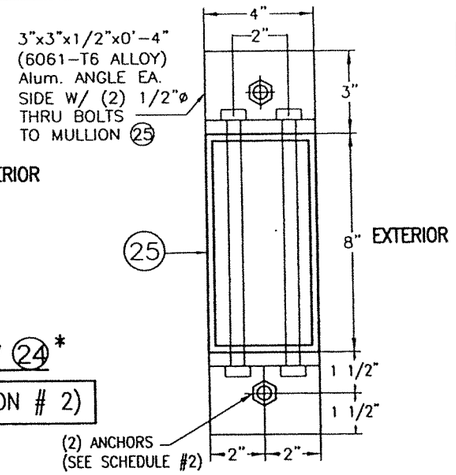

ALTERNATIVE SECTION X1-X1 W/ (25) *

(4"x8" INTERIOR MULLION ONLY W/ ORIENTATION # 2)




ALTERNATIVE SECTION X1-X1 W/ (25) *

(4"x8" END & INTERIOR MULLION W/ ORIENTATION # 1)




ALTERNATIVE SECTION X1-X1 W/ (25) *

(4"x8" END & INTERIOR MULLION W/ ORIENTATION # 1)

◊ SEE MAXIMUM (24) (INTERIOR) & (25) (END & INTERIOR) TRAPPED MOUNTED MULLIONS SPAN COVERED BY SCHEDULE 1b' FOR INSTALLATION CASES I, Ia & II ON SHEET 27

(LIMITED LOAD, MULLION SPACING AND SPAN INSTALLATION):

INSTALLATION CASE I – RESIDENTIAL AND COMMERCIAL APPLICATIONS W/ MAXIMUM A.S.D. DESIGN LOAD, MAXIMUM MULLION SPACING. SEE SCHEDULES #1 & #2 FOR ANCHOR SPECS.

INSTALLATION CASE Ia – RESIDENTIAL AND COMMERCIAL APPLICATION W/ MAXIMUM A.S.D. DESIGN LOAD, MAXIMUM MULLION SPACING. SEE SCHEDULES #1 & #2 FOR ANCHOR SPECS.

INSTALLATION CASE II – COMMERCIAL APPLICATION FOR MAXIMUM A.S.D. DESIGN LOAD, MAXIMUM MULLION SPACING. SEE SCHEDULES #1 & #2 FOR ANCHOR SPECS.

* SIDE RAILS (5) & (6) AND BOX NOT SHOWN FOR CLARITY.

**SCHEDULE #1**

| INSTALLATION CASES | MIN. SLAB THICKNESS REQ'D. | ANCHOR TYPE & SIZE (TYP. TOP & BOTTOM) | MIN. ANCHOR EMBEDMENT | MIN. EDGE DISTANCE FOR ANCHOR |
|---|---|---|---|---|
| I | 4" | 3/8"ø HILTI INC KWIK HUS–H SCREW & 3/8"ø DEWALT, INC WEDGE–BOLT ANCHOR FOR (24) & (25) (INTERIOR) MULLIONS W/ ORIENTATION #2. | 2 1/2" | 5 1/2" |
| | | 1/2"ø HILTI INC KWIK HUS–H SCREW & 1/2"ø DEWALT, INC. WEDGE– BOLT ANCHOR FOR (25) (END & INTERIOR) MULLION W/ ORIENTATION #1. | 3" | 6" |
| Ia | 4" | 1/2"ø HILTI INC KWIK BOLT TZ ONLY FOR (24) & (25) INTERIOR MULLIONS W/ ORIENTATION #2) & (25) (END MULLION W/ ORIENTATION #1). | 2 1/2" | 5 1/2" |
| | | 1/2"ø HILTI INC KWIK HUS–H SCREW & 1/2"ø DEWALT, INC. WEDGE– BOLT ANCHOR FOR (24) & (25) (END OR INTERIOR MULLION) W/ ORIENTATIONS #1 OR #2. | 3" | 6" |
| II | 6" | 1/2"ø HILTI INC KWIK BOLT TZ ONLY FOR (24) & (25) INTERIOR MULLIONS W/ ORIENTATION #2) & (25) (END MULLION W/ ORIENTATION #1). | 3 1/4" | 7 1/2" |
| | | 1/2"ø HILTI INC KWIK HUS–H SCREW OR 1/2"ø DEWALT, INC WEDGE– BOLT ANCHOR SEE * NOTE ON SCHEDULE 1b' ON SHEET 25. VALID FOR END & INTERIOR MULLIONS (24) & (25) W/ ORIENTATIONS #1 OR #2. | 3" | 6" |

**SCHEDULE #2**

| INSTALLATION CASES | MIN. SLAB THICKNESS REQ'D. | ANCHOR TYPE & SIZE (TYP. TOP & BOTTOM) | MIN. ANCHOR EMBEDMENT | MIN. EDGE DISTANCE FOR ANCHOR |
|---|---|---|---|---|
| I, Ia & II | 4" | 5/8"ø HILTI INC KWIK HUS–H SCREW & 5/8"ø DEWALT, INC. WEDGE–BOLT ANCHOR W/ ORIENTATION #1. | 2 1/2" | 7 1/2" |

FLORIDA BUILDING CODE (High Velocity Hurricane Zone

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7/28/2023

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**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

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WEST PALM BEACH, FL. 33407
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FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
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| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

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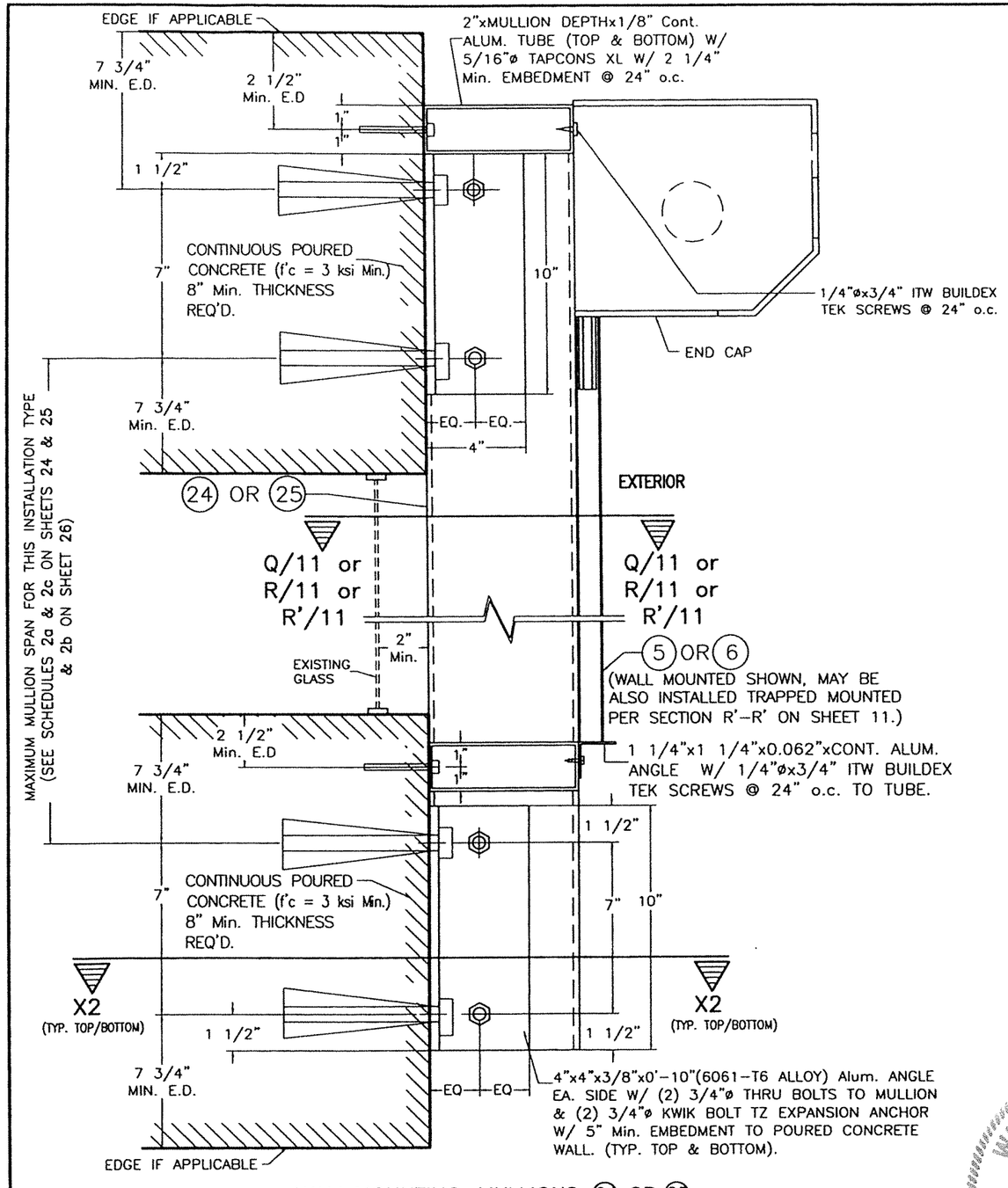
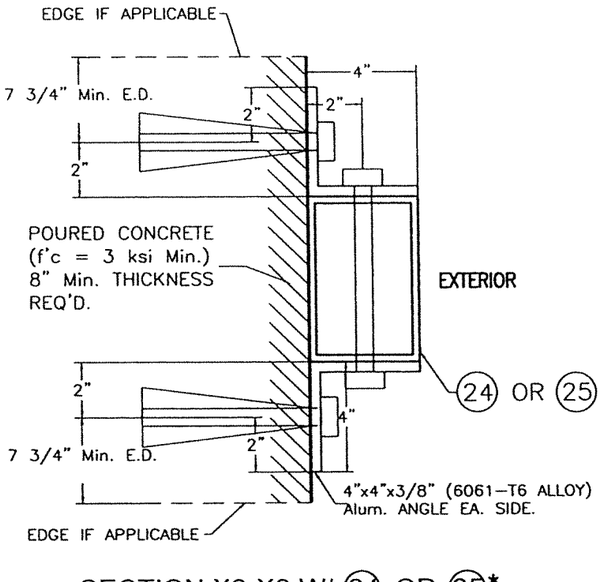
7/28/2023 DATE
23-137 DRAWING No
SHEET 13 OF 25

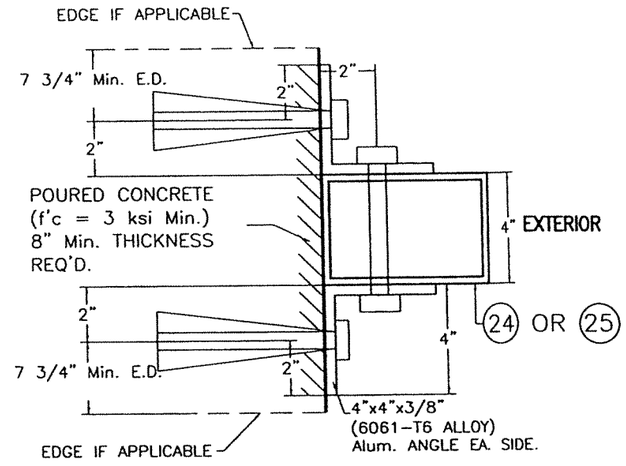



WALL MOUNTING : MULLIONS (24) OR (25)
POURED CONCRETE WALL

## SECTION W-2




SECTION X2-X2 W/ (24) OR (25)*
(END & INTERIOR MULLION)
(W/ ORIENTATION # 1)
(6"x4" or 8"x4")




ALTERNATIVE SECTION X2-X2 W/ (24) OR (25)*
(END & INTERIOR MULLION)
(W/ ORIENTATION # 2)
(4"x6" or 4"x8")

# END RETENTION SYSTEM

## END & INTERIOR WALL MOUNTED MULLION INSTALLATION

APPLICABLE TO ALL INSTALLATIONS EXCEPT THOSE W/ LIMITATIONS COVERED ON SHEET 15

SCALE: 1/8" = 1"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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7/28/2023

