

**HR3110V SMALL MISSILE &
LARGE MISSILE (LEVEL C)
IMPACT RESISTANT, VINYL HORIZONTAL ROLLER**

DESIGN PRESSURE RATING	RATED FOR SMALL MISSILE & LEVEL C LARGE MISSILE IMPACT RESISTANCE
+50 / -50 PSF	

1) THIS PRODUCT HAS BEEN DESIGNED & TESTED TO COMPLY WITH THE REQUIREMENTS OF THE 2018 INTERNATIONAL BUILDING CODE (IBC) AND THE 2018 INTERNATIONAL RESIDENTIAL CODE (IRC) FOR THE DESIGN PRESSURES LISTED.

2) SHUTTERS ARE NOT REQUIRED WHEN USED IN WIND-BORNE DEBRIS REGIONS AT THE FOLLOWING LOCATIONS:

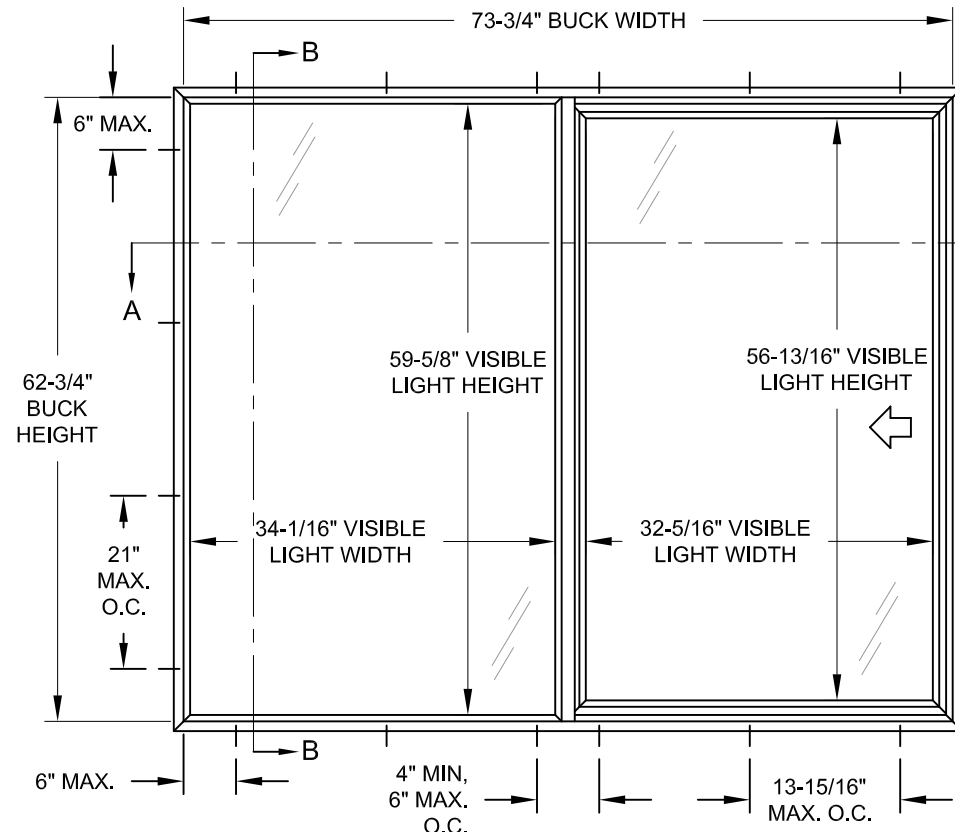
- A) WITHIN 1 MILE OF THE COASTAL MEAN HIGH WATER LINE WHERE THE ULTIMATE WIND SPEED IS EQUAL TO OR GREATER THAN 130 MPH AND LESS THAN 140 MPH.
- B) GREATER THAN 1 MILE FROM THE COASTAL MEAN HIGH WATER LINE WHERE THE ULTIMATE WIND SPEED IS GREATER THAN OR EQUAL TO 140 MPH AND LESS THAN 150 MPH.

3) MASONRY ANCHORS MAY BE USED INTO WOOD. ALL WOOD BUCKS LESS THAN 1-1/2" THICK ARE TO BE CONSIDERED 1X INSTALLATIONS. 1X WOOD BUCKS ARE OPTIONAL IF UNIT IS INSTALLED DIRECTLY TO SUBSTRATE. WOOD BUCKS DEPICTED AS 2X ARE 1-1/2" THICK OR GREATER. 1X AND 2X BUCKS (WHEN USED) SHALL BE DESIGNED TO PROPERLY TRANSFER LOADS TO THE STRUCTURE. WOOD BUCK DESIGN AND INSTALLATION IS THE RESPONSIBILITY OF THE ENGINEER OR ARCHITECT OF RECORD.

4) ANCHOR EMBEDMENT TO BASE MATERIAL SHALL BE BEYOND WALL DRESSING OR STUCCO. USE ANCHORS OF SUFFICIENT LENGTH. INSTALLATION ANCHORS SHOULD BE SEALED. OVERALL SEALING/FLASHING STRATEGY FOR WATER RESISTANCE OF INSTALLATION SHALL BE DONE BY OTHERS AND IS BEYOND THE SCOPE OF THESE INSTRUCTIONS.

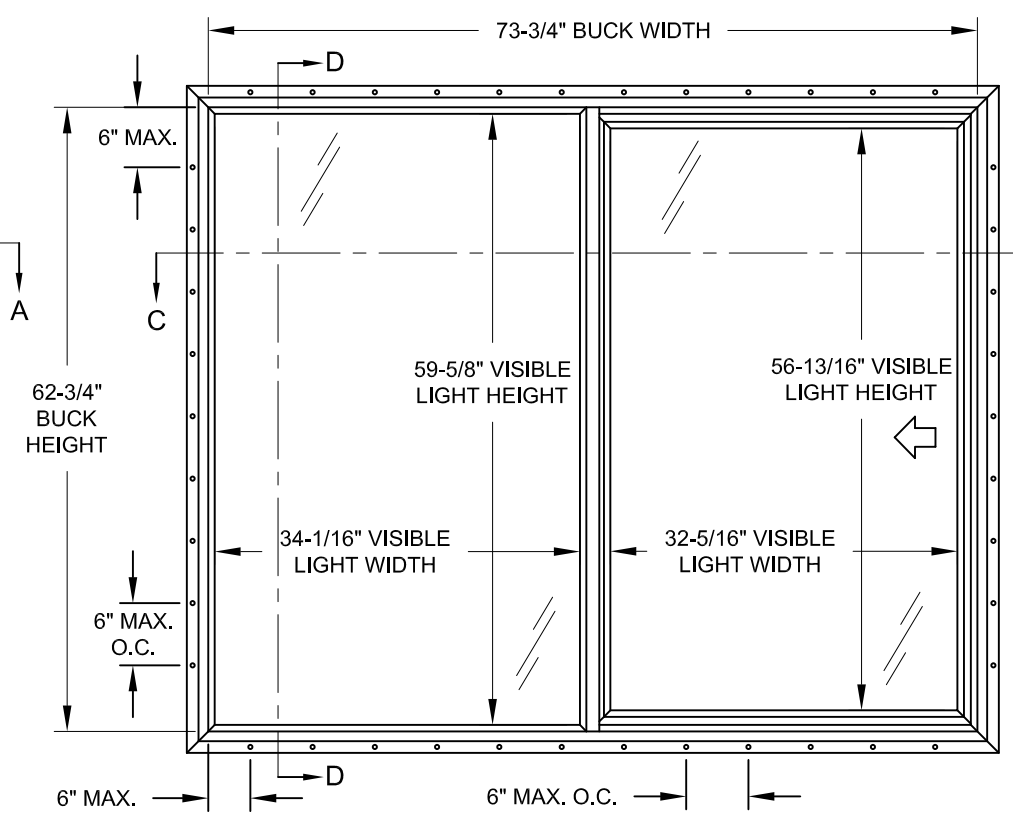
5) SHIMS ARE REQUIRED AT EACH FLANGE/EQUAL LEG ANCHOR LOCATION WHERE THE PRODUCT IS NOT FLUSH TO THE SUBSTRATE. USE SHIMS CAPABLE OF TRANSFERRING APPLIED LOADS. WOOD BUCKS, BY OTHERS, MUST BE SUFFICIENTLY ANCHORED TO RESIST LOADS IMPOSED ON THEM BY THE WINDOW.

