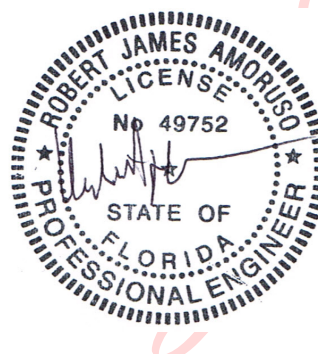


PTC, LLC**Jeld-Wen W-2500/W-3500 Clad Window
Unreinforced Mulled Combination Assemblies****AAMA 450-06/09/10 Performance Rating
Summary****Report No. 1466****Revision 3****Project No. 415-0707****Date: April 29, 2016****Prepared by:****PTC Product Design Group, LLC****PO Box 520775****Longwood, FL 32752-0775****Evaluated by:****Robert J. Amoruso, P.E.****FL No. 49752****Digitally signed
by Robert J.****Amoruso, PE****Date:****2016.04.29****10:44:49 -04'00'**

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SCOPE PTC, LLC was contracted by Jeld-Wen to perform engineering evaluations of various mulled window combinations. The evaluations are intended to propose alternate span and design pressure ratings for the as-tested mullions. Possible groupings of untested mullions based on the section property comparisons are proposed. Grouping and evaluation rules of AAMA 450-06/09/10 Voluntary Performance Rating Method for Mulled Fenestration have been used. This report summarizes the comparison of the as-tested mullion assemblies of the "Premium Sitrine Ex Clad" to the "W-2500/W-3500 Clad" series using equal or stronger frame and sash section properties.

PRODUCT APPLICABILITY: This report is applicable to the following product lines and types.

1. Product Lines
 - a. W-2500/W-3500 Clad
2. Product Types
 - a. Casement
 - b. Awning
 - c. Picture/Fixed/Stationary
 - d. In-Sash
 - e. Direct Set Geometric and Radius
 - f. Double Hung

AAMA 450-06/09/10 Product Grouping and Comparison Analysis: This report summarizes the results of PTC Report No. 1465 (Reference 1.a).

Installation Anchorage: Documented in PTC Report No. 1465-Supplemental (Reference 1.b).

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LIMITATIONS AND CONDITIONS OF USE

1. Production and sale of product configurations shown in this analysis are subject to the approval of JELD-WEN, Inc.
2. Design Pressures shall not exceed the lower of the individual window units comprising the mullied assemblies or the mullion load/spans shown in Tables 1, 2 and 3.
3. Installation shall be as shown in Appendix A. Additional engineered solutions prepared by a licensed design professional may be submitted with this report for consideration by the Building Official.

REFERENCES

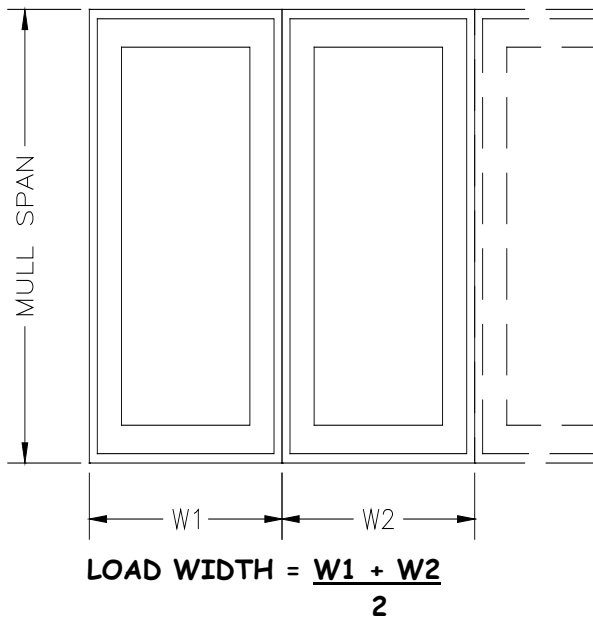
1. PTC Product Design Group, LLC Engineering Analysis
 - a. No. 1465, Rev. 1, dated 1/31/13, Jeld-Wen W-2500/W-3500 Clad Window Unreinforced Mullion Combination Assemblies - AAMA 450 Performance Rating and Comparison Analyses.
 - a. Report No. 1465-Supplemental, Rev. 1, dated 1/31/13, Jeld-Wen W-2500/W-3500 Clad Window Unreinforced Mullion - Various Mullied Configurations - Comparison Analysis & Anchorage Engineering.
2. Architectural Testing Report
 - a. No. 79762.01-602-47 tested to 60 PSF DP. Vertically unreinforced jamb to jamb Fixed Casement windows in a 42" x 84" size resulting in an overall size of 84" x 84". Results applicable to intermixed combinations of Double Hung, Casement, Awning, Picture, In-Sash and Direct Set Geometric or Radius.
 - b. No. 85145.01-602-44-R2 tested to 60 PSF DP. Horizontally unreinforced jamb to jamb Fixed Casement windows in a 84" x 24" size resulting in an overall size of 84" x 48". Results applicable to intermixed combinations of Double Hung, Casement, Awning, Picture,