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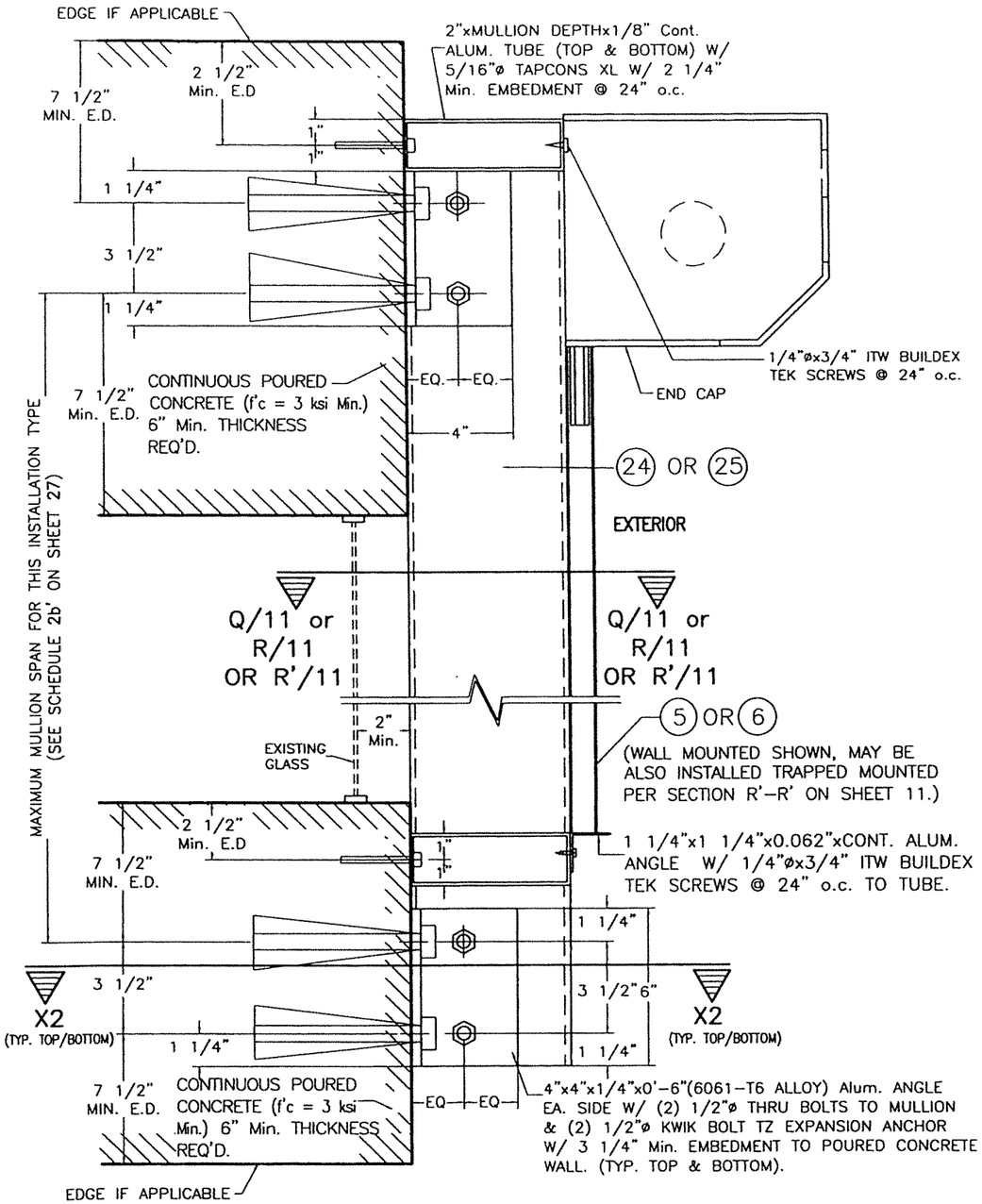
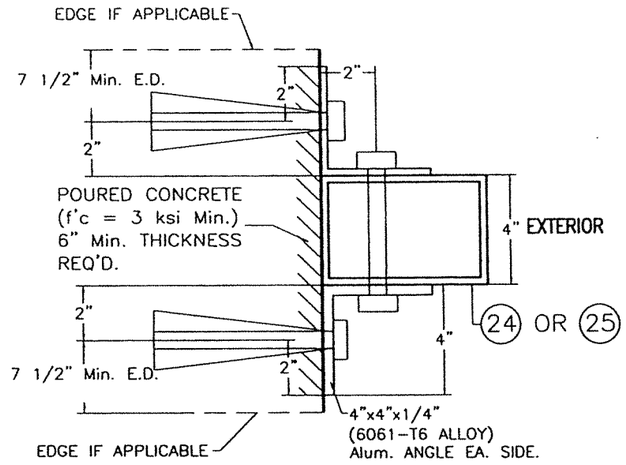
23-137 DRAWING No

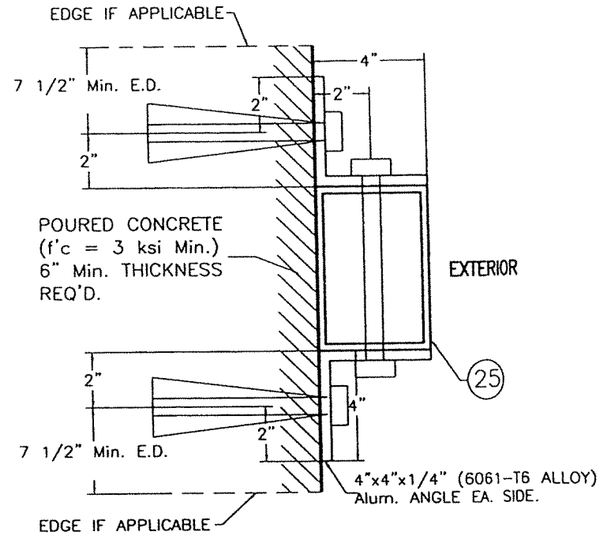



WALL MOUNTING : MULLIONS (24) OR (25)
POURED CONCRETE WALL

## SECTION W-2




ALTERNATIVE SECTION X2-X2 W/ (24) OR (25) *
(INTERIOR MULLION)
(W/ ORIENTATION # 2)
(4"x6" or 4"x8")




ALTERNATIVE SECTION X2-X2 W/ (25)*
(END & INTERIOR MULLIONS)
(W/ ORIENTATION # 1)
(8"x4")

◇ SEE MAXIMUM (24) (INTERIOR) & (25) (END & INTERIOR) WALL MOUNTED MULLIONS SPAN COVERED BY SCHEDULE 2b' FOR INSTALLATION CASES I' & II' ON SHEET 27 (LIMITED LOAD, MULLION SPACING AND SPAN INSTALLATION):

INSTALLATION CASE I' – RESIDENTIAL AND COMMERCIAL APPLICATIONS W/ MAXIMUM A.S.D. DESIGN LOAD, MAXIMUM MULLION SPACING. VALID FOR CONNECTION TO CONCRETE W/ HILTI INC KWIK HUS-H OR POWER FASTENERS WEDGE-BOLT ANCHORS.

INSTALLATION CASE II' – COMMERCIAL APPLICATION FOR MAXIMUM A.S.D. DESIGN LOAD, MAXIMUM MULLION SPACING. VALID FOR CONNECTION TO CONCRETE W/ HILTI INC KWIK BOLT TZ ANCHORS.

# END RETENTION SYSTEM

## ◇ END & INTERIOR WALL MOUNTED MULLION INSTALLATION

## APPLICABLE TO A LIMITED LOAD, MULLION SPAN AND MULLION SPACING INSTALLATIONS

SCALE: 1/8" = 1"

**FLORIDA BUILDING CODE (High Velocity Hurricane Zone)**

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P.E. SEAL/SIGNATURE/DATE

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7/28/2023 DATE
23-137 DRAWING No
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# END RETENTION SYSTEM

## TYPICAL MANDATORY PROCEDURE FOR VERIFYING PRODUCT CODE COMPLIANCE RELATED TO ITS INSTALLATION INTO EXISTING POURED CONCRETE OR GROUTED CONCRETE BLOCK STRUCTURES
## (VALID FOR SLATS ① & ③ )

STEP 1: OBTAIN JOB SITE'S A.S.D. DESIGN LOAD (p.s.f.) FOR THE OPENING AND DESIRED PRODUCT SPAN "L" (ft) TO PROTECT (SEE GENERAL NOTE #1, SHEET 1).

STEP 2: ENTER TO CHARTS **Ia, Ib & Ic** ON SHEETS 17 & 18 FOR SLAT ①, AND TO CHARTS **Ia, Ib & Ic** ON SHEET 19 FOR SLAT ③ TO DETERMINE, BASED ON SUBSTRATE, ANCHOR TYPE AT SIDE RAILS & A.S.D. DESIGN LOAD (p.s.f.); THE MAXIMUM SLAT SPAN "LMAX" (ft) AND THE REQUIRED SEPARATION TO GLASS.

STEP 3: OBTAIN INFORMATION ON PRODUCT'S SIDE RAIL ANCHOR SPACING REQUIREMENTS FOR CONNECTION TO EXISTING STRUCTURE FROM ANCHOR SCHEDULES IIa & IIb ON SHEETS 20 & 21 FOR SLAT ① & FROM ANCHOR SCHEDULES IIa & IIb ON SHEETS 22 & 23 FOR SLAT ③. ENTER SCHEDULES WITH FINALLY DETERMINED ANCHOR TYPE, SUBSTRATE, MOUNTING TYPE, A.S.D. DESIGN LOAD & PRODUCT SPAN AND OBTAIN MAXIMUM ANCHOR SPACING (INCHES ON CENTERS). SEE GENERAL NOTE 5 ON SHEET 1 FOR ANCHOR SPECS.

STEP 4: IF PRODUCT INSTALLATION INCLUDES MULLIONS, THE FOLLOWING MANDATORY ADDITIONAL PROCEDURE IS APPLICABLE.

1. MINIMUM SEPARATION TO GLASS FOR SLATS IF MULLIONS ARE USED SHALL BE BASED ON INSTALLATIONS INDICATED ON CHARTS **Ic** ON SHEET 25 FOR SLAT ① & ON SHEET 28 FOR SLAT ③. IT SHALL BE MEASURED FROM BACK OF SLAT TO GLASS.
2. ENTER SCHEDULES 1a, 2a, 1c, 2c, 1b, 2b, 1b' & 2b' ON SHEETS 24 THRU 27 W/ A.S.D. DESIGN LOAD ; MAXIMUM MULLION SPACING (MAX., 12', 8', 7' OR 6'-10") FOR SLAT ① & SHEETS 28 & 29 FOR SLAT ③ , AND DETERMINE MAXIMUM MULLION SPAN (HEIGHT) W/ ALLOWABLE INTERPOLATION IN BETWEEN SPACINGS FOR A GIVEN (㉔,㉕), MULLION TYPE & MULLION ORIENTATION.
3. SEE SHEETS 12 THRU 15 FOR REQUIRED MULLION CONNECTION DETAILS AT TOP & BOTTOM FOR FLOOR TO CEILING (TRAPPED) OR WALL MOUNTINGS OF MULLIONS INTO CONCRETE FOR A GIVEN MULLION TYPE (㉔,㉕)

WALTER A. TILLIT JR. P.E. LICENSE NO. 44167 STATE OF FLORIDA PROFESSIONAL ENGINEER

7/28/2023

P.E. SEAL/SIGNATURE/DATE

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TILTECO INC.
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CA-0006719
WALTER A. TILLIT Jr., P.E.
FLORIDA Lic. # 44167

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

AMERICAN SHUTTER SYSTEMS ASSOC., INC.
4268 WESTROADS DRIVE
WEST PALM BEACH, FL 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.

7/28/2023 DATE

23-137 DRAWING No

# SLAT ① PERFORMANCE CHART

POURED CONCRETE

SLAT PERFORMANCE CHARTS **Ia, Ib & Ic**: (ONLY VALID FOR 3/8" SLIP)
FOR A GIVEN A.S.D. DESIGN LOAD (p.s.f), PRODUCT MOUNT CONDITION INCLUDING ANCHOR TYPE

| CHART Ia | CHART Ib | CHART Ic |
|---|---|---|
| USE MAXIMUM VALUE BETWEEN POSITIVE AND NEGATIVE A.S.D. LOAD | | USE MAXIMUM POSITIVE A.S.D. LOAD VALUE |
| 3/8"Ø WEDGE BOLT ANCHOR | 5/16"ø TAPCON XL, ULTRACON OR TAPPER +XTREME ANCHORS | |

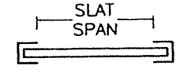
| A.S.D. DESIGN LOAD (psf) | MAX. SLAT SPAN "LMAX." (FT) | | | | | | MAX. SLAT SPAN "LMAX." (FT) | | | | | | REQUIRED MIN. SEPARATION TO GLASS MEASURED TO BACK OF SLAT (in) SEE NOTES * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WALL MOUNT SEE NOTES * | TRAPPED MOUNT SEE NOTES * | 2" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 2" BUILD-OUT MOUNT W/ (15) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (15) SEE NOTES * | WALL MOUNT SEE NOTES * | TRAPPED MOUNT SEE NOTES * | 2" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 2" BUILD-OUT MOUNT W/ (15) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (15) SEE NOTES * | |
| 30.0 | 16'-0" | 16'-0" | 8'-0" | 8'-0" | 16'-0" | 16'-0" | 16'-0" | 16'-0" | 8'-0" | 8'-0" | 12'-0" | 10'-3" | 7 1/4" |
| 35.0 | 16'-0" | 16'-0" | 8'-0" | 8'-0" | 16'-0" | 15'-3" | 16'-0" | 15'-0" | 8'-0" | 8'-0" | 11'-0" | 9'-3" | 7 1/4" |
| 40.0 | 16'-0" | 16'-0" | 8'-0" | 8'-0" | 16'-0" | 14'-0" | 16'-0" | 13'-6" | 8'-0" | 8'-0" | 10'-0" | 8'-5" | 7 1/4" |
| 45.0 | 16'-0" | 15'-6" | 8'-0" | 8'-0" | 15'-0" | 13'-0" | 15'-0" | 12'-6" | 8'-0" | 7'-10" | 9'-6" | 7'-10" | 7 1/4" |
| 50.0 | 15'-5" | 14'-11" | 8'-0" | 8'-0" | 14'-0" | 12'-3" | 14'-4" | 11'-6" | 8'-0" | 7'-4" | 8'-9" | 7'-4" | 8 1/4" |
| 55.0 | 14'-10" | 14'-4" | 8'-0" | 8'-0" | 13'-3" | 11'-4" | 13'-6" | 10'-9" | 8'-0" | 6'-10" | 8'-3" | 6'-10" | 8 1/4" |
| 60.0 | 14'-3" | 13'-9" | 8'-0" | 8'-0" | 12'-3" | 10'-9" | 12'-6" | 10'-0" | 7'-9" | 6'-6" | 7'-9" | 6'-6" | 9" |
| 65.0 | 13'-9" | 13'-3" | 8'-0" | 8'-0" | 11'-6" | 10'-3" | 12'-0" | 9'-3" | 7'-6" | 6'-3" | 7'-6" | 6'-3" | 9" |
| 70.0 | 13'-1" | 12'-7" | 8'-0" | 8'-0" | 10'-9" | 9'-9" | 11'-0" | 8'-9" | 7'-3" | 6'-0" | 7'-3" | 6'-0" | 9" |
| 75.0 | 12'-7" | 12'-1" | 8'-0" | 8'-0" | 10'-3" | 9'-3" | 10'-9" | 8'-3" | 7'-0" | 5'-10" | 7'-0" | 5'-10" | 9" |
| 80.0 | 12'-0" | 11'-6" | 8'-0" | 8'-0" | 9'-9" | 8'-9" | 10'-4" | 7'-10" | 6'-9" | 5'-9" | 6'-9" | 5'-9" | 9" |
| 85.0 | 11'-4" | 10'-10" | – | – | – | – | 9'-9" | 7'-4" | – | – | – | – | 8 1/2" |
| 90.0 | 10'-9" | 10'-3" | – | – | – | – | 9'-6" | 7'-0" | – | – | – | – | 8" |
| 95.0 | 10'-0" | 9'-5" | – | – | – | – | 8'-9" | 6'-9" | – | – | – | – | 8" |
| 100.0 | 9'-5" | 8'-11" | – | – | – | – | 8'-0" | 6'-8" | – | – | – | – | 7 1/2" |
| 105.0 | 8'-9" | 8'-3" | – | – | – | – | 7'-6" | 6'-6" | – | – | – | – | 7" |
| 110.0 | 8'-1" | 7'-7" | – | – | – | – | 7'-4" | 6'-3" | – | – | – | – | 7" |
| 115.0 | 7'-6" | 7'-0" | – | – | – | – | 7'-0" | 6'-0" | – | – | – | – | 6 5/8" |
| 120.0 | 6'-10" | 6'-10" | – | – | – | – | 6'-10" | 5'-0" | – | – | – | – | 6 5/8" |

* NOTES:

1. ABOVE INDICATED MAX. SLAT SPANS MAY BE USED AS LONG AS ANCHOR SPACING SCHEDULES ON SHEET 20 INDICATE THAT AN ANCHOR SPACING IS AVAILABLE FOR THE CORRESPONDING SLAT SPAN AND A.S.D. DESIGN LOAD.

