Structural Design, Inc.
13014 S.W. 120 Street • Miami, Fl 33186 • Tel: (305) 235-4300 • E-Mail: sdi@sdieng.com

STRUCTURAL CALCULATIONS

DATE: June 14, 2026

JOB NAME: Structural Calculations for the new glass railing at **"9841 SW 73 Court Pinecrest, FL 33156"**

JOB NUMBER: 26-068

PREPAIRED BY: Farrokh Rasekhi, P.E.

DESIGN CRITERIA:

- F.B.C. 2023 (8th Edition)
- ASCE 7-22

NOTES:

- Contractor to verify all dimensions.

STRUCTURAL DESIGN, INC.
13014 S.W. 120 Street
Miami, Florida 33186

FARROKH RASEKHI
LICENSE
No. 38001
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by "Farrokh Rasekhi P.E.", on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Digitally signed by FARROKH RASEKHI
Date: 2026.07.20 19:23:47 -04'00'

Sheets. 1 thru 17

13014 S.W. 120 Street
MIAMI, FL 33186

Structural Design, Inc.

Phone: (305) 235-4300
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Lic. # 8803

GLASS RAIL CALCULATIONS:

I) DESIGN LOADS:

WIND LOADS: AS PER ASCE 7-22

(SEE SHTS. 4, 5, 12 & 13)

FOR INTERIOR RAILS: 50 #/' OR 200 # @ ANY PT.

II) POOL DECK GLASS RAILING:

MAX. WIND LOAD = 633 #   (SEE SHT. 5)

MAX. GLASS SIZE = 60" X 45"

WIND LOAD / FT² $= \frac{633}{(60 \times 45)/144} = 33.76$ PSF

GLASS CALCS:

(SEE SHTS. 6 THRU 9)

GLASS CAPACITY = 37.6 PSF > 33.76 PSF ∴ O.K.

(SEE SHT. 8)   USE: 9/16" LAMIN. GLASS

CONNECTION CALCULATIONS:

MAX. OVERTURNING MOM. = 1073 #-FT (SHT. 5)

TRY: 8 ANCHORS (4 SETS OF 2 ANCHORS)

MAX. TENSION / ANCHOR $= \frac{1073 \times 12}{4 \times 4} = 805$ #

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Project: 9841 S.W. 73 CT. PINECREST Calculated by: F.R. Date: 5/15/26

Job Number: 26-068 Sheet: 2 of 17 Checked by: Date:

USE: (8) - 3/8" φ HILTI HIT-HY 200
ADHESIVE ANCHORING @ 15" O.C. (MAX.)
(MIN. EMBD. = 3 3/8")

CONN. CAPACITY = 5300(0.7)(0.25) = 927.5 < 805" ∴ O.K.
(SEE SHTS. 10 & 11)

III) BALCONY GLASS RAILING:

MAX. WIND LOAD = 868# (SEE SHT. 13)
MAX. GLASS SIZE = 60"x50"

$$\text{WIND LOAD}/FT^2 = \frac{868}{(60\times 50)/144} = 41.7 \text{ psf}$$

GLASS CALCS:

GLASS CAPACITY = 48.9 psf > 41.7 psf ∴ O.K
(SEE SHT. 16) USE: 9/16" LAMIN. GLASS

CONNECTION CALCULATIONS:

MAX. OVERTURNING MOM. = 1989 #-FT (SEE SHT. 13)
USING (2)-3/8" φ HILTI HIT-HY 200 ANCHORS @ 4" O.C.:

ANCHOR CAPACITY = 927.5# (SEE SHT. 2)

$$\text{\# OF ROWS REQ'D} = \frac{1989\times 12}{4\times 927.5} = 6.4 \quad \text{USE: (8)}$$

USE: 8 ROWS OF (2) - 3/8" φ HILTI HIT-HY 200 ANCHORS (MIN. EMBD. = 3 3/8")

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FL Registration # 38001

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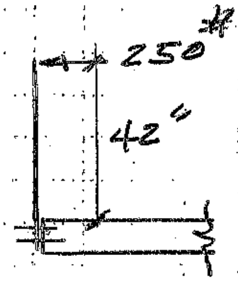
Project: 9841 S.W. 73 CT. PINECREST Calculated by: F.R. Date: 5/15/26

Job Number: 26-068 Sheet: 3 of 17 Checked by: ______ Date: ______

IV) INTERIOR GLASS RAILING:



MAX. GLASS SIZE = 60" x 50"

MAX. LOAD = $50\left(\frac{60}{12}\right) = 250^{\#}$

MAX. MOM. = 250(47") = 11,750 #-in

WITH ANCHORS @ 4" O.C. VERTICALLY

& ANCHOR CAPACITY = 927.5 #

OF ANCHOR ROWS = $\frac{11,750}{4(927.5)} = 3.16$ USE: (4)

USE: (6) - 3/8" ϕ HILTI HIT-HY 200 ADHESIVE ANCHORS (3 ROWS)

(MIN. EMBD. = 3 3/8")

Farrokh Rasekhi, P.E.
FL. Registration # 38001

MecaWind v2526

Calculations Prepared by:
Structural Design, Inc.
13014 SW 120 Street
Miami, Florida, 33186
Date: Jul 13, 2026
Designer: F.R.

Calculations Prepared For:
Client: Ag Const, LLC
Project #: 26-068
Location: 9841 SW 73rd Court Pinecrest, FL
Description: pool Glass Railings

File Location: D:\Wind Load Runs\26-068 pool railing (2).wnd

General:
Reference Abbreviations: T: Table, F: Figure, E: Equation, §: Section

Wind Load Standard	= ASCE 7-22	Basic Wind Speed	= 175.0 mph
Exposure Classification	= C	Risk Category	= II
Structure Type	= Freestanding Wall	Basis for Wind Pressures	= ASD
MWFRS Analysis Method	= Ch 29	C&C Analysis Method	= None
Dynamic Type of Structure	= Rigid	Advanced Options	= True
Base Elevation Of Structure	= 0.0000 ft	MWFRS Pressure Elevations	= Manual
Topographic Effects	= None	Override Directionality Factor	= False
Override Gust Factor	= False	Override Minimum Pressure	= False

