

Structural Performance: SH93WW Sm. Uneq. Glass Sloped Single Hung (1 Unit)

Analysis at Meeting Rails Region

Rev. 15-Jun-12

Single Hung Width	38.000	Nominal Size:	3262	© Veka Inc. 2010
Single Hung Height	74.000	Pressure:	Test: Design:	
		PSF:	75.0 50.0	
		MPH:	171.2 139.7	
Sash Width:	34.875	End Vent Width:	38.000	
Sash Height:	36.875	Ctr. Vent Width:	N.A.	N.A.
Top Glass Width:	35.313	Top Glass Area:	8.4 Sq.Ft.	
Btm. Glass Width:	32.250	Glass Short Side to Long Side Ratio:	1 to 1.0	
Glass Height:	34.250	Bottom Glass Area:	7.7 Sq.Ft.	
		Glass Short Side to Long Side Ratio:	1 to 1.1	

Span: 34.053			Material:	Extreme Fibers (Max.)		Modulus
Span Profiles Mass Properties Profiles	No. of Pieces	Moments of Inertia:		At Exterior	At Interior	E (PSI)
SH9304 Fixed Mtg. Rail	1	0.2608	PVC	1.1625	1.2095	405400
SE9346 Sm. Lock Rail	1	0.2759	Al. 6063-T5	N.A.	N.A.	1.00E+07
N.A.	N.A.	N.A.	Al. 6063-T6	0.8052	0.8423	1.00E+07
RF SH9304 A0 M Fixed Mtg. Al.	1	0.1888	Al. 6061-T6	N.A.	N.A.	1.00E+07
RF SE9346 A0 M Lock R. Al.	1	0.1591	Steel (Rails)	N.A.	N.A.	3.00E+07
N.A.	N.A.	N.A.	Fiberglass	N.A.	N.A.	6.00E+06
N.A.	N.A.	N.A.	Wood:	N.A.	N.A.	3.13E+06
N.A.	N.A.	N.A.	Glass:	0.0575	0.0575	1.04E+07
N.A.	N.A.	N.A.	S.S. AISI 201	0.385	0.385	2.80E+07
Load on Mtg. Rails(lb.):			302.0			
Bending Moment (in-lb):			1,713.9			
Notes:			1" I.G.unit of (1) DS pane AN & of (1) DS pane AN			
RF SH9304 A0 M (Alum. 6063-T6) in Fixed Mtg. Rail SH9304.						
RF SE9346 A0 M (Alum. 6063-T6) used in Lock Rail SE9346.						
Spacers:			2 0.002077			
I.G. Unit			2 0.0083			
Frame Shielded			Glass spacers: S.S. AISI 201			

Deflection at Mid-Span:			Hardware & Sash Overlaps			
	End Unit	Ctr. Unit	Tilt Latch:	End Unit	Ctr. Unit	Remarks
Inches:	0.050	N.A.	Nominal:	0.252	N.A.	
L/175 (Ref. Only):	0.217	N.A.	Under Load:	0.252	N.A.	O.K.
Probable AAMA Class: LC-PG 50*			Interlocks:	End Unit	Ctr. Unit	
			Nominal:	0.236	N.A.	
			Under Load:	0.236	N.A.	O.K.
Materials:	PVC	Al. 6005-T5	Al.6063-T6	Al.6061-T6	Steel	
Will help unit resist loading:	CERTAIN	N.A.	CERTAIN	N.A.	N.A.	
OK:	N.A.	TRUE	TRUE	TRUE	*Below the Gateway size req'd	
Region:	Mullion	Mtg. Rails	Btm. Rail	All Stiles	Size	

Note: The rating may represent an Optional Performance Class (R, LC, C, HC, or AW) of AAMA/WDMA /CSA 101/I.S.2/A440-08. Please check the glass with ASTM E1300-09a or equivalent software.

Stress in Extr. Fibers (PSI):	At Exterior	At Interior	Prob. Stress	Allowable	Remarks:
Material	(- Load)	(+ Load)	Allowable	Strength	
PVC	203	211	100.00%	6,556	(Tensile)
Alum. 6063-T5	N.A.	N.A.	N.A.	16,000	(Ult. Yield) Spacers or rebars
Alum. 6063-T6 (Rails)	3,463	3,623	100.000%	25,000	(Ult. Yield)
Alum. 6005-T5 (Rails)	N.A.	N.A.	N.A.	35,000	(Ult. Yield)
Steel (Hot Dipped Galv. G90)*	N.A.	N.A.	N.A.	42,000	(Ult. Yield)
Fiberglass Pultrusion	N.A.	N.A.	N.A.	95,000	(Tensile)
Stainless AISI 201	4,637	4,637	100.00%	90,000	(Ult. Yield) Spacers only
Heartwood (ImpactKore)	N.A.	N.A.	N.A.	25,396	(Modulus Of Rupture)
Glass	514	514	0.2 breaks per 1000	O.K.	