2. REQUIRES SIDE RAILS FASTENED TO EXISTING STRUCTURE WITH **3/8"ø WEDGE BOLT, 5/16"ø TAPCON XL, 5/16" ø ULTRACON OR 5/16" ø TAPPER+XTREME ANCHORS,** INTO POURED CONCRETE OR WITH 1/4"ø HEX HEAD HWH SELF-DRILL TEK SCREWS AT MULLIONS CONNECTION. VALID FOR WALL MOUNTED, TRAPPED MOUNTED, AND BUILD-OUT MOUNTED.

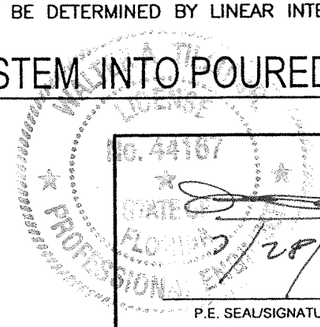
3. MAXIMUM SLAT SPANS FOR INTERMEDIATE LOADS MAY BE DETERMINED BY LINEAR INTERPOLATION BETWEEN END VALUES.




SLAT SPAN DEFINITION

## END RETENTION SYSTEM INTO POURED CONCRETE

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)




P.E. SEAL/SIGNATURE/DATE

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CA-0006719
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40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM

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| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.
7/28/2023 DATE
23-137 DRAWING No

# SLAT ① PERFORMANCE CHART

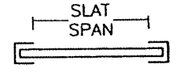
GROUTED CONCRETE BLOCK

SLAT PERFORMANCE CHARTS **Ia, Ib & Ic**: (ONLY VALID FOR 3/8" SLIP)
FOR A GIVEN A.S.D. DESIGN LOAD (p.s.f), PRODUCT MOUNT CONDITION INCLUDING ANCHOR TYPE

| CHART **Ia** | | | | | | | CHART **Ib** | | | | | | CHART **Ic** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USE MAXIMUM VALUE BETWEEN POSITIVE AND NEGATIVE A.S.D. LOAD | | | | | | | | | | | | | USE MAXIMUM POSITIVE A.S.D. LOAD VALUE |
| 3/8"Ø HILTI KWIK HUS BOLT ANCHOR | | | | | | | 5/16"ø TAPCON XL, ULTRACON OR TAPPER+XTREME ANCHORS | | | | | | |
| A.S.D. DESIGN LOAD (psf) | MAX. SLAT SPAN "LMAX." (FT) | | | | | | MAX. SLAT SPAN "LMAX." (FT) | | | | | | REQUIRED MIN. SEPARATION TO GLASS MEASURED TO BACK OF SLAT (in) SEE NOTES * |
| | WALL MOUNT SEE NOTES * | TRAPPED MOUNT SEE NOTES * | 2" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 2" BUILD-OUT MOUNT W/ (15) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (15) SEE NOTES * | WALL MOUNT SEE NOTES * | TRAPPED MOUNT SEE NOTES * | 2" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 2" BUILD-OUT MOUNT W/ (15) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (15) SEE NOTES * | |
| **30.0** | 14'-7" | 14'-7" | 8'-0" | 8'-0" | 11'-0" | 9'-7" | 10'-6" | 8'-0" | 7'-3" | 6'-6" | 7'-6" | 6'-10" | 7 1/4" |
| **35.0** | 13'-7" | 13'-7" | 8'-0" | 8'-0" | 10'-0" | 8'-8" | 9'-6" | 7'-4" | 6'-8" | 6'-1" | 7'-0" | 6'-4" | 7 1/4" |
| **40.0** | 13'-0" | 12'-6" | 8'-0" | 7'-6" | 9'-4" | 8'-0" | 9'-0" | 6'-8" | 6'-3" | 5'-10" | 6'-6" | 5'-9" | 7 1/4" |
| **45.0** | 12'-0" | 11'-6" | 8'-0" | 7'-0" | 8'-10" | 7'-7" | 8'-6" | 6'-3" | 6'-0" | 5'-6" | 6'-3" | 5'-7" | 7 1/4" |
| **50.0** | 11'-1" | 10'-6" | 7'-9" | 6'-8" | 8'-4" | 7'-2" | 8'-0" | 6'-0" | 5'-9" | 5'-3" | 5'-11" | 5'-4" | 8 1/4" |
| **55.0** | 10'-0" | 9'-9" | 7'-2" | 6'-4" | 7'-10" | 6'-7" | 7'-4" | 5'-8" | 5'-6" | 5'-1" | 5'-9" | 5'-2" | 8 1/4" |
| **60.0** | 9'-6" | 9'-3" | 6'-10" | 6'-0" | 7'-6" | 6'-4" | 7'-0" | 5'-5" | 5'-3" | 4'-11" | 5'-6" | 5'-0" | 7 1/2" |
| **65.0** | 9'-0" | 8'-9" | 6'-8" | 5'-8" | 7'-0" | 6'-3" | 6'-6" | 5'-3" | 5'-1" | 4'-10" | 5'-3" | 4'-11" | 7 1/2" |
| **70.0** | 8'-6" | 8'-3" | 6'-6" | 5'-6" | 6'-9" | 6'-0" | 6'-4" | 5'-0" | 5'-0" | 4'-8" | 5'-0" | 4'-10" | 7 1/2" |
| **75.0** | 8'-0" | 7'-9" | 6'-3" | 5'-5" | 6'-6" | 5'-9" | 6'-3" | 4'-10" | 4'-10" | 4'-7" | 4'-11" | 4'-8" | 7 1/2" |
| **80.0** | 7'-6" | 7'-3" | 6'-0" | 5'-4" | 6'-0" | 5'-6" | 6'-0" | 4'-8" | 4'-8" | 4'-6" | 4'-10" | 4'-7" | 7 1/2" |
| **85.0** | 7'-3" | 7'-0" | – | – | – | – | 5'-6" | 4'-6" | – | – | – | – | 6 5/8" |
| **90.0** | 7'-0" | 6'-9" | – | – | – | – | 5'-0" | 4'-4" | – | – | – | – | 6 5/8" |
| **95.0** | 7'-0" | 6'-6" | – | – | – | – | 4'-11" | 4'-3" | – | – | – | – | 6 5/8" |
| **100.0** | 6'-9" | 6'-4" | – | – | – | – | 4'-10" | 4'-2" | – | – | – | – | 6 5/8" |
| **105.0** | 6'-6" | 6'-0" | – | – | – | – | 4'-9" | 4'-0" | – | – | – | – | 6 5/8" |
| **110.0** | 6'-6" | 5'-9" | – | – | – | – | 4'-8" | 3'-11" | – | – | – | – | 6 5/8" |
| **115.0** | 6'-5" | 5'-6" | – | – | – | – | 4'-7" | 3'-10" | – | – | – | – | 6 5/8" |
| **120.0** | 6'-3" | 5'-3" | – | – | – | – | 4'-6" | 3'-9" | – | – | – | – | 6 5/8" |

* NOTES:

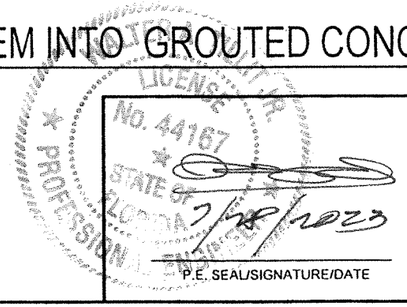
1. ABOVE INDICATED MAX. SLAT SPANS MAY BE USED AS LONG AS ANCHOR SPACING SCHEDULES ON SHEET 21 INDICATE THAT AN ANCHOR SPACING IS AVAILABLE FOR THE CORRESPONDING SLAT SPAN AND A.S.D. DESIGN LOAD.
2. REQUIRES SIDE RAILS FASTENED TO EXISTING STRUCTURE WITH **3/8"ø HILTI KWIK HUS BOLT, 5/16"ø TAPCON XL, 5/16" ø ULTRACON OR 5/16" ø TAPPER+XTREME ANCHORS** INTO GROUTED CONCRETE BLOCK OR WITH 1/4"ø HEX HD. HWH SELF-DRILL TEK SCREWS AT MULLIONS CONNECTION. VALID FOR WALL MOUNTED, TRAPPED MOUNTED, AND BUILD-OUT MOUNTED.
3. MAXIMUM SLAT SPANS FOR INTERMEDIATE LOADS MAY BE DETERMINED BY LINEAR INTERPOLATION BETWEEN END VALUES.




SLAT SPAN DEFINITION

## END RETENTION SYSTEM INTO GROUTED CONCRETE BLOCK

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)




P.E. SEAL/SIGNATURE/DATE

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FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.
7/28/2023 DATE
23-137 DRAWING No

# SLAT ③ PERFORMANCE CHARTS

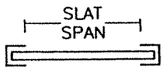
## POURED CONCRETE

SLAT PERFORMANCE CHARTS **Ia, Ib & Ic**: (ONLY VALID FOR 3/8" SLIP)
FOR A GIVEN A.S.D. DESIGN LOAD (p.s.f), PRODUCT MOUNT CONDITION INCLUDING ANCHOR TYPE

| CHART **Ia** | | | | CHART **Ib** | | | | CHART **Ic** |
|---|---|---|---|---|---|---|---|---|
| USE MAXIMUM VALUE BETWEEN POSITIVE AND NEGATIVE A.S.D. LOAD | | | | | | | | USE MAXIMUM POSITIVE A.S.D. LOAD VALUE |
| 3/8"Ø WEDGE BOLTS ANCHOR | | | | 5/16"ø TAPCON XL ANCHORS | | | | |
| A.S.D. DESIGN LOAD (psf) | MAX. SLAT SPAN "$L_{MAX.}$" (FT) | | | | MAX. SLAT SPAN "$L_{MAX.}$" (FT) | | | | REQUIRED MIN. SEPARATION TO GLASS MEASURED TO BACK OF SLAT (in) |
| | WALL MOUNT SEE NOTES * | TRAPPED MOUNT SEE NOTES * | 2" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | WALL MOUNT SEE NOTES * | TRAPPED MOUNT SEE NOTES * | 2" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | |
| 30.0 | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 7" |
| 35.0 | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 7" |
| 40.0 | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 7" |
| 45.0 | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-0" | 7" |
| 50.0 | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 7'-6" | 7" |
| 55.0 | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 7'-0" | 7" |
| 60.0 | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 6'-8" | 7" |
| 65.0 | 7'-9" | 7'-9" | 7'-9" | 7'-9" | 7'-9" | 7'-9" | 7'-9" | 6'-5" | 6 3/4" |
| 70.0 | 7'-5" | 7'-5" | 7'-5" | 7'-5" | 7'-5" | 7'-5" | 7'-5" | 6'-0" | 6 1/2" |
| 75.0 | 7'-0" | 7'-0" | 7'-0" | 7'-0" | 7'-0" | 7'-0" | 7'-0" | 5'-10" | 6 3/8" |
| 80.0 | 6'-10" | 6'-10" | 6'-10" | 6'-10" | 6'-10" | 6'-10" | 6'-10" | 5'-8" | 6 1/4" |

* NOTES:

1. ABOVE INDICATED MAX. SLAT SPANS MAY BE USED AS LONG AS ANCHOR SPACING SCHEDULES ON SHEET 22 INDICATE THAT AN ANCHOR SPACING IS AVAILABLE FOR THE CORRESPONDING SLAT SPAN AND A.S.D. DESIGN LOAD.
2. REQUIRES SIDE RAILS FASTENED TO EXISTING STRUCTURE WITH **3/8"ø WEDGE BOLTS ANCHOR OR 5/16"ø TAPCON XL ANCHOR,** INTO POURED CONCRETE OR WITH 1/4"ø HEX HD. HWH SELF-DRILL 410 S.S. SCREWS AT MULLIONS CONNECTION. VALID FOR WALL MOUNTED, TRAPPED MOUNTED, AND BUILD-OUT MOUNTED.
3. MAXIMUM SLAT SPANS FOR INTERMEDIATE LOADS MAY BE DETERMINED BY LINEAR INTERPOLATION BETWEEN END VALUES.