Freestanding Wall Inputs:

h = Height from grade to top.	= 3.0833 ft	S = Height of Sign/Frame	= 3.0833 ft
B = Width of Sign/Frame	= 5.0000 ft	T = Thickness/Depth of Sign.	= 0.5625 ft
L_r = Dimension of return corner L_r	= 0.0000 ft	ε = Solidity Ratio	= 1.000
AttachWall = Attached to Wall	= False	Dbl = Double Faced & Sides Enclosed	= False
IsCol = Supported on Columns	= False		

Exposure Constants [T:26.11-1]:

α = 3-s Gust-speed exponent	= 9.800	Z_g = Nominal Ht of Boundary Layer	= 2460.000 ft
â = Reciprocal of α	= 0.102	b = 3 sec gust speed factor	= 1.000
α_m = Mean hourly Wind-Speed Exponent	= 0.156	b_m = Mean hourly Windspeed Exponent	= 0.660
c = Turbulence Intensity Factor	= 0.200	ε = Integral Length Scale Exponent	= 0.2000

Main Wind Force Resisting System (MWFRS) Wind Calculations for Freestanding Wall per §29.4

h = Mean structure height	= 3.083 ft	$K_h = 2.41 \cdot (15/Z_g)^{2/\alpha}$ T:26.10-1	= 0.851
K_{zt} = No Topographic Feature	= 1.000	K_d = Directionality Factor T:26.6-1	= 0.85
LF = ASD Load Factor	= 0.60	K_e = Ground Elev Factor T:26.10-1	= 1.000
$q_h = .00256 \cdot K_h \cdot K_{zt} \cdot K_e \cdot V^2 \cdot LF$ E:26.10-1	= 40.04 psf		

Gust Factor Calculation for Wind:

Gust Factor Category I Rigid Structures - Simplified Method

G_1	= Simplified: For Rigid Structures can use 0.85	= 0.85

Gust Factor Category II Rigid Structures - Complete Analysis

Z_m	= Equiv Struc Height: $Max(0.6 \cdot h, Z_{min})$	= 15.000 ft
I_{zm}	= Turbulence Intensity: $c \cdot (33/Z_m)^{1/6}$ [E:26.11-7]	= 0.228
L_{zm}	= Turbulence Integral Length Scale: $\ell \cdot (Z_m/33)^{\varepsilon}$ [E:26.11-9]	= 427.057 ft
B	= Avg Structure Width Normal to Wind Direction	= 5.000 ft
Q	= $[1/(1+0.63 \cdot [(B+h)/L_{zm}]^{0.63})]^{0.5}$ [E:26.11-8]	= 0.975
G_2	= Detailed: $0.925 \cdot [(1+1.7 \cdot g_q \cdot I_{zm} \cdot Q)/(1+1.7 \cdot g_v \cdot I_{zm})]$ [E:26.11-6]	= 0.912

Gust Factor Used in Analysis

G	= Gust Factor: $Min(G_1, G_2)$	= 0.850

MWFRS Wind Pressures on Freestanding Wall per F:29.3-1

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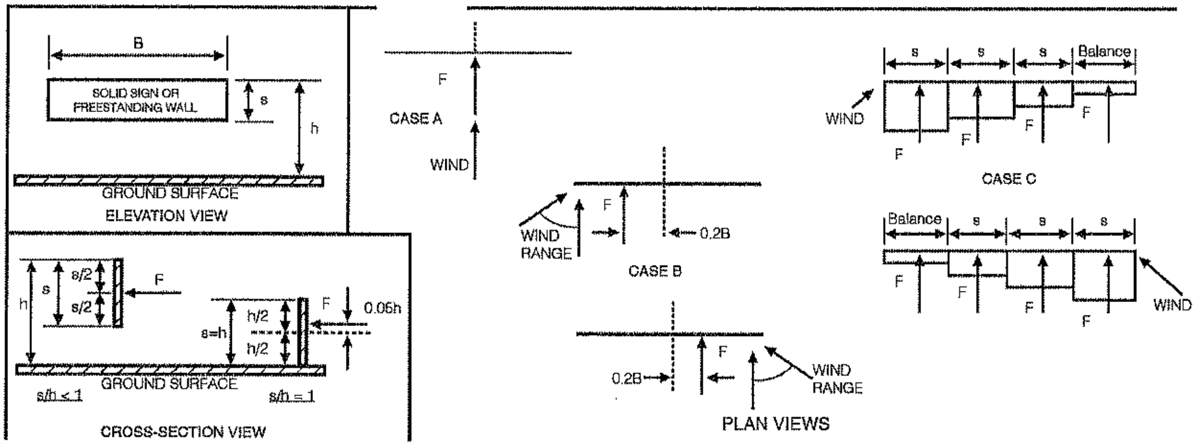


R	= Reduction factor to account for openings: $(1-(1-1)^{3/2})$	= 1.000
R_c	= Reduction factor for Case C since s/h > 0.8: (1.8-s/h)	= 0.800
A_s	= Gross Area of Freestanding Wall: B•s	= 15.42 ft^2
B/s	= Aspect Ratio: B/s	= 1.622
s/h	= Clearance Ratio: s/h	= 1.000
C_f	= Net Force Coefficient for Case A and B per F:29.3-1	= 1.419
e	= Not Double Faced, Case B eccentricity is 0.2	= 0.2000

Case A: Resultant force acts normal to face through geometric center and since s/h = 1 then consider force acting 0.05*s above the geometric center

0.05•s	= Since s/h = 1, load applied at vertical offset from geom center	= 0.154 ft
F	= Wind Pressure: $q_z \cdot K_d \cdot G \cdot C_f A_s$ E:29.3-1	= 633 lb
M	= Overturning Moment: F•(h/2+0.05•h)	= 1,073 lb•ft

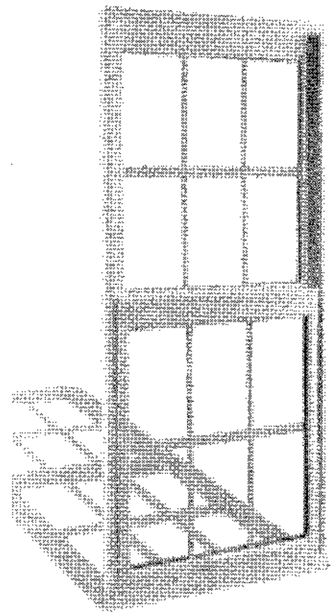
Case B: Resultant force acts normal to face at a distance from the geometric center toward the windward edge equal to e times the average width and since s/h = 1 then consider force acting 0.05*s above the geometric center