6) THE ANCHORAGE METHODS SHOWN HAVE BEEN DESIGNED TO RESIST THE WIND LOADS CORRESPONDING TO THE REQUIRED DESIGN PRESSURE. THE 33-1/3% STRESS INCREASE HAS NOT BEEN USED IN THE DESIGN OF THIS PRODUCT. THE 1.6 LOAD DURATION FACTOR WAS USED FOR THE EVALUATION OF ANCHORS INTO WOOD. ANCHORS THAT COME INTO CONTACT WITH OTHER DISSIMILAR MATERIALS SHALL MEET THE REQUIREMENTS OF THE IBC/IRC FOR CORROSION RESISTANCE.



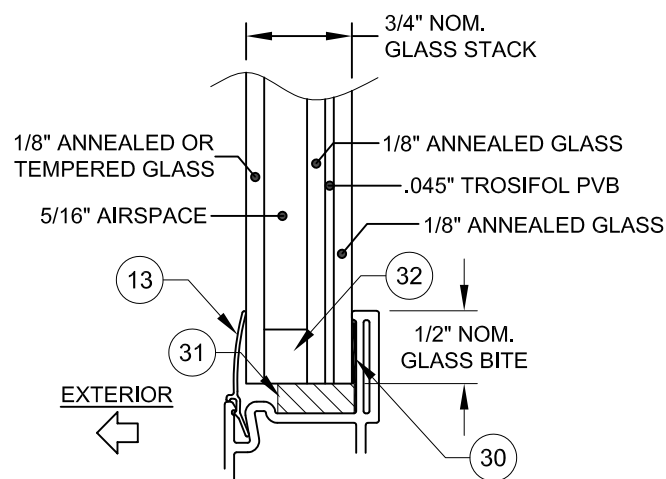
**TYP. ANCHOR LOCATIONS @ TESTED SIZE
(FLANGE / EQUAL LEG FRAME)**

REFER TO TABLE 2 FOR APPROVED SIZES.

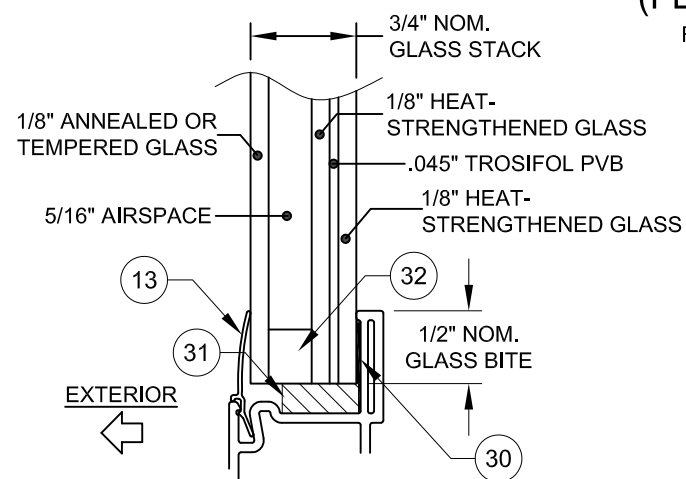


**TYP. ANCHOR LOCATIONS @ TESTED SIZE
(INTEGRAL FIN / J-CHANNEL FRAME)**

REFER TO TABLE 2 FOR APPROVED SIZES.



**GLASS TYPE 1 (W/ ANNEALED CAP)
GLASS TYPE 2 (W/ TEMPERED CAP)**



**GLASS TYPE 3 (W/ ANNEALED CAP)
GLASS TYPE 4 (W/ TEMPERED CAP)**

TABLE 1:

Glass Types	
1	1/8" AN Cap, 5/16" Airspace, 1/8" AN, 0.045" Trosifol PVB, 1/8" AN
2	1/8" TP Cap, 5/16" Airspace, 1/8" AN, 0.045" Trosifol PVB, 1/8" AN
3	1/8" AN Cap, 5/16" Airspace, 1/8" HS, 0.045" Trosifol PVB, 1/8" HS
4	1/8" TP Cap, 5/16" Airspace, 1/8" HS, 0.045" Trosifol PVB, 1/8" HS

TROSIFOL PVB INTERLAYER
MANUFACTURED BY KURARAY
AMERICA, INC.

AN = ANNEALED GLASS
HS = HEAT-STRENGTHENED GLASS
TP = TEMPERED GLASS

TABLE 2:

Allowable Glass Types, XO & OX		
Width up to 73-3/4"		
Height	up to 54"	1 - 4
	up to 62-3/4"	3 or 4

- 1) BUCK DIMENSIONS SHOWN.
- 2) FOR SIZES NOT SHOWN, ROUND UP TO THE NEXT AVAILABLE WIDTH OR HEIGHT DIMENSION.

CERTIFICATION TABLE:

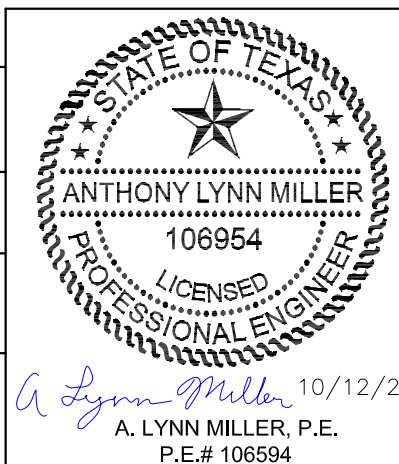
Window Buck Size		Config-uration	Design Pressure		Glazing (see Table 1)	Certification Number
Width	Height		(+) psf	(-) psf		
73-3/4"	54"	XO or OX	50.0	50.0	Types 1 & 2	NI015343.01
73-3/4"	62-3/4"	XO or OX	50.0	50.0	Types 3 & 4	NI015343
111"	54"	XOX	50.0	50.0	Types 1 - 4	NI015447

Title: VINYL HORIZONTAL ROLLER (LM)		Drawn By: JENS ROSOWSKI	
Description: GENERAL NOTES & ELEVATION		Date: 08/24/21	
Revision:		Rev. By:	Rev. Date:
Series/Model: HR3110V	Scale: NTS	Sheet: 1 OF 7	Drawing No. HR3110TDI-1
		Rev:	