*Note: Ultimate yield of this steel ranges from 35,000 to 49,000 psi.

**The glass breakage & stress results pertain only to the side of the structural members herein investigated.

Structural Performance: SH93WW Sm. Uneq. Glass Sloped Single Hung (1 Unit) © Veka Inc. 2010						
Analysis at Stiles				Rev. 15-Jun-12		
Single Hung Width	38.000	Nominal Size:		3262		
Single Hung Height	74.000	Pressure:		Test:	Design:	
Sash Height:	36.875	PSF:		75.0	50.0	
Stile Clips:	None	MPH:		171.2	139.7	
Glass Width:	32.250	Glass Area (Sq. Ft.):		7.7		
Glass Height:	34.250	Glass Short Side to Long Side Ratio:		1 to 1.1		
Notes:		1" I.G. unit of (1) DS pane AN & of (1) DS pane AN				
Load Area Width/Side:	17.526	Frame Shielded		Glass spacers: S.S. AISI 201		
Vertical Span (along vent):	35.052					
Span Profiles Mass Properties:		Moments of Inertia:	Material:	Extreme Fibers (Max.)		Modulus E (PSI)
Profiles:	Pcs.			At Exterior	At Interior	
SE9345 Small Stile	1	0.2028	PVC	N.A.	0.7323	405400
N.A.	N.A.	N.A.	Al. 6063-T5	N.A.	N.A.	1.00E+07
N.A.	N.A.	N.A.	Al. 6063-T6	N.A.	N.A.	1.00E+07
N.A.	N.A.	N.A.	Al. 6061-T6	N.A.	N.A.	1.00E+07
N.A.	N.A.	N.A.	Steel	N.A.	N.A.	3.00E+07
N.A.	N.A.	N.A.	Fiberglass	N.A.	N.A.	6.00E+06
N.A.	N.A.	N.A.	Wood:	N.A.	N.A.	3.13E+06
N.A.	N.A.	N.A.	Glass:	N.A.	0.0575	1.04E+07
Spacers:	1	0.0020771	S.S. AISI 201	0.385	0.385	2.80E+07
Glass	1	0.00385	Total Loading (Lb.)		Bending Moment:	
Deflection at Mid-Span: (To Interior-Side)		At Stile Span: 159.9		933.9 In-#		
Inches:	0.636	At Clip: None		(No clips used)		
L/175 (Ref. Only):	0.200 (Ref. Only)					
Probable AAMA Class: LC-PG 50*			*Below the Gateway size req'd			
Materials:	PVC	Al. 6005-T5	Al.6063-T6	Al.6061-T6	Steel	
Will help unit resist loading:	CERTAIN	N.A.	N.A.	N.A.	N.A.	
OK:	N.A.	TRUE	TRUE	TRUE	*Below the Gateway size req'd	
Region:	Mullion	Mtg. Rails	Btm. Rail	All Stiles	Size	
<i>Note: The rating may represent an Optional Performance Class (R, LC, C, HC, or AW) of AAMA/WDMA /CSA 101/I.S.2/A440-08. Please check the glass with ASTM E1300-09a or equivalent software.</i>						
Stress in Extreme Fibers (PSI):	At Exterior (- Load)*	At Interior (+ Load)	Prob. Stress Allowable	Allowable Strength		Remarks:
PVC	N.A.	1,537	100.00%	6,556	(Tensile)	
Alum. 6063-T5	N.A.	N.A.	N.A.	16,000	(Ult. Yield)	Spacers or rebars
Alum. 6063-T6 (Rebars)	N.A.	N.A.	N.A.	25,000	(Ult. Yield)	
Alum. 6005-T5 (Rebars)	N.A.	N.A.	N.A.	35,000	(Ult. Yield)	
Steel (Hot Dipped Galv. G90)	N.A.	N.A.	N.A.	42,000	(Ult. Yield)**	
Fiberglass Pultrusion	N.A.	N.A.	N.A.	95,000	(Tensile)	
Stainless AISI 201	N.A.	55,817	100.00%	90,000	(Ult. Yield)	Spacers only
Heartwood (ImpactKore)	N.A.	N.A.	N.A.	25,396	(Modulus Of Rupture)	
Glass***	N.A.	3,096	5.5 breaks per 1000	O.K.		
<i>*Negative load results are ignored since the stiles would be pulled against the jambs, which are attached to the building. Thus the stile's stresses are greatly alleviated by the strength of the jamb/building assembly, which is beyond the scope of this program.</i>						
<i>**Note: Ultimate yield of this steel ranges from 35,000 to 49,000 psi.</i>						
<i>***The glass breakage & stress results pertain only to the side of the structural members herein investigated.</i>						