0.05•s	= Since s/h = 1, load applied at vertical offset from geom center	= 0.154 ft
D_x	= Force Offset from Center toward windward edge: e•B	= 1.000 ft
F	= Wind Pressure: $q_z \cdot K_d \cdot G \cdot C_f A_s$ E:29.3-1	= 633 lb
F_1	= Reduced Design Force: F•R	= 633 lb
T_1	= Torsion about Vertical Axis: F_1•e•b	= 633 lb•ft
M_1	= Overturning Moment: F_1•(h/2+0.05•h)	= 1,073 lb•ft

Title

July 20, 2026

Project Name: Pool Glass Railing
Customer Name: AG Construction
Project Location: 9841 SW 73 Court
Pinecrest
Prepared By: Farrokh Rasekhi, P.E.
Project Comments: 60" long Pool Glass
Railing



Disclaimer

These calculations are based on the ASTM E1300-09, ASTM E1300-12, ASTM E1300-16 and ASTM E1300-24 Standard Practices for determining the load resistance of glass in buildings and provided to the customer as a guide only. WGD does NOT take responsibility for providing structural load calculations and providing load resistances for the customer's application.

The software used to generate this report has been developed by Standards Design Group (SDG), and can be used to determine the load resistance of specified glass types exposed to uniform lateral loads of short or long duration subject to the following condition(s):

- The glass is free of edge and surface damage and has been properly glazed in the opening in conformance with the manufacturer's recommendations.

The user has the responsibility for selecting the correct procedures for the required application from the software. The stiffness of members supporting any glass edge shall be sufficient that under design load, edge deflections shall not exceed L/175, where L denotes the length of the supported edge. The non-factored load values for laminated glass are representative of test data and calculations performed for an interlayer at a temperature of 50° C (122° F). For other limiting conditions that may apply, refer to Section 5 of ASTM E1300 and local building codes.

SDG disclaims any responsibility for any particular results relating to the use of the WGD Program. SDG disclaims any liability for any personal injury or any loss or damage of any kind, including all indirect, special, or consequential damages and lost profits, arising out of or relating to the use of the WGD Program.

Signature / Stamp

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Glazing Information

Supported Edges:	One side Supported
Shape:	Rectangular
Unsupported Length:	45.0 in.
Supported Length:	60.0 in.
Glazing Angle:	90.0 °

Glazing Construction (Single Glazed Lite)

Single Lite Properties (1/2 in. Laminated)

Construction: 1/2 in. (FT) | 0.060 in. (PVB)

Applied Loads

Description	Load	Duration
Short Duration	33.8 psf	3.00 sec

ASTM E1300 Extended Basic

Load Resistance Report

July 20, 2026

Glazing Construction (Single Glazed Lite)

Single Lite Properties (1/2 in. Laminated)

Construction: 1/2 in. (FT) | 0.060 in. (PVB) (USE: 9/16" LAMINATED GLASS)

Load Resistance

Short Duration (3 Sec)

Description	NFL	GTF	LR
Single Lite	9.4 psf	4.00	37.6 psf

Long Duration (30 Days)

Description	NFL	GTF	LR
Single Lite	9.4 psf	3.00	28.2 psf

Comparisons

Short Duration

33.8 psf 3.00 sec <= 37.6 psf — OK

Single Lite

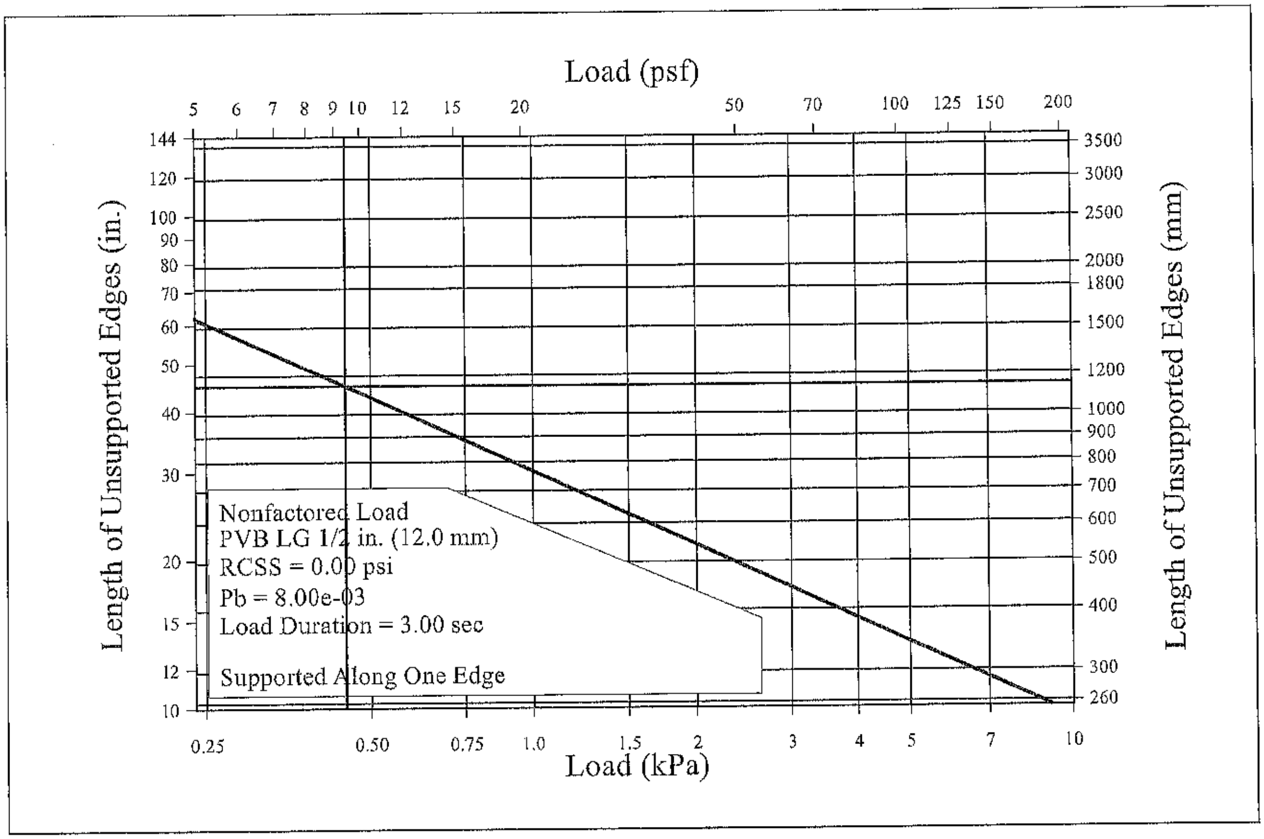
Approximate edge of glass deflection: 2.56 in. *