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In-Sash and Direct Set Geometric or Radius.

- c. No. 85776.01-602-44-R2 tested to 30 PSF DP. Casement Transom window unreinforced jamb to jamb overhead with two vertically unreinforced jamb to jamb Fixed Casement windows in a 72" x 36" over two 36" x 72" size resulting in an overall size of 72" x 108". Results applicable to intermixed combinations of Double Hung, Casement, Awning, Picture, In-Sash and Direct Set Geometric or Radius.
- 3. AAMA 450-06/09/10, Voluntary Performance Rating Method for Mullled Fenestration Assemblies.
- 4. AAMA 103, Procedural Guide - AAMA Certification Program
 - a. AAMA 103.3-93
 - b. AAMA 103-04
 - c. AAMA 103-07
- 5. AAMA 203, Procedural Guide - WINS
 - a. AAMA 203-98
 - b. AAMA 203-03
- 6. Florida Building Code
 - a. Current Edition Florida Building Code (FBC), Building Volume, Chapter 17
 - i. Mullions occurring between individual window and glass door assemblies
 - b. Current Edition Florida Building Code (FBC), Residential Volume, Chapter 6
 - i. Mullions
 - ii. Anchorage methods

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THIS CHART APPLIES TO 2W1H, 3W1H, 4W1H, & 5W1H MULLS.

LOAD WIDTH must be calculated using two largest adjacent (side by side) window heights.

Mull Spans are restricted by those shown on this table.

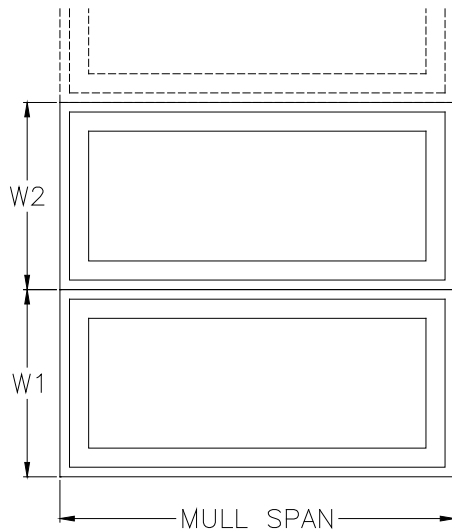
Windows may be intermixed combinations of Double Hung, Casement, Awning, Picture, In-Sash and Direct Set Geometric or Radius

Allowable pressures on the mullied assembly shall be controlled by the lesser of mullion or the individual window unit.

Mullion End Anchor Clusters: 4 anchor clusters required where noted with asterisk (*) under load width; otherwise 2 anchor clusters allowed.

