

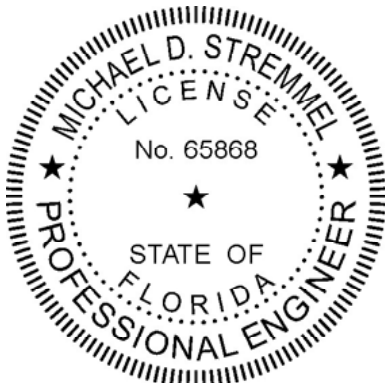
PRODUCT APPROVAL SUPPORTING CALCULATIONS

Series 1209 and Series 1210 Premium Coastal Impact Casement Windows

REPORT TO:

**WEATHER SHIELD WINDOWS & DOORS
ONE WEATHER SHIELD PLAZA
MEDFORD, WISCONSIN 54451**

REPORT NUMBER: 27845.01-107-16-R0
REPORT DATE: 12/21/2023



This item has been digitally signed
and sealed by Michael D. Stremmel,
PE on the date adjacent to the seal.

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A handwritten signature in black ink, appearing to read "Michael D. Stremmel".

Michael D. Stremmel, PE
FL PE 65868
FL REG 37122

Scope

Molimo, LLC was contracted by Weather Shield Windows & Doors to evaluate installation methods for their Series 1209 and Series 1210 Premium Coastal Impact Casement Windows. The evaluation is based on physical testing and product certifications. Reference standards utilized in this project include:

Florida Building Code, Building, 8th Edition (2023). International Code Council, 2023.

ANSI/AWC NDS-2018 *National Design Specification (NDS) for Wood Construction.* American Wood Council, 2018.

AISI S100-16 *North American Specification for the Design of Cold-Formed Steel Structural Members, 2016.* American Iron and Steel Institute, 2016.

ADM1-2020 *2020 Aluminum Design Manual.* The Aluminum Association, Inc., 2020.

ICC-ES Report ESR-1976 *ITW Buildex TEKS Self-Drilling Fasteners.* ICC Evaluation Service. 07/2020.

NOA 16-1222.06 *Tapcon with Advanced Threadform Technology Concrete and Masonry Anchors.* Miami-Dade County Product Control Section, December 13, 2016.

The anchorage analyses presented herein do not address the water resistance, water penetration or air infiltration performance of the installation method or the installed product. In addition, the analyses rely on the assumption that the building substrate is capable of withstanding incurred loads.

Certification of Independence

In accordance with Rule 61G20-3 Florida Administrative Code, Molimo, LLC hereby certifies the following:

- Molimo, LLC does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products tested or labeled by the agency.
- Molimo, LLC is not owned, operated or controlled by any company manufacturing or distributing products it tests or labels.
- Michael D. Stremmel, P.E. does not have nor will acquire, a financial interest in any company manufacturing or distributing products for which the reports are being issued.
- Michael D. Stremmel, P.E. does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.

Analyses

Window Anchorage

The as-tested and as-tested with alternate substrate anchorage methods are evaluated on page 33 to page 46 and summarized in Table 1, Table 2 (page 4) and Table 3 (page 5). The as-tested capacities will be used to justify anchorage to alternate substrates having equal or higher anchorage capacities.

Table 1 Anchorage Capacities for Fin Installation

Substrate	Anchor	Capacity	Comments
Wood SYP 2x	#6 x 1-5/8" Screw	204 lb	1. As-tested installation. 2. Limited by pull-over at fin. 3. 1/4" maximum shim space between frame and substrate.
16 Gauge Steel Stud	#10-16 TEKS Screw	209 lb	1. 50 ksi yield strength stud. 2. Full penetration +3 threads. 3. Limited by pull-out at substrate. 4. 1/4" maximum shim space between frame and substrate.
1/8" thick Aluminum Tube Mullion	#10-16 TEKS Screw	235 lb	1. 6063-T6 aluminum tube mullion. 2. Full penetration +3 threads. 3. Limited by pull-out at substrate. 4. 1/4" maximum shim space between frame and substrate. 5. 1/8" thick mullion qualifies 1/4" thick mullion

In all cases the alternate substrate capacities for the fin installation connections are equal to or greater than the as-tested value. Thus, the connection to the alternate substrate with the proposed anchor placed at the as-tested spacing is acceptable.

Table 2 Anchorage Capacities for Through-Frame Installation

Substrate	Anchor	Capacity	Comments
Wood SYP 2x	#10 x 2-1/2" Screw	112 lb	1. As-tested installation. 2. 1-1/4" minimum penetration. 3. Limited by shear capacity. 4. 1/4" maximum shim space between frame and substrate.
16 Gauge Steel Stud	#10-16 TEKS Screw	359 lb	1. 50 ksi yield strength stud. 2. Full penetration +3 threads. 3. Limited by bearing capacity. 4. 1/4" maximum shim space between frame and substrate.
1/8" thick Aluminum Tube Mullion	#10-16 TEKS Screw	359 lb	1. 6063-T6 aluminum tube mullion. 2. Full penetration +3 threads. 3. Limited by bearing capacity. 4. 1/4" maximum shim space between frame and substrate. 5. 1/8" thick mullion qualifies 1/4" thick mullion.
Concrete	3/16" Tapcon	186 lb	1. Minimum $f'_c = 3,000$ psi. 2. 1-1/2" minimum embedment. 3. 2" minimum edge distance. 4. Limited by shear capacity. 5. 1/4" maximum shim space between frame and substrate.
CMU	3/16" Tapcon	135 lb	1. Minimum ASTM C90 CMU. 2. 1" minimum embedment. 3. 2" minimum edge distance. 4. Limited by shear capacity. 5. 1/4" maximum shim space between frame and substrate.

In all cases the alternate substrate capacities for the through-frame installation connections are equal to or greater than the as-tested value. Thus, the connection to the alternate substrate with the proposed anchor placed at the as-tested spacing is acceptable.

Table 3 Anchorage Capacities for Anchor Clip Installation

Substrate	Anchor	Capacity	Comments
Wood SYP 2x	#6 x 1-5/8" Screw (Four Screws)	24 lb	1. As-tested installation. 2. 1-1/4" minimum penetration 3. Limited by bending of anchor clip. 4. 1/4" maximum shim space between frame and substrate.
16 Gauge Steel Stud	#10-16 TEKS Screw (Four Screws)	24 lb	1. 50 ksi yield strength stud. 2. Full penetration +3 threads. 3. Limited by bending of anchor clip. 4. 1/4" maximum shim space between frame and substrate.
1/8" thick Aluminum Tube Mullion	#10-16 TEKS Screw (Four Screws)	24 lb	1. 6063-T6 aluminum tube mullion. 2. Full penetration +3 threads. 3. Limited by bearing capacity. 4. 1/4" maximum shim space between frame and substrate. 5. 1/8" thick mullion qualifies 1/4" thick mullion
Concrete	3/16" Tapcon (One Anchor)	24 lb	1. Minimum $f'_c = 3,000$ psi 2. 1-1/2" minimum embedment. 3. 1" Minimum edge distance. 4. Limited by bending of anchor clip. 5. 1/4" maximum shim space between frame and substrate.
CMU	3/16" Tapcon (One Anchor)	24 lb	1. Minimum ASTM C90 CMU 2. 1" minimum embedment 3. 2" Minimum edge distance. 4. Limited by bending of anchor clip. 5. 1/4" maximum shim space between frame and substrate.

Note: For all substrates, the clip shall be secured to the window frame with four (4) #8 x 3/4" screws.

In all cases the alternate substrate capacities for the anchor clip installation connections are equal to or greater than the as-tested value. Thus, the connection to the alternate substrate with the proposed anchor(s) placed at the as-tested spacing is acceptable.

Anchorage Requirements

Anchorage requirements for the various approved Series 1209 and Series 1210 Premium Coastal Impact Casement Windows are presented in Table 4 (page 6) to Table 29 (page 31).

Table 4 Series 1209 Casement (36x84)

Window: Series 1209 Casement (36x84)		Test Report: ESP019892P-1719	
Maximum Size: 36" wide by 84" tall		Product Approval: FL17017.6	
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jams.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes: 1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 5 Series 1209 Casement (42x84)

Window: Series 1209 Casement (42x84)		Test Report: ESP015989-1525	
Maximum Size: 42" wide by 84" tall		Product Approval: FL17017.2	
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jams.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes: 1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 6 Series 1209 Casement (36x78)

Window: Series 1209 Casement (36x78)		Test Report: ESP019600-1705	
Maximum Size: 36" wide by 78" tall		Product Approval: FL17017.4	
Design Pressure: +65/-85 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jams.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes: 1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 7 Series 1210 Casement (36x84)

Window: Series 1210 Casement (36x84)		Test Report: ESP020870P-1773	
Maximum Size: 36" wide by 84" tall		Product Approval: FL17017.9	
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jams.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes: 1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 8 Series 1210 Casement (42x84)

Window: Series 1210 Casement (42x84)		Test Report: ESP015989P-1525	
Maximum Size: 42" wide by 84" tall		Product Approval: FL17017.14	
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jams.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes: 1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 9 Series 1210 Casement (42x84)

Window: Series 1210 Casement (42x84)		Test Report: ESP020114P-1727	
Maximum Size: 42" wide by 84" tall		Product Approval: FL17017.1	
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 10 Series 1209 Casement Picture (72x84)

Window: 1209 Casement Picture (72x84)		Test Reports: ESP017571P-1606 ESP018503P-1655.1	
Maximum Size: 72" wide by 84" tall		Product Approval: FL17694.2	
Design Pressure: +55/-70 psf		Missile Impact: Missile D, Wind Zone 4	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes:

1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 11 Series 1209 Casement Picture (42x78)