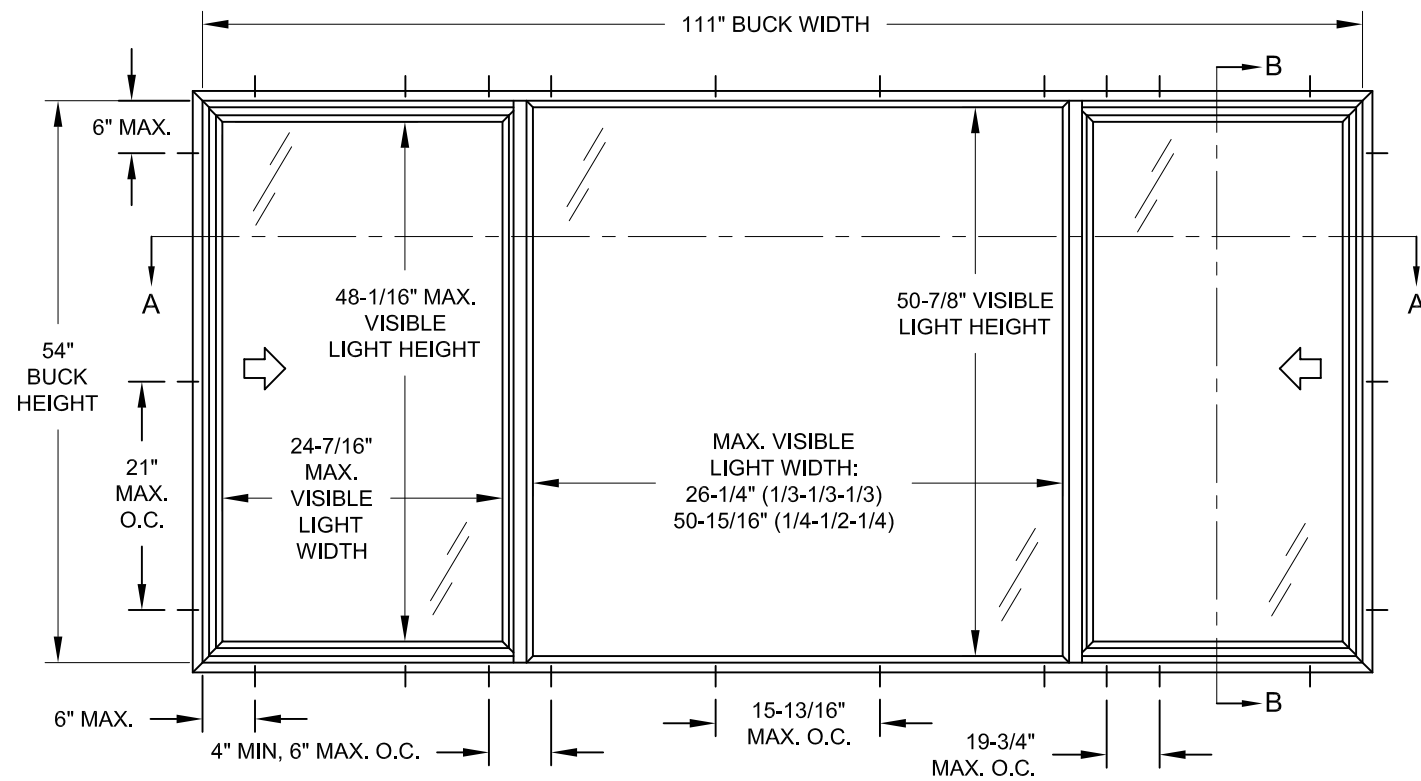


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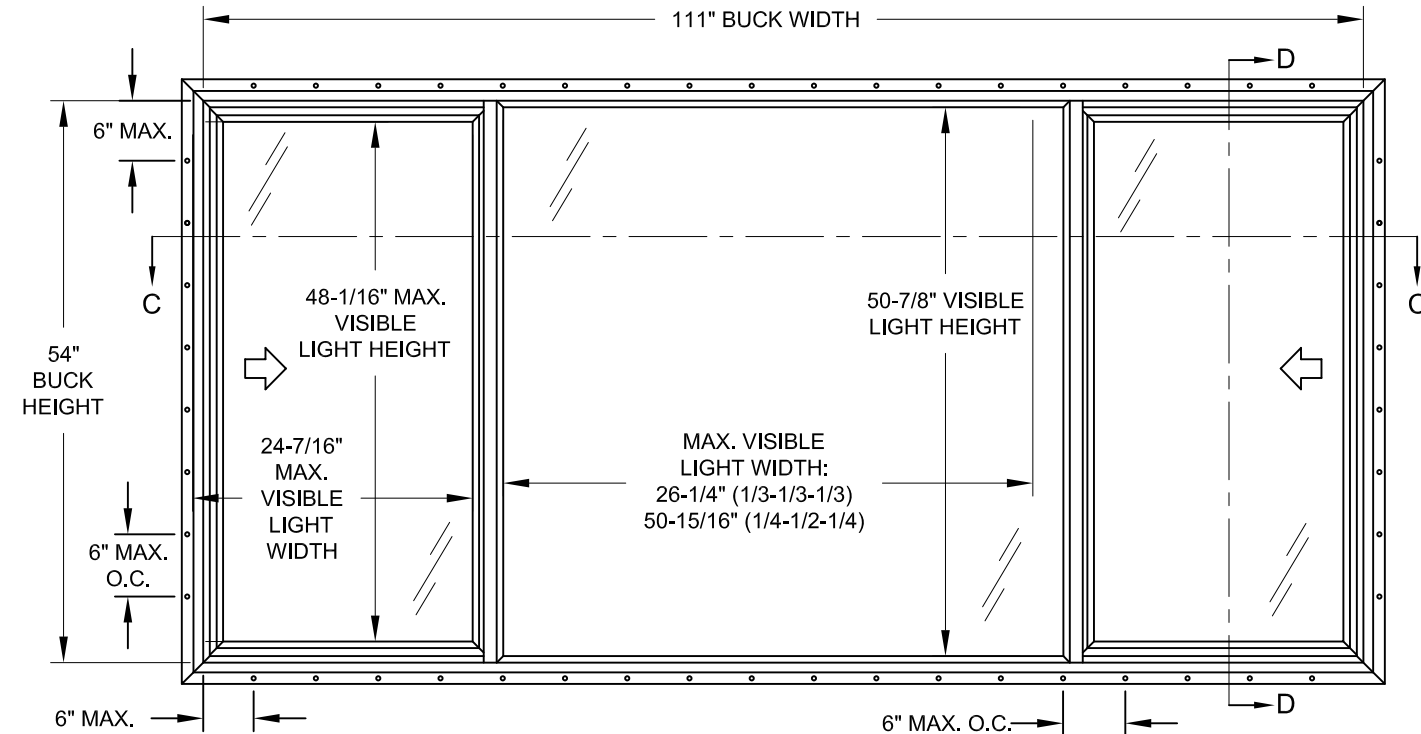


A. LYNN MILLER, P.E.
P.E.# 106594



**TYP. ANCHOR LOCATIONS @ TESTED SIZE
(FLANGE / EQUAL LEG FRAME)**

1/4-1/2-1/4 SHOWN, REFER TO TABLE 3 FOR APPROVED SIZES & GLASS TYPES
1/3-1/3-1/3 SIMILAR, REFER TO TABLE 4 FOR APPROVED SIZES & GLASS TYPES



**TYP. ANCHOR LOCATIONS @ TESTED SIZE
(INTEGRAL FIN / J-CHANNEL FRAME)**

1/4-1/2-1/4 SHOWN, REFER TO TABLE 3 FOR APPROVED SIZES & GLASS TYPES
1/3-1/3-1/3 SIMILAR, REFER TO TABLE 4 FOR APPROVED SIZES & GLASS TYPES

TABLE 3:

Allowable Glass Types, XOX 1/4-1/2-1/4							
		Width					
		90"	92"	96"	100"	104"	111"
Height	43"	1 - 4	1 - 4	1 - 4	1 - 4	1 - 4	1 - 4
	46"	1 - 4	1 - 4	1 - 4	1 - 4	1 - 4	4
	48"	1 - 4	1 - 4	1 - 4	1 - 4	4	4
	50"	1 - 4	1 - 4	1 - 4	4	4	4
	52"	1 - 4	1 - 4	4	4	4	4
	54"	1 - 4	4	4	4	4	4

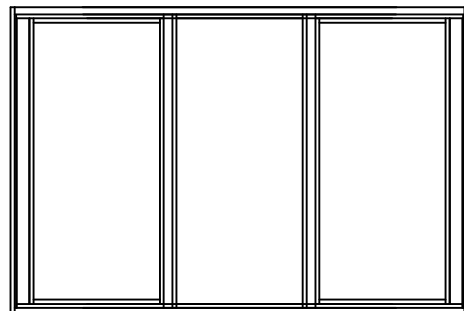
1) BUCK DIMENSIONS SHOWN.
2) FOR SIZES NOT SHOWN, ROUND UP TO THE NEXT AVAILABLE WIDTH OR HEIGHT DIMENSION.

TABLE 4:

Allowable Glass Types, XOX 1/3-1/3-1/3		
		Width up to 86-1/4"
Height	up to 54"	1 - 4

1) BUCK DIMENSIONS SHOWN.
2) FOR SIZES NOT SHOWN, ROUND UP TO THE NEXT AVAILABLE WIDTH OR HEIGHT DIMENSION.

WINDOW MAY BE A 1/4 - 1/2 - 1/4 CONFIGURATION (AS SHOWN ABOVE), OR 1/3 - 1/3 - 1/3 CONFIGURATION (AS SHOWN BELOW).