MULLION TABLE 1 (VERTICAL SPAN—UNREINFORCED)					
MULL SPAN	LOAD WIDTH	DP (PSF)	MULL SPAN	LOAD WIDTH	DP (PSF)
18	24	679	54	24	109
	30	679		30	94
	36	679		36	85
	42	679		42	79
	48	679		48	76
	54	679		54	75
	60	679		60	75
24	24	382	60	24	96
	30	382		30	81
	36	382		36	73
	42	382		42	67
	48	382		48	64
	54	382		54	62
	60	382		60	61
30	24	255	66	24	85
	30	244		30	72
	36	244		36	64
	42	244		42	58
	48	244		48	55
	54	244		54	52
	60	244		60	51
36	24	191	72	24	76
	30	175		30	64
	36	170		36	57
	42	170		42	51
	48	170		48 *	69
	54	170		54 *	65
	60	170		60 *	63
42	24	153	78	24	69
	30	136		30	58
	36	127		36	51
	42	125		42 *	66
	48	125		48 *	61
	54	125		54 *	58
	60	125		60 *	55
48	24	127	84	24	64
	30	111		30	53
	36	102		36 *	67
	42	97		42 *	60
	48	96		48 *	55
	54	96		54 *	51
	60	96		60 *	48

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$$\text{LOAD WIDTH} = \frac{W1 + W2}{2}$$

THIS CHART APPLIES TO 1W2H, 1W3H, 1W4H AND 1W5H MULLS.

LOAD WIDTH must be calculated using two largest adjacent (side by side) window widths.

Mull Spans are restricted by those shown on this table.

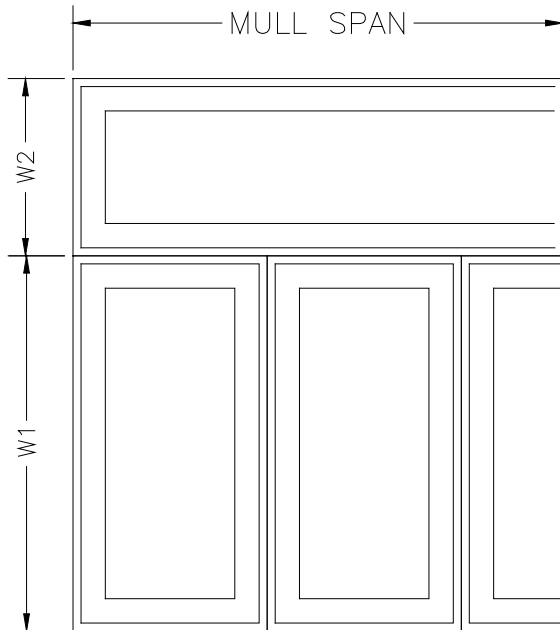
Windows may be intermixed combinations of Double Hung, Casement, Awning, Picture, In-Sash and Direct Set Geometric or Radius

Allowable pressures on the mullied assembly shall be controlled by the lesser of mullion or the individual window unit.

Mullion End Anchor Clusters: 4 anchor clusters required where noted with asterisk (*) under load width; otherwise 2 anchor clusters allowed.

MULLION TABLE 2 (HORIZONTAL SPAN—UNREINFORCED)					
MULL SPAN	LOAD WIDTH	DP (PSF)	MULL SPAN	LOAD WIDTH	DP (PSF)
18	24	679	54	24	158
	30	679		30	136
	36	679		36	123
	42	679		42	115
	48	679		48	110
	54	679		54	109
24	60	679	60	60	109
	24	382		24	138
	30	382		30	118
	36	382		36	105
	42	382		42	97
	48	382		48	92
30	54	382	66	54	89
	60	382		60	88
	24	255		24	123
	30	244		30	104
	36	244		36	92
	42	244		42	84
36	48	244	72	48	79
	54	244		54	75
	60	244		60	74
	24	191		24	76
	30	175		30	64
	36	170		36	57
42	42	170	78	42	51
	48	170		48 *	69
	54	170		54 *	65
	60	170		60 *	63
	24	153		24	69
	30	136		30	58
48	36	127	84	36	51
	42	125		42 *	66
	48	125		48 *	61
	54	125		54 *	58
	60	125		60 *	55
	24	127		24	64
	30	111		30	53
	36	102		36 *	67
	42	97		42 *	60
	48	96		48 *	55
	54	96		54 *	51
	60	96		60 *	48

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$$\text{LOAD WIDTH} = \frac{W1 + W2}{2}$$

THIS CHART APPLIES ("T") 3-WAY MULLS

Mull Spans are restricted by those shown on this table.