Window: 1209 Casement Picture (42x78)		Test Report: ESP019600P-1705	
Maximum Size: 42" wide by 78" tall		Product Approval: FL17694.1	
Design Pressure: +65/-85 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 12 Series 1210 Casement Picture (72x84)

Window: 1210 Casement Picture (72x84)		Test Report: ESP020870P-1773	
Maximum Size: 72" wide by 84" tall		Product Approval: FL17694.8	
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes:

1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 13 Series 1210 Casement Picture (42x78)

Window: 1210 Casement Picture (42x78)		Test Report: ESP019139-1688	
Maximum Size: 42" wide by 78" tall		Product Approval: FL17694.9	
Design Pressure: +65/-85 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7438-36 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7438-38 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7438-37 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 14 Series 1209 Mulled Casement (2 – 5 Wide)

Window: 1209 Mulled Casement		Test Reports: ESP015989P-1525	
Max. Operator Size: 42" wide by 84" tall		ESP017571P-1606	
Max. Fixed Size: 42" wide by 84" tall		ESP018503P-1655.1	
Design Pressure: +55/-70 psf		ESP018974P-1682	
Missile Impact: Missile D, Wind Zone 4		Product Approval: FL17017.5	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 15 Series 1209 Mulled Casement (2 – 5 Wide)

Window: 1209 Mulled Casement		Test Reports: ESP019892P-1719	
Max. Operator Size: 36" wide by 84" tall		ESP017571P-1606	
Max. Fixed Size: 36" wide by 84" tall		Product Approval: FL17017.6	
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 16 Series 1209 Mulled Casement (2 – 5 Wide)

Window: 1209 Mulled Casement		Test Reports: ESP019600P-1705	
Max. Operator Size: 36" wide by 78" tall		Product Approval: FL17017.1	
Max. Fixed Size: 42" wide by 78" tall			
Design Pressure: +65/-85 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes: 1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 17 Series 1209 Mulled Casement (2 – 3 Wide)

Window: 1209 Mulled Casement		Test Reports: ESP015989P-1525	
Max. Operator Size: 42" wide by 84" tall		ESP017571P-1606	
Max. Fixed Size: 72" wide by 84" tall		ESP018503P-1655.1	
Design Pressure: +55/-70 psf		ESP018829P-1676	
Missile Impact: Missile D, Wind Zone 4		Product Approvals: FL17017.14	
		FL17694.2	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Table 18 Series 1209 Mulled Casement (2 – 3 Wide)

Window: 1209 Mulled Casement		Test Reports: ESP019892P-1719	
Max. Operator Size: 36" wide by 84" tall		ESP017571P-1606	
Max. Fixed Size: 72" wide by 84" tall		ESP018503P-1655.1	
Design Pressure: +55/-70 psf		ESP018829P-1676	
Missile Impact: Missile D, Wind Zone 4		Product Approval: FL17017.8	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Table 19 Series 1209 Muller Fixed Casement (2 – 3 Wide)

Window: 1209 Muller Fixed Casement		Test Reports: ESP017571P-1606	
Max. Fixed Size: 72" wide by 84" tall		ESP018503P-1655.1	
Design Pressure: +55/-70 psf		ESP018829P-1676	
Missile Impact: Missile D, Wind Zone 4		Product Approval: FL14696.35	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Table 20 Series 1210 Mulled Casement (2 – 5 Wide)

Window: 1210 Mulled Casement		Test Reports: ESP020114P-1727	
Max. Operator Size: 42" wide by 84" tall		ESP020870P-1773	
Max. Fixed Size: 42" wide by 84" tall		ESP019892P-1682	
Design Pressure: +55/-70 psf		Product Approvals: FL17017.8	
Missile Impact: Missile D, Wind Zone 4		FL17017.5	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 21 Series 1210 Mulled Casement (2 – 5 Wide)

Window: 1210 Mulled Casement		Test Reports: ESP019892P-1719	
Max. Operator Size: 36" wide by 84" tall		ESP020114P-1727	
Max. Fixed Size: 72" wide by 84" tall		ESP020870P-1773	
Design Pressure: +55/-70 psf		Product Approvals: FL17017.6	
Missile Impact: Missile D, Wind Zone 4		FL17017.8	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes: 1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 22 Series 1210 Mulled Casement (2 – 5 Wide)

Window: 1210 Mulled Casement		Test Reports: ESP020114P-1727	
Max. Operator Size: 42" wide by 84" tall		ESP020870P-1773	
Max. Fixed Size: 42" wide by 84" tall		Product Approvals: FL17017.10	
Design Pressure: +55/-70 psf		FL17017.1	
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. f _c = 3,000 psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. f _c = 3,000 psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

Notes: 1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.

Table 23 Series 1210 Mulled Casement (2 – 3 Wide)

Window: 1210 Mulled Casement		Test Reports: ESP015989P-1525	
Max. Operator Size: 42" wide by 84" tall		ESP020870P-1773	
Max. Fixed Size: 72" wide by 84" tall		ESP018829P-1676	
Design Pressure: +55/-70 psf		Product Approvals: FL17017.8	
Missile Impact: Missile D, Wind Zone 4		FL17694.2	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Table 24 Series 1210 Mulled Casement (2 – 3 Wide)

Window: 1210 Mulled Casement		Test Reports: ESP020870P-1773	
Max. Operator Size: 36" wide by 84" tall		Product Approval: FL17017.8	
Max. Fixed Size: 72" wide by 84" tall			
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Table 25 Series 1210 Mulled Fixed Casement (2 – 3 Wide)

Window: 1210 Mulled Fixed Casement		Test Reports: ESP020870P-1773	
Max. Fixed Size: 72" wide by 84" tall		ESP018829P-1676	
Design Pressure: +55/-70 psf		Product Approval: FL14696.35	
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. f _c = 3,000 psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. f _c = 3,000 psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Table 26 Series 1209 Transom over Casement (1 – 2 Wide Casement)

Window: 1209 Transom over Casement		Test Report: ESP018974P-1682	
Max. Operator Size: 42" wide by 84" tall		Product Approval: FL17017.7	
Max. Fixed Size: 84" wide by 72" tall			
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Table 27 Series 1209 Transom over Casement (1 – 2 Wide Casement)

Window: 1209 Transom over Casement		Test Report: ESP019892P-1719	
Max. Operator Size: 36" wide by 84" tall		Product Approval: FL17017.6	
Max. Fixed Size: 72" wide by 84" tall			
Design Pressure: +55/-70 psf			
Missile Impact: Missile D, Wind Zone 4			
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Table 28 Series 1210 Transom over Casement (1 – 2 Wide Casement)

Window: 1210 Transom over Casement		Test Reports: ESP020870P-1773	
Max. Operator Size: 42" wide by 84" tall		ESP015989P-1525	
Max. Fixed Size: 84" wide by 72" tall		ESP018974P-1682	
Design Pressure: +55/-70 psf		Product Approvals: FL17017.7	
Missile Impact: Missile D, Wind Zone 4		FL17017.14	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Table 29 Series 1210 Transom over Casement (1 – 2 Wide Casement)

Window: 1210 Transom over Casement		Test Reports: ESP020114P-1727	
Max. Operator Size: 42" wide by 84" tall		ESP020870P-1773	
Max. Fixed Size: 72" wide by 84" tall		ESP019892P-1719	
Design Pressure: +55/-70 psf		Product Approvals: FL17017.6	
Missile Impact: Missile D, Wind Zone 4		FL17017.10	
Installation Method	Substrate	Anchor	Comments
Fin (see Note 1)	Wood	#6 x 1-5/8" Screw	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 5/8" minimum edge distance.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
Through-Frame (see Note 2)	Wood	#10 x 2-1/2" Screw	1. Southern Yellow Pine substrate. 2. 1-1/4" penetration to substrate. 3. 1-1/8" min. edge distance at sill; 2-1/8" min. at head and jambs.
	Steel Stud or Alum. Mull.	#10-16 TEKS Screw	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 2" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.
Anchor Clip (see Note 3, 4)	Wood	(4) #6 x 1-5/8" Screws	1. Southern Yellow Pine substrate. 2. 1-1/2" penetration to substrate. 3. 1/2" minimum edge distance.
	Steel Stud or Alum. Mull.	(4) #10-16 TEKS Screws	1. 16 gauge, 50 ksi steel stud or 1/8" min. thick 6063-T6 mullion. 2. Full penetration + 3 threads. 3. 1/2" minimum edge distance.
	Concrete	3/16" Tapcon Anchor (NOA 16-1222.06)	1. $f'_c = 3,000$ psi concrete. 2. 1-1/2" embedment to substrate. 3. 1" minimum edge distance.
	CMU	3/16" Tapcon Anchor (NOA 16-1222.06)	1. ASTM C90 medium weight block. 2. 1" penetration to substrate. 3. 2" minimum edge distance.