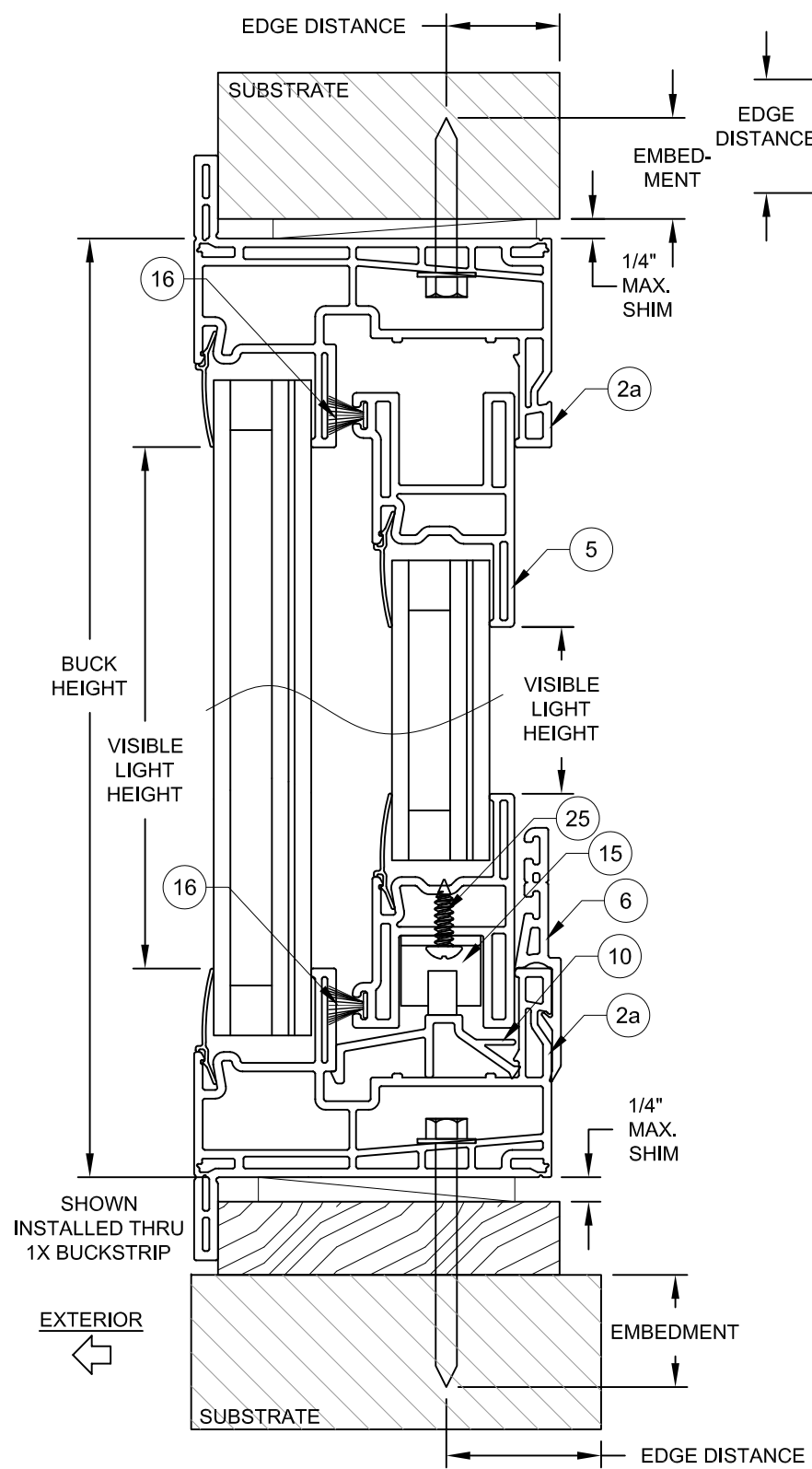
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Description: GENERAL NOTES & ELEVATION		Date: 08/24/21	
Revision:		Rev. By: Rev. Date:	
Series/Model: HR3110V	Scale: NTS	Sheet: 2 OF 7	Drawing No.: HR3110TDI-1
		Rev:	



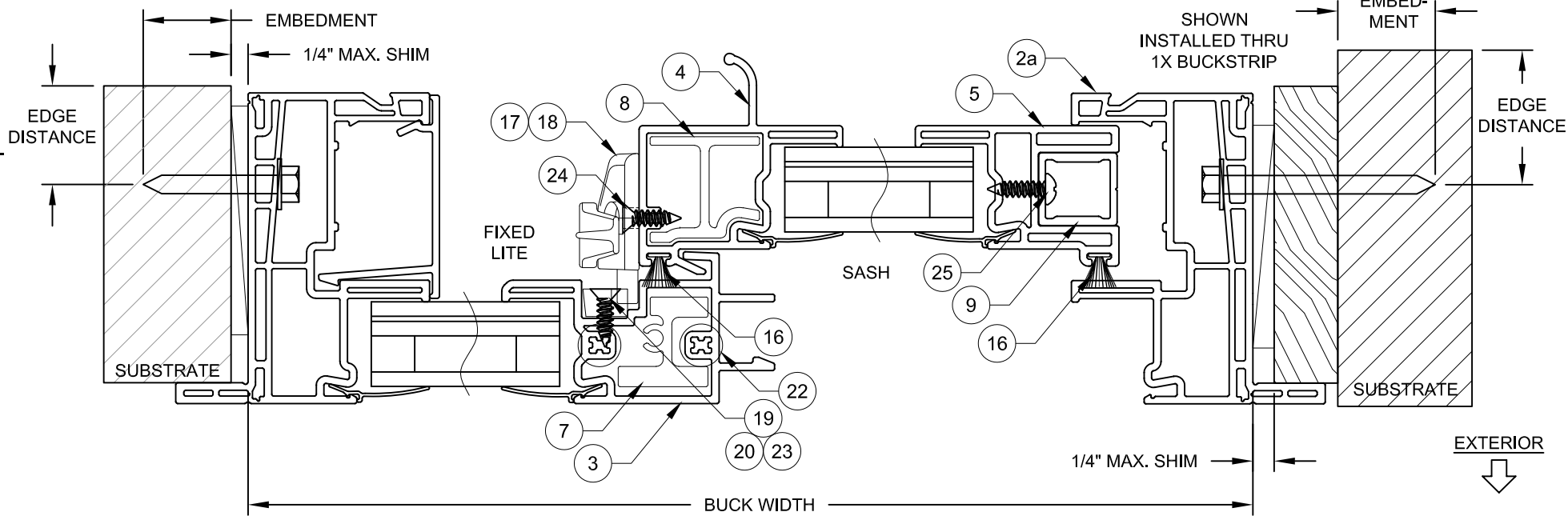
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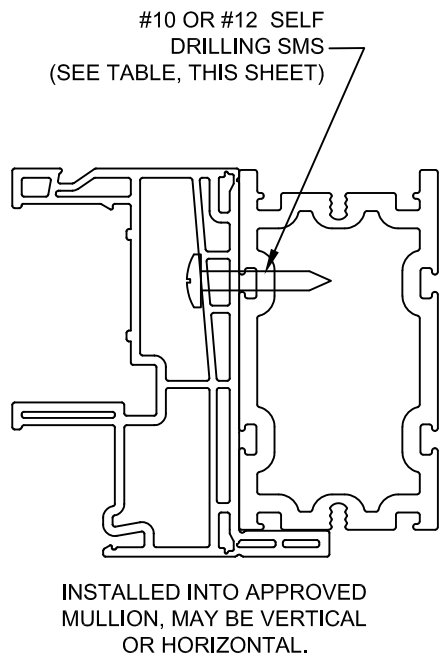
10/12/21
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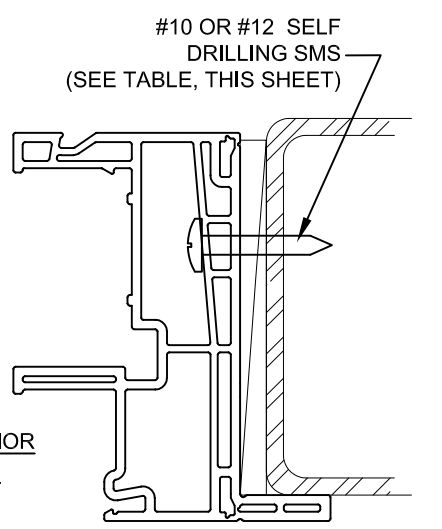
VERTICAL SECTION B-B



HORIZONTAL SECTION A-A



INSTALLED INTO APPROVED MULLION, MAY BE VERTICAL OR HORIZONTAL.



INSTALLED DIRECTLY INTO APPROVED ALUMINUM, STEEL FRAMING OR STEEL STUD.

- NOTES:**
- 1) USE ONLY SUBSTRATE APPROPRIATE ANCHORS LISTED IN TABLE 5. FOLLOW EMBEDMENT AND EDGE DISTANCE LIMITS. ANY INSTALLATION OPTION SHOWN MAY BE USED ON ANY SIDE OF THE WINDOW.
 - 2) MASONRY ANCHORS MAY BE USED INTO WOOD AS PER TABLE 5. ALL WOOD BUCKS LESS THAN 1-1/2" THICK ARE TO BE CONSIDERED 1X INSTALLATIONS. 1X WOOD BUCKS ARE OPTIONAL IF UNIT IS INSTALLED DIRECTLY TO SUBSTRATE. WOOD BUCKS DEPICTED AS 2X ARE 1-1/2" THICK OR GREATER. 1X AND 2X BUCKS (WHEN USED) SHALL BE DESIGNED TO PROPERLY TRANSFER LOADS TO THE STRUCTURE. WOOD BUCK DESIGN AND INSTALLATION IS THE RESPONSIBILITY OF THE ENGINEER OR ARCHITECT OF RECORD.
 - 3) SEE SHEET 1 OR 2 FOR ANCHOR SPACING REQUIREMENTS.
 - 4) MAX. SHIM THICKNESS TO BE 1/4".