Windows may be intermixed combinations of Double Hung, Casement, Awning, Picture, In-Sash and Direct Set Geometric or Radius

Allowable pressures on the mulled assembly shall be controlled by the lesser of mullion or the individual window unit.

Mullion End Anchor Clusters: 4 anchor clusters required for all load widths.

MULLION TABLE 3 (HORIZONTAL SPAN—UNREINFORCED)					
MULL SPAN	LOAD WIDTH	DP (PSF)	MULL SPAN	LOAD WIDTH	DP (PSF)
18	36	180	48	36	68
	42	154		42	58
	48	135		48	51
	54	120		54	45
	60	108		60	41
	66	98		66	37
	72	90		72	34
24	36	135	54	36	60
	42	116		42	51
	48	101		48	45
	54	90		54	40
	60	81		60	36
	66	74		66	33
	72	68		72	30
30	36	108	60	36	54
	42	93		42	46
	48	81		48	41
	54	72		54	36
	60	65		60	32
	66	59		66	29
	72	54		72	27
36	36	90	66	36	49
	42	77		42	42
	48	68		48	37
	54	60		54	33
	60	54		60	29
	66	49		66	27
	72	45		72	25
42	36	77	72	36	45
	42	66		42	39
	48	58		48	34
	54	51		54	30
	60	46		60	27
	66	42		66	25
	72	39		72	23

**The following configurations are covered by
this report.**

Jeld-Wen Drawing No. D008995_001 on next page.

- **PRODUCT TYPES:**
 - **CASEMENT**
 - **AWNING**
 - **STATIONARY (FIXED/PICTURE)**
 - **PICTURE**
 - **DIRECT SET**
 - **DOUBLE HUNG WINDOWS ALSO ALLOWED.**
- **PRODUCT LINES:**
 - **W-2500/W-3500**

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PRODUCT TYPES: CASEMENT, AWNING,
STATIONARY, PICTURE, DIRECT SET
SHOWN. DOUBLE HUNG ALSO ALLOWED.

