

Prepared with Cooperation from:

September 21, 2012

Window Craftsmen Inc.
6031 Clark Center Avenue
Sarasota, FL 34238

Anchor Calculations:
Installation of Single Impact Slider Window
In Aluminum, Wood or Concrete and Masonry Openings

Window Series: SS-300
Single Slider Window Impact Insulated Glass

Reference: Test report NCTL-110-14897-1,2,3,4,5 Report Date: 08/2/10
NAMI# NI011056

Testing Facility: NCTL
5 Leigh Drive
York, PA, 17406

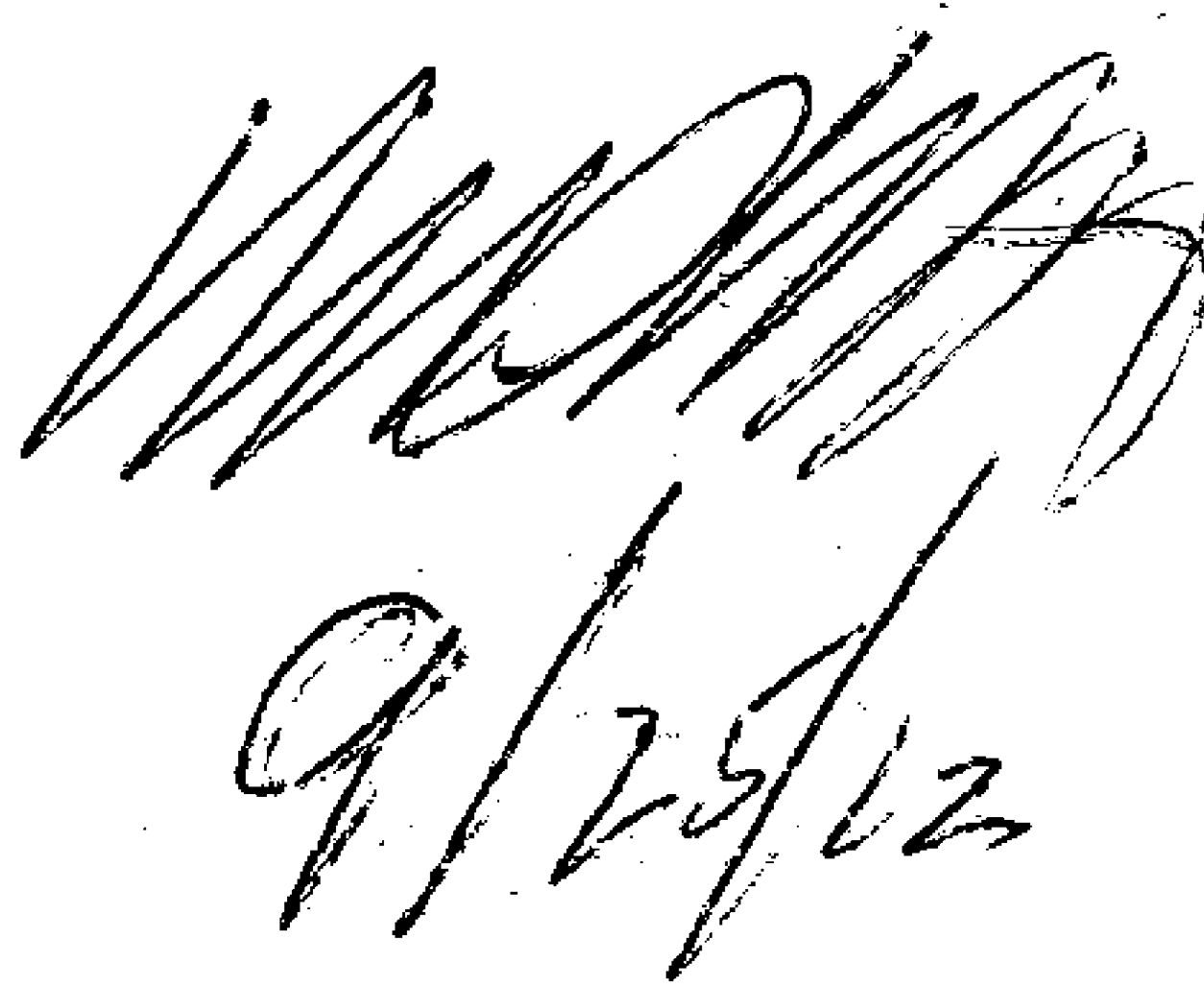
Test Standards: AAMA/WDMA/CSA 101/I.S.2/A440-08
AAMA/WDMA/CSA 101/I.S.2/A440-05
CSA A440S1-09, TAS-202, TAS-201/203