TABLE 5:

Anchor	Substrate	Minimum Edge Distance	Minimum Embedment
#10 or #12 Steel, 18-8 SS or 410 SS Screw	Southern Pine (SG = .55)	9/16"	1-3/8"
	Aluminum, 6063-T5 min.	3/8"	0.060"
	Steel Stud, Gr. 33 min.	3/8"	0.045" (18 Ga)
3/16" Steel Ultracon	A36 Steel	3/8"	0.050"
	Concrete (min. 2.9 ksi)	1"	1-3/8"
3/16" Steel Ultracon+	Grouted CMU, (ASTM C-90)	2-1/2"	2-1/4"
	Southern Pine (SG = .55)	1"	1-3/8"
	Concrete (min. 2.9 ksi)	1"	1-3/4"
1/4" Steel Ultracon	Grouted CMU, (ASTM C-90)	1"	2-1/4"
	Ungrouted CMU, (ASTM C-90)	2-1/2"	1-1/4"
	Southern Pine (SG = .55)	1"	1-3/8"
1/4" Steel Ultracon+	Concrete (min. 3.0 ksi)	1"	1-3/8"
	Ungrouted CMU, (ASTM C-90)	2-1/2"	1-1/4"
	Southern Pine (SG = .55)	1"	1-3/8"
1/4" Steel Ultracon+	Concrete (min. 3.0 ksi)	1"	1-3/8"
	Ungrouted CMU, (ASTM C-90)	1"	1-1/4"
	Southern Pine (SG = .55)	1"	1-3/8"

- 1) ANCHOR MUST EXTEND A MINIMUM OF 3 THREADS BEYOND ANY METAL SUBSTRATE.
- 2) "UNGROUTED CMU" VALUES MAY BE USED FOR GROUTED CMU APPLICATIONS.
- 3) ALL ANCHOR HEAD TYPES ARE APPLICABLE.

Title: VINYL HORIZONTAL ROLLER (LM) **Drawn By:** JENS ROSOWSKI

Description: FLANGE INSTALLATION **Date:** 08/24/21

Revision: **Rev. By:** **Rev. Date:**

Series/Model: HR3110V **Scale:** NTS **Sheet:** 3 OF 7 **Drawing No.:** HR3110TDI-1 **Rev:**

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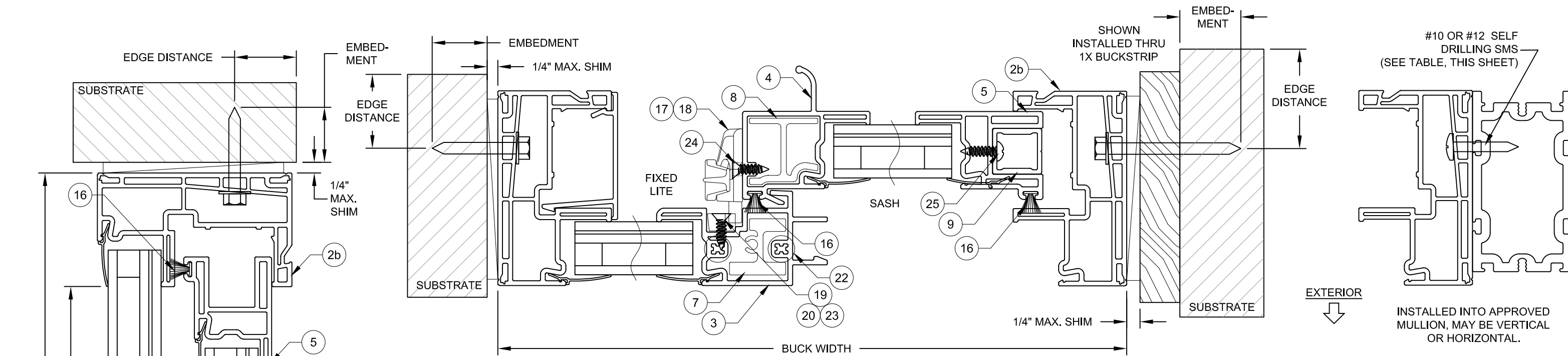
★ ANTHONY LYNN MILLER ★

106954

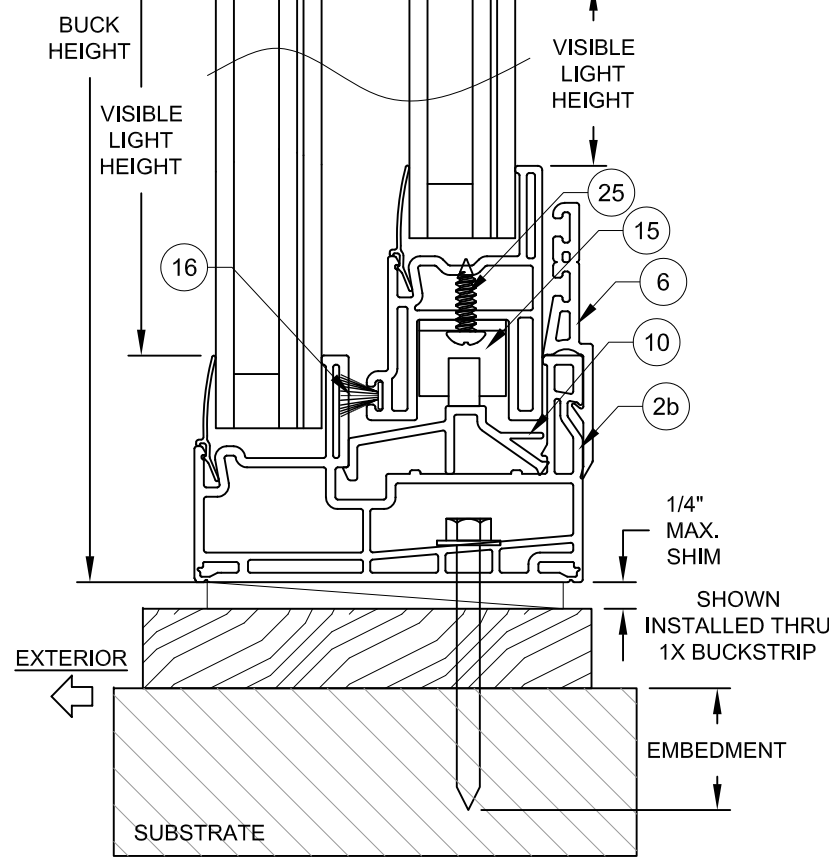
PROFESSIONAL ENGINEER

A Lynn Miller 10/12/21

A. LYNN MILLER, P.E.
P.E.# 106594



HORIZONTAL SECTION A-A



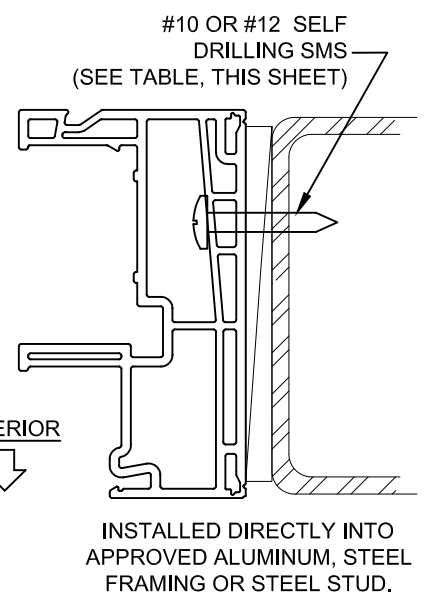
VERTICAL SECTION B-B

- NOTES:**
- 1) USE ONLY SUBSTRATE APPROPRIATE ANCHORS LISTED IN TABLE 6. FOLLOW EMBEDMENT AND EDGE DISTANCE LIMITS. ANY INSTALLATION OPTION SHOWN MAY BE USED ON ANY SIDE OF THE WINDOW.
 - 2) MASONRY ANCHORS MAY BE USED INTO WOOD AS PER TABLE 6. ALL WOOD BUCKS LESS THAN 1-1/2" THICK ARE TO BE CONSIDERED 1X INSTALLATIONS. 1X WOOD BUCKS ARE OPTIONAL IF UNIT IS INSTALLED DIRECTLY TO SUBSTRATE. WOOD BUCKS DEPICTED AS 2X ARE 1-1/2" THICK OR GREATER. 1X AND 2X BUCKS (WHEN USED) SHALL BE DESIGNED TO PROPERLY TRANSFER LOADS TO THE STRUCTURE. WOOD BUCK DESIGN AND INSTALLATION IS THE RESPONSIBILITY OF THE ENGINEER OR ARCHITECT OF RECORD.
 - 3) SEE SHEET 1 OR 2 FOR ANCHOR SPACING REQUIREMENTS.
 - 4) MAX. SHIM THICKNESS TO BE 1/4".