SLAT SPAN DEFINITION

## GROUTED CONCRETE BLOCK

SLAT PERFORMANCE CHARTS **Ia, Ib & Ic**: (ONLY VALID FOR 3/8" SLIP)
FOR A GIVEN A.S.D. DESIGN LOAD (p.s.f), PRODUCT MOUNT CONDITION INCLUDING ANCHOR TYPE

| CHART **Ia** | | | | | CHART **Ib** | | | | CHART **Ic** |
|---|---|---|---|---|---|---|---|---|---|
| USE MAXIMUM VALUE BETWEEN POSITIVE AND NEGATIVE A.S.D. LOAD | | | | | | | | | USE MAXIMUM POSITIVE A.S.D. LOAD VALUE |
| 3/8"Ø HILTI KWIK HUS BOLT ANCHOR | | | | | 5/16"ø TAPCON XL ANCHORS | | | | |
| A.S.D. DESIGN LOAD (psf) | MAX. SLAT SPAN "$L_{MAX.}$" (FT) | | | | MAX. SLAT SPAN "$L_{MAX.}$" (FT) | | | | REQUIRED MIN. SEPARATION TO GLASS MEASURED TO BACK OF SLAT (in) |
| | WALL MOUNT SEE NOTES * | TRAPPED MOUNT SEE NOTES * | 2" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | WALL MOUNT SEE NOTES * | TRAPPED MOUNT SEE NOTES * | 2" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | 4" BUILD-OUT MOUNT W/ (12A) SEE NOTES * | |
| 30.0 | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 8'-4" | 7'-9" | 6'-4" | 7" |
| 35.0 | 8'-4" | 8'-4" | 8'-4" | 7'-7" | 8'-4" | 8'-4" | 7'-0" | 5'-10" | 7" |
| 40.0 | 8'-4" | 8'-4" | 8'-4" | 7'-0" | 8'-4" | 8'-4" | 6'-6" | 5'-6" | 7" |
| 45.0 | 8'-4" | 8'-4" | 8'-0" | 6'-6" | 8'-4" | 8'-4" | 6'-0" | 5'-2" | 7" |
| 50.0 | 8'-4" | 8'-4" | 7'-6" | 6'-2" | 8'-4" | 8'-4" | 5'-9" | 4'-10" | 7" |
| 55.0 | 8'-4" | 8'-4" | 7'-0" | 5'-10" | 8'-4" | 8'-4" | 5'-5" | 4'-9" | 7" |
| 60.0 | 8'-4" | 8'-4" | 6'-8" | 5'-7" | 8'-4" | 8'-4" | 5'-2" | 4'-7" | 7" |
| 65.0 | 7'-9" | 7'-9" | 6'-4" | 5'-4" | 7'-9" | 7'-9" | 5'-0" | 4'-5" | 6 3/4" |
| 70.0 | 7'-5" | 7'-5" | 6'-0" | 5'-0" | 7'-5" | 7'-5" | 4'-10" | 4'-3" | 6 1/2" |
| 75.0 | 7'-0" | 7'-0" | 5'-10" | 4'-11" | 7'-0" | 7'-0" | 4'-7" | 4'-2" | 6 3/8" |
| 80.0 | 6'-10" | 6'-10" | 5'-7" | 4'-9" | 6'-10" | 6'-10" | 4'-6" | 4'-0" | 6 1/4" |

* NOTES:

1. ABOVE INDICATED MAX. SLAT SPANS MAY BE USED AS LONG AS ANCHOR SPACING SCHEDULES ON SHEET 23 INDICATE THAT AN ANCHOR SPACING IS AVAILABLE FOR THE CORRESPONDING SLAT SPAN AND A.S.D. DESIGN LOAD.
2. REQUIRES SIDE RAILS FASTENED TO EXISTING STRUCTURE WITH **3/8"ø HILTI KWIK HUS BOLT ANCHOR OR 5/16"ø TAPCON XL ANCHOR** INTO GROUTED CONCRETE BLOCK OR WITH 1/4"ø HEX HD. HWH SELF-DRILL 410 S.S. SCREWS AT MULLIONS CONNECTION. VALID FOR WALL MOUNTED, TRAPPED MOUNTED, AND BUILD-OUT MOUNTED.
3. MAXIMUM SLAT SPANS FOR INTERMEDIATE LOADS MAY BE DETERMINED BY LINEAR INTERPOLATION BETWEEN END VALUES.

# END RETENTION SYSTEM

# INTO CONCRETE OR GROUTED CONCRETE BLOCK

**FLORIDA BUILDING CODE (High Velocity Hurricane Zone)**

7/28/2023
P.E. SEAL/SIGNATURE/DATE

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TILTECO INC.
TILLIT TESTING & ENGINEERING COMPANY
6355 N.W. 36th. St., Ste. 305 - VIRGINIA GARDENS, FL. 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

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

**AMERICAN SHUTTER SYSTEMS ASSOC., INC.**
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.
7/28/2023 DATE
23-137 DRAWING No

# END RETENTION SYSTEM W/ SLAT (1)

## MAX. ANCHOR'S SPACING SCHEDULE IIa

FOR A GIVEN PRODUCT MOUNTING TYPE, W/ 3/8"Ø WEDGE BOLT ANCHORS TO POURED CONCRETE WALL, A.S.D. DESIGN LOAD & SLAT SPAN RANGE †

WALL MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–9' † | > 9'–12' † | > 12'–16' † |
| ≤ 30.0 | 9" | 9" | 9" | 9" | 9" | 9" | 9" |
| >30–40 | 8" | 8" | 8" | 8" | 8" | 8" | 8" |
| >40–60 | 7" | 7" | 7" | 7" | 7" | 7" | 7" |
| >60–80 | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | – |
| >80–105 | 7 1/2" | 7 1/2" | 7 1/2" | 7 1/2" | 7 1/2" | – | – |
| >105–120 | 9" | 9" | 9" | 9" | – | – | – |

TRAPPED MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–9' † | > 9'–12' † | > 12'–16' † |
| ≤ 30.0 | 6" | 6" | 6" | 6" | 6" | 6" | 6" |
| >30–40 | 6" | 6" | 6" | 6" | 6" | 6" | 6" |
| >40–60 | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" |
| >60–80 | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | – |
| >80–105 | 5" | 5" | 5" | 5" | 5" | – | – |
| >105–120 | 6" | 6" | 6" | 6" | – | – | – |

**SLAT SPAN DEFINITION**

† NOTE:
MAX. SLAT SPAN FOR A GIVEN A.S.D. DESIGN LOAD SHALL NEVER EXCEED MAX. SLAT SPAN INDICATED ON SLAT PERFORMANCE CHART ON SHEET 17.

BUILD-OUT MOUNT W/(12A)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–8' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 6" | 4 1/2" | 6" | 4 1/2" | 6" | 4 1/2" | 6" | 4 1/2" | 6" | 4 1/2" |
| >30–40 | 5" | 4 1/2" | 5" | 4 1/2" | 5" | 4 1/2" | 5" | 4 1/2" | 5" | 4 1/2" |
| >40–60 | 5" | 4" | 5" | 4" | 5" | 4" | 5" | 4" | 5" | 4" |
| >60–80 | 5" | 4" | 5" | 4" | 5" | 4" | 5" | 4" | 5" | 4" |

BUILD-OUT MOUNT W/(15)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–9' † | | > 9'–12' † | | > 12'–16' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" |
| >30–40 | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" |
| >40–60 | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | – |
| >60–80 | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | – | – | – |

## MAX. ANCHOR'S SPACING SCHEDULE IIa

FOR A GIVEN PRODUCT MOUNTING TYPE, W/ 5/16"Ø TAPCON XL, ULTRACON OR TAPPER+XTREME ANCHORS TO POURED CONCRETE WALL, A.S.D. DESIGN LOAD & SLAT SPAN RANGE †

WALL MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–9' † | > 9'–12' † | > 12'–16' † |
| ≤ 30.0 | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" |
| >30–40 | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" |
| >40–60 | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" |
| >60–80 | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" |
| >80–105 | 4" | 4" | 4" | 4" | 4" | – | – |
| >105–120 | 4" | 4" | 4" | 4" | – | – | – |

TRAPPED MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–9' † | > 9'–12' † | > 12'–16' † |
| ≤ 30.0 | 5" | 5" | 5" | 5" | 5" | 5" | 5" |
| >30–40 | 4" | 4" | 4" | 4" | 4" | 4" | 4" |
| >40–60 | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" |
| >60–80 | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | 3 1/2" | – |
| >80–105 | 4" | 4" | 4" | 4" | 4" | – | – |
| >105–120 | 4" | 4" | 4" | 4" | – | – | – |

BUILD-OUT MOUNT W/(12A)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–8' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 4" | 3 1/2" | 4" | 3 1/2" | 4" | 3 1/2" | 4" | 3 1/2" | 4" | 3 1/2" |
| >30–40 | 4" | 4" | 4" | 4" | 4" | 4" | 4" | 4" | 4" | 4" |
| >40–60 | 4" | 4" | 4" | 4" | 4" | 4" | 4" | 4" | 4" | – |
| >60–80 | 4" | 4" | 4" | 4" | 4" | 4" | 3 1/2" | – | – | – |

BUILD-OUT MOUNT W/(15)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–9' † | | > 9'–12' † | | > 12'–16' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 4 1/2" | 4" | 4 1/2" | 4" | 4 1/2" | 4" | 4 1/2" | 4" | 4 1/2" | 4" | 4 1/2" | 4" | – | – |
| >30–40 | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | – | – | – |
| >40–60 | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | 4 1/2" | – | – | – | – | – |
| >60–80 | 4" | 4" | 4" | 4" | 4" | 4" | 4" | – | – | – | – | – | – | – |

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

P.E. SEAL/SIGNATURE/DATE

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FLORIDA Lic. # 44167

40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM

AMERICAN SHUTTER SYSTEMS ASSOC., INC.
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.
7/28/2023 DATE
23-137 DRAWING No
SHEET 20 OF 29

# END RETENTION SYSTEM W/ SLAT (1)

## MAX. ANCHOR'S SPACING SCHEDULE IIb

FOR A GIVEN PRODUCT MOUNTING TYPE, W/ 3/8"Ø HILTI KWIK HUS BOLT ANCHORS TO GROUTED CONCRETE BLOCK WALL, A.S.D. DESIGN LOAD & SLAT SPAN RANGE †

WALL MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–9' † | > 9'–12' † | > 12'–16' |
| ≤ 30.0 | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" |
| >30–40 | 6" | 6" | 6" | 6" | 6" | 6" | 6" |
| >40–60 | 6" | 6" | 6" | 6" | 6" | 6" | – |
| >60–80 | 6" | 6" | 6" | 6" | 6" | – | – |
| >80–105 | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | – | – | – |
| >105–120 | 6" | 6" | 6" | 6" | – | – | – |

TRAPPED MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–9' † | > 9'–12' † | > 12'–16'† |
| ≤ 30.0 | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" |
| >30–40 | 6" | 6" | 6" | 6" | 6" | 6" | 6" |
| >40–60 | 6" | 6" | 6" | 6" | 6" | 6" | – |
| >60–80 | 6" | 6" | 6" | 6" | 6" | – | – |
| >80–105 | 6" | 6" | 6" | – | – | – | – |
| >105–120 | 6 1/2" | 6 1/2" | 6 1/2" | – | – | – | – |

**SLAT SPAN DEFINITION**

† NOTE:
MAX. SLAT SPAN FOR A GIVEN A.S.D. DESIGN LOAD SHALL NEVER EXCEED MAX. SLAT SPAN INDICATED ON SLAT PERFORMANCE CHART ON SHEET 18.