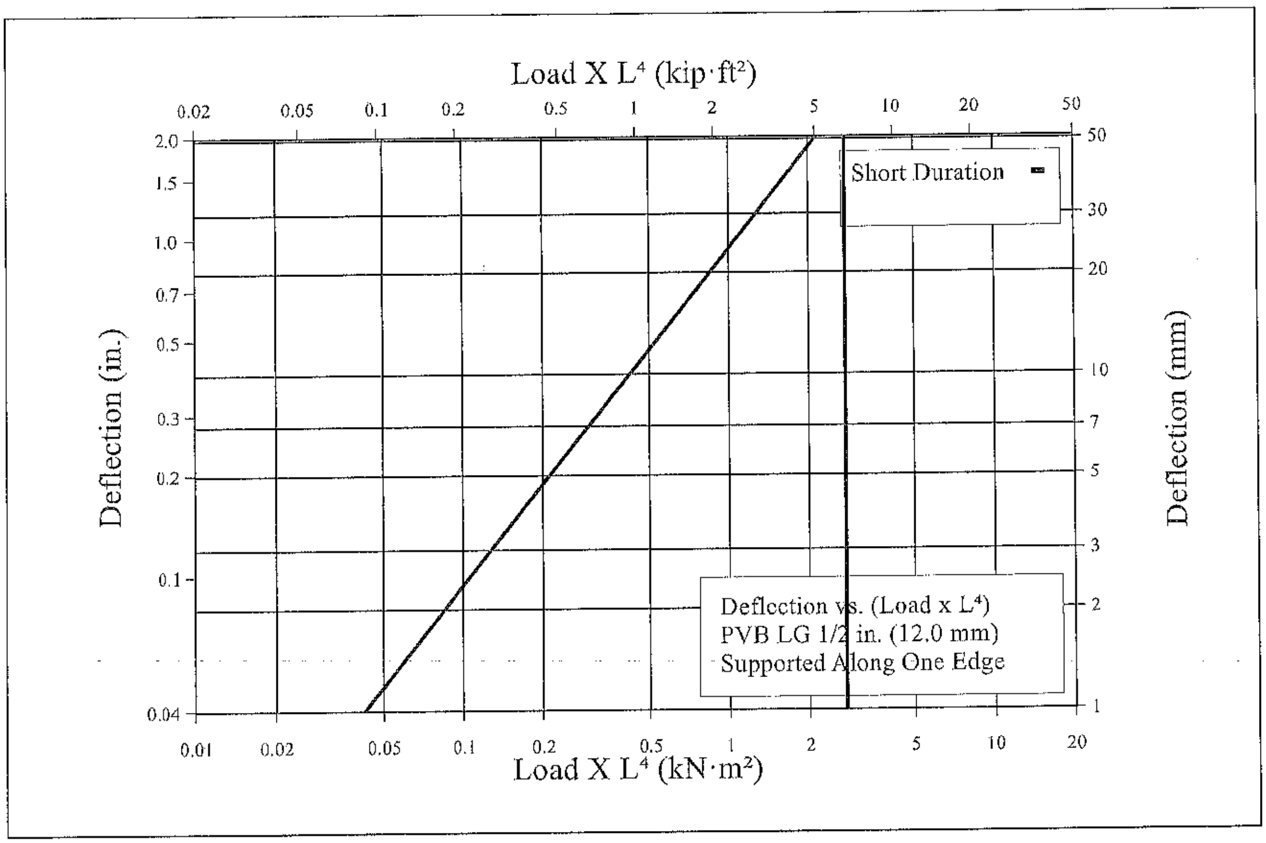
Glass bite reduction/pullout: 0.00 in.

Notes

Load resistance values are computed in accordance with ASTM E1300-16 Section 6.2 and are based on non-factored load values calculated in a manner consistent with those presented in ASTM E1300-16.

* Deflection value extends beyond deflection chart


Load (psf)
5 6 7 8 9 10 12 15 20 50 70 100 125 150 200
Length of Unsupported Edges (in.)
144 120 100 90 80 70 60 50 40 30 20 15 12 10
Length of Unsupported Edges (mm)
3500 3000 2500 2000 1800 1500 1200 1000 900 800 700 600 500 400 300 260
Nonfactored Load
PVB LG 1/2 in. (12.0 mm)
RCSS = 0.00 psi
Pb = 8.00e-03
Load Duration = 3.00 sec
Supported Along One Edge
0.25 0.50 0.75 1.0 1.5 2 3 4 5 7 10
Load (kPa)


Load X L⁴ (kip·ft²)
0.02 0.05 0.1 0.2 0.5 1 2 5 10 20 50
Deflection (in.)
2.0 1.5 1.0 0.7 0.5 0.3 0.2 0.1 0.04
Deflection (mm)
50 30 20 10 7 5 3 2 1
Short Duration
Deflection vs. (Load x L⁴)
PVB LG 1/2 in. (12.0 mm)
Supported Along One Edge
0.01 0.02 0.05 0.1 0.2 0.5 1 2 5 10 20
Load X L⁴ (kN·m²)

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HIT-HY 200 Adhesive Anchoring System 3.2.3

Table 3 - HIT-HY 200 design strength with concrete/pullout failure for HIT-Z(-R) rods in uncracked concrete [1,2,3,4,5,6,7,8,10]