TABLE 6:

Anchor	Substrate	Minimum Edge Distance	Minimum Embedment
#10 or #12 Steel, 18-8 SS or 410 SS Screw	Southern Pine (SG = .55)	9/16"	1-3/8"
	Aluminum, 6063-T5 min.	3/8"	0.060"
	Steel Stud, Gr. 33 min.	3/8"	0.045" (18 Ga)
	A36 Steel	3/8"	0.050"
3/16" Steel Ultracon	Concrete (min. 2.9 ksi)	1"	1-3/8"
	Grouted CMU, (ASTM C-90)	2-1/2"	2-1/4"
	Southern Pine (SG = .55)	1"	1-3/8"
3/16" Steel Ultracon+	Concrete (min. 2.9 ksi)	1"	1-3/4"
	Grouted CMU, (ASTM C-90)	1"	2-1/4"
	UngROUTED CMU, (ASTM C-90)	2-1/2"	1-1/4"
1/4" Steel Ultracon	Concrete (min. 3.0 ksi)	1"	1-3/8"
	UngROUTED CMU, (ASTM C-90)	2-1/2"	1-1/4"
	Southern Pine (SG = .55)	1"	1-3/8"
1/4" Steel Ultracon+	Concrete (min. 3.0 ksi)	1"	1-3/8"
	UngROUTED CMU, (ASTM C-90)	1"	1-1/4"
	Southern Pine (SG = .55)	1"	1-3/8"

- 1) ANCHOR MUST EXTEND A MINIMUM OF 3 THREADS BEYOND ANY METAL SUBSTRATE.
- 2) "UNGRouted CMU" VALUES MAY BE USED FOR GRouted CMU APPLICATIONS.
- 3) ALL ANCHOR HEAD TYPES ARE APPLICABLE.



Title: VINYL HORIZONTAL ROLLER (LM) **Drawn By:** JENS ROSOWSKI

Description: EQUAL-LEG INSTALLATION **Date:** 08/24/21

Revision: **Rev. By:** **Rev. Date:**

Series/Model: HR3110V **Scale:** NTS **Sheet:** 4 OF 7 **Drawing No.:** HR3110TDI-1 **Rev:**

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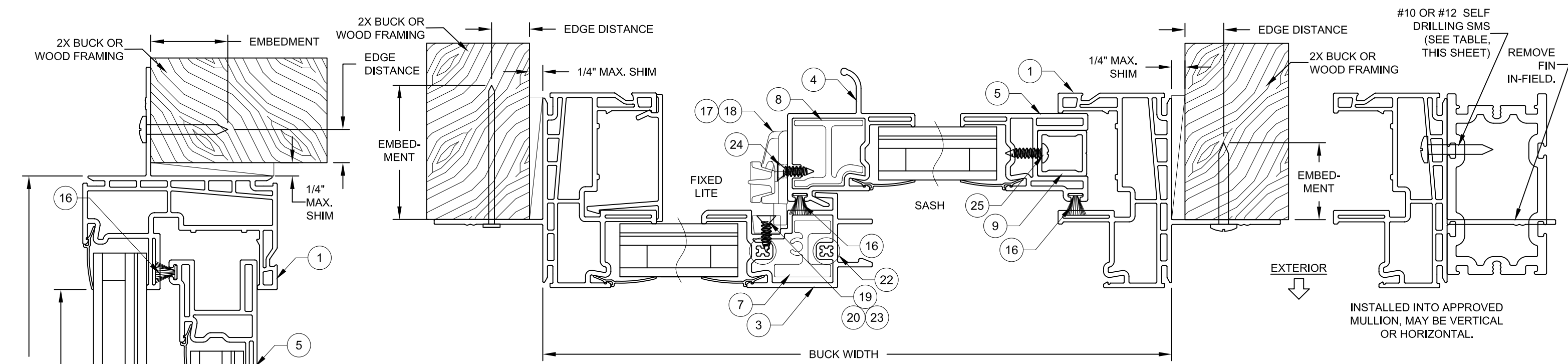
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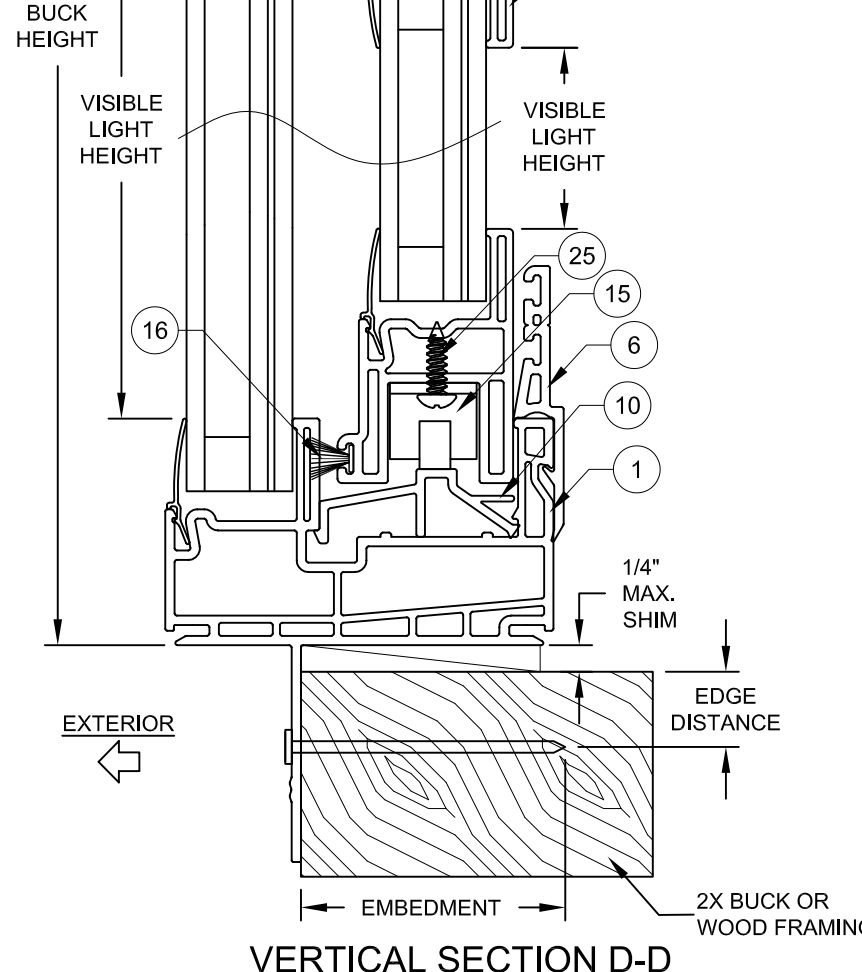
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P.E.# 106594



HORIZONTAL SECTION C-C



VERTICAL SECTION D-D

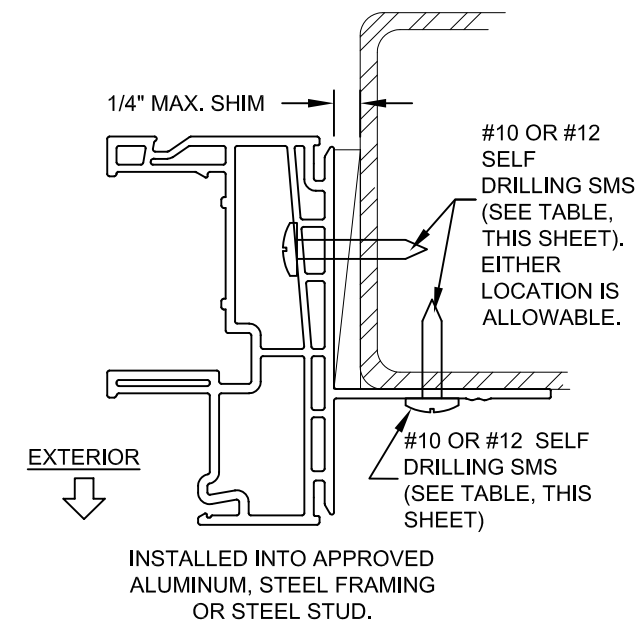
NOTES:

- 1) USE ONLY SUBSTRATE APPROPRIATE ANCHORS LISTED IN TABLE 7. FOLLOW EMBEDMENT AND EDGE DISTANCE LIMITS. ANY INSTALLATION OPTION SHOWN MAY BE USED ON ANY SIDE OF THE WINDOW.
- 2) 2X WOOD FRAMING OR BUCK, 1-1/2" THICK OR GREATER.
- 3) SEE SHEET 1 FOR ANCHOR SPACING REQUIREMENTS.
- 4) MAX. SHIM THICKNESS TO BE 1/4" AND SPACED MAX. 18" O.C.