BUILD-OUT MOUNT W/(12A)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–8' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" |
| >30–40 | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" |
| >40–60 | 6" | 6" | 6" | 6" | 6" | 6" | 6" | – | – | – |
| >60–80 | 6" | 6" | 6" | 6" | 6" | 6" | – | – | – | – |

BUILD-OUT MOUNT W/(15)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–9' † | | > 9'–12' † | | > 12'–16' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | – | – |
| >30–40 | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | – | 6" | – | – | – |
| >40–60 | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | – | – | – | – | – |
| >60–80 | 6" | 6" | 6" | 6" | 6" | 6" | 6" | – | – | – | – | – | – | – |

## MAX. ANCHOR'S SPACING SCHEDULE IIb

FOR A GIVEN PRODUCT MOUNTING TYPE, W/ 5/16"Ø TAPCON XL, ULTRACON OR TAPPER+XTREME ANCHORS TO GROUTED CONCRETE BLOCK WALL, A.S.D. DESIGN LOAD & SLAT † SPAN RANGE

WALL MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–9' † | > 9'–12' † | > 12'–16'† |
| ≤ 30.0 | 5 1/2" | 5 1/2" | 5 1/2" | 5 1/2" | 5 1/2" | 5 1/2" | – |
| >30–40 | 5" | 5" | 5" | 5" | 5" | – | – |
| >40–60 | 5" | 5" | 5" | 5" | – | – | – |
| >60–80 | 5" | 5" | 5" | – | – | – | – |
| >80–105 | 6" | 6" | – | – | – | – | – |
| >105–120 | 6" | 6" | – | – | – | – | – |

TRAPPED MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–9' † | > 9'–12' † | > 12'–16'† |
| ≤ 30.0 | 5" | 5" | 5" | 5" | 5" | – | – |
| >30–40 | 5" | 5" | 5" | 5" | – | – | – |
| >40–60 | 5" | 5" | 5" | – | – | – | – |
| >60–80 | 5" | 5" | – | – | – | – | – |
| >80–105 | 5" | 5" | – | – | – | – | – |
| >105–120 | 5 1/2" | – | – | – | – | – | – |

BUILD-OUT MOUNT W/(12A)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–8' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | – |
| >30–40 | 5" | 5" | 5" | 5" | 5" | 5" | 5" | – | – | – |
| >40–60 | 5" | 5" | 5" | 5" | 5" | – | – | – | – | – |
| >60–80 | 5" | 5" | 5" | 5" | – | – | – | – | – | – |

BUILD-OUT MOUNT W/(15)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–9' † | | > 9'–12' † | | > 12'–16' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | 5" | – | – | – | – | – |
| >30–40 | 5" | 5" | 5" | 5" | 5" | 5" | 5" | – | – | – | – | – | – | – |
| >40–60 | 5" | 5" | 5" | 5" | 5" | – | – | – | – | – | – | – | – | – |
| >60–80 | 5" | 5" | 5" | 5" | – | – | – | – | – | – | – | – | – | – |

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

P.E. SEAL/SIGNATURE/DATE

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

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

**AMERICAN SHUTTER SYSTEMS ASSOC., INC.**
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.
7/28/2023 DATE
23–137 DRAWING No
SHEET 21 OF 29

# END RETENTION SYSTEM W SLAT ③

## MAX. ANCHOR'S SPACING SCHEDULE IIa

FOR A GIVEN PRODUCT MOUNTING TYPE, W/ 3/8"Ø WEDGE BOLT ANCHORS TO POURED CONCRETE WALL, A.S.D. DESIGN LOAD & SLAT SPAN RANGE †

WALL MOUNT

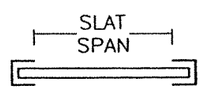
| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | |
|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–8' † |
| ≤ 30.0 | 10" | 10" | 10" | 10" | 10" |
| >30–40 | 10" | 10" | 10" | 10" | 10" |
| >40–60 | 10" | 10" | 10" | 10" | 10" |
| >60–80 | 10" | 10" | 10" | 10" | – |

TRAPPED MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | |
|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–8' † |
| ≤ 30.0 | 9" | 9" | 9" | 9" | 9" |
| >30–40 | 9" | 9" | 9" | 9" | 9" |
| >40–60 | 9" | 9" | 9" | 9" | 9" |
| >60–80 | 9" | 9" | 9" | 9" | – |

BUILD-OUT MOUNT W/ (12A)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–8' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 9" | 9" | 9" | 9" | 9" | 9" | 9" | 9" | 9" | 9" |
| >30–40 | 9" | 9" | 9" | 9" | 9" | 9" | 9" | 9" | 9" | 9" |
| >40–60 | 8 1/2" | 6 1/2" | 8 1/2" | 6 1/2" | 8 1/2" | 6 1/2" | 8 1/2" | 6 1/2" | 8 1/2" | 6 1/2" |
| >60–80 | 8 1/2" | 6" | 8 1/2" | 6" | 8 1/2" | 6" | 8 1/2" | 6" | – | – |




SLAT SPAN DEFINITION

† NOTE:
MAX. SLAT SPAN FOR A GIVEN A.S.D. DESIGN LOAD SHALL NEVER EXCEED MAX. SLAT SPAN INDICATED ON SLAT PERFORMANCE CHART ON SHEET 19.

## MAX. ANCHOR'S SPACING SCHEDULE IIa

FOR A GIVEN PRODUCT MOUNTING TYPE, W/ 5/16"ø TAPCON XL ANCHORS TO POURED CONCRETE WALL, A.S.D. DESIGN LOAD & SLAT SPAN RANGE †

WALL MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | |
|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–8' † |
| ≤ 30.0 | 8" | 8" | 8" | 8" | 8" |
| >30–40 | 8" | 8" | 8" | 8" | 8" |
| >40–60 | 8" | 8" | 8" | 8" | 8" |
| >60–80 | 8" | 8" | 8" | 8" | – |

TRAPPED MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | |
|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–8' † |
| ≤ 30.0 | 6" | 6" | 6" | 6" | 6" |
| >30–40 | 6" | 6" | 6" | 6" | 6" |
| >40–60 | 6" | 6" | 6" | 6" | 6" |
| >60–80 | 6" | 6" | 6" | 6" | – |

BUILD-OUT MOUNT W/ (12A)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–8' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 6" | 5 1/2" | 6" | 5 1/2" | 6" | 5 1/2" | 6" | 5 1/2" | 6" | 5 1/2" |
| >30–40 | 6" | 4" | 6" | 4" | 6" | 4" | 6" | 4" | 6" | 4" |
| >40–60 | 4" | 3 3/4" | 4" | 3 3/4" | 4" | 3 3/4" | 4" | 3 3/4" | 4" | – |
| >60–80 | 4" | 3 3/4" | 4" | 3 3/4" | 4" | 3 3/4" | 4" | – | – | – |

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

7/28/2023

P.E. SEAL/SIGNATURE/DATE

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TILLIT TESTING & ENGINEERING COMPANY
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CA-0006719
WALTER A. TILLIT Jr., P.E.
FLORIDA Lic. # 44167

40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM

AMERICAN SHUTTER SYSTEMS ASSOC., INC.
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.

7/28/2023 DATE

23-137 DRAWING No

# END RETENTION SYSTEM W/ SLAT ③

## MAX. ANCHOR'S SPACING SCHEDULE IIb

FOR A GIVEN PRODUCT MOUNTING TYPE, W/ 3/8"Ø HILTI KWIK HUS BOLT ANCHORS TO GROUTED CONCRETE BLOCK WALL, A.S.D. DESIGN LOAD & SLAT SPAN RANGE

WALL MOUNT

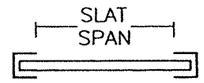
| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | |
|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–8' † |
| ≤ 30.0 | 10" | 10" | 10" | 10" | 10" |
| >30–40 | 10" | 10" | 10" | 10" | 10" |
| >40–60 | 7 1/2" | 7 1/2" | 7 1/2" | 7 1/2" | 7 1/2" |
| >60–80 | 7 1/2" | 7 1/2" | 7 1/2" | 7 1/2" | – |

TRAPPED MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | |
|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–8' † |
| ≤ 30.0 | 9" | 9" | 9" | 9" | 9" |
| >30–40 | 9" | 9" | 9" | 9" | 9" |
| >40–60 | 7" | 7" | 7" | 7" | 7" |
| >60–80 | 6 1/2" | 6 1/2" | 6 1/2" | 6 1/2" | – |

BUILD-OUT MOUNT W/ (12A)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–8' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 8 1/2" | 6" | 8 1/2" | 6" | 8 1/2" | 6" | 8 1/2" | 6" | 8 1/2" | 6" |
| >30–40 | 6 1/2" | 6" | 6 1/2" | 6" | 6 1/2" | 6" | 6 1/2" | 6" | 6 1/2" | 6" |
| >40–60 | 6" | 6" | 6" | 6" | 6" | 6" | 6" | – | – | – |
| >60–80 | 6" | 6" | 6" | 6" | 6" | – | – | – | – | – |




SLAT SPAN DEFINITION

† NOTE:
MAX. SLAT SPAN FOR A GIVEN A.S.D. DESIGN LOAD SHALL NEVER EXCEED MAX. SLAT SPAN INDICATED ON SLAT PERFORMANCE CHART ON SHEET 19.

## MAX. ANCHOR'S SPACING SCHEDULE IIb

FOR A GIVEN PRODUCT MOUNTING TYPE, W/ 5/16"Ø TAPCON XL ANCHORS TO GROUTED CONCRETE BLOCK WALL, A.S.D. DESIGN LOAD & SLAT SPAN RANGE †

WALL MOUNT

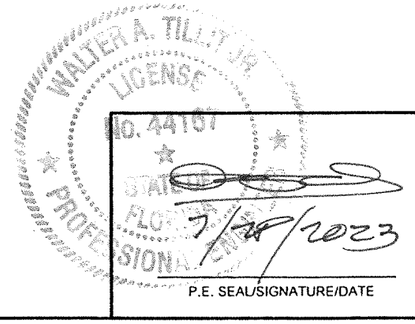
| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | |
|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–8' † |
| ≤ 30.0 | 8" | 8" | 8" | 8" | 8" |
| >30–40 | 8" | 8" | 8" | 8" | 8" |
| >40–60 | 7" | 7" | 7" | 7" | 7" |
| >60–80 | 7" | 7" | 7" | 7" | – |

TRAPPED MOUNT

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | |
|---|---|---|---|---|---|
| | 0'–4' † | > 4'–5' † | > 5'–6' † | > 6'–7' † | > 7'–8' † |
| ≤ 30.0 | 6" | 6" | 6" | 6" | 6" |
| >30–40 | 6" | 6" | 6" | 6" | 6" |
| >40–60 | 5 1/2" | 5 1/2" | 5 1/2" | 5 1/2" | 5 1/2" |
| >60–80 | 5 1/2" | 5 1/2" | 5 1/2" | 5 1/2" | – |

BUILD-OUT MOUNT W/ (12A)

| A.S.D. DESIGN LOAD RANGE (p.s.f.) | SLAT SPAN RANGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0'–4' † | | > 4'–5' † | | > 5'–6' † | | > 6'–7' † | | > 7'–8' † | |
| | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O | 2" B.O | 4" B.O |
| ≤ 30.0 | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | – | 3 3/4" | – |
| >30–40 | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | – | – | – |
| >40–60 | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | 3 3/4" | – | – | – | – | – |
| >60–80 | 3 3/4" | 3 3/4" | 3 3/4" | – | – | – | – | – | – | – |




P.E. SEAL/SIGNATURE/DATE

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM

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| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20–173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.

7/28/2023 DATE

23–137 DRAWING No

# MULLION SCHEDULE FOR END RETENTION SYSTEM W/ SLAT①

## SCHEDULE 1a
## FLOOR TO CEILING (TRAPPED) MOUNTING

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN A.S.D. DESIGN LOAD (psf), AND A MAX. MULLION SPACING (ft) *

| A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30 | 16'-0" | 6' - 6" | 9' - 4" | 5' - 11" | 11' - 6" | 7' - 8" | 9' - 7" | 6' - 9" | 12' - 0" |
| 35 | 16'-0" | 6' - 0" | 8' - 10" | 5' - 6" | 10' - 11" | 7' - 2" | 8' - 11" | 6' - 4" | 12' - 0" |
| 40 | 16'-0" | 5' - 8" | 8' - 5" | 5' - 2" | 10' - 5" | 6' - 5" | 8' - 0" | 5' - 11" | 12' - 0" |
| 45 | 16'-0" | 5' - 8" | 8' - 4" | 5' - 2" | 10' - 4" | 6' - 4" | 8' - 1" | 5' - 11" | 12' - 0" |
| 50 | 15'-5" | 5' - 6" | 8' - 2" | 5' - 1" | 9' - 10" | 6' - 1" | 7' - 10" | 5' - 10" | 12' - 0" |
| 55 | 14'-10" | 5' - 6" | 8' - 1" | 5' - 0" | 9' - 5" | 5' - 11" | 7' - 9" | 5' - 9" | 12' - 0" |
| 60 | 14'-3" | 5' - 6" | 8' - 0" | 5' - 1" | 9' - 3" | 5' - 11" | 7' - 10" | 5' - 9" | 12' - 0" |
| 65 | 13'-9" | 5' - 6" | 7' - 11" | 5' - 0" | 9' - 0" | 5' - 11" | 7' - 7" | 5' - 8" | 12' - 0" |
| 70 | 13'-2" | 5' - 5" | 7' - 11" | 5' - 0" | 8' - 7" | 5' - 10" | 7' - 5" | 5' - 7" | 12' - 0" |
| 75 | 12'-6" | 5' - 6" | 7' - 10" | 5' - 1" | 8' - 7" | 5' - 11" | 7' - 5" | 5' - 8" | 12' - 0" |
| 80 | 12'-0" | 5' - 5" | 7' - 10" | 5' - 0" | 8' - 6" | 5' - 9" | 7' - 2" | 5' - 7" | 12' - 0" |
| 85 | 11'-4" | 5' - 6" | 7' - 10" | 5' - 1" | 8' - 7" | 6' - 0" | 7' - 4" | 5' - 9" | 12' - 0" |
| 90 | 10'-9" | 5' - 8" | 7' - 10" | 5' - 3" | 8' - 9" | 6' - 2" | 7' - 7" | 6' - 0" | 12' - 0" |
| 95 | 10'-0" | 5' - 10" | 7' - 11" | 5' - 5" | 9' - 0" | 6' - 7" | 8' - 0" | 6' - 2" | 12' - 0" |
| 100 | 9'-5" | 6' - 0" | 8' - 1" | 5' - 7" | 9' - 4" | 7' - 0" | 8' - 6" | 6' - 5" | 12' - 0" |
| 105 | 8'-9" | 6' - 4" | 8' - 2" | 5' - 11" | 9' - 10" | 7' - 6" | 8' - 6" | 6' - 9" | 12' - 0" |
| 110 | 8'-1" | 6' - 2" | 8' - 1" | 5' - 10" | 9' - 6" | 7' - 5" | 8' - 6" | 6' - 8" | 12' - 0" |
| 115 | 7'-5" | 6' - 0" | 8' - 0" | 5' - 9" | 9' - 2" | 7' - 2" | 8' - 3" | 6' - 7" | 12' - 0" |
| 120 | 6'-10" | 6' - 0" | 7' - 11" | 5' - 8" | 8' - 10" | 6' - 11" | 7' - 10" | 6' - 6" | 12' - 0" |