Nominal anchor diameter in.	Effective embed. in. (mm)	Tension — ΦN_n or N_r				Shear — ΦV_n or V_r			
		f'_c = 2500 psi (17.2 Mpa) lb (kN)	f'_c = 3000 psi (20.7 Mpa) lb (kN)	f'_c = 4000 psi (27.6 Mpa) lb (kN)	f'_c = 6000 psi (41.4 Mpa) lb (kN)	f'_c = 2500 psi (17.2 Mpa) lb (kN)	f'_c = 3000 psi (20.7 Mpa) lb (kN)	f'_c = 4000 psi (27.6 Mpa) lb (kN)	f'_c = 6000 psi (41.4 Mpa) lb (kN)
3/8	2-3/8 (60)	2,855 (12.7)	3,125 (13.9)	3,610 (16.1)	4,425 (19.7)	3,075 (13.7)	3,370 (15.0)	3,890 (17.3)	4,765 (21.2)
	3-3/8 (86)	4,835 (21.5)	5,300 (23.6)	5,560 (24.7)	5,560 (24.7)	10,415 (46.3)	11,410 (50.8)	13,175 (58.6)	16,135 (71.8)
	4-1/2 (114)	5,560 (24.7)	5,560 (24.7)	5,560 (24.7)	5,560 (24.7)	16,035 (71.3)	17,570 (78.2)	20,285 (90.2)	24,845 (110.5)
1/2	2-3/4 (70)	3,555 (15.8)	3,895 (17.3)	4,500 (20.0)	5,510 (24.5)	7,660 (34.1)	8,395 (37.3)	9,690 (43.1)	11,870 (52.8)
	4-1/2 (114)	7,445 (33.1)	8,155 (36.3)	8,190 (36.4)	8,190 (36.4)	16,035 (71.3)	17,570 (78.2)	20,285 (90.2)	24,845 (110.5)
	6 (152)	8,190 (36.4)	8,190 (36.4)	8,190 (36.4)	8,190 (36.4)	24,690 (109.8)	27,045 (120.3)	31,230 (138.9)	38,250 (170.1)
5/8	3-3/4 (95)	5,665 (25.2)	6,205 (27.6)	7,165 (31.9)	8,775 (39.0)	12,200 (54.3)	13,365 (59.5)	15,430 (68.6)	18,900 (84.1)
	5-5/8 (143)	10,405 (46.3)	11,400 (50.7)	13,165 (58.6)	14,950 (66.5)	22,415 (99.7)	24,550 (109.2)	28,350 (126.1)	34,720 (154.4)
	7-1/2 (191)	14,950 (66.5)	14,950 (66.5)	14,950 (66.5)	14,950 (66.5)	34,505 (153.5)	37,800 (168.1)	43,650 (194.2)	53,455 (237.8)
3/4	4 (102)	6,240 (27.8)	6,835 (30.4)	7,895 (35.1)	9,665 (43.0)	13,440 (59.8)	14,725 (65.5)	17,000 (75.6)	20,820 (92.6)
	6-3/4 (171)	13,680 (60.9)	14,985 (66.7)	17,305 (77.0)	19,890 (88.5)	29,460 (131.0)	32,275 (143.6)	37,265 (165.8)	45,645 (203.0)
	8-1/2 (216)	19,330 (86.0)	19,890 (88.5)	19,890 (88.5)	19,890 (88.5)	41,635 (185.2)	45,605 (202.9)	52,660 (234.2)	64,500 (286.9)

Table 4 - HIT-HY 200 design strength with concrete/pullout failure for HIT-Z(-R) rods in cracked concrete [1,2,3,4,5,6,7,8,9,10]

Nominal anchor diameter in.	Effective embed. in. (mm)	Tension — ΦN_n or N_r				Shear — ΦV_n or V_r			
		f'_c = 2500 psi (17.2 Mpa) lb (kN)	f'_c = 3000 psi (20.7 Mpa) lb (kN)	f'_c = 4000 psi (27.6 Mpa) lb (kN)	f'_c = 6000 psi (41.4 Mpa) lb (kN)	f'_c = 2500 psi (17.2 Mpa) lb (kN)	f'_c = 3000 psi (20.7 Mpa) lb (kN)	f'_c = 4000 psi (27.6 Mpa) lb (kN)	f'_c = 6000 psi (41.4 Mpa) lb (kN)
3/8	2-3/8 (60)	2,020 (9.0)	2,215 (9.9)	2,560 (11.4)	3,135 (13.9)	2,180 (9.7)	2,385 (10.6)	2,755 (12.3)	3,375 (15.0)
	3-3/8 (86)	3,425 (15.2)	3,755 (16.7)	4,335 (19.3)	5,305 (23.6)	7,380 (32.8)	8,085 (36.0)	9,335 (41.5)	11,430 (50.8)
	4-1/2 (114)	5,275 (23.5)	5,560 (24.7)	5,560 (24.7)	5,560 (24.7)	11,360 (50.5)	12,445 (55.4)	14,370 (63.9)	17,600 (78.3)
1/2	2-3/4 (70)	2,520 (11.2)	2,760 (12.3)	3,185 (14.2)	3,905 (17.4)	5,425 (24.1)	5,945 (26.4)	6,865 (30.5)	8,405 (37.4)
	4-1/2 (114)	5,275 (23.5)	5,780 (25.7)	6,670 (29.7)	7,640 (34.0)	11,360 (50.5)	12,445 (55.4)	14,370 (63.9)	17,600 (78.3)
	6 (152)	7,640 (34.0)	7,640 (34.0)	7,640 (34.0)	7,640 (34.0)	17,490 (77.8)	19,160 (85.2)	22,120 (98.4)	27,095 (120.5)
5/8	3-3/4 (95)	4,010 (17.8)	4,395 (19.5)	5,075 (22.6)	6,215 (27.6)	8,640 (38.4)	9,465 (42.1)	10,930 (48.6)	13,390 (59.6)
	5-5/8 (143)	7,370 (32.8)	8,075 (35.9)	9,325 (41.5)	11,420 (50.8)	15,875 (70.6)	17,390 (77.4)	20,080 (89.3)	24,595 (109.4)
	7-1/2 (191)	11,350 (50.5)	12,430 (55.3)	14,355 (63.9)	14,950 (66.5)	24,440 (108.7)	26,775 (119.1)	30,915 (137.5)	37,865 (168.4)
3/4	4 (102)	4,420 (19.7)	4,840 (21.5)	5,590 (24.9)	6,845 (30.4)	9,520 (42.3)	10,430 (46.4)	12,040 (53.6)	14,750 (65.6)
	6-3/4 (171)	9,690 (43.1)	10,615 (47.2)	12,255 (54.5)	15,010 (66.8)	20,870 (92.8)	22,860 (101.7)	26,395 (117.4)	32,330 (143.8)
	8-1/2 (216)	13,690 (60.9)	15,000 (66.7)	17,320 (77.0)	19,535 (86.9)	29,490 (131.2)	32,305 (143.7)	37,300 (165.9)	45,685 (203.2)