TABLE 7: THROUGH-FIN ANCHORS

Anchor	Substrate	Min. Embedment or Metal Thickness	Min. Edge Distance
2-1/2" x .131" Common Nail	Southern Pine (SG = .55)	2-1/2"	3/8"
2-1/2" x .145" Roofing Nail	Southern Pine (SG = .55)	2-1/2"	3/8"
#10 or #12 Steel, 18-8 SS or 410 SS Screw (G5)	Southern Pine (SG = .55)	1-3/8"	1/2"
	Aluminum, 6063-T5 min	0.125"	3/8"
	Steel Stud, Gr. 33 min.	0.045"	3/8"
	A36 Steel	0.050"	3/8"

- 1) ANCHOR MUST EXTEND A MINIMUM OF 3 THREADS BEYOND ANY METAL SUBSTRATE.
- 2) ALL SCREW HEAD TYPES ARE APPLICABLE.



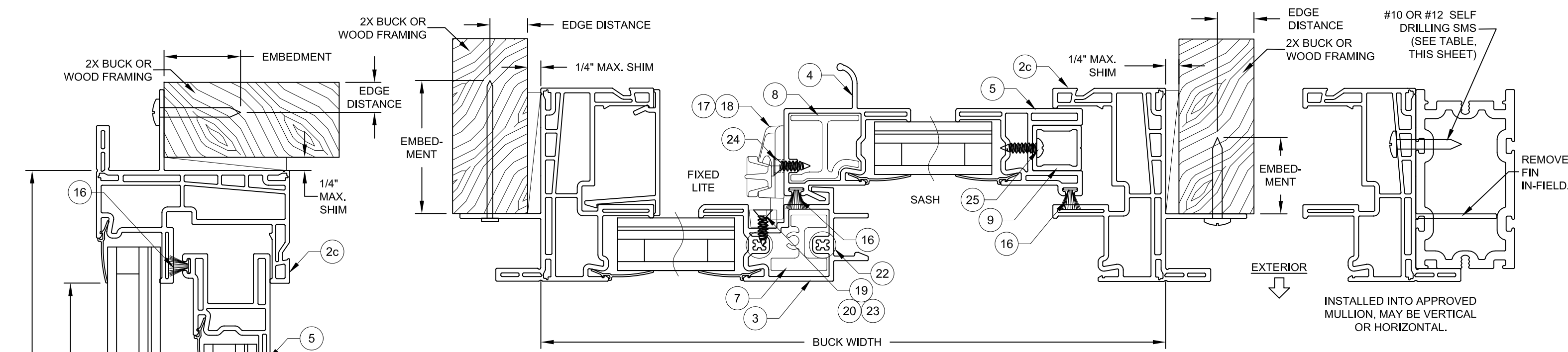
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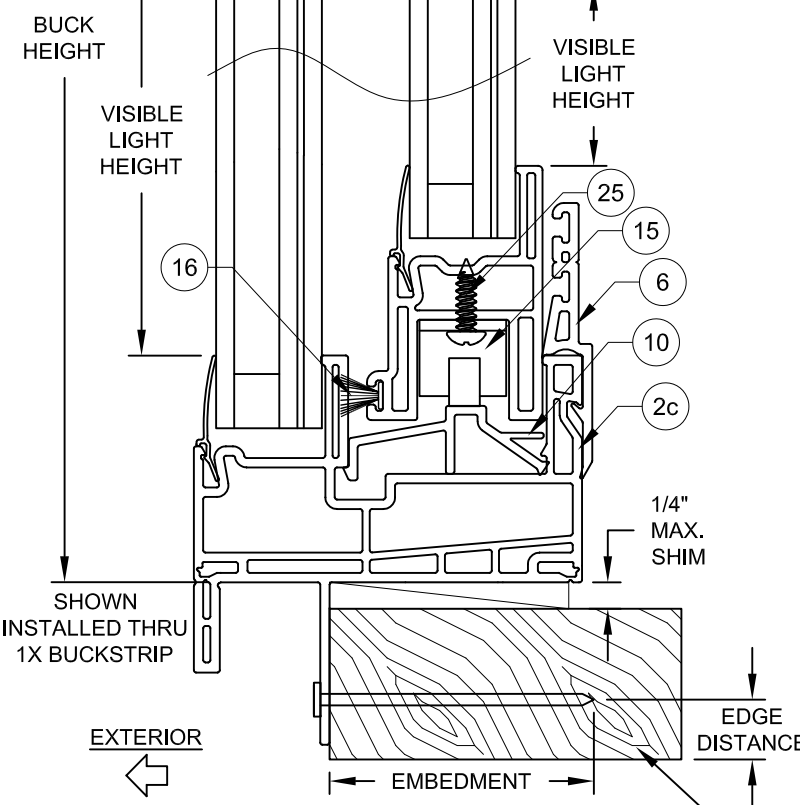


A Lynn Miller 10/12/21
A. LYNN MILLER, P.E.
P.E.# 106594

Title: VINYL HORIZONTAL ROLLER (LM)		Drawn By: JENS ROSOWSKI	
Description: FIN INSTALLATION		Date: 08/24/21	
Revision:		Rev. By: Rev. Date:	
Series/Model: HR3110V	Scale: NTS	Sheet: 5 OF 7	Drawing No.: HR3110TDI-1
		Rev:	



HORIZONTAL SECTION C-C



VERTICAL SECTION D-D

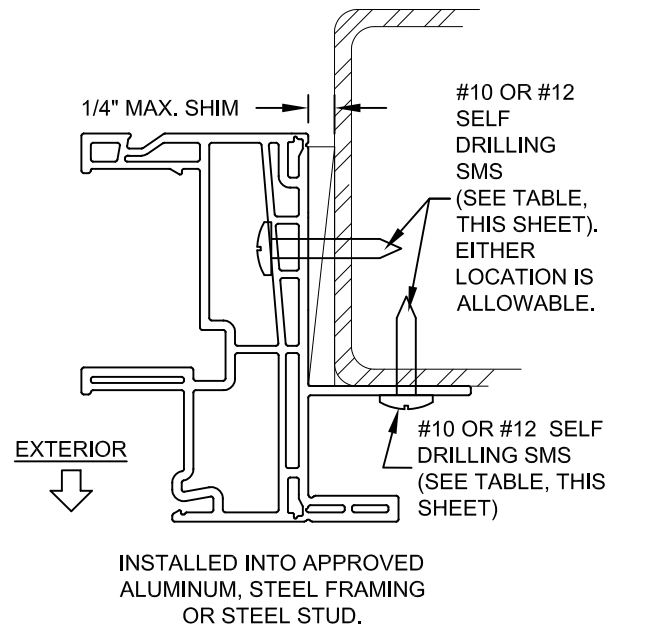
NOTES:

- 1) USE ONLY SUBSTRATE APPROPRIATE ANCHORS LISTED IN TABLE 8. FOLLOW EMBEDMENT AND EDGE DISTANCE LIMITS. ANY INSTALLATION OPTION SHOWN MAY BE USED ON ANY SIDE OF THE WINDOW.
- 2) 2X WOOD FRAMING OR BUCK, 1-1/2" THICK OR GREATER.
- 3) SEE SHEET 1 FOR ANCHOR SPACING REQUIREMENTS.
- 4) MAX. SHIM THICKNESS TO BE 1/4" AND SPACED MAX. 18" O.C.