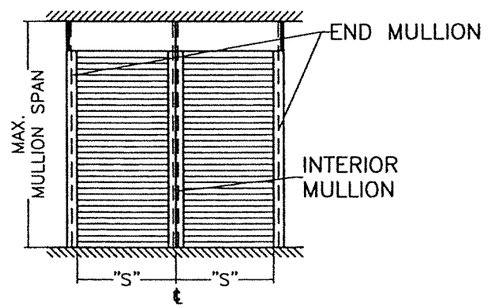
## SCHEDULE 2a
## WALL MOUNTING

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN A.S.D. DESIGN LOAD (psf), AND A MAX. MULLION SPACING (ft) *

| A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30 | 16'-0" | 6' - 5" | 9' - 3" | 5' - 11" | 11' - 6" | 7' - 8" | 9' - 7" | 5' - 7" | 12' - 0" |
| 35 | 16'-0" | 6' - 0" | 8' - 10" | 5' - 6" | 10' - 11" | 7' - 2" | 8' - 11" | 4' - 10" | 12' - 0" |
| 40 | 16'-0" | 5' - 8" | 8' - 5" | 5' - 2" | 10' - 5" | 6' - 9" | 8' - 5" | 4' - 4" | 12' - 0" |
| 45 | 16'-0" | 5' - 8" | 8' - 4" | 5' - 2" | 10' - 4" | 6' - 9" | 8' - 8" | 4' - 3" | 12' - 0" |
| 50 | 15'-5" | 5' - 6" | 8' - 2" | 5' - 1" | 10' - 2" | 6' - 7" | 8' - 8" | 4' - 2" | 12' - 0" |
| 55 | 14'-10" | 5' - 6" | 8' - 1" | 5' - 0" | 10' - 0" | 6' - 6" | 8' - 8" | 4' - 1" | 12' - 0" |
| 60 | 14'-3" | 5' - 6" | 8' - 0" | 5' - 1" | 9' - 11" | 6' - 6" | 8' - 7" | 4' - 1" | 12' - 0" |
| 65 | 13'-9" | 5' - 6" | 7' - 11" | 5' - 0" | 9' - 10" | 6' - 5" | 8' - 6" | 4' - 1" | 12' - 0" |
| 70 | 13'-2" | 5' - 6" | 7' - 10" | 5' - 0" | 9' - 9" | 6' - 6" | 8' - 5" | 4' - 0" | 12' - 0" |
| 75 | 12'-6" | 5' - 6" | 7' - 10" | 5' - 1" | 9' - 9" | 6' - 6" | 8' - 5" | 4' - 1" | 12' - 0" |
| 80 | 12'-0" | 5' - 6" | 7' - 9" | 5' - 0" | 9' - 8" | 6' - 6" | 8' - 4" | 4' - 1" | 12' - 0" |
| 85 | 11'-4" | 5' - 6" | 7' - 10" | 5' - 1" | 9' - 8" | 6' - 7" | 8' - 4" | 4' - 2" | 12' - 0" |
| 90 | 10'-9" | 5' - 7" | 7' - 10" | 5' - 3" | 9' - 9" | 6' - 9" | 8' - 5" | 4' - 5" | 12' - 0" |
| 95 | 10'-0" | 5' - 10" | 7' - 11" | 5' - 5" | 9' - 10" | 6' - 11" | 8' - 5" | 4' - 8" | 12' - 0" |
| 100 | 9'-5" | 6' - 0" | 8' - 0" | 5' - 7" | 10' - 0" | 7' - 2" | 8' - 6" | 5' - 1" | 12' - 0" |
| 105 | 8'-9" | 6' - 4" | 8' - 2" | 5' - 11" | 10' - 2" | 7' - 6" | 8' - 6" | 6' - 9" | 12' - 0" |
| 110 | 8'-1" | 6' - 3" | 8' - 1" | 5' - 10" | 10' - 0" | 7' - 5" | 8' - 6" | 5' - 6" | 12' - 0" |
| 115 | 7'-5" | 6' - 2" | 8' - 0" | 5' - 9" | 9' - 11" | 7' - 3" | 8' - 5" | 5' - 4" | 12' - 0" |
| 120 | 6'-10" | 6' - 0" | 7' - 11" | 5' - 8" | 9' - 10" | 7' - 2" | 8' - 5" | 5' - 2" | 12' - 0" |

* MAXIMUM MULLION SPACING SHALL BE SUCH THAT MAX. ALLOWABLE SLAT SPAN FOR THAT A.S.D. DESIGN LOAD SHALL NOT BE EXCEEDED.

† MULLION ORIENTATION IS AS SEEN FROM THE OUTSIDE (EXTERIOR) OF PRODUCT.




MULLION SPACING: "S"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

7/28/2023

P.E. SEAL/SIGNATURE/DATE

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

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

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4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.

7/28/2023 DATE

23-137 DRAWING No

# MULLION SCHEDULE FOR END RETENTION SYSTEM W/ SLAT①

## SCHEDULE 1c
## FLOOR TO CEILING (TRAPPED) MOUNTING

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN A.S.D. DESIGN LOAD (psf), AND A 7'-0" MAX. MULLION SPACING (ft) *

| DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30.0 | 7'-0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 35.0 | 7'-0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 40.0 | 7'-0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 45.0 | 7'-0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 50.0 | 7'-0" | 12' - 0" | 11' - 7" | 11' - 8" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 55.0 | 7'-0" | 12' - 0" | 11' - 3" | 10' - 11" | 12' - 0" | 12' - 0" | 12' - 0" | 11' - 11" | 12' - 0" |
| 60.0 | 7'-0" | 12' - 0" | 10' - 11" | 10' - 4" | 12' - 0" | 12' - 0" | 11' - 11" | 11' - 3" | 12' - 0" |
| 65.0 | 7'-0" | 11' - 4" | 10' - 8" | 9' - 11" | 12' - 0" | 12' - 0" | 11' - 7" | 10' - 9" | 12' - 0" |
| 70.0 | 7'-0" | 10' - 9" | 10' - 5" | 9' - 6" | 12' - 0" | 12' - 0" | 11' - 3" | 10' - 4" | 12' - 0" |
| 75.0 | 7'-0" | 10' - 3" | 10' - 2" | 9' - 2" | 12' - 0" | 12' - 0" | 11' - 0" | 9' - 11" | 12' - 0" |
| 80.0 | 7'-0" | 9' - 10" | 9' - 11" | 8' - 10" | 12' - 0" | 11' - 6" | 10' - 10" | 9' - 8" | 12' - 0" |
| 85.0 | 7'-0" | 9' - 5" | 9' - 9" | 8' - 7" | 12' - 0" | 11' - 1" | 10' - 7" | 9' - 4" | 12' - 0" |
| 90.0 | 7'-0" | 9' - 1" | 9' - 7" | 8' - 5" | 11' - 10" | 10' - 8" | 10' - 5" | 9' - 1" | 12' - 0" |
| 95.0 | 7'-0" | 8' - 9" | 9' - 5" | 8' - 2" | 11' - 7" | 10' - 4" | 10' - 2" | 8' - 11" | 12' - 0" |
| 100.0 | 7'-0" | 8' - 6" | 9' - 3" | 8' - 0" | 11' - 5" | 10' - 0" | 10' - 0" | 8' - 8" | 12' - 0" |
| 105.0 | 7'-0" | 8' - 3" | 9' - 1" | 7' - 9" | 11' - 3" | 9' - 9" | 9' - 10" | 8' - 6" | 12' - 0" |
| 110.0 | 7'-0" | 8' - 0" | 8' - 11" | 7' - 7" | 11' - 1" | 9' - 6" | 9' - 9" | 8' - 4" | 12' - 0" |
| 115.0 | 7'-0" | 7' - 10" | 8' - 10" | 7' - 4" | 10' - 11" | 9' - 3" | 9' - 7" | 8' - 2" | 12' - 0" |
| 120.0 | 6'-10" | 7' - 8" | 8' - 8" | 7' - 2" | 10' - 9" | 9' - 0" | 9' - 5" | 8' - 1" | 12' - 0" |

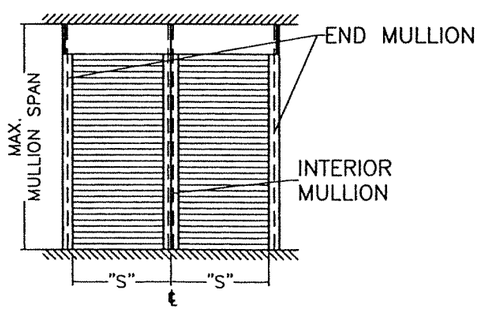
## SCHEDULE 2c
## WALL MOUNTING

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN A.S.D. DESIGN LOAD (psf), AND A 7'-0" MAX. MULLION SPACING (ft) *

| A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30.0 | 7'-0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 35.0 | 7'-0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 40.0 | 7'-0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 45.0 | 7'-0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 50.0 | 7'-0" | 12' - 0" | 11' - 7" | 11' - 8" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| 55.0 | 7'-0" | 12' - 0" | 11' - 3" | 10' - 11" | 12' - 0" | 12' - 0" | 12' - 0" | 11' - 11" | 12' - 0" |
| 60.0 | 7'-0" | 12' - 0" | 10' - 11" | 10' - 4" | 12' - 0" | 12' - 0" | 11' - 11" | 11' - 3" | 12' - 0" |
| 65.0 | 7'-0" | 11' - 4" | 10' - 8" | 9' - 11" | 12' - 0" | 12' - 0" | 11' - 7" | 10' - 9" | 12' - 0" |
| 70.0 | 7'-0" | 10' - 9" | 10' - 5" | 9' - 6" | 12' - 0" | 12' - 0" | 11' - 3" | 10' - 4" | 12' - 0" |
| 75.0 | 7'-0" | 10' - 3" | 10' - 2" | 9' - 2" | 12' - 0" | 12' - 0" | 11' - 0" | 9' - 11" | 12' - 0" |
| 80.0 | 7'-0" | 9' - 10" | 9' - 11" | 8' - 10" | 12' - 0" | 11' - 6" | 10' - 10" | 9' - 8" | 12' - 0" |
| 85.0 | 7'-0" | 9' - 5" | 9' - 9" | 8' - 7" | 12' - 0" | 11' - 1" | 10' - 7" | 9' - 4" | 12' - 0" |
| 90.0 | 7'-0" | 9' - 1" | 9' - 7" | 8' - 5" | 11' - 10" | 10' - 8" | 10' - 5" | 9' - 1" | 12' - 0" |
| 95.0 | 7'-0" | 8' - 9" | 9' - 5" | 8' - 2" | 11' - 7" | 10' - 4" | 10' - 2" | 8' - 11" | 12' - 0" |
| 100.0 | 7'-0" | 8' - 6" | 9' - 3" | 8' - 0" | 11' - 5" | 10' - 0" | 10' - 0" | 8' - 8" | 12' - 0" |
| 105.0 | 7'-0" | 8' - 3" | 9' - 1" | 7' - 9" | 11' - 3" | 9' - 9" | 9' - 10" | 8' - 6" | 12' - 0" |
| 110.0 | 7'-0" | 8' - 0" | 8' - 11" | 7' - 7" | 11' - 1" | 9' - 6" | 9' - 9" | 8' - 4" | 12' - 0" |
| 115.0 | 7'-0" | 7' - 10" | 8' - 10" | 7' - 4" | 10' - 11" | 9' - 3" | 9' - 7" | 8' - 2" | 12' - 0" |
| 120.0 | 6'-10" | 7' - 8" | 8' - 8" | 7' - 2" | 10' - 9" | 9' - 0" | 9' - 5" | 8' - 1" | 12' - 0" |

* MAXIMUM MULLION SPACING SHALL BE SUCH THAT MAX. ALLOWABLE SLAT SPAN FOR THAT A.S.D. DESIGN LOAD SHALL NOT BE EXCEEDED.

† MULLION ORIENTATION IS AS SEEN FROM THE OUTSIDE (EXTERIOR) OF PRODUCT.