1 See section 3.1.7 for explanation on development of load values.
2 See section 3.1.7.3 to convert design strength (factored resistance) value to ASD value.
3 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.
4 Apply spacing, edge distance, and concrete thickness factors in tables 10 - 17 as necessary. Compare to the steel values in table 5. The lesser of the values is to be used for the design.
5 Data is for temperature range A: Max. short term temperature = 104° F (40° C), max. long term temperature = 75° F (24° C).
For temperature range B: Max. short term temperature = 176° F (80° C), max. long term temperature = 122° F (50° C) multiply above value by 0.86.
For temperature range C: Max. short term temperature = 248° F (120° C), max. long term temperature = 162° F (72° C) multiply above value by 0.70.
Short term elevated concrete temperatures are those that occur over brief intervals, e.g., as a result of diurnal cycling. Long-term concrete temperatures are roughly constant over significant periods of time.
6 Tabular values are for dry and water saturated concrete conditions.
7 Tabular values are for short-term loads only. For sustained loads, see section 3.1.7.5.
8 Tabular values are for normal-weight concrete only. For lightweight concrete multiply design strength (factored resistance) by λ_a as follows:
For sand-lightweight, λ_a = 0.51. For all-lightweight, λ_a = 0.45.
9 Tabular values are for static loads only. For seismic loads, multiply cracked concrete tabular values by the following reduction factors:
3/8-in diameter - α_{seis} = 0.705
1/2-in to 3/4-in diameter - α_{seis} = 0.75
See Section 3.1.7.4 for additional information on seismic applications.
10 Diamond core drilling with Hilti HIT-Z(-R) rods is permitted with no reduction in published data above.

Table 10 - Load adjustment factors for 3/8-in. diameter HIT-Z and HIT-Z-R rods in uncracked concrete [1,2]

3/8-in. HIT-Z(-R) uncracked concrete		Spacing factor in tension f_{AN}			Edge distance factor in tension f_{RN}			Spacing factor in shear[3] f_{AV}		
Embedment h_{ef} in.	(mm)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)
Spacing (s) / Edge distance (c_a) / Concrete thickness (h), - in. (mm): 1-7/8	(48)	0.63	0.59	0.57	n/a	n/a	0.21	0.57	0.53	0.52
2	(51)	0.64	0.60	0.57	n/a	0.25	0.21	0.57	0.53	0.52
2-1/4	(57)	0.66	0.61	0.58	0.38	0.26	0.22	0.58	0.54	0.53
3	(76)	0.71	0.65	0.61	0.46	0.30	0.25	0.61	0.55	0.54
4	(102)	0.78	0.70	0.65	0.59	0.36	0.29	0.64	0.57	0.55
4-5/8	(117)	0.82	0.73	0.67	0.69	0.40	0.31	0.66	0.58	0.56
5	(127)	0.85	0.75	0.69	0.74	0.43	0.33	0.68	0.58	0.56
5-3/4	(146)	0.90	0.78	0.71	0.86	0.49	0.36	0.70	0.59	0.57
6	(152)	0.92	0.80	0.72	0.89	0.51	0.38	0.71	0.60	0.57
7	(178)	0.99	0.85	0.76	1.00	0.60	0.43	0.75	0.61	0.59
8	(203)	1.00	0.90	0.80		0.69	0.49	0.79	0.63	0.60
9	(229)	1.00	0.94	0.83		0.77	0.55	0.82	0.65	0.61
10	(254)	1.00	0.99	0.87		0.86	0.61	0.86	0.66	0.62
11	(279)		1.00	0.91		0.94	0.67	0.89	0.68	0.63
12	(305)			0.94		1.00	0.73	0.93	0.70	0.65
14	(356)			1.00			0.85	1.00	0.73	0.67
16	(406)						0.98		0.76	0.70
18	(457)						1.00		0.79	0.72
24	(610)								0.89	0.79
30	(762)								0.99	0.87
36	(914)								1.00	0.94
> 48	(1219)									1.00

3/8-in. HIT-Z(-R) uncracked concrete		Edge distance in shear: ⊥ Toward edge f_{RV}			Edge distance in shear: ∥ To edge f_{RV}			Concrete thickness factor in shear[4] f_{HV}		
Embedment h_{ef} in.	(mm)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)
Spacing (s) / Edge distance (c_a) / Concrete thickness (h), - in. (mm): 1-7/8	(48)	n/a	n/a	0.05	n/a	n/a	0.10	n/a	n/a	n/a
2	(51)	n/a	0.09	0.06	n/a	0.17	0.11	n/a	n/a	n/a
2-1/4	(57)	0.33	0.10	0.07	0.38	0.21	0.13	n/a	n/a	n/a
3	(76)	0.51	0.16	0.10	0.51	0.32	0.21	n/a	n/a	n/a
4	(102)	0.79	0.24	0.16	0.79	0.44	0.29	0.76	n/a	n/a
4-5/8	(117)	0.98	0.30	0.20	0.98	0.49	0.31	0.81	0.55	n/a
5	(127)	1.00	0.34	0.22	1.00	0.52	0.33	0.84	0.57	n/a
5-3/4	(146)	1.00	0.42	0.27	1.00	0.59	0.36	0.91	0.61	0.53
6	(152)	1.00	0.45	0.29	1.00	0.62	0.38	0.92	0.63	0.54
7	(178)		0.57	0.37		0.72	0.43	1.00	0.68	0.58
8	(203)		0.69	0.45		0.83	0.49	1.00	0.72	0.63
9	(229)		0.83	0.54		0.93	0.55		0.77	0.66
10	(254)		0.97	0.63		1.00	0.63		0.81	0.70
11	(279)		1.00	0.72			0.72		0.85	0.73
12	(305)			0.83			0.83		0.88	0.77
14	(356)			1.00			1.00		0.96	0.83
16	(406)								1.00	0.88
18	(457)									0.94
24	(610)									1.00
30	(762)									
36	(914)									
> 48	(1219)									