PRODUCT LINES: W-2500 CLAD

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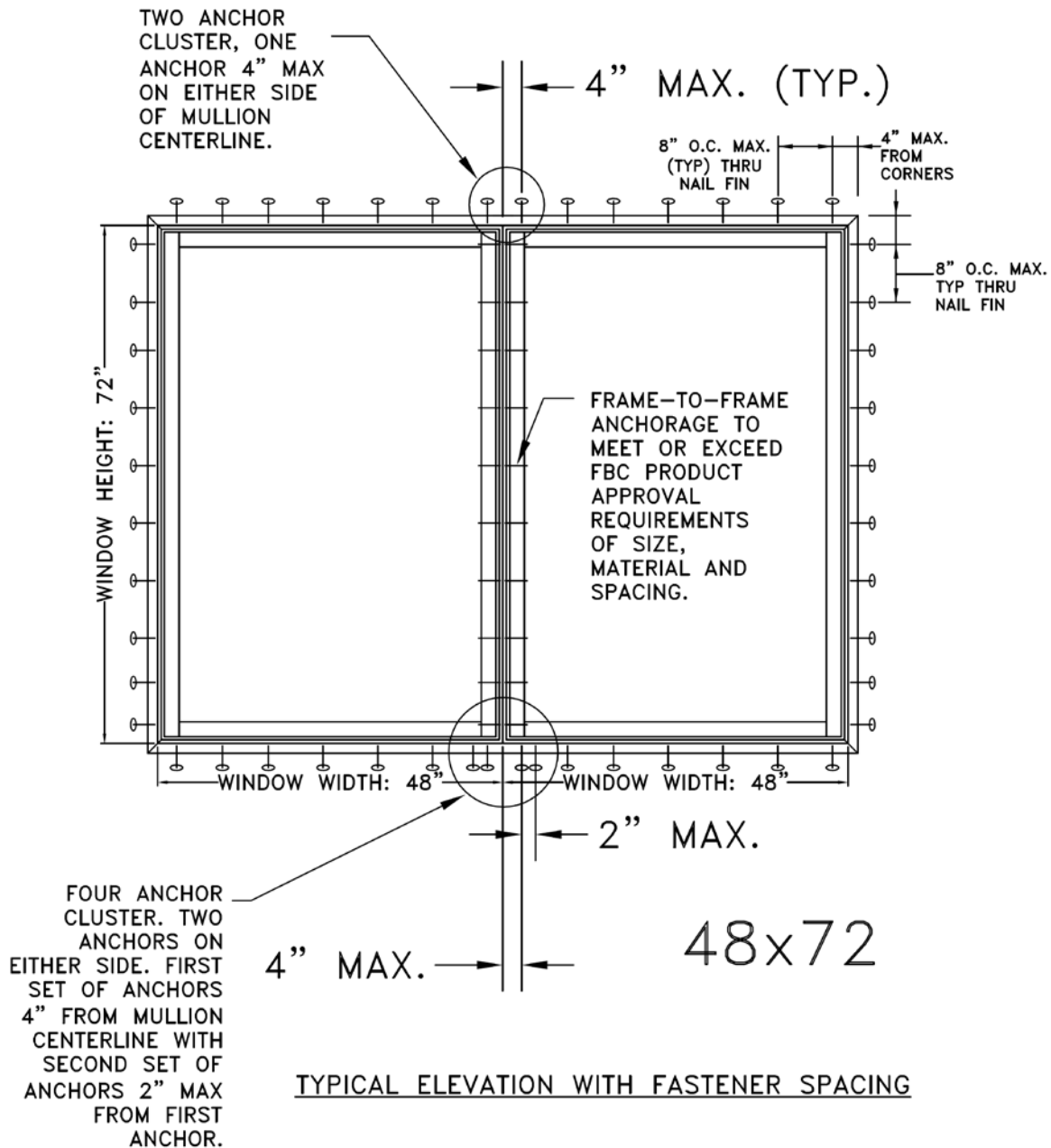
Appendix A - Mullion Anchorage Description

1. Installation of the individual window units shall be in accordance with the manufacturer's installation instructions and current Florida Building Code product Approvals.
2. Unreinforced Mullion end anchor clusters shall be a minimum of No. 8 wood or tapping screws (see notes 3 and 6 below).
3. Mullion end anchor clusters shall be in either 2 or 4 anchor clusters as required by notation in the Mullion Span/DP Load Capacity Tables 1 through 5.
4. Mullion end anchor clusters shall be installed as shown in the following Figures 1 and 2.
5. Frame-to-frame anchorage to meet or exceed FBC Product Approval requirements of size, material and spacing as follows.
 - a. with through frame anchorage meeting/exceeding the anchorage required for individual window-to-substrate fastening as illustrated in Figure 1; or
 - b. with wood mullion end caps and aluminum cladding clips as illustrated in Figure 3.
6. Substrate Anchorage shall be Wood/Tapping Screws meeting the following:
 - a. Can be either Pan Head Wood Screws or Pan Head Tapping Screws.
 - b. Shall meet ANSI B18.6.1 for Wood Screws and ASME B18.6.4 for Tapping Screws.
 - c. Edge Distances shall be $\frac{1}{2}$ " or greater.
 - d. Embedment shall be as shown in Figure 2.
 - e. All screws shall have a corrosion resistant coating or be made of corrosion resistant materials.
7. See Figure 1 and 2 for illustration of above requirements. Casement window used for illustrations. Applicable to all other configurations.