- Notes:**
1. Anchor placement for fin install per Drawing 85-7815-15 (attached)
 2. Anchor placement for through-frame install per Drawing 85-7815-16 (attached)
 3. Anchor placement for anchor clip install per Drawing 85-7815-17 (attached)
 4. Anchor clip shall be secured to window frame with four (4) #8 x 3/4" screws.
 5. Anchor clip placement at mullion per Drawing 85-7815-21 (attached)

Attachments

Appendix A – Revision Log (1 page)

Appendix B – Installation Drawings (7 pages)

As-Tested – PVC Nail Fin to Wood

#6 x 1-5/8" Wood Screw

PVC Nailing Fin

Southern Yellow Pine Wood Substrate Minimum (G=0.55)

Allowable Tension of #6 x 1-5/8" Wood Screw

$$W = 1.6(1.500'')(119 \text{ lb/in}) \text{ (NDS, Table 12.2B)}$$
$$W = 286 \text{ lb}$$

Pull-Over of #6 x 1-5/8" Wood Screw

Validated by Testing

Report: ESP017571P-1606
Size: 72" wide by 84" tall
Pressure: 70 psf
As-tested spacing: 8"-10" on center

$$\text{Load to Anchor: } p = (70 \text{ psf}/144)(84''/2)(10'') = 204 \text{ lb}$$

Pull-over governs

Must maintain anchor spacing and anchor head size

As-tested spacing: 8"-10" on center
As-tested anchor head size: 0.279"

Capacity of Connection is 204 lb

Alternate Substrate – PVC Nail Fin to Steel Stud

#10-16 TEKS Screw

PVC Nailing Fin

Minimum 16 gauge 50 KSI Steel Stud

Allowable Tension of #10-16 TEKS Screw

$$P_{ss}/\Omega = (145 \text{ lb})(1.44) = 209 \text{ lb} \quad (\text{ESR-1976, Table 2})$$

Pull-Over of #10-16 TEKS Screw

Anchor head size: 0.365" > 0.279" Maintain as-tested spacing.

Capacity of Connection is 209 lb

Alternate Substrate – PVC Nail Fin to Aluminum Tube Mullion

#10-16 TEKS Screw

PVC Nailing Fin

1/8" thick 6063-T6 aluminum tube mullion (qualifies 1/4" thick mullion)

Tensile Capacity of #10-16 TEKS Screw

$$P_{ts}/\Omega = 885 \text{ lb} \quad (\text{ESR-1976})$$

Pull-Out of #10-16 TEKS Screw at Tube Mullion

$$\begin{aligned} P_{\text{not}} &= K_s D L_e F_{ty2} / 3.0 \\ P_{\text{not}} &= 1.2 (0.190") (0.125") (25,000 \text{ psi}) / 3.0 \\ P_{\text{not}} &= 238 \text{ lb} \end{aligned}$$

Pull-Over of #10-16 TEKS Screw

Anchor head size: 0.365" > 0.279" Maintain as-tested spacing.

Capacity of Connection is 235 lb

As-Tested – Through Frame to Wood

#10 x 2-1/2" Wood Screw

1-3/16" thick Window Frame (Ponderosa Pine/Douglas Fir, $G_{min} = 0.43$)

1/4" Maximum Shim Space

Southern Yellow Pine 2x Wood Substrate ($G=0.55$)

Allowable Shear of #10 x 1-1/2" Wood Screw

$Z' = 117 \text{ lb}$ (Limited by Mode IV, see next two pages)

Capacity of Connection is 112 lb

As-Tested – Through Frame to Wood (Continued)

Lateral Design Strength of Wood Connections

Data

Fastener			
Fastener	=	#10 Wood Screw	
Shank Dia	=	0.190	in.
Root Dia.	=	0.152	in.
F_{yb}	=	80,000	psi
Fastener length	=	2.500	in.
Main Member			
Material	=	SYP	
G	=	0.55	
θ	=	90	<= (Angle of load to grain $0^\circ \leq \theta \leq 90^\circ$)
F_e	=	5,550	psi
Thickness	=	1.500	in.
Side Member			
Material	=	Ponderosa Pine	
G	=	0.43	
θ	=	90	<= (Angle of load to grain $0^\circ \leq \theta \leq 90^\circ$)
F_{es}	=	3,500	psi
Thickness	=	1.180	in.

Calculations

Lateral Bearing Factors

D	=	0.152	in.
ℓ_m	=	0.940	in.
K_θ	=	1.25	
K_D	=	2.20	
R_e	=	1.586	
R_t	=	0.80	
k_1	=	0.4616	
k_2	=	1.4939	
k_3	=	0.96	

Yield Mode	R_d
I_m, I_s	2.20
II	2.20
III_m, III_s, IV	2.20

As-Tested – Through Frame to Wood (Continued)

Lateral Design Values, Z

Mode I _m	=	360	lbf	
Mode I _s	=	285	lbf	
Mode II	=	132	lbf	
Mode III _m	=	129	lbf	
Mode III _s	=	121	lbf	
Mode IV	=	112	lbf	
C _D	=	1		<===== Minimum Value

Wet Service Factor

Fabrication/In-Service		Dry/Dry	
C _M	=	1.0	
In service temperature		T≤100°F	
C _t	=	1.0	
C _g	=	1.0	
C _Δ	=	1.0	
Is fastener installed in end grain?		No	
C _{eg}	=	1.00	
Is fastener part of a diaphragm?		No	
C _{di}	=	1.0	
Is fastener toe-nailed?		No	
C _{tn}	=	1.00	
Z'	=	112	lbf

Alternate Substrate – Through Frame to Steel Stud

#10-16 TEKS Screw

1-3/16" thick Window Frame (Ponderosa Pine/Douglas Fir, G = 0.43)

1/4" Maximum Shim Space

Minimum 16 gauge 50 KSI Steel Stud

Allowable Shear of #10-16 TEKS Screw

$$P_{ss}/\Omega = 573 \text{ lb (ESR-1976)}$$

Bearing of #10-16 TEKS Screw on Wood Frame

$$F_e = 3,500 \text{ psi}$$

$$D = 0.190"$$

$$V_a = (F_e)(D)(L)/R_d = (3,500 \text{ psi})(0.190")(1.188")/2.2 = 359 \text{ lb}$$

Bearing of #10-16 TEKS Screw on Steel Stud

$$V_a = 2.7DtF_{tu}/3.0$$

$$V_a = 2.7(0.190")(0.054")(65,000 \text{ psi})/3.0$$

$$V_a = 600 \text{ lb.}$$

Tilting of #10-16 TEKS Screw in Steel Stud

$$V_a = 4.2(t_2^3 D)^{1/2} F_{tu2}/n_s$$

$$V_a = 4.2(0.054"{}^3 \times 0.190")^{1/2} (65,000 \text{ psi})/3.0$$

$$V_a = 497 \text{ lb.}$$

Capacity of Connection is 359 lb.

Alternate Substrate – Through Frame to Aluminum Tube Mullion

#10-16 TEKS Screw

1-3/16" thick Window Frame (Ponderosa Pine/Douglas Fir, G = 0.43)

1/4" Maximum Shim Space

1/8" thick 6063-T6 aluminum tube mullion (qualifies 1/4" thick mullion)

Allowable Shear of #10-16 TEKS Screw

$$P_{ss}/\Omega = 573 \text{ lb (ESR-1976)}$$

Bearing of #10-16 TEKS Screw on Wood Frame

$$F_e = 3,500 \text{ psi}$$

$$D = 0.190"$$

$$V_a = (F_e)(D)(L)/R_d = (3,500 \text{ psi})(0.190")(1.188")/2.2 = 359 \text{ lb}$$

Bearing of #10-16 TEKS Screw on Aluminum Tube Mullion

$$V_a = 2DtF_u/n_u$$

$$V_a = 2(0.190")(0.125")(30,000 \text{ psi})/3.0$$

$$V_a = 475 \text{ lb.}$$

Tilting of #10-16 TEKS Screw in Aluminum Tube Mullion

$$V_a = 4.2(t_2^3 D)^{1/2} F_{tu2}/n_s$$

$$V_a = 4.2(0.125''^3 \times 0.190'')^{1/2} (30,000 \text{ psi})/3.0$$

$$V_a = 809 \text{ lb.}$$

Capacity of Connection is 359 lb.

Alternate Substrate – Through Frame to Concrete

3/16" Tapcon Anchor

2" Minimum Edge Distance, 1-1/2" Minimum Embedment, 2" Minimum Spacing

1-3/16" thick Window Frame (Ponderosa Pine/Douglas Fir, G = 0.43)

1/4" Maximum Shim Space

Minimum $f'_c = 3,000$ psi Concrete

Allowable Shear of 3/16" Tapcon Anchor

$$P_{ss}/\Omega = 186 \text{ lb} \quad (\text{NOA No. 16-1222.06})$$

Bearing of 3/16" Tapcon Anchor on Wood Frame

$$F_e = 3,500 \text{ psi}$$

$$D = 0.188"$$

$$V_a = (F_e)(D)(L)/R_d = (3,500 \text{ psi})(0.188")(1.188")/2.2 = 355 \text{ lb}$$

Capacity of Connection is 186 lb

Alternate Substrate – Through Frame to CMU

3/16" Tapcon Anchor

2" Minimum Edge Distance, 1" Minimum Embedment, 3" Minimum Spacing

1-3/16" thick Window Frame (Ponderosa Pine/Douglas Fir, G = 0.43)

1/4" Maximum Shim Space

Minimum ASTM C90 Medium-Weight Concrete Masonry Unit

Allowable Shear of 3/16" Tapcon Anchor

$$P_{ss}/\Omega = 135 \text{ lb} \quad (\text{NOA No. 16-1222.06})$$

Bearing of 3/16" Tapcon Anchor on Wood Frame

$$F_e = 3,500 \text{ psi}$$

$$D = 0.188"$$

$$V_a = (F_e)(D)(L)/R_d = (3,500 \text{ psi})(0.188")(1.188")/2.2 = 355 \text{ lb}$$

Capacity of Connection is 135 lb

As-Tested – Installation Clip to Wood

(4) #6 x 1-5/8" Wood Screws

0.040" thick steel anchor clip ($F_y = 33,000$ psi, $F_u = 45,000$ psi)

Southern Yellow Pine Wood Substrate Minimum ($G=0.55$)

1/4" Maximum Shim Space

Allowable Tension of #6 x 1-5/8" Wood Screw

$$W = 1.6(1.500")(119 \text{ lb/in}) \text{ (NDS, Table 12.2B)}$$
$$W = 286 \text{ lb}$$