TABLE 8: THROUGH-FIN ANCHORS

Anchor	Substrate	Min. Embedment or Metal Thickness	Min. Edge Distance
2-1/2" x .131" Common Nail	Southern Pine (SG = .55)	2-1/2"	3/8"
2-1/2" x .145" Roofing Nail	Southern Pine (SG = .55)	2-1/2"	3/8"
#10 or #12 Steel, 18-8 SS or 410 SS Screw (G5)	Southern Pine (SG = .55)	1-3/8"	1/2"
	Aluminum, 6063-T5 min	0.125"	3/8"
	Steel Stud, Gr. 33 min.	0.045"	3/8"
	A36 Steel	0.050"	3/8"

- 1) ANCHOR MUST EXTEND A MINIMUM OF 3 THREADS BEYOND ANY METAL SUBSTRATE.
- 2) ALL SCREW HEAD TYPES ARE APPLICABLE.



Title: VINYL HORIZONTAL ROLLER (LM)		Drawn By: JENS ROSOWSKI	
Description: J-CHANNEL INSTALLATION		Date: 08/24/21	
Revision:		Rev. By: Rev. Date:	
Series/Model: HR3110V	Scale: NTS	Sheet: 6 OF 7	Drawing No.: HR3110TDI-1

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P.E.# 106594

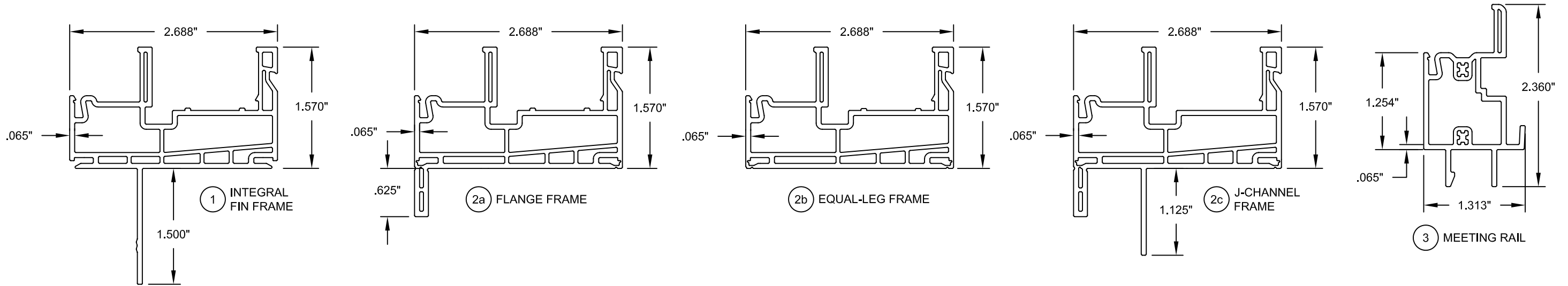
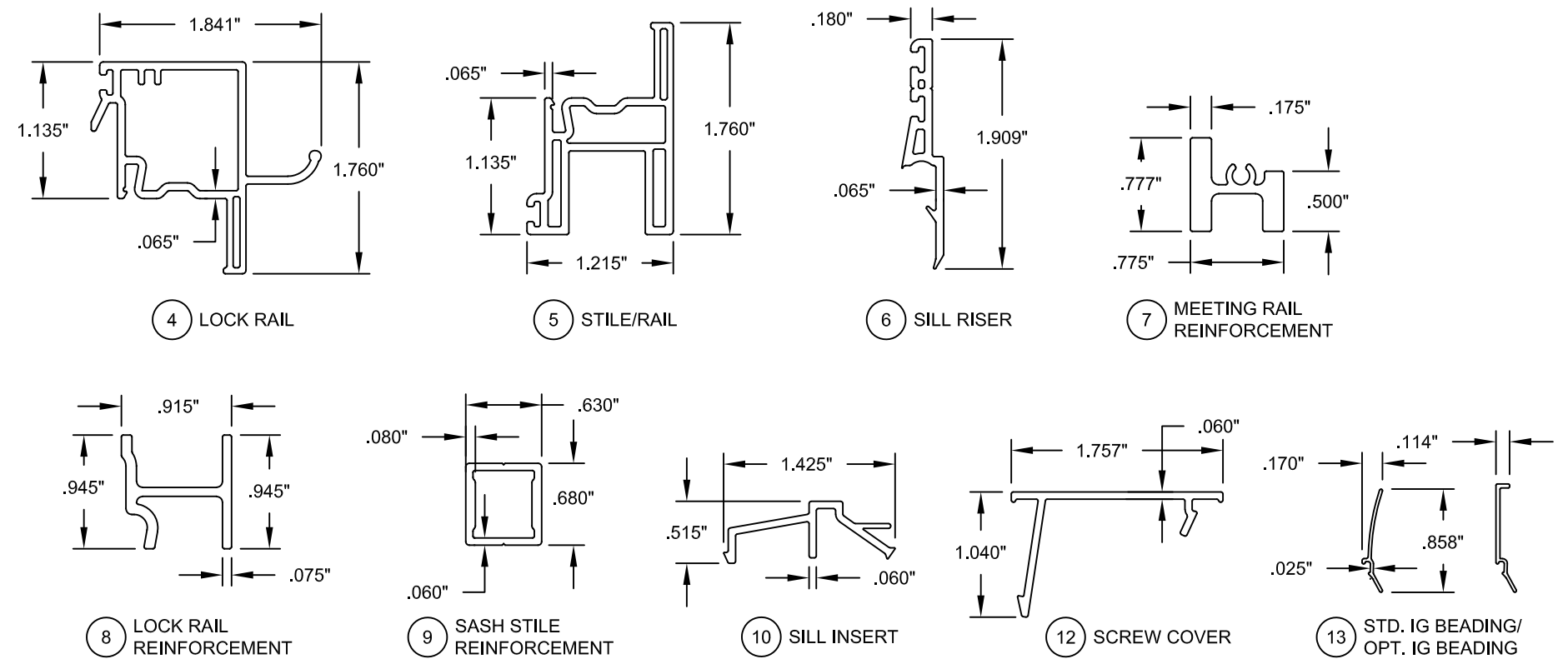


TABLE 9:

Item #	Part #	Description	Material
1	3358	Integral Fin Frame	Rigid PVC
2a	3356	Flange Frame	Rigid PVC
2b	3356	Equal-leg Frame	Rigid PVC
2c	3356	J-Channel Frame	Rigid PVC
3	3360	Meeting Rail	Rigid PVC
4	3365	Lock Rail	Rigid PVC
5	3366	Stile/Rail	Rigid PVC
6	5732	Sill Riser	Rigid PVC
7	6302	Meeting Rail Reinforcement	6063-T6
8	6107	Lock Rail Reinforcement	6063-T6
9	6109	Sash Stile Reinforcement	6063-T6
10	3355	Sill Insert	Rigid PVC
12	8395	Screw Cover/Sash Stop	Rigid PVC
13	3190	Std./Opt. IG Beading	Rigid PVC
15	8152	Roller	
16	4002	Weatherstrip, .187 x .290 fin seal	
17	8111	Cam Lock - Zinc/Metal	Zinc/Metal
18		Cam Lock - Composite Plastic	Composite Plastic
19	8093	Keeper - Zinc/Metal	Zinc/Metal
20		Keeper - Composite	Composite Plastic
21	8160	Sash Cam	Nylon
22	1035	#8 x 1-3/4" Truss Pan SMS	S/S
23	1013	#6 x 3/4" PFH SMS	S/S
24	1033	#6 x 1-1/8" PFH SMS	S/S
25	1004	#6 x 1/2" PPH SMS	S/S
30		Sika 552, Dow 791 or 983 Backbedding	Silicone
31		Setting Block, 1/8" x 3/4" x 2" or 1/8" x 3/4" x 3/4"	
32	varies	Kommerling Kodispace 4SG TPS	varies
		Quanex Super Spacer nXT with Hot Melt Butyl	
		Metal IG Spacer	



Title: VINYL HORIZONTAL ROLLER (LM)		Drawn By: JENS ROSOWSKI	
Description: EXTRUSIONS AND BOM		Date: 08/24/21	
Revision:		Rev. By:	Rev. Date:
Series/Model: HR3110V	Scale: NTS	Sheet: 7 OF 7	Drawing No. HR3110TDI-1



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