MULLION SPACING: "S"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

7/28/2023

P.E. SEAL/SIGNATURE/DATE

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

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

**AMERICAN SHUTTER SYSTEMS ASSOC., INC.**
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.

7/28/2023 DATE

23-137 DRAWING No

# MULLION SCHEDULE FOR END RETENTION SYSTEM W/ SLAT①

## SCHEDULE 1b
## FLOOR TO CEILING (TRAPPED) MOUNTING

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN DESIGN LOAD (psf), AND A 12'-0" MAX. MULLION SPACING (ft) *

| DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) † | | ORIENTATION #2 ( ▯ ) † | | ORIENTATION #1 ( ▭ ) † | | ORIENTATION #2 ( ▯ ) † | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30.0 | 12'-0" | 10' - 1" | 11' - 6" | 8' - 8" | 12' - 0" | 12' - 0" | 12' - 0" | 9' - 5" | 12' - 0" |
| 35.0 | 12'-0" | 9' - 4" | 10' - 11" | 8' - 2" | 12' - 0" | 11' - 1" | 11' - 11" | 8' - 11" | 12' - 0" |
| 40.0 | 12'-0" | 8' - 8" | 10' - 5" | 7' - 10" | 12' - 0" | 10' - 4" | 11' - 4" | 8' - 6" | 12' - 0" |
| 45.0 | 12'-0" | 8' - 2" | 10' - 1" | 7' - 6" | 12' - 0" | 9' - 9" | 10' - 11" | 8' - 2" | 12' - 0" |
| 50.0 | 12'-0" | 7' - 9" | 9' - 8" | 7' - 2" | 12' - 0" | 9' - 2" | 10' - 7" | 7' - 11" | 12' - 0" |
| 55.0 | 12'-0" | 7' - 5" | 9' - 5" | 6' - 10" | 11' - 8" | 8' - 9" | 10' - 3" | 7' - 8" | 12' - 0" |
| 60.0 | 12'-0" | 7' - 1" | 9' - 2" | 6' - 7" | 11' - 4" | 8' - 5" | 9' - 11" | 7' - 5" | 12' - 0" |
| 65.0 | 12'-0" | 6' - 10" | 8' - 11" | 6' - 4" | 11' - 0" | 8' - 1" | 9' - 8" | 7' - 3" | 12' - 0" |
| 70.0 | 12'-0" | 6' - 7" | 8' - 8" | 6' - 1" | 10' - 9" | 7' - 10" | 9' - 5" | 7' - 0" | 12' - 0" |
| 75.0 | 12'-0" | 6' - 4" | 8' - 6" | 5' - 11" | 10' - 6" | 7' - 6" | 9' - 3" | 6' - 9" | 12' - 0" |
| 80.0 | 12'-0" | 6' - 2" | 8' - 4" | 5' - 8" | 10' - 3" | 7' - 4" | 9' - 0" | 6' - 6" | 12' - 0" |

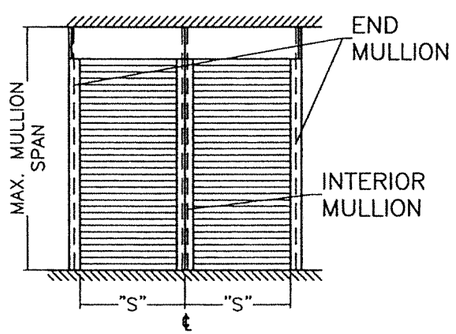
## SCHEDULE 2b
## WALL MOUNTING

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN DESIGN LOAD (psf), AND A 12'-0" MAX. MULLION SPACING (ft) *

| DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) † | | ORIENTATION #2 ( ▯ ) † | | ORIENTATION #1 ( ▭ ) † | | ORIENTATION #2 ( ▯ ) † | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30.0 | 12'-0" | 8' - 8" | 11' - 6" | 8' - 8" | 12' - 0" | 12' - 0" | 12' - 0" | 9' - 5" | 12' - 0" |
| 35.0 | 12'-0" | 8' - 2" | 10' - 11" | 8' - 2" | 12' - 0" | 11' - 1" | 11' - 11" | 8' - 11" | 12' - 0" |
| 40.0 | 12'-0" | 7' - 10" | 10' - 5" | 7' - 10" | 12' - 0" | 10' - 4" | 11' - 4" | 8' - 6" | 12' - 0" |
| 45.0 | 12'-0" | 7' - 6" | 10' - 1" | 7' - 6" | 12' - 0" | 9' - 9" | 10' - 11" | 8' - 2" | 12' - 0" |
| 50.0 | 12'-0" | 7' - 2" | 9' - 8" | 7' - 2" | 12' - 0" | 9' - 2" | 10' - 7" | 7' - 11" | 12' - 0" |
| 55.0 | 12'-0" | 6' - 10" | 9' - 5" | 6' - 10" | 11' - 8" | 8' - 9" | 10' - 3" | 7' - 8" | 12' - 0" |
| 60.0 | 12'-0" | 6' - 7" | 9' - 2" | 6' - 7" | 11' - 4" | 8' - 5" | 9' - 11" | 7' - 5" | 12' - 0" |
| 65.0 | 12'-0" | 6' - 4" | 8' - 11" | 6' - 4" | 11' - 0" | 8' - 1" | 9' - 8" | 7' - 3" | 12' - 0" |
| 70.0 | 12'-0" | 6' - 1" | 8' - 8" | 6' - 1" | 10' - 9" | 7' - 10" | 9' - 5" | 7' - 0" | 12' - 0" |
| 75.0 | 12'-0" | 5' - 11" | 8' - 6" | 5' - 11" | 10' - 6" | 7' - 6" | 9' - 3" | 7' - 7" | 12' - 0" |
| 80.0 | 12'-0" | 5' - 8" | 8' - 4" | 5' - 8" | 10' - 3" | 7' - 4" | 9' - 0" | 5' - 3" | 12' - 0" |

* MAXIMUM MULLION SPACING SHALL BE SUCH THAT MAX. ALLOWABLE SLAT SPAN FOR THAT DESIGN LOAD SHALL NOT BE EXCEEDED.

† MULLION ORIENTATION IS AS SEEN FROM THE OUTSIDE (EXTERIOR) OF PRODUCT.




MULLION SPACING: "S"

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

7/28/2023

P.E. SEAL/SIGNATURE/DATE

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e-mail: tilteco@aol.com
CA-0006719
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40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM

AMERICAN SHUTTER SYSTEMS ASSOC., INC.
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WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.

7/28/2023 DATE

23-137 DRAWING No

# MULLION SCHEDULE FOR END RETENTION SYSTEM W/ SLAT①

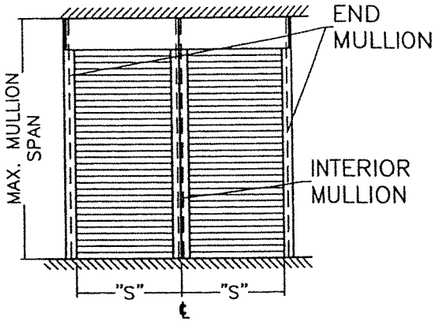
## SCHEDULE 1b' (LIMITED LOAD, MULLION SPACING & SPAN INSTALLATION)
### FLOOR TO CEILING (TRAPPED) MOUNTING
MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN DESIGN LOAD (psf), AND FOR 12'-0" (CASE I) & 8'-0" (CASES Ia & II) MAX. MULLION SPACING (ft) *

| INSTALLATION CASES | A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | |
|---|---|---|---|---|---|---|---|
| | | | ㉔ 4"x6"x1/4" MULLION | | ㉕ 4"x8"x1/4" MULLION | | |
| | | | ORIENTATION #1 | ORIENTATION # 2 | ORIENTATION #1 | ORIENTATION #1 | ORIENTATION # 2 |
| | | | ( ▭ ) 🔒 | ( ▯ ) 🔒 | ( ▭ ) 🔒 | ( ▭ ) 🔒 | ( ▯ ) 🔒 |
| | | | END | INTERIOR | END | INTERIOR | INTERIOR |
| CASE I | 30.0 | 12'-0" | - | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| | 35.0 | 12'-0" | - | 12 ' - 0 " | 11 ' - 1 " | 11 ' - 11 " | 12 ' - 0 " |
| | 40.0 | 12'-0" | - | 12 ' - 0 " | 10 ' - 4 " | 11 ' - 4 " | 12 ' - 0 " |
| | 45.0 | 12'-0" | - | 12 ' - 0 " | 9 ' - 9 " | 10 ' - 11 " | 12 ' - 0 " |
| | 50.0 | 12'-0" | - | 12 ' - 0 " | 8 ' - 11 " | 10 ' - 7 " | 12 ' - 0 " |
| | 55.0 | 12'-0" | - | 11 ' - 8 " | 8 ' - 2 " | 10 ' - 3 " | 12 ' - 0 " |
| | 60.0 | 12'-0" | - | 11 ' - 4 " | 7 ' - 6 " | 9 ' - 11 " | 12 ' - 0 " |
| | 60.8 | 12'-0" | - | 11 ' - 3 " | 7 ' - 4 " | 9 ' - 11 " | 12 ' - 0 " |
| CASE Ia | 30.0 | 8'-0" | - | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| | 35.0 | 8'-0" | - | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| | 40.0 | 8'-0" | - | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| | 45.0 | 8'-0" | - | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| | 50.0 | 8'-0" | - | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| | 55.0 | 8'-0" | - | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 8 " | 12 ' - 0 " |
| | 60.0 | 8'-0" | - | 12 ' - 0 " | 11 ' - 10 " | 11 ' - 4 " | 12 ' - 0 " |
| | 60.8 | 8'-0" | - | 12 ' - 0 " | 11 ' - 9 " | 11 ' - 4 " | 12 ' - 0 " |
| CASE II | 30.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 35.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 40.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 45.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 50.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 55.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 60.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 65.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 70.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 75.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 80.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 85.0 | 8'-0" | - | 9 ' - 0 " | 8 ' - 6 "Δ | 8 ' - 6 "Δ | 9 ' - 0 " |
| | 90.0 | 8'-0" | - | 9 ' - 0 " | 8 ' - 0 "Δ | 8 ' - 0 "Δ | 9 ' - 0 " |
| | 95.0 | 8'-0" | - | 9 ' - 0 " | 7 ' - 7 "Δ | 7 ' - 7 "Δ | 9 ' - 0 " |
| | 100.0 | 8'-0" | - | 9 ' - 0 " | 7 ' - 2 "Δ | 7 ' - 3 "Δ | 9 ' - 0 " |

Δ NOTE: USE 9'-0" SPAN IF ANCHOR CONSISTS OF HILTI, INC KWIK HUS-H SCREW, DEWALT, INC OR WEDGE-BOLT ANCHOR IN LIEU OF HILTI KWIK BOLT TZ, SEE SCHEDULES 1 & 2 ON SHEET 11.

## SCHEDULE 2b' (LIMITED LOAD, MULLION SPACING & SPAN INSTALLATION)
### WALL MOUNTED
MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN DESIGN LOAD (psf), AND FOR 12'-0" (CASE I') & 8'-0" (CASE II') MAX. MULLION SPACING (ft) *

| INSTALLATION CASES | A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | |
|---|---|---|---|---|---|---|---|
| | | | ㉔ 4"x6"x1/4" MULLION | | ㉕ 4"x8"x1/4" MULLION | | |
| | | | ORIENTATION #1 | ORIENTATION # 2 | ORIENTATION #1 | ORIENTATION #1 | ORIENTATION # 2 |
| | | | ( ▭ ) 🔒 | ( ▯ ) 🔒 | ( ▭ ) 🔒 | ( ▭ ) 🔒 | ( ▯ ) 🔒 |
| | | | END | INTERIOR | END | INTERIOR | INTERIOR |
| CASE I' | 30.0 | 12'-0" | - | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| | 35.0 | 12'-0" | - | 12 ' - 0 " | 11 ' - 1 " | 11 ' - 11 " | 12 ' - 0 " |
| | 40.0 | 12'-0" | - | 12 ' - 0 " | 10 ' - 4 " | 11 ' - 4 " | 12 ' - 0 " |
| | 45.0 | 12'-0" | - | 12 ' - 0 " | 9 ' - 9 " | 10 ' - 11 " | 12 ' - 0 " |
| | 50.0 | 12'-0" | - | 12 ' - 0 " | 9 ' - 2 " | 10 ' - 7 " | 12 ' - 0 " |
| | 55.0 | 12'-0" | - | 11 ' - 8 " | 7 ' - 3 " | 10 ' - 3 " | 12 ' - 0 " |
| | 60.0 | 12'-0" | - | 11 ' - 4 " | 6 ' - 7 " | 9 ' - 11 " | 12 ' - 0 " |
| | 60.8 | 12'-0" | - | 11 ' - 3 " | 6 ' - 6 " | 9 ' - 11 " | 12 ' - 0 " |
| CASE II' | 30.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 35.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 40.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 45.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 50.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 55.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 60.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 65.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 70.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 75.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 80.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 85.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 90.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 95.0 | 8'-0" | - | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " | 9 ' - 0 " |
| | 100.0 | 8'-0" | - | 9 ' - 0 " | 8 ' - 10 " | 9 ' - 0 " | 9 ' - 0 " |




MULLION SPACING: "S"

* MAXIMUM MULLION SPACING SHALL BE SUCH THAT MAX. ALLOWABLE SLAT SPAN FOR THAT DESIGN LOAD SHALL NOT BE EXCEEDED.

† MULLION ORIENTATION IS AS SEEN FROM THE OUTSIDE (EXTERIOR) OF PRODUCT.