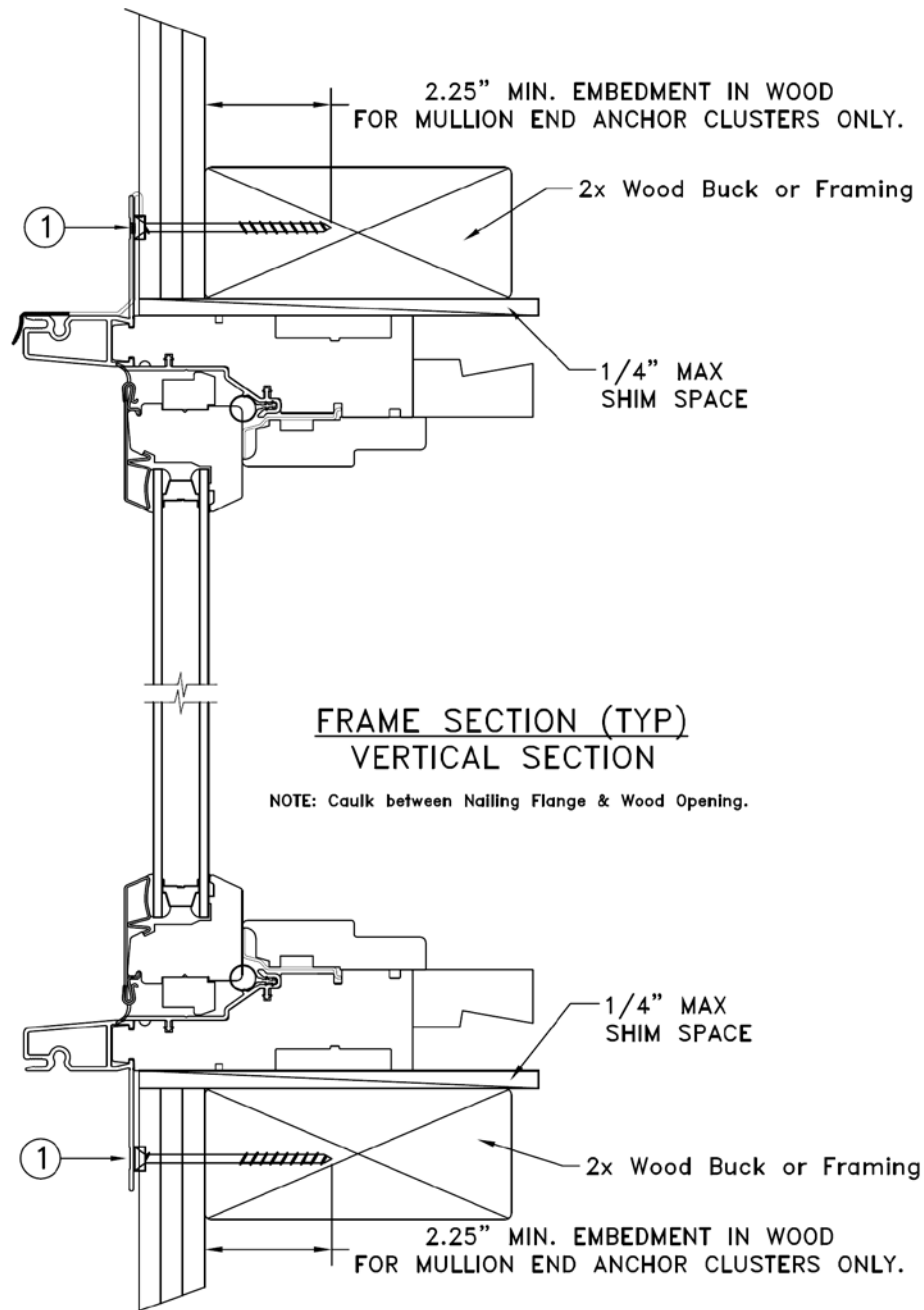
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Elevation, Fixed Casement - Figure 1

Note: Anchor spacing shown below for window framing illustrative only. See individual window FBC Product Approval for requirements.
See Figure 3 for alternate frame-to-frame mullion joining.



Section, Fixed Casement - Figure 2



ITEM NO. 1 – NO. 8 WOOD SCREW OR TAPPING SCREW

Section, Fixed Casement - Figure 3 Alternate Frame-To-Frame Mullion Fastening