Pull-Over of #6 x 1-5/8" Wood Screw

$$P_{nov} = 1.5t_1d_wF_u/\Omega$$
$$P_{nov} = 1.5(0.040")(0.279")(45,000 \text{ psi})/3.0$$
$$P_{nov} = 251 \text{ lb}$$

Tension in Clip

$$A_{net} = (1.500" - (2)(0.180"))(0.040") = 0.0456 \text{ in}^2$$
$$P_n = F_uA_{net} = (45,000 \text{ psi})(0.0456 \text{ in}^2) = 2,052 \text{ lb}$$
$$P_a = P_n/\Omega = 2,052 \text{ lb}/2.0 = 1,026 \text{ lb}$$

Bending of Clip

$$L = (1/4" \text{ shim} + 1/2" \text{ edge distance})/2 = 0.375"; \text{ guided cantilever at bend in clip}$$
$$S = (1.500")(0.040")^2/6 = 0.0004 \text{ in}^3$$
$$F_b = 0.67F_y = (0.67)(33,000 \text{ psi}) = 22,110 \text{ psi}$$
$$M_a = P_a(L) = F_bS; P_a = F_bS/L = (22,110 \text{ psi})(0.0004 \text{ in}^3)/0.375" = 24 \text{ lb}$$

Capacity of Connection is 24 lb

Alternate Substrate – Installation Clip to Steel Stud

#10-16 TEKS Screw

0.040" thick steel anchor clip ($F_y = 33,000$ psi, $F_u = 45,000$ psi)

Minimum 16 gauge 50 KSI Steel Stud

1/4" Maximum Shim Space

Pull-Out of #10-16 TEKS Screw

$$\begin{aligned}P_{\text{not}} &= 0.85t_c d F_{u2} / 3.0 \\P_{\text{not}} &= 0.85(0.054")(0.190")(65,000 \text{ psi}) / 3.0 \\P_{\text{not}} &= 189 \text{ lb}\end{aligned}$$

Pull-Over of #10-16 TEKS Screw

$$\begin{aligned}P_{\text{nov}} &= 1.5t_1 d_w F_u / \Omega \\P_{\text{nov}} &= 1.5(0.040")(0.365")(45,000 \text{ psi}) / 3.0 \\P_{\text{nov}} &= 329 \text{ lb}\end{aligned}$$

Tension in Clip

$$\begin{aligned}A_{\text{net}} &= (1.500" - (2)(0.180"))(0.040") = 0.0456 \text{ in}^2 \\P_n &= F_u A_{\text{net}} = (45,000 \text{ psi})(0.0456 \text{ in}^2) = 2,052 \text{ lb} \\P_a &= P_n / \Omega = 2,052 \text{ lb} / 2.0 = 1,026 \text{ lb}\end{aligned}$$

Bending of Clip

$$\begin{aligned}L &= (1/4" \text{ shim} + 1/2" \text{ edge distance}) / 2 = 0.375"; \text{ guided cantilever at bend in clip} \\S &= (1.500")(0.040")^2 / 6 = 0.0004 \text{ in}^3 \\F_b &= 0.67F_y = (0.67)(33,000 \text{ psi}) = 22,110 \text{ psi} \\M_a &= P_a(L) = F_b S; P_a = F_b S / L = (22,110 \text{ psi})(0.0004 \text{ in}^3) / 0.375" = 24 \text{ lb}\end{aligned}$$

Capacity of Connection is 24 lb

Alternate Substrate – Installation Clip to Aluminum Tube Mullion

#10-16 TEKS Screw

0.040" thick steel anchor clip ($F_y = 33,000$ psi, $F_u = 45,000$ psi)

1/8" thick 6063-T6 aluminum tube mullion (qualifies 1/4" thick tube mullion)

1/4" Maximum Shim Space

Pull-Out of #10-16 TEKS Screw at Tube Mullion

$$\begin{aligned}P_{\text{not}} &= K_s D L_e F_{ty2} / 3.0 \\P_{\text{not}} &= 1.2 (0.190") (0.125") (25,000 \text{ psi}) / 3.0 \\P_{\text{not}} &= 238 \text{ lb}\end{aligned}$$

Pull-Over of #10-16 TEKS Screw

$$\begin{aligned}P_{\text{nov}} &= 1.5 t_1 d_w F_u / \Omega \\P_{\text{nov}} &= 1.5 (0.040") (0.365") (45,000 \text{ psi}) / 3.0 \\P_{\text{nov}} &= 329 \text{ lb}\end{aligned}$$

Tension in Clip

$$\begin{aligned}A_{\text{net}} &= (1.500" - (2)(0.180")) (0.040") = 0.0456 \text{ in}^2 \\P_n &= F_u A_{\text{net}} = (45,000 \text{ psi}) (0.0456 \text{ in}^2) = 2,052 \text{ lb} \\P_a &= P_n / \Omega = 2,052 \text{ lb} / 2.0 = 1,026 \text{ lb}\end{aligned}$$

Bending of Clip

$$\begin{aligned}L &= (1/4" \text{ shim} + 1/2" \text{ edge distance}) / 2 = 0.375"; \text{ guided cantilever at bend in clip} \\S &= (1.500") (0.040")^2 / 6 = 0.0004 \text{ in}^3 \\F_b &= 0.67 F_y = (0.67) (33,000 \text{ psi}) = 22,110 \text{ psi} \\M_a &= P_a (L) = F_b S; P_a = F_b S / L = (22,110 \text{ psi}) (0.0004 \text{ in}^3) / 0.375" = 24 \text{ lb}\end{aligned}$$

Capacity of Connection is 24 lb

Alternate Substrate – Installation Clip to Concrete

3/16" Tapcon Anchor

1" Minimum Edge Distance, 1-1/2" Minimum Embedment

Minimum $f'_c = 3,000$ psi Concrete

0.040" thick steel anchor clip ($F_y = 33,000$ psi, $F_u = 45,000$ psi)

1/4" Maximum Shim Space

Tension Capacity of 3/16" Tapcon Anchor

$$P_a = 261 \text{ lb (NOA No. 16-1222.06)}$$

Pull-Over of 3/16" Tapcon Anchor

$$\begin{aligned} P_{nov} &= 1.5t_1d_wF_u/\Omega \\ P_{nov} &= 1.5(0.040")(0.357")(45,000 \text{ psi})/3.0 \\ P_{nov} &= 321 \text{ lb} \end{aligned}$$

Tension in Clip

$$\begin{aligned} A_{net} &= (1.500" - (2)(0.180"))(0.040") = 0.0456 \text{ in}^2 \\ P_n &= F_uA_{net} = (45,000 \text{ psi})(0.0456 \text{ in}^2) = 2,052 \text{ lb} \\ P_a &= P_n/\Omega = 2,052 \text{ lb}/2.0 = 1,026 \text{ lb} \end{aligned}$$

Bending of Clip

$$\begin{aligned} L &= (1/4" \text{ shim} + 1/2" \text{ edge distance})/2 = 0.375"; \text{ guided cantilever at bend in clip} \\ S &= (1.500")(0.040")^2/6 = 0.0004 \text{ in}^3 \\ F_b &= 0.67F_y = (0.67)(33,000 \text{ psi}) = 22,110 \text{ psi} \\ M_a &= P_a(L) = F_bS; P_a = F_bS/L = (22,110 \text{ psi})(0.0004 \text{ in}^3)/0.375" = 24 \text{ lb} \end{aligned}$$

Capacity of Connection is 24 lb

Alternate Substrate – Installation Clip to CMU

3/16" Tapcon Anchor

2" Minimum Edge Distance, 1" Minimum Embedment

Minimum ASTM C90 Medium-Weight Concrete Masonry Unit

0.040" thick steel anchor clip ($F_y = 33,000$ psi, $F_u = 45,000$ psi)

1/4" Maximum Shim Space

Tension Capacity of 3/16" Tapcon Anchor

$$P_a = 68 \text{ lb (NOA No. 16-1222.06)}$$

Pull-Over of 3/16" Tapcon Anchor

$$\begin{aligned} P_{\text{nov}} &= 1.5t_1d_wF_u/\Omega \\ P_{\text{nov}} &= 1.5(0.040")(0.357")(45,000 \text{ psi})/3.0 \\ P_{\text{nov}} &= 321 \text{ lb} \end{aligned}$$

Tension in Clip

$$\begin{aligned} A_{\text{net}} &= (1.500" - (2)(0.180"))(0.040") = 0.0456 \text{ in}^2 \\ P_n &= F_uA_{\text{net}} = (45,000 \text{ psi})(0.0456 \text{ in}^2) = 2,052 \text{ lb} \\ P_a &= P_n/\Omega = 2,052 \text{ lb}/2.0 = 1,026 \text{ lb} \end{aligned}$$

Bending of Clip

$$\begin{aligned} L &= (1/4" \text{ shim} + 1/2" \text{ edge distance})/2 = 0.375"; \text{ guided cantilever at bend in clip} \\ S &= (1.500")(0.040")^2/6 = 0.0004 \text{ in}^3 \\ F_b &= 0.67F_y = (0.67)(33,000 \text{ psi}) = 22,110 \text{ psi} \\ M_a &= P_a(L) = F_bS; P_a = F_bS/L = (22,110 \text{ psi})(0.0004 \text{ in}^3)/0.375" = 24 \text{ lb} \end{aligned}$$