Table 11 - Load adjustment factors for 3/8-in. diameter HIT-Z and HIT-Z-R rods in cracked concrete [1,2]

3/8-in. HIT-Z(-R) cracked concrete		Spacing factor in tension f_{AN}			Edge distance factor in tension f_{RN}			Spacing factor in shear[3] f_{AV}		
Embedment h_{ef} in.	(mm)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)
Spacing (s) / Edge distance (c_a) / Concrete thickness (h), - in. (mm): 1-7/8	(48)	0.63	0.59	0.57	n/a	0.56	0.50	0.57	0.53	0.52
2	(51)	0.64	0.60	0.57	n/a	0.57	0.51	0.57	0.53	0.52
2-1/4	(57)	0.66	0.61	0.58	0.73	0.60	0.53	0.58	0.54	0.53
3	(76)	0.71	0.65	0.61	0.88	0.70	0.60	0.61	0.55	0.54
4	(102)	0.78	0.70	0.65	1.00	0.84	0.70	0.64	0.57	0.55
4-5/8	(117)	0.82	0.73	0.67		0.93	0.76	0.67	0.58	0.56
5	(127)	0.85	0.75	0.69		0.99	0.80	0.68	0.58	0.56
5-3/4	(146)	0.90	0.78	0.71		1.00	0.88	0.71	0.59	0.57
6	(152)	0.92	0.80	0.72			0.91	0.71	0.60	0.57
7	(178)	0.99	0.85	0.76			1.00	0.75	0.61	0.59
8	(203)	1.00	0.90	0.80				0.79	0.63	0.60
9	(229)		0.94	0.83				0.82	0.65	0.61
10	(254)		0.99	0.87				0.86	0.66	0.62
11	(279)		1.00	0.91				0.89	0.68	0.64
12	(305)			0.94				0.93	0.70	0.65
14	(356)			1.00				1.00	0.73	0.67
16	(406)								0.76	0.70
18	(457)								0.79	0.72
24	(610)								0.89	0.79
30	(762)								0.99	0.87
36	(914)								1.00	0.94
> 48	(1219)									1.00

3/8-in. HIT-Z(-R) cracked concrete		Edge distance in shear: ⊥ Toward edge f_{RV}			Edge distance in shear: ∥ To edge f_{RV}			Concrete thickness factor in shear[4] f_{HV}		
Embedment h_{ef} in.	(mm)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)	2-3/8 (60)	3-3/8 (86)	4-1/2 (114)
Spacing (s) / Edge distance (c_a) / Concrete thickness (h), - in. (mm): 1-7/8	(48)	n/a	0.08	0.05	n/a	0.16	0.10	n/a	n/a	n/a
2	(51)	n/a	0.09	0.06	n/a	0.17	0.11	n/a	n/a	n/a
2-1/4	(57)	0.34	0.10	0.07	0.67	0.21	0.14	n/a	n/a	n/a
3	(76)	0.52	0.16	0.10	0.88	0.32	0.21	n/a	n/a	n/a
4	(102)	0.80	0.25	0.16	1.00	0.49	0.32	0.76	n/a	n/a
4-5/8	(117)	0.99	0.31	0.20		0.61	0.40	0.81	0.55	n/a
5	(127)	1.00	0.34	0.22		0.69	0.45	0.85	0.57	n/a
5-3/4	(146)		0.42	0.28		0.85	0.55	0.91	0.61	0.53
6	(152)		0.45	0.29		0.91	0.59	0.93	0.63	0.54
7	(178)		0.57	0.37		1.00	0.74	1.00	0.68	0.59
8	(203)		0.70	0.45			0.91		0.72	0.63
9	(229)		0.83	0.54			1.00		0.77	0.67
10	(254)		0.97	0.63					0.81	0.70
11	(279)		1.00	0.73					0.85	0.74
12	(305)			0.83					0.89	0.77
14	(356)			1.00					0.96	0.83
16	(406)								1.00	0.89
18	(457)									0.94
24	(610)									1.00
30	(762)									
36	(914)									
> 48	(1219)									

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a four-anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Anchor Design software or perform anchor calculation using design equations from ACI 318 Appendix D.

3 Spacing reduction factor in shear, f_{AV}, assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, f_{HV}, assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

If a reduction factor value is in a shaded area, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with figure 6 and table 6 of this section to calculate permissible edge distance, spacing and concrete thickness combinations.

MecaWind v2526

Calculations Prepared by:
Structural Design, Inc.
13014 SW 120 Street
Miami, Florida, 33186
Date: Jul 13, 2026
Designer: F.R.

Calculations Prepared For:
Client: Ag Const, LLC
Project #: 26-068
Location: 9841 SW 73rd Court Pinecrest, FL
Description: Balcony Glass Railings

File Location: D:\Wind Load Runs\26-068 balcony railing.wnd

General:
Reference Abbreviations: T: Table, F: Figure, E: Equation, §: Section

Wind Load Standard	= ASCE 7-22	Basic Wind Speed	= 175.0 mph
Exposure Classification	= C	Risk Category	= II
Structure Type	= Freestanding Wall	Basis for Wind Pressures	= ASD
MWFRS Analysis Method	= Ch 29	C&C Analysis Method	= None
Dynamic Type of Structure	= Rigid	Advanced Options	= True
Base Elevation Of Structure	= 0.0000 ft	MWFRS Pressure Elevations	= Manual
Topographic Effects	= None	Override Directionality Factor	= False
Override Gust Factor	= False	Override Minimum Pressure	= False

Freestanding Wall Inputs:

h = Height from grade to top.	= 4.1670 ft	S = Height of Sign/Frame	= 4.1670 ft
B = Width of Sign/Frame	= 5.0000 ft	T = Thickness/Depth of Sign.	= 0.5625 ft
L_r = Dimension of return corner L_r	= 0.0000 ft	ε = Solidity Ratio	= 1.000
AttachWall = Attached to Wall	= False	Dbl = Double Faced & Sides Enclosed	= False
IsCol = Supported on Columns	= False		

Exposure Constants [T:26.11-1]:

α = 3-s Gust-speed exponent	= 9.800	Z_g = Nominal Ht of Boundary Layer	= 2460.000 ft
$\hat{a}$ = Reciprocal of α	= 0.102	b = 3 sec gust speed factor	= 1.000
α_m = Mean hourly Wind-Speed Exponent	= 0.156	b_m = Mean hourly Windspeed Exponent	= 0.660
c = Turbulence Intensity Factor	= 0.200	ε = Integral Length Scale Exponent	= 0.2000

Main Wind Force Resisting System (MWFRS) Wind Calculations for Freestanding Wall per §29.4

h = Mean structure height	= 4.167 ft	$K_h = 2.41 \cdot (15/Z_g)^{2/\alpha}$ T:26.10-1	= 0.851
K_{zt} = No Topographic Feature	= 1.000	K_d = Directionality Factor T:26.6-1	= 0.85
LF = ASD Load Factor	= 0.60	K_e = Ground Elev Factor T:26.10-1	= 1.000
$q_h = .00256 \cdot K_h \cdot K_{zt} \cdot K_e \cdot V^2 \cdot LF_{E:26.10-1}$	= 40.04 psf		

Gust Factor Calculation for Wind:

Gust Factor Category I Rigid Structures - Simplified Method

G_1	= Simplified: For Rigid Structures can use 0.85	= 0.85

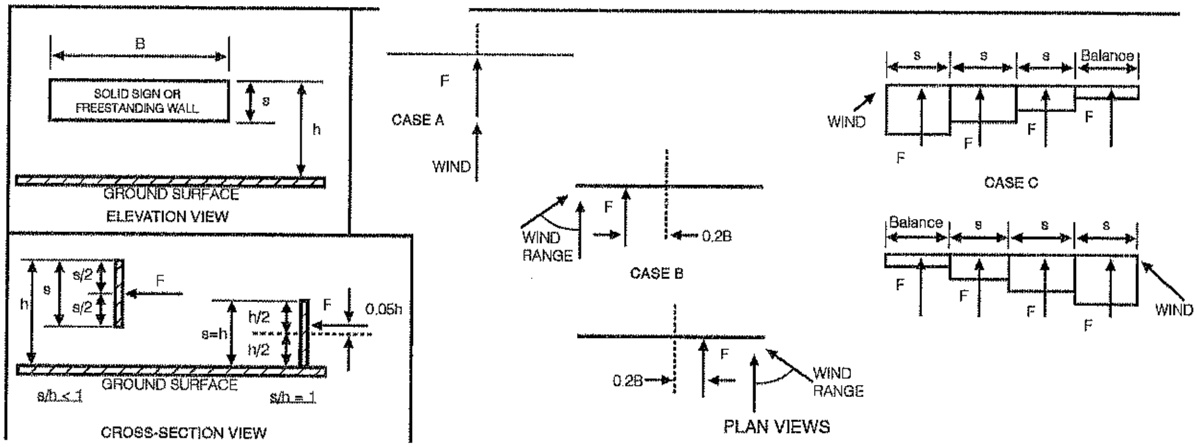
Gust Factor Category II Rigid Structures - Complete Analysis

Z_m	= Equiv Struc Height: Max(0.6•h, Z_{min})	= 15.000 ft
I_{zm}	= Turbulence Intensity: $c \cdot (33/Z_m)^{1/6}$ [E:26.11-7]	= 0.228
L_{zm}	= Turbulence Integral Length Scale: $\ell \cdot (Z_m/33)^{\varepsilon}$ [E:26.11-9]	= 427.057 ft
B	= Avg Structure Width Normal to Wind Direction	= 5.000 ft
Q	= $[1/(1+0.63 \cdot [(B+h)/L_{zm}]^{0.63})]^{0.5}$ [E:26.11-8]	= 0.973
G_2	= Detailed: $0.925 \cdot [(1+1.7 \cdot g_q \cdot I_{zm} \cdot Q)/(1+1.7 \cdot g_v \cdot I_{zm})]$ [E:26.11-6]	= 0.911

Gust Factor Used in Analysis

G	= Gust Factor: Min(G_1, G_2)	= 0.850

MWFRS Wind Pressures on Freestanding Wall per F:29.3-1



R	= Reduction factor to account for openings: $(1-(1-1)^{3/2})$	= 1.000
R_c	= Reduction factor for Case C since s/h > 0.8: (1.8-s/h)	= 0.800
A_s	= Gross Area of Freestanding Wall: B•s	= 20.84 ft^2
B/s	= Aspect Ratio: B/s	= 1.200
s/h	= Clearance Ratio: s/h	= 1.000
C_f	= Net Force Coefficient for Case A and B per F:29.3-1	= 1.440
e	= Not Double Faced, Case B eccentricity is 0.2	= 0.2000

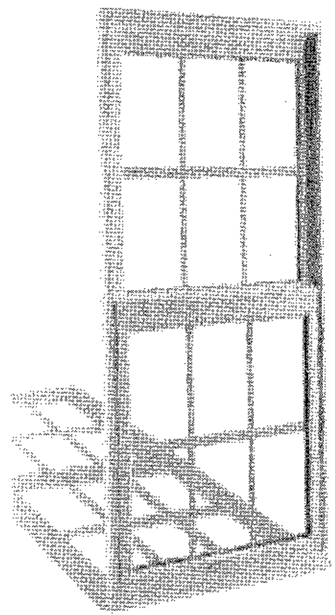
Case A: Resultant force acts normal to face through geometric center
and since s/h = 1 then consider force acting 0.05*s above the geometric center

0.05•s	= Since s/h = 1, load applied at vertical offset from geom center	= 