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

7/28/2023

P.E. SEAL/SIGNATURE/DATE

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TILLIT TESTING & ENGINEERING COMPANY
8355 N.W. 36th. St., Ste. 305 – VIRGINIA GARDENS, FL 33166
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CA-0006719
WALTER A. TILLIT Jr., P.E.
FLORIDA Lic. # 44167

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

**AMERICAN SHUTTER SYSTEMS ASSOC., INC.**
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.
7/28/2023 DATE
23-137 DRAWING No
SHEET 27 OF 29

# MULLION SCHEDULE FOR END RETENTION SYSTEM W/ SLAT③

## SCHEDULE 1a
## FLOOR TO CEILING (TRAPPED) MOUNTING

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN A.S.D. DESIGN LOAD (psf), AND A MAX. MULLION SPACING (ft) *

| A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30 | 8'-4" | 12 ' - 0 " | 12 ' - 0 " | 10 ' - 10 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 9 " | 12 ' - 0 " |
| 35 | 8'-4" | 12 ' - 0 " | 12 ' - 0 " | 10 ' - 3 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 2 " | 12 ' - 0 " |
| 40 | 8'-4" | 11 ' - 9 " | 11 ' - 10 " | 9 ' - 9 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 10 ' - 8 " | 12 ' - 0 " |
| 45 | 8'-4" | 11 ' - 0 " | 11 ' - 4 " | 9 ' - 5 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 10 ' - 3 " | 12 ' - 0 " |
| 50 | 8'-4" | 10 ' - 6 " | 11 ' - 0 " | 9 ' - 1 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 11 " | 9 ' - 10 " | 12 ' - 0 " |
| 55 | 8'-4" | 10 ' - 0 " | 10 ' - 7 " | 8 ' - 9 " | 12 ' - 0 " | 11 ' - 9 " | 11 ' - 7 " | 9 ' - 7 " | 12 ' - 0 " |
| 60 | 8'-4" | 9 ' - 7 " | 10 ' - 4 " | 8 ' - 6 " | 12 ' - 0 " | 11 ' - 3 " | 11 ' - 3 " | 9 ' - 3 " | 12 ' - 0 " |
| 65 | 7'9" | 9 ' - 8 " | 10 ' - 3 " | 8 ' - 8 " | 12 ' - 0 " | 11 ' - 5 " | 11 ' - 2 " | 9 ' - 5 " | 12 ' - 0 " |
| 70 | 7'-5" | 9 ' - 7 " | 10 ' - 2 " | 8 ' - 7 " | 12 ' - 0 " | 11 ' - 4 " | 11 ' - 1 " | 9 ' - 4 " | 12 ' - 0 " |
| 75 | 7'-0" | 9 ' - 8 " | 10 ' - 2 " | 8 ' - 8 " | 12 ' - 0 " | 11 ' - 5 " | 11 ' - 0 " | 9 ' - 5 " | 12 ' - 0 " |
| 80 | 6'-10" | 9 ' - 6 " | 10 ' - 0." | 8 ' - 7 " | 12 ' - 0 " | 11 ' - 3 " | 10 ' - 11 " | 9 ' - 4 " | 12 ' - 0 " |

## SCHEDULE 2a
## WALL MOUNTING

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN A.S.D. DESIGN LOAD (psf), AND A MAX. MULLION SPACING (ft) *

| A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30 | 8'-4" | 12 ' - 0 " | 12 ' - 0 " | 10 ' - 10 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 9 " | 12 ' - 0 " |
| 35 | 8'-4" | 12 ' - 0 " | 12 ' - 0 " | 10 ' - 3 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 2 " | 12 ' - 0 " |
| 40 | 8'-4" | 11 ' - 9 " | 11 ' - 10 " | 9 ' - 9 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 10 ' - 8 " | 12 ' - 0 " |
| 45 | 8'-4" | 11 ' - 0 " | 11 ' - 4 " | 9 ' - 5 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 10 ' - 3 " | 12 ' - 0 " |
| 50 | 8'-4" | 10 ' - 6 " | 11 ' - 0 " | 9 ' - 1 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 11 " | 9 ' - 10 " | 12 ' - 0 " |
| 55 | 8'-4" | 10 ' - 0 " | 10 ' - 7 " | 8 ' - 9 " | 12 ' - 0 " | 11 ' - 9 " | 11 ' - 7 " | 9 ' - 7 " | 12 ' - 0 " |
| 60 | 8'-4" | 9 ' - 7 " | 10 ' - 4 " | 8 ' - 6 " | 12 ' - 0 " | 11 ' - 3 " | 11 ' - 3 " | 9 ' - 3 " | 12 ' - 0 " |
| 65 | 7'-9" | 9 ' - 8 " | 10 ' - 3 " | 8 ' - 8 " | 12 ' - 0 " | 11 ' - 5 " | 11 ' - 2 " | 9 ' - 5 " | 12 ' - 0 " |
| 70 | 7'-5" | 9 ' - 7 " | 10 ' - 2 " | 8 ' - 7 " | 12 ' - 0 " | 11 ' - 4 " | 11 ' - 1 " | 9 ' - 4 " | 12 ' - 0 " |
| 75 | 7'-0" | 9 ' - 8 " | 10 ' - 2 " | 8 ' - 8 " | 12 ' - 0 " | 11 ' - 5 " | 11 ' - 0 " | 9 ' - 5 " | 12 ' - 0 " |
| 80 | 6'-10" | 9 ' - 6 " | 10 ' - 0 " | 8 ' - 7 " | 12 ' - 0 " | 11 ' - 3 " | 10 ' - 11 " | 9 ' - 4 " | 12 ' - 0 " |

## SCHEDULE 1c
## FLOOR TO CEILING (TRAPPED) MOUNTING

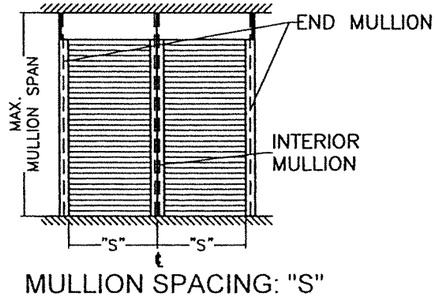
MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN A.S.D. DESIGN LOAD (psf), AND A **6'-10"** MAX. MULLION SPACING (ft) *

| DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30.0 | 6'-10" | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | -12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 35.0 | 6'-10" | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | -12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 40.0 | 6'-10" | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | -12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 45.0 | 6'-10" | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 50.0 | 6'-10" | 12 ' - 0 " | 11 ' - 7 " | 11 ' - 8 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 55.0 | 6'-10" | 12 ' - 0 " | 11 ' - 3 " | 10 ' - 11 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 11 " | 12 ' - 0 " |
| 60.0 | 6'-10" | 12 ' - 0 " | 10 ' - 11 " | 10 ' - 4 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 11 " | 11 ' - 3 " | 12 ' - 0 " |
| 65.0 | 6'-10" | 11 ' - 4 " | 10 ' - 8 " | 9 ' - 11 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 7 " | 10 ' - 9 " | 12 ' - 0 " |
| 70.0 | 6'-10" | 10 ' - 9 " | 10 ' - 5 " | 9 ' - 6 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 3 " | 10 ' - 4 " | 12 ' - 0 " |
| 75.0 | 6'-10" | 10 ' - 3 " | 10 ' - 2 " | 9 ' - 2 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 0 " | 9 ' - 11 " | 12 ' - 0 " |
| 80.0 | 6'-10" | 9 ' - 6 " | 10 ' - 0 " | 8 ' - 7 " | 12 ' - 0 " | 11 ' - 3 " | 10 ' - 11 " | 9 ' - 4 " | 12 ' - 0 " |

## SCHEDULE 2c
## WALL MOUNTING

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN A.S.D. DESIGN LOAD (psf), AND A **6'-10"** MAX. MULLION SPACING (ft) *

| A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ㉔ 4"x6"x1/4" MULLION | | | | ㉕ 4"x8"x1/4" MULLION | | | |
| | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | | ORIENTATION #1 ( ▭ ) | | ORIENTATION #2 ( ▯ ) | |
| | | END | INTERIOR | END | INTERIOR | END | INTERIOR | END | INTERIOR |
| 30.0 | 6'-10" | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | -12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 35.0 | 6'-10" | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | -12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 40.0 | 6'-10" | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | -12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 45.0 | 6'-10" | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 50.0 | 6'-10" | 12 ' - 0 " | 11 ' - 7 " | 11 ' - 8 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " |
| 55.0 | 6'-10" | 12 ' - 0 " | 11 ' - 3 " | 10 ' - 11 " | 12 ' - 0 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 11 " | 12 ' - 0 " |
| 60.0 | 6'-10" | 12 ' - 0 " | 10 ' - 11 " | 10 ' - 4 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 11 " | 11 ' - 3 " | 12 ' - 0 " |
| 65.0 | 6'-10" | 11 ' - 4 " | 10 ' - 8 " | 9 ' - 11 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 7 " | 10 ' - 9 " | 12 ' - 0 " |
| 70.0 | 6'-10" | 10 ' - 9 " | 10 ' - 5 " | 9 ' - 6 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 3 " | 10 ' - 4 " | 12 ' - 0 " |
| 75.0 | 6'-10" | 10 ' - 3 " | 10 ' - 2 " | 9 ' - 2 " | 12 ' - 0 " | 12 ' - 0 " | 11 ' - 0 " | 9 ' - 11 " | 12 ' - 0 " |
| 80.0 | 6'-10" | 9 ' - 6 " | 10 ' - 0 " | 8 ' - 7 " | 12 ' - 0 " | 11 ' - 3 " | 10 ' - 11 " | 9 ' - 4 " | 12 ' - 0 " |

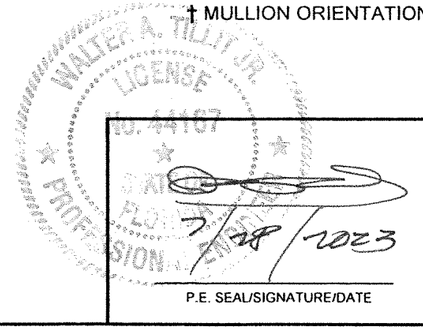


MULLION SPACING: "S"

* MAXIMUM MULLION SPACING SHALL BE SUCH THAT MAX. ALLOWABLE SLAT SPAN FOR THAT A.S.D. DESIGN LOAD SHALL NOT BE EXCEEDED.

† MULLION ORIENTATION IS AS SEEN FROM THE OUTSIDE (EXTERIOR) OF PRODUCT.

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)



P.E. SEAL/SIGNATURE/DATE

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WALTER A. TILLIT Jr., P.E.
FLORIDA Lic. # 44167

**40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM**

**AMERICAN SHUTTER SYSTEMS ASSOC., INC.**
4268 WESTROADS DRIVE
WEST PALM BEACH, FL. 33407
PHONE: (877)999-2772
FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.
7/28/2023 DATE
23-137 DRAWING No
SHEET 28 OF 29

# MULLION SCHEDULE FOR END RETENTION SYSTEM W/ SLAT③

## SCHEDULE 1b' (LIMITED LOAD, MULLION SPACING & SPAN INSTALLATION)
## FLOOR TO CEILING (TRAPPED) MOUNTING

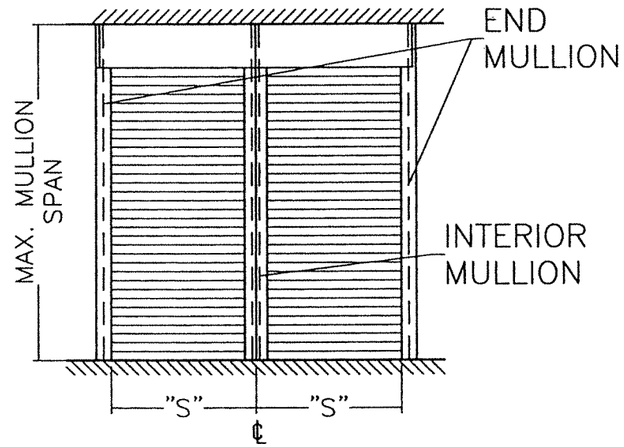
MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN DESIGN LOAD (psf), AND FOR 8'-0" (CASES Ia & II) MAX. MULLION SPACING (ft) *

| INSTALLATION CASES | A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | |
|---|---|---|---|---|---|---|---|
| | | | ㉔ 4"x6"x1/4" MULLION | | ㉕ 4"x8"x1/4" MULLION | | |
| | | | ORIENTATION #1 ( ▭ ) END | ORIENTATION # 2 ( ▯ ) INTERIOR | ORIENTATION #1 ( ▭ ) END | ORIENTATION #1 ( ▭ ) INTERIOR | ORIENTATION # 2 ( ▯ ) INTERIOR |
| CASE Ia | 30.0 | 8'-0" | - | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| | 35.0 | 8'-0" | - | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| | 40.0 | 8'-0" | - | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| | 45.0 | 8'-0" | - | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| | 50.0 | 8'-0" | - | 12' - 0" | 12' - 0" | 12' - 0" | 12' - 0" |
| | 55.0 | 8'-0" | - | 12' - 0" | 12' - 0" | 11' - 8" | 12' - 0" |
| | 60.0 | 8'-0" | - | 12' - 0" | 11' - 10" | 11' - 4" | 12' - 0" |
| | 60.8 | 8'-0" | - | 12' - 0" | 11' - 9" | 11' - 4" | 12' - 0" |
| CASE II | 30.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 35.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 40.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 45.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 50.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 55.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 60.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 65.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 70.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 75.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 80.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |

## SCHEDULE 2b' (LIMITED LOAD, MULLION SPACING & SPAN INSTALLATION)
## WALL MOUNTED

MAX. SPAN (ft) FOR END AND INTERIOR MULLIONS FOR A GIVEN DESIGN LOAD (psf), AND FOR 8'-0" (CASE II') MAX. MULLION SPACING (ft) *

| INSTALLATION CASES | A.S.D. DESIGN LOAD (p.s.f.) | MAXIMUM MULLION SPACING (ft)* | MAXIMUM MULLION SPAN (ft) | | | | |
|---|---|---|---|---|---|---|---|
| | | | ㉔ 4"x6"x1/4" MULLION | | ㉕ 4"x8"x1/4" MULLION | | |
| | | | ORIENTATION #1 ( ▭ ) END | ORIENTATION # 2 ( ▯ ) INTERIOR | ORIENTATION #1 ( ▭ ) END | ORIENTATION #1 ( ▭ ) INTERIOR | ORIENTATION # 2 ( ▯ ) INTERIOR |
| CASE II' | 30.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 35.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 40.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 45.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 50.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 55.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 60.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 65.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 70.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 75.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |
| | 80.0 | 8'-0" | - | 9' - 0" | 9' - 0" | 9' - 0" | 9' - 0" |




MULLION SPACING: "S"

* MAXIMUM MULLION SPACING SHALL BE SUCH THAT MAX. ALLOWABLE SLAT SPAN FOR THAT DESIGN LOAD SHALL NOT BE EXCEEDED.

† MULLION ORIENTATION IS AS SEEN FROM THE OUTSIDE (EXTERIOR) OF PRODUCT.

FLORIDA BUILDING CODE (High Velocity Hurricane Zone)

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

7/28/2023

P.E. SEAL/SIGNATURE/DATE

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WALTER A. TILLIT Jr., P.E.
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40mm ER SLAT BERTHA IMPACT PROTECTIVE ROLLING SYSTEM

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FAX: (561)209-8380

| REV. No | DESCRIPTION | DATE | REV. No | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| 1 | OLD 20-173 | 7/28/23 | 3 | | |
| 2 | | | 4 | | |

DRAWN BY: Y.M.

7/28/2023 DATE

23-137 DRAWING No