Capacity of Connection is 24 lb

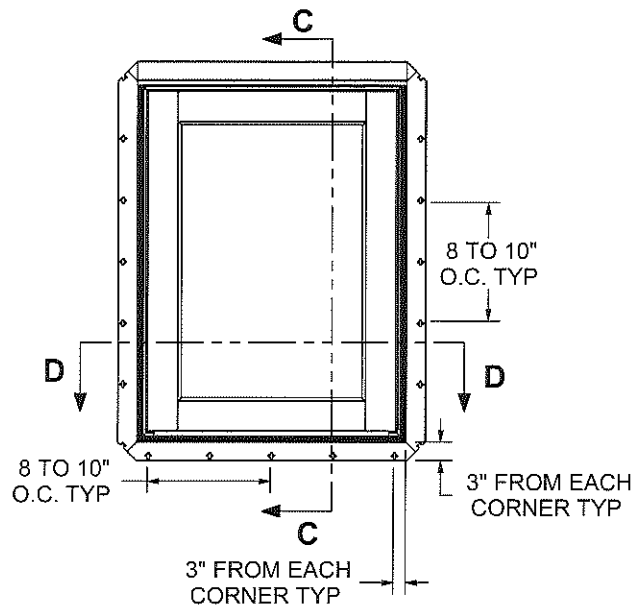
Appendix A

Revision Log

<u>Identification</u>	<u>Date</u>	<u>Page & Revision</u>
Original Issue	12/21/23	Not Applicable

Appendix B

Installation Drawings



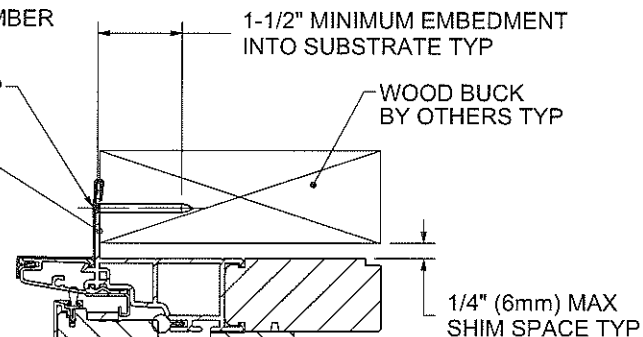
#6 NON-CORROSIVE SCREWS
 1-1/2" MIN PENETRATION INTO FRAMING MEMBER
 3" FROM EACH CORNER
 8-10" ON CENTER THROUGH NAILING FIN
 AROUND THE UNITS ENTIRE PERIMETER TYP

USE SILICONE SEALANT
 AROUND ENTIRE PERIMETER
 BETWEEN NAILING FIN &
 WOOD BUCK BY OTHERS TYP

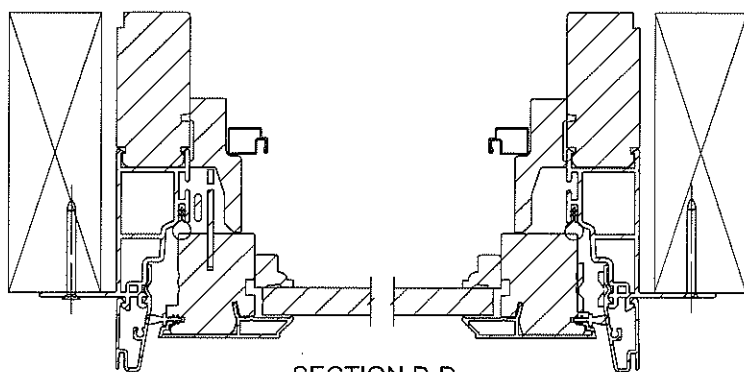
Weather Shield

Windows & Doors

1209, 1210, 8211
 CASEMENT, AWNING, AND PICTURE
 NAILING FIN INSTALLATION



SECTION C-C
 SCALE 1 : 3



SECTION D-D
 SCALE 1 : 3

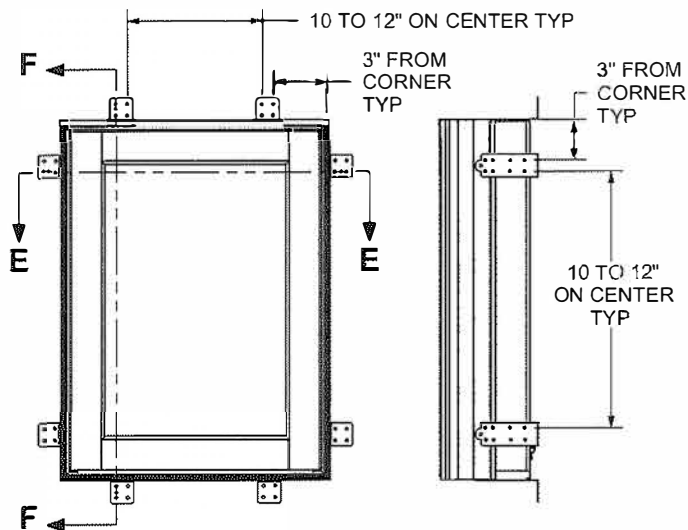
.625" MINIMUM
 EDGE DISTANCE
 TYP

NOTE(S):

1. DIMENSIONED VIEWS ARE TYPICAL FOR ALL CROSS SECTION DETAILS.

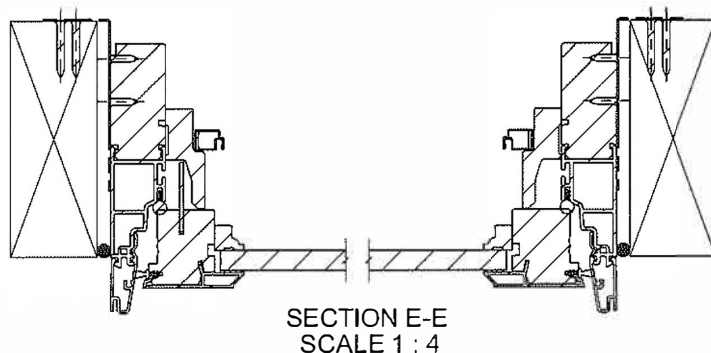
THIS SCHEDULE ADDRESSES ONLY THE FASTENERS REQUIRED TO ANCHOR THE WINDOW(S) TO ACHIEVE THE RATED DESIGN PRESSURE. THOROUGHLY READ AND FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS RECEIVED WITH UNIT. THIS GUIDE DOES NOT ADDRESS THE SEALING CONSIDERATIONS THAT MAY ARISE IN DIFFERENT WALL CONDITIONS.

					TYP. WALL THICKNESS:	CUR STOCK SIZE:	1209, 1210, 8211		
					AREA:	ECO OR W.S. #:	30166		
					WT./FT.:		TITLE: INSTALLATION INSTRUCTIONS		
					FILE PATH:		DWG. NO. 85-7438-36		REV.
REVISION	DATE	DESCRIPTION		WHITE SLIP NUMBER	ENG.	DO NOT SCALE DRAWING	DRAWN BY: JK/EB	DATE: 10-30-14	SCALE: 1:12 SHEET NAME: Sheet1
									SHEET 1 OF 1

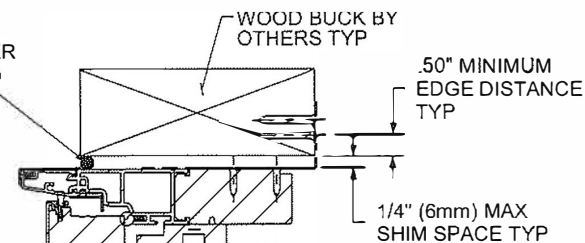


Weather Shield Windows & Doors

1209, 1210, 8211
CASEMENT, AWNING, AND PICTURE
Installation Clip
INSTALLATION METHOD



USE SILICONE SEALANT
AROUND ENTIRE PERIMETER
BETWEEN JAMB & FRAMING
MEMBER BY OTHERS TYP



SECTION F-F
SCALE 1:4

(4) #8 NON-CORROSIVE
SCREWS THROUGH
INSTALLATION CLIP INTO UNIT
TYP

1/2" MINIMUM PENETRATION
INTO JAMB TYP

(4) #6 NON-CORROSIVE
SCREWS THROUGH
INSTALLATION CLIP INTO
FRAMING MEMBER TYP

1-1/2" MINIMUM EMBEDMENT
INTO SUBSTRATE TYP

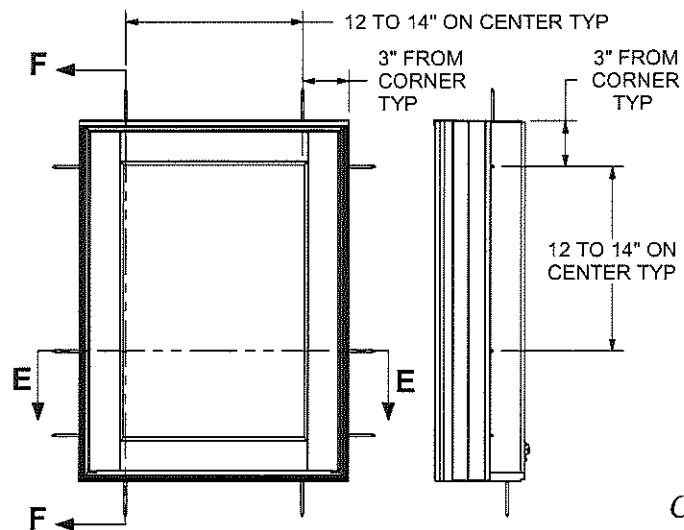
NOTE(S):

1. DIMENSIONED VIEWS ARE TYPICAL FOR ALL CROSS SECTION DETAILS.

THIS SCHEDULE ADDRESSES ONLY THE FASTENERS REQUIRED TO ANCHOR THE WINDOW(S) TO ACHIEVE THE RATED DESIGN PRESSURE. THOROUGHLY READ AND FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS RECEIVED WITH UNIT. THIS GUIDE DOES NOT ADDRESS THE SEALING CONSIDERATIONS THAT MAY ARISE IN DIFFERENT WALL CONDITIONS.

MATERIAL:		Weather Shield Windows & Doors	
DIV./ORDER #:			
DATE ORDERED:		PRODUCTS:	
Q.C. COMPARATOR CHECK: ☐		1209, 1210, 8211	
FINISH:		TITLE:	
CUT STOCK SIZE:		INSTALLATION INSTRUCTIONS	
ECO OR W.S. #: 30166		DWG. NO.	
FILE PATH:		85-7438-37	
DRAWN BY:		DATE:	
JK/EB		10-30-14	
DO NOT SCALE DRAWING		SCALE: 1:12 SHEET NAME: Sheet1	
REVISION		SHEET 1 OF 1	

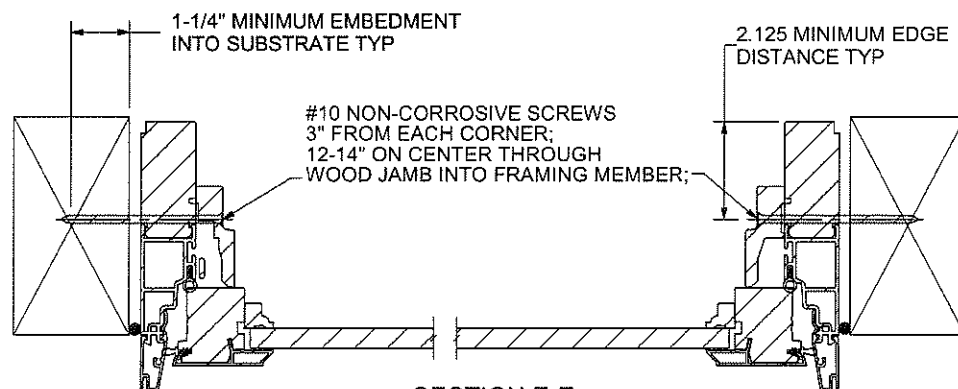
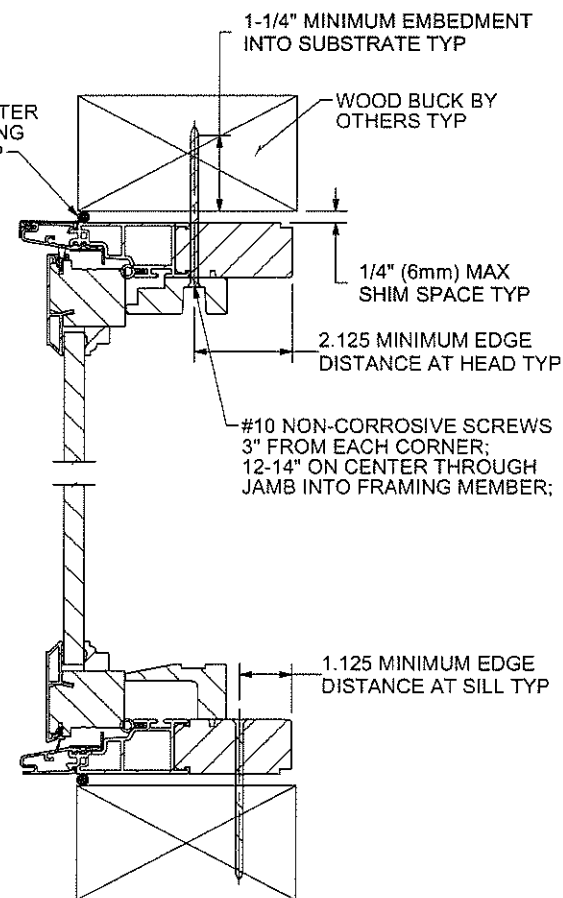
REVISION	DATE	DESCRIPTION	WHITE SLIP NUMBER	ENG.



Weather Shield Windows & Doors

1209, 1210, 8211
CASEMENT, AWNING AND PICTURE
THRU THE JAMB INSTALLATION

USE SILICONE SEALANT
AROUND ENTIRE PERIMETER
BETWEEN JAMB & FRAMING
MEMBER BY OTHERS TYP



SECTION E-E
SCALE 1 : 4

SECTION F-F
SCALE 1 : 4

NOTE(S):

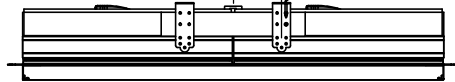
1. DIMENSIONED VIEWS ARE TYPICAL FOR ALL CROSS SECTION DETAILS.

THIS SCHEDULE ADDRESSES ONLY THE FASTENERS REQUIRED TO ANCHOR THE WINDOW(S) TO ACHIEVE THE RATED DESIGN PRESSURE. THOROUGHLY READ AND FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS RECEIVED WITH UNIT. THIS GUIDE DOES NOT ADDRESS THE SEALING CONSIDERATIONS THAT MAY ARISE IN DIFFERENT WALL CONDITIONS.

DIE #, X-REF #, COMPARATOR #: TYP. WALL THICKNESS: AREA: WT./FT.: FILE PATH:		MATERIAL:		Weather Shield <i>Windows & Doors</i> PRODUCTS: 1209, 1210, 8211 DWG. NO. 85-7438-38 SCALE: 1:12 SHEET NAME: Sheet1
		DIV./ORDER #:		
		DATE ORDERED:		
		G.C. COMPARATOR CHECK: ☐		
		FINISH:		REV.
		CUT STOCK SIZE:		
		ECO OR W.S. #: 30166		
		DRAWN BY: JK/EB		
		DATE: 10-30-14		
		DO NOT SCALE DRAWING		

REVISION	DATE	DESCRIPTION	WHITE SLIP NUMBER	ENG.

Q TO 4.000 TYP
INSTALLATION CLIPS
AT EACH MULL/STACK
JOINT TYPICAL



#6 X (1-5/8") NON-CORROSIVE SCREW
1-1/2" MIN PENETRATION INTO FRAMING MEMBER
2" FROM CORNERS
8-10" ON CENTER THROUGH NAILING FIN
AROUND THE UNITS ENTIRE PERIMETER TYP

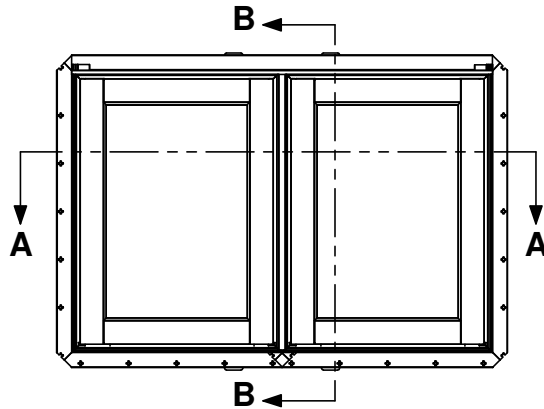
USE SILICONE SEALANT
AROUND ENTIRE PERIMETER
BETWEEN NAILING FIN &
WOOD BUCK BY OTHERS TYP

1-1/2" MINIMUM PENETRATION
INTO SUBSTRATE TYP

WOOD BUCK
BY OTHERS TYP

MIN EDGE DISTANCE 1/2"

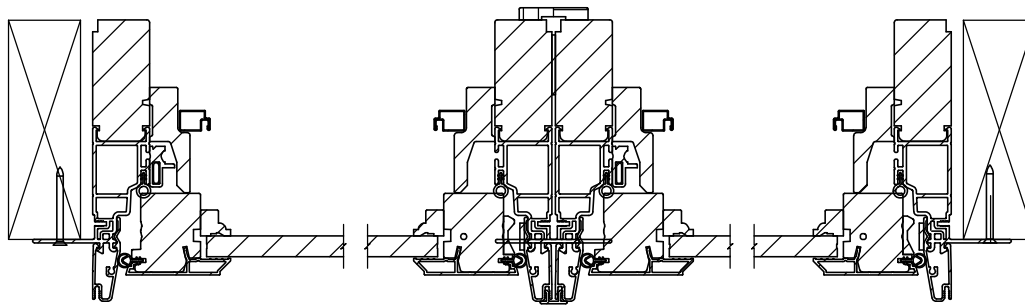
1/4" (6mm) MAX
SHIM SPACE TYP



Weather Shield Windows & Doors

1209, 1210 Twin
NAILING FIN INSTALLATION

SECTION B-B
SCALE 1 : 4



SECTION A-A
SCALE 1 : 4

1/2" MINIMUM PENETRATION
INTO WOOD JAMB TYP

(4) #6 NON-CORROSIVE SCREWS
THROUGH INSTALLATION CLIP
INTO FRAMING MEMBER TYP

1-1/2" MINIMUM PENETRATION
INTO FRAMING MEMBER TYP

(4) #8 NON-CORROSIVE SCREWS
THROUGH INSTALLATION CLIP
INTO UNIT TYP

NOTE(S): INSTALLATION CLIPS COMPRISED OF
1-1/2 X 5-1/2", 20 GAUGE GALV. STEEL.

THIS SCHEDULE ADDRESSES ONLY THE FASTENERS REQUIRED TO ANCHOR THE WINDOW(S) TO ACHIEVE THE RATED DESIGN PRESSURE. THOROUGHLY READ AND FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS RECEIVED WITH UNIT. THIS GUIDE DOES NOT ADDRESS THE SEALING CONSIDERATIONS THAT MAY ARISE IN DIFFERENT WALL CONDITIONS.

TOLERANCES UNLESS SPECIFIED:	
INCHES	ANGLE
.x ± .1"	xx ± 1°
.xx ± .03"	xx.x ± .5° (1/2°)
.xxx ± .015"	xx.xx ± .25° (1/4°)

WEATHER SHIELD.
WINDOWS & DOORS

PRODUCTS:
1209, 1210 TWIN

DRAWN BY:
JK/EB

DATE:
10-30-14

TITLE:
INSTALLATION INSTRUCTIONS

DWG NO.:
85-7815-15

REV
M

SCALE: 1:12 SHEET NAME: Sheet1

SHEET 1 OF 1

DO NOT SCALE DRAWING

REV	DATE	DESCRIPTION	PCR NO.	ENG	PDR #:	PROFILE #:

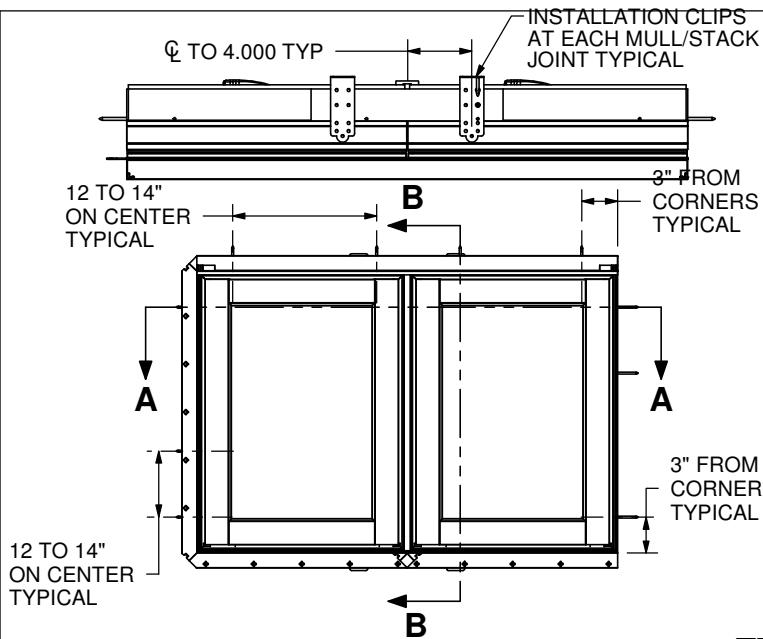
TYP. WALL THICKNESS:

WT/FT:

AREA:

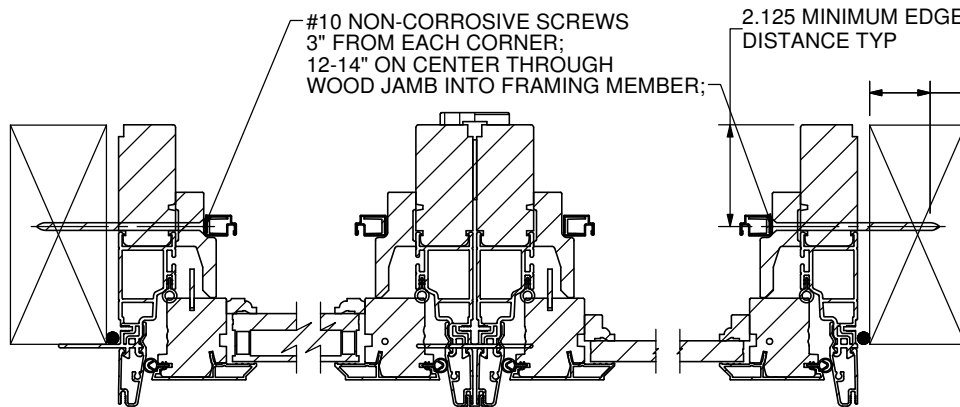
MAT:

FINISH:

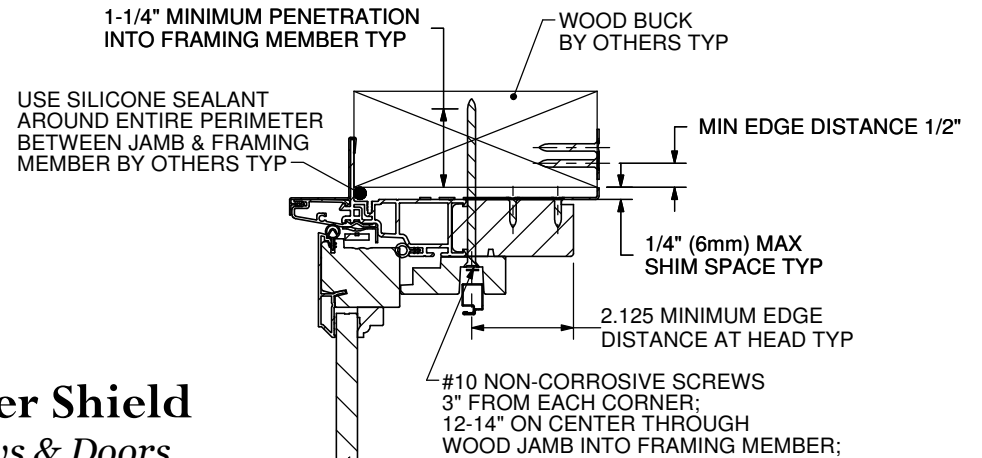


Weather Shield Windows & Doors

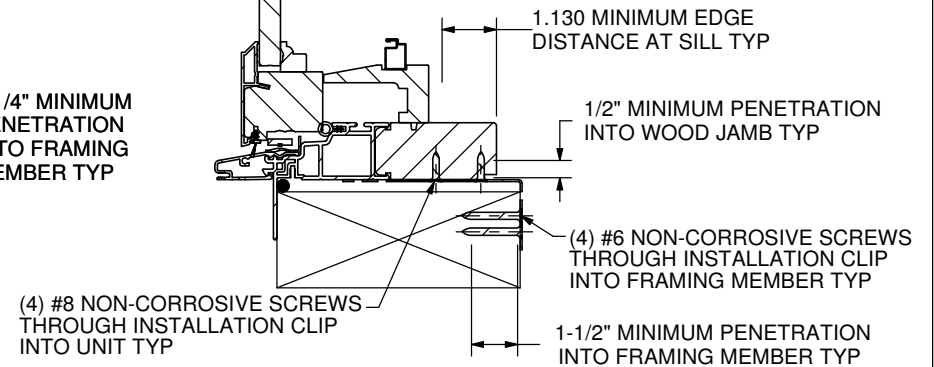
1209, 1210 Twin THRU THE JAMB INSTALLATION



SECTION A-A
SCALE 1 : 4



SECTION B-B
SCALE 1 : 4



THIS SCHEDULE ADDRESSES ONLY THE FASTENERS REQUIRED TO ANCHOR THE WINDOW(S) TO ACHIEVE THE RATED DESIGN PRESSURE. THOROUGHLY READ AND FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS RECEIVED WITH UNIT. THIS GUIDE DOES NOT ADDRESS THE SEALING CONSIDERATIONS THAT MAY ARISE IN DIFFERENT WALL CONDITIONS.

TOLERANCES UNLESS SPECIFIED:	
INCHES	ANGLE
.X ± .1"	XX ± 1°
.XX ± .03"	XX.X ± 5° (1/2°)
.XXX ± .015"	XX.XX ± .25° (1/4°)

WEATHER SHIELD.
WINDOWS & DOORS

PRODUCTS:
1209, 1210 TWIN

DRAWN BY:
JK/EB

DATE:
10-30-14

TITLE:

DWG NO.:
85-7815-16

REV
B

SCALE: 1:12 SHEET NAME: Sheet1

SHEET 1 OF 1

DO NOT SCALE DRAWING

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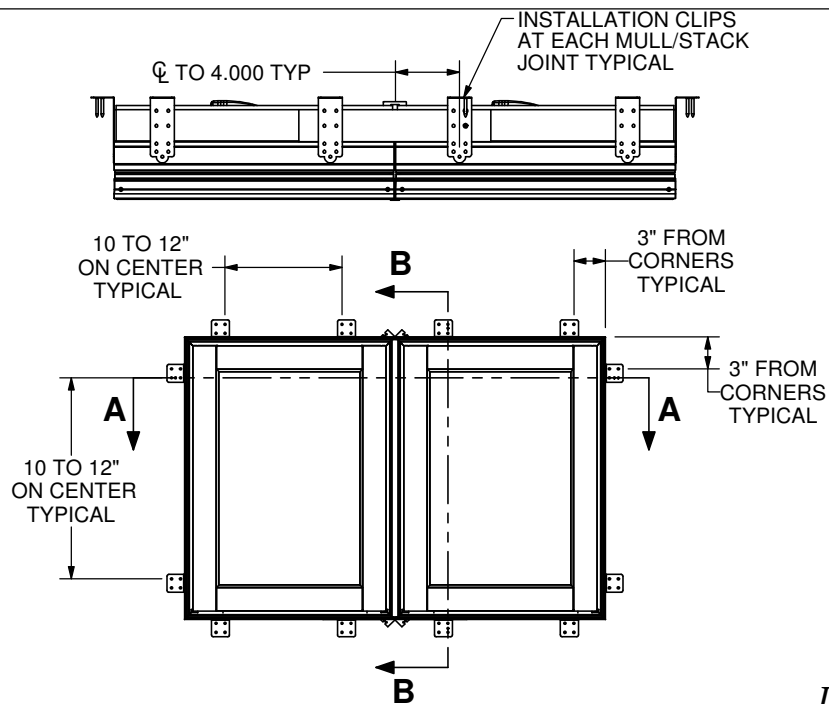
TYP. WALL THICKNESS:

WT/FT:

AREA:

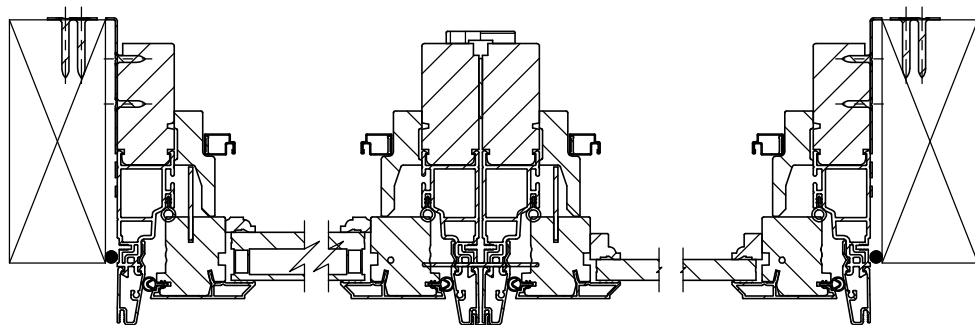
MAT:

FINISH:



Weather Shield Windows & Doors

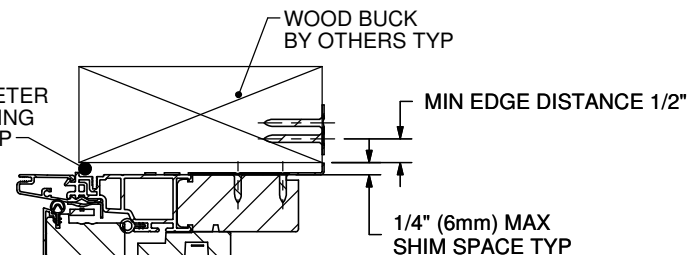
1209, 1210 Twin Installation Clip INSTALLATION METHOD



SECTION A-A
SCALE 1 : 4

THIS SCHEDULE ADDRESSES ONLY THE FASTENERS REQUIRED TO ANCHOR THE WINDOW(S) TO ACHIEVE THE RATED DESIGN PRESSURE. THOROUGHLY READ AND FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS RECEIVED WITH UNIT. THIS GUIDE DOES NOT ADDRESS THE SEALING CONSIDERATIONS THAT MAY ARISE IN DIFFERENT WALL CONDITIONS.

USE SILICONE SEALANT AROUND ENTIRE PERIMETER BETWEEN JAMB & FRAMING MEMBER BY OTHERS TYP



SECTION B-B
SCALE 1 : 4

(4) #8 NON-CORROSIVE SCREWS THROUGH INSTALLATION CLIP INTO UNIT TYP

1/2" MINIMUM PENETRATION INTO WOOD JAMB TYP

(4) #6 NON-CORROSIVE SCREWS THROUGH INSTALLATION CLIP INTO FRAMING MEMBER TYP

1-1/2" MINIMUM PENETRATION INTO FRAMING MEMBER TYP

TOLERANCES UNLESS SPECIFIED:	
INCHES	ANGLE
.X ± .1"	XX ± 1°
.XX ± .03"	XX.X ± .5° (1/2°)
.XXX ± .015"	XX.XX ± .25° (1/4°)

PRODUCTS:
1209, 1210 TWIN

DRAWN BY:
JK/EB

DATE:
10-30-14

TITLE:

WEATHER SHIELD.
WINDOWS & DOORS

DWG NO.:
85-7815-17

REV

SCALE: 1:12 SHEET NAME: Sheet1

SHEET 1 OF 1

DO NOT SCALE DRAWING

REV	DATE	DESCRIPTION	PCR NO.	ENG	PDR #:	PROFILE #:

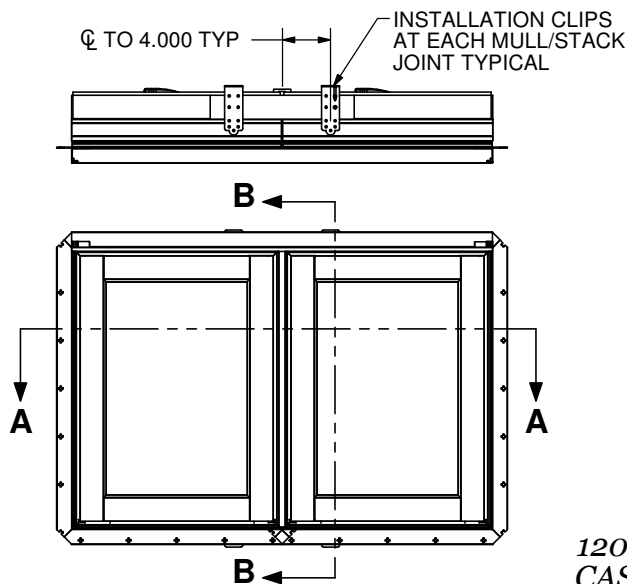
TYP. WALL THICKNESS:

WT/FT:

AREA:

MAT:

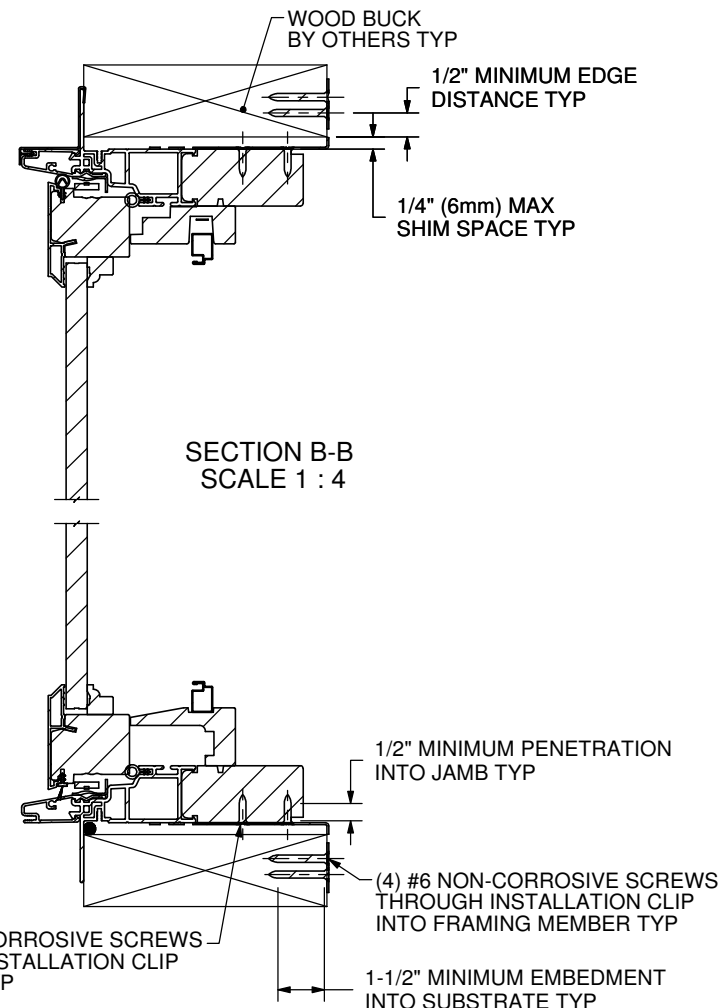
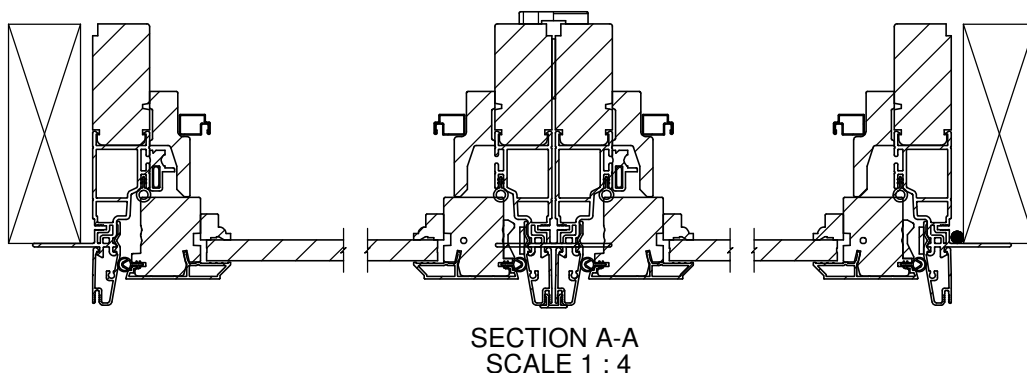
FINISH:



REFERENCE DRAWING NUMBER 85-7438-36 FOR THE INDIVIDUAL UNIT NAIL FIN INSTALLATION METHOD.
 REFERENCE DRAWING NUMBER 85-7438-37 FOR THE INDIVIDUAL UNIT INSTALLATION CLIP INSTALLATION METHOD.
 REFERENCE DRAWING NUMBER 85-7438-38 FOR THE INDIVIDUAL UNIT THROUGH THE JAMB INSTALLATION METHOD.

Weather Shield Windows & Doors

1209, 1210, 1217, 1218, 8211, 8217, 8218
 CASEMENT, AWNING, AND PICTURE
 MULLION INSTALLATION



NOTE(S):
 1. DIMENSIONED VIEWS ARE TYPICAL FOR ALL CROSS SECTION DETAILS.

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TOLERANCES UNLESS SPECIFIED:	
INCHES	ANGLE
.x ± .1"	xx ± 1°
.xx ± .03"	xx.x ± .5° (1/2°)
.xxx ± .015"	xx.xx ± .25° (1/4°)

WEATHER SHIELD.
WINDOWS & DOORS

PRODUCTS:
 1209, 1210, 1217, 1218, 8211, 8217, 8218

DRAWN BY:
 JK/EB

DATE:
 10-30-14

TITLE:
 TWIN

DWG NO.:
 85-7815-21

REV
 B.2

SCALE : 1:12 SHEET NAME: Sheet1

SHEET 1 OF 1

DO NOT SCALE DRAWING

					TYP. WALL THICKNESS:
					WT/FT:
					AREA:
					MAT:
					FINISH:
REV	DATE	DESCRIPTION	PCR NO.	ENG	PDR #:
					PROFILE #: