Prepared with Cooperation from: November 17, 2020

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

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

Window Series: DS-200
Double Slider Window insulated glass

Reference: Test report NCTL-110-14895-1 Report Date: 10/6/10
NAMI# NI011054.01

Testing Facility: NCTL
5 Leigh Drive
York, PA, 17406
Test Standards: TAS-202-94

Specimen: 74" x 63" Vinyl Double Slider,

Glazing: 7/8" overall thickness, 2 lites of 5/32" annealed glass, 7/16" spacer

Design Pressure: +50PSF/-50PSF

MARK ALEXANDER SMITH
LICENSE
No 55511
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Digitally signed by Mark Smith
Date: 2020.11.17 06:24:44 -05'00'

Mark A. Smith, P.E.
Florida No. 55511
3738 Kingswood Drive
Sarasota, FL 34232

Window Craftsmen, Inc.
DS-200 Vinyl Double 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 ¼". A load bearing shim shall be located at each anchor.
6) Anchor calculations and analysis comply with the current Florida Building Code.

Tested Installation Anchor Information

Six (6) #8 x 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" on center. The Jambs each had four (4) #8 x 2" Phillips flat head counter-sunk sheet metal screws located 6" from the corners and 12" 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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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=.234" , Moment arm=.165
Allowable bending load=128 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=.234" , Moment arm=.165
Allowable bending load=128 pounds

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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=.234" , Moment arm=.165
Allowable bending load=184 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=.234" , Moment arm=.165
Allowable bending load=184 pounds

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#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 x Ftu1/ x D x t1/nu= (2)(22000)(.206)(.045/1.95)=209 lbs
2 x Ftu2 x D x t2/nu=(2)(22000)(.206)(.045/1.95)=209 lbs
4.2 x ((t2)^3 x D)^1/2 x Ftu2/ns for t2<or=t1.4.2(((.045^3)(.206))^1/2)(22000/3)=127 lbs
Pns/1.25ns=459/(1.25x3)=122.4
Bending:
Allowable bending stress=64 ksi
Cantilever=.234", Moment arm=.165
Allowable bending load=190 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 x Ftu1/ x D x t1/nu= (2)(22000)(.206)(.045/1.95)=209 lbs
2 x Ftu2 x D x t2/nu=(2)(22000)(.206)(.045/1.95)=209 lbs
4.2 x ((t2)^3 x D)^1/2 x Ftu2/ns for t2<or=t1.4.2(((.045^3)(.206))^1/2)(22000/3)=127 lbs
Pns/1.25ns=459/(1.25x3)=122.4
Bending:
Allowable bending stress=64 ksi
Cantilever=.234" , Moment arm=.165
Allowable bending load=190 pounds

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DS-200 Vinyl Double Slider

50R Series Vinyl Double Slider

Load on 74" header or sill:
Area=1339 square in=9.3 square feet
Design pressure= 50 psf
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=<1.0
Head or Sill: (0.605)+(0.048) =(0.653)<1.0
Jambs: (0.539)+(0.038)=(0.577)<1.0

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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=<1.0
Head or Sill: (0.421)+(0.036)=(0.457)<1.0
Jambs: (0.375)+(0.029)=(0.404)<1.0

Anchor Locations Required (63” X 43”) # 10 wood screw, 3/16” Tapcon and #12 Tek Screw:
Spacing, Locations End Distance & # of Anchors/Location:

Head or Sill:	12-3/8”	6 Locations	6” End Distance	1 Anchors/Loc
Frame Jamb:	12-3/4”	5 Locations	6” End Distance	1 Anchors/Loc

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