Specimen: 74" x 63" Vinyl Single Slider,

Glazing: 7/8" overall thickness, 1 lite of 1/8" annealed glass, 7/16" spacer
1/8"annealed-.090" PVB interlayer-1/8" annealed laminated glass.

Design Pressure: +50PSF/-50PSF

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Window Craftsmen, Inc.
SS-300 Vinyl Single Impact Slider

Notes:

Anchor calculations are based on approved installation instructions and:

- 1) Concrete or masonry substrate where one by, non-structural, wood bucking is employed, use 3/16" ITW Tapcon anchors of sufficient length to achieve a minimum embedment of 1-1/4" into concrete or masonry.
- 2) Concrete substrate where wood bucking is not employed, use 3/16" ITW Tapcon anchors of sufficient length to achieve a minimum embedment of 1-1/4" into concrete or masonry.
- 3) Wood Frame substrate, use #10 wood screws of sufficient embedment of 1-1/2" into wood framing.
- 4) Aluminum Frame substrate, #12 Tek screw of sufficient length to allow full thread engagement through aluminum. Reference Aluminum Design Manual, Allowable stress design, 5.4.
- 5) Maximum allowable shim thickness shall be 1/4". A load bearing shim shall be located at each anchor.
- 6) Anchor calculations and analysis comply with the 2010 Florida Building Code.

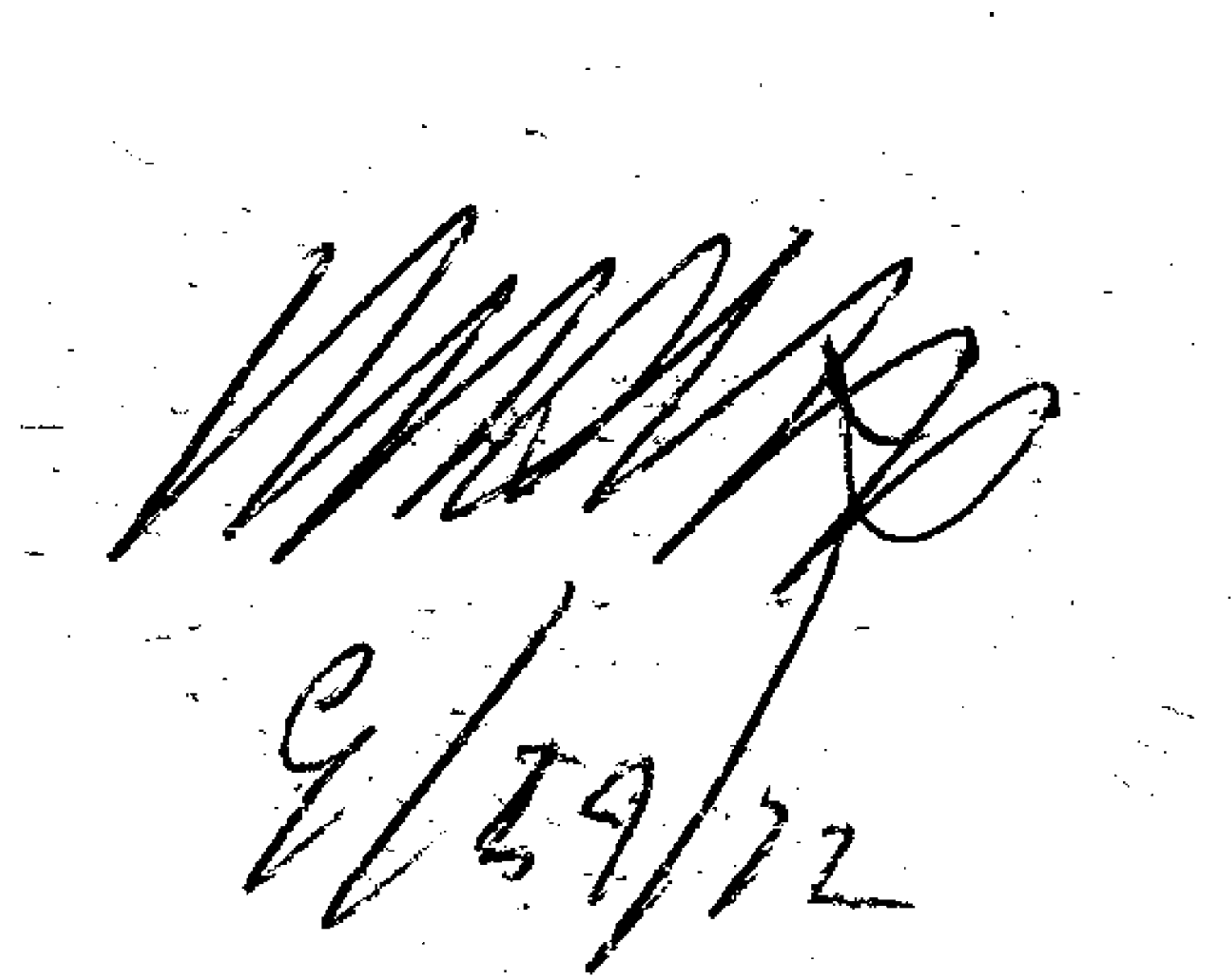
Tested Installation Anchor Information

Six (6) #8 x 1-1/2" Phillips flat head counter-sunk sheet metal screws were used to fasten the head and sill into a wooden test buck. The screws were located 6" from the corners and 12"-12 1/2" on center. The Jamb's each had five (5) #8 x 1-1/2" Phillips flat head counter-sunk sheet metal screws located 6" from the corners and 12 1/2"-13" on center.

Anchors to be qualified:

1. #10 wood screws for installation in wood substrates.
2. 3/16" ITW Tapcons for installation in concrete and masonry substrates.
3. #12 Tek screws for installation into aluminum substrates.

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SS-300 Vinyl Single Impact Slider

Anchor Calculations:

#10 wood screw
1-1/2" embedment

Head & Sill

Shear:

Proof load 80 ksi
Root diameter = .150 in.
Allowable Shear=353 pounds
NDS min lateral load in wood with metal for #10 wood screw is 121 pounds

Bending:

Allowable bending stress=64 ksi
Cantilever=.206" , Moment arm=.138
Allowable bending load=152 pounds

Jamb

Shear:

Proof load 80 ksi
Root diameter = .150 in.
Shear=353 pounds
NDS min lateral load in wood with metal for #10 wood screw is 121 pounds

Bending:

Allowable bending stress=64 ksi
Cantilever=.206" , Moment arm=.138
Allowable bending load=152 pounds

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Window Craftsmen, Inc.
SS-300 Vinyl Single Impact Slider

3/16" Tapcon
1-1/4" embedment
2000psi concrete

Head & Sill

Shear:
Yield Strength = 92 ksi
Allowable shear stress 23 ksi
Allowable shear load = 406 pounds
Allowable lateral load = 170 pounds

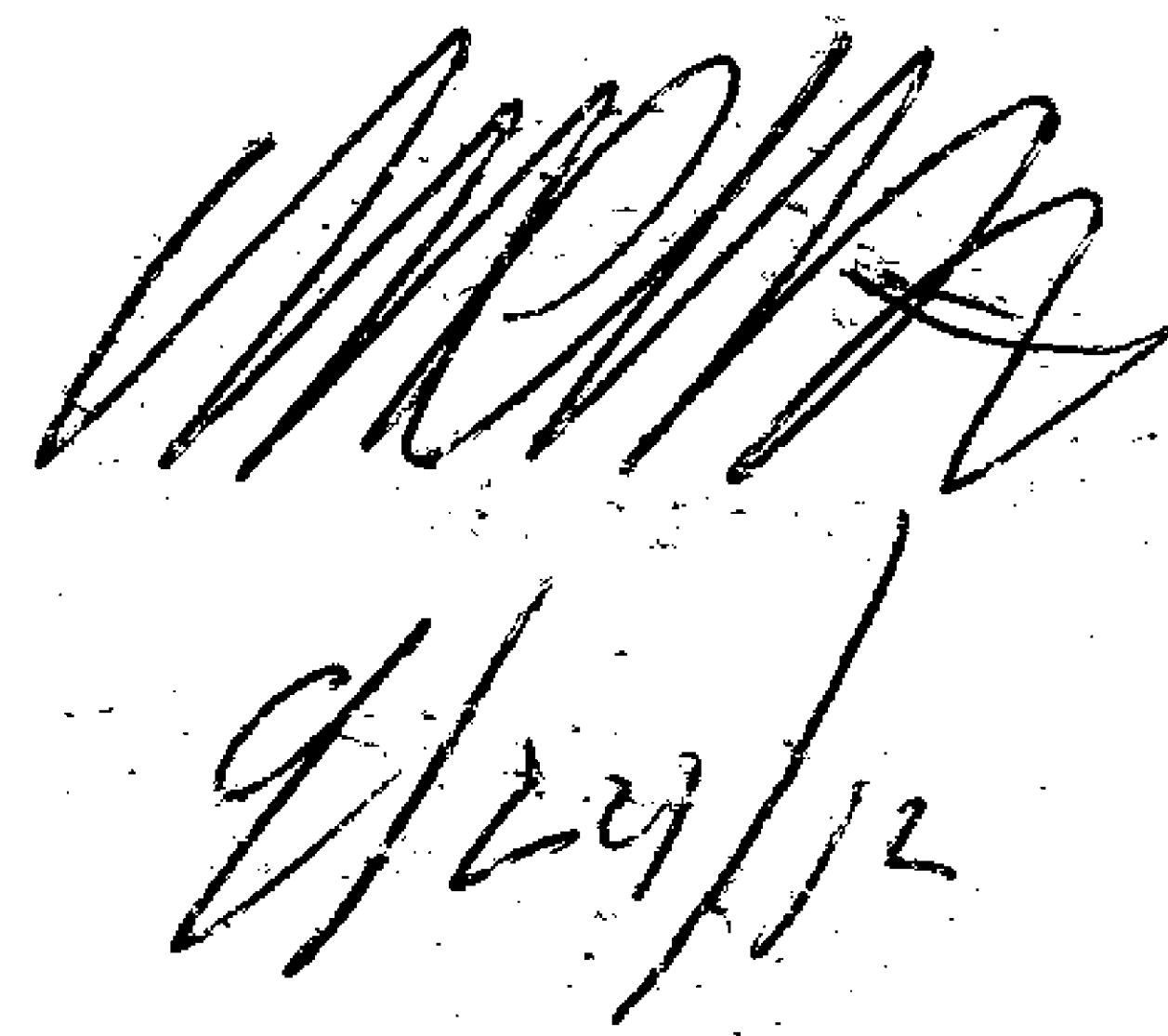
Bending:
Root dia=.150
Allowable bending stress=73.6 ksi
Cantilever=.206" , Moment arm=.138
Allowable bending load=218 pounds

Jambs

Shear:
Yield Strength = 92 ksi
Allowable shear stress 23 ksi
Allowable shear load = 406 pounds
Allowable shear= 170 pounds

Bending:
Root dia=.150
Allowable bending stress=73.6 ksi
Cantilever=.206" , Moment arm=.138
Allowable bending load=218 pounds

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Handwritten signature of Mark A. Smith and date 8/29/12.

Window Craftsmen, Inc.
SS-300 Vinyl Single Impact Slider

#12 TEK Screw

Min .045" thick aluminum

Head & Sill

Shear:

Proof load 80 ksi

Root diameter = .171 in.

Allowable shear stress 20 ksi

Shear=459 pounds

Shear shall not exceed the least of:

$$2 \times F_{tu1} / x D \times t1 / nu = (2)(22000)(.206)(.045/1.95) = 209 \text{ lbs}$$

$$2 \times F_{tu2} \times D \times t2 / nu = (2)(22000)(.206)(.045/1.95) = 209 \text{ lbs}$$

$$4.2 \times ((t2)^3 \times D)^{1/2} \times F_{tu2} / ns \text{ for } t2 \leq t1. 4.2(((.045^3)(.206))^{1/2})(22000/3) = 127 \text{ lbs}$$

$$P_{ns} / 1.25ns = 459 / (1.25 \times 3) = 122.4$$

Bending:

Allowable bending stress=64 ksi

Cantilever=.206" , Moment arm=.138

Allowable bending load=225 pounds

Jamb

Shear:

Proof load 80 ksi

Root diameter = .171 in.

Allowable shear stress 20 ksi

Shear=459 pounds

Shear shall not exceed the least of:

$$2 \times F_{tu1} / x D \times t1 / nu = (2)(22000)(.206)(.045/1.95) = 209 \text{ lbs}$$

$$2 \times F_{tu2} \times D \times t2 / nu = (2)(22000)(.206)(.045/1.95) = 209 \text{ lbs}$$

$$4.2 \times ((t2)^3 \times D)^{1/2} \times F_{tu2} / ns \text{ for } t2 \leq t1. 4.2(((.045^3)(.206))^{1/2})(22000/3) = 127 \text{ lbs}$$

$$P_{ns} / 1.25ns = 459 / (1.25 \times 3) = 122.4$$

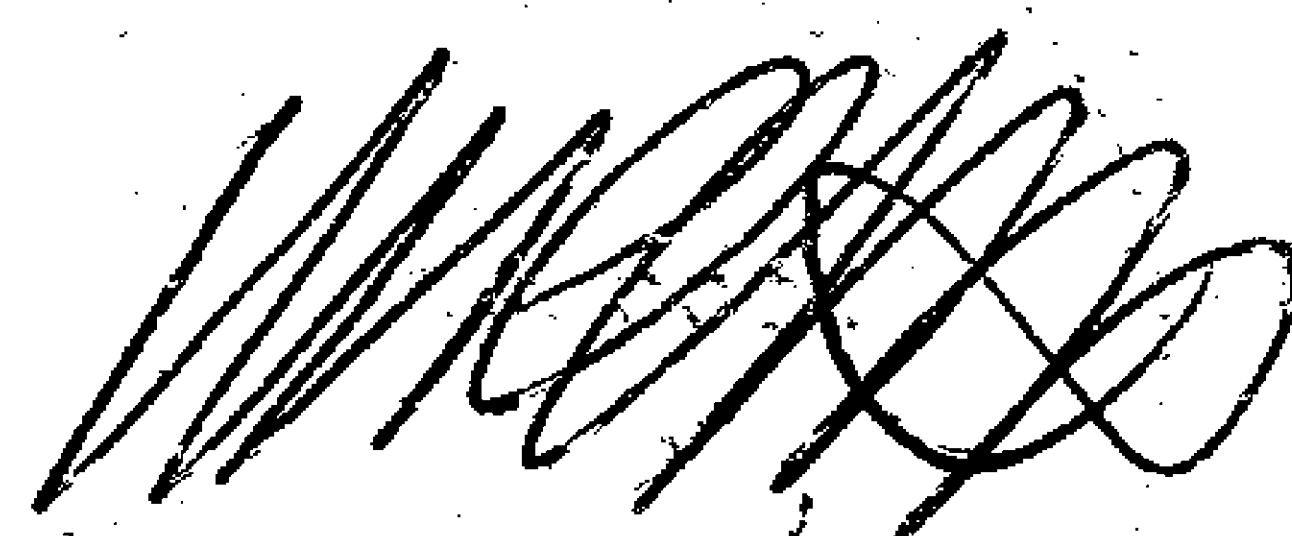
Bending:

Allowable bending stress=64 ksi

Cantilever=.206" , Moment arm=.138

Allowable bending load=225 pounds

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9/29/12

Window Craftsmen, Inc.
SH-300 Vinyl Single Impact Slider

50R Series Vinyl Single Impact Slider

Load on 74" header or sill:
Area=1339 square in=9.3 square feet
Design pressure= 50psf
Total load = 465 pounds

Load on 63" Jambs:
Area=992 square in=6.9 square feet
Design Pressure= 50 psf
Total load= 345 pounds

Minimum Anchors required, #10 wood screw:

Spacing, Locations End Distance & # of Anchors/Location:

Head or Sill:	12.4"	6 Locations	6" End Distance	1 Anchor/Loc
Frame Jambs:	12.75"	5 Locations	6" End Distance	1
Anchors/Loc				

Verify Anchor Locations Required exceeds # of Anchor Locations during Testing:

Head or Sill:	6 Locations Required =>	6 Locations Tested
Frame Jambs:	5 Locations Required =>	5 Locations Tested

#10 Wood Anchor:

Head or Sill Capacity:	726 lbs.	>	465 lbs.	OK
Jamb Capacity:	605 lbs.	>	345 lbs.	OK

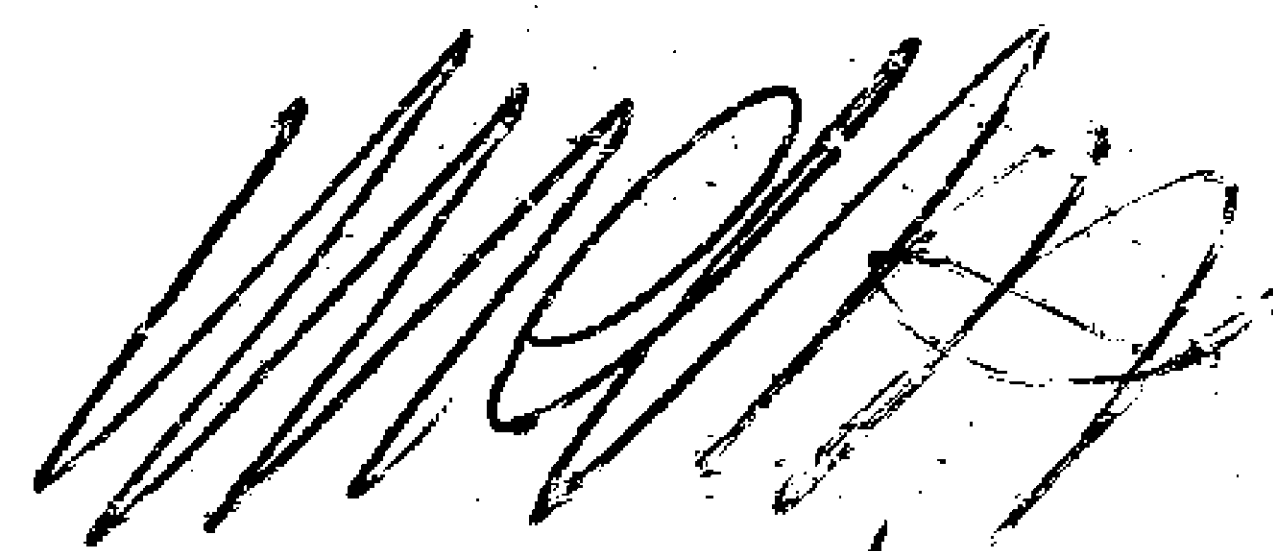
#12 Tek Screw:

Head or Sill:	732 lbs.	>	465 lbs.	OK
Jamb Capacity:	610lbs .	<	345 lbs.	OK

Dade Shear and Bending Load on lesser screw

$(fb/Fb)+(fv/Fv)^2 \leq 1.0$
Head or Sill: $(0.510)+(0.048)=(0.558) < 1.0$
Jambs: $(0.454)+(0.038)=(0.492) < 1.0$

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9/24/12

Window Craftsmen, Inc.
SS-200 Vinyl Single Slider

Minimum Anchors required, 3/16 Tapcon:

Spacing, Locations End Distance & # of Anchors/Location:

Head or Sill: 12.4" 6 Locations 6" End Distance 1 Anchors/Loc
Frame Jambs: 12.75" 5 Locations 6" End Distance 1
Anchors/Loc

Verify Anchor Locations Required exceeds # of Anchor Locations during Testing:

Head or Sill: 6 Locations Required => 6 Locations Tested
Frame Jambs: 5 Locations Required => 5 Locations Tested

3/16" Tapcon:

Head or Sill Capacity: 1020 lbs. > 465 lbs OK
Jamb Capacity: 850 lbs. > 345 lbs. OK

Dade Shear and Bending Load on screw

$$(fb/Fb)+(fv/Fv)^2 \leq 1.0$$

Head or Sill: $(0.356)+(0.036)=(0.392) < 1.0$

Jambs: $(0.321)+(0.029)=(0.350) < 1.0$

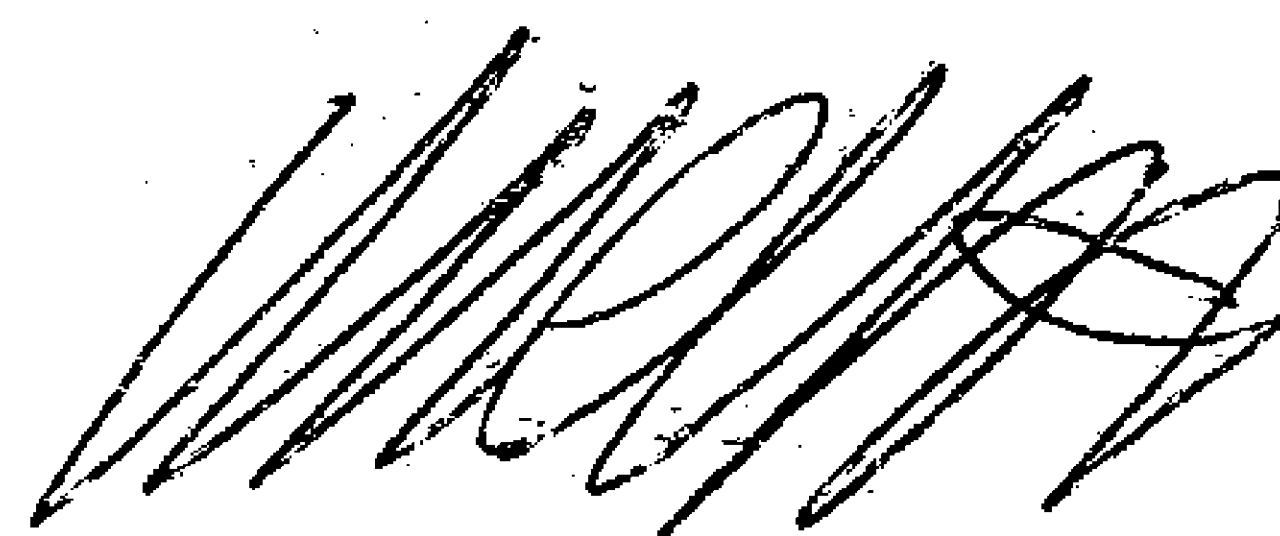
Anchor Locations Required (72" X 48") # 10 wood screw, 3/16" Tapcon and #12

Tek Screw:

Spacing, Locations End Distance & # of Anchors/Location:

Head or Sill: 12-7/16" 6 Locations 6" End Distance 1
Anchors/Loc
Frame Jamb: 12-3/4" 4 Locations 6" End Distance 1
Anchors/Loc

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