Structural Performance: SH93WW Sm. Uneq. Glass Sloped Single Hung (1 Unit)						
Analysis at Bottom Rail		Rev. 15-Jun-12		Standard: Probable AAMA Class: © Veka Inc. 2010		
Single Hung Width	38.000			Nominal Size: 3262		
Single Hung Height	74.000			Pressure:	Test:	Design:
Bottom Sash Width:	34.875			PSF:	75.0	50.0
Bottom Stile Clips:	None			MPH:	171.2	139.7
				Btm. Glass Area (Sq. Ft.): 7.7		
				Glass Short Side to Long Side Ratio: 1 to 1.1		
Bottom Glass Width:	32.250	Notes:		1" I.G.unit of (1) DS pane AN & of (1) DS pane AN		
Bottom Glass Height:	34.250	Sill exterior upstand is single-walled 0.080 in. thick.				
Span:	34.053	Frame Shielded			Glass spacers: S.S. AISI 201	
Span Profiles Mass Properties:		Moments of Inertia:		Material:	Extreme Fibers (Max.)	
Profiles:	Pcs.				At Exterior	At Interior
Modulus E (PSI)						
SE9345 Sm. Bot. Rail	1	0.2028		PVC	2.2181	2.3384
N.A.	N.A.	N.A.		Alum 6063-T5	N.A.	N.A.
N.A.	N.A.	N.A.		Alum 6063-T6	NA	NA
N.A.	N.A.	N.A.		Steel	NA	NA
N.A.	N.A.	N.A.		Fiberglass	N.A.	N.A.
N.A.	N.A.	N.A.		Wood:	N.A.	N.A.
N.A.	N.A.	N.A.		Glass	0.0575	0.0575
N.A.	N.A.	N.A.		S.S. AISI 201	0.385	0.385
				Total Loading (Lb.)		Bending Moment:
				151.0		857.0 In-#
Spacers:	1	0.0020771		Overlaps	P. Bar/Side:	Ext. Sill
I.G. Unit Iyy:	1	0.0036		Nominal:	0.375	0.519
				Under Load:	0.375	0.519
				Judgment:	Acceptable	Acceptable
				Water Hd: 1.92 at 10 psf		
				Resisting water Hd: 2.436		
				Water test met: * AW		
				* Exterior-Interior equalizing not factored in.		
				Steel		
				N.A.		
				*Below the Gateway size req'd		
				Size		
Note: The rating may represent an Optional Performance Class (R, LC, C, HC, or AW) of AAMA/WDMA /CSA 101/I.S.2/A440-05. Please check the glass with ASTM E1300-09a or equivalent software.						
Stress in Extreme Fibers (PSI):	At Exterior (- Load)*	At Interior (+ Load)*	Prob. Stress Allowable	Allowable Strength	Remarks:	
Material						
PVC (Bottom Rail)	432	175	100.00%	6,556 (Tensile)		
PVC (Sill Upstands)	1,735	1,181	100.00%	6,556 (Tensile)		
Alum. 6063-T5	N.A.	N.A.	N.A.	16,000 (Ult. Yield)	Spacers or rebars	
Alum. 6005-T5 (Rebars)	N.A.	N.A.	N.A.	35,000 (Ult. Yield)		
Alum. 6063-T6 (Rebars)	N.A.	N.A.	N.A.	25,000 (Ult. Yield)		
Steel (Hot Dipped Galv. G90)	N.A.	N.A.	N.A.	42,000 (Ult. Yield)**		
Fiberglass Pultrusion	N.A.	N.A.	N.A.	95,000 (Tensile)		
Stainless AISI 201	12,091	6,338	100.00%	90,000 (Ult. Yield)	Spacers only	
Heartwood (ImpactKore)	N.A.	N.A.	N.A.	25,396 (Modulus Of Rupture)		
Glass***	671	671	0.3 breaks per 1000	O.K.		
*Negative wind loads are restrained by the lift rail and the sill's single-walled upstand or dam leg.						
*Positive wind loads are restrained by the lift rail and the sill's double-walled upstand or dam leg.						
**Note: Ultimate yield of this steel ranges from 35,000 to 49,000 psi.						
***The glass breakage & stress results pertain only to the side of the structural members herein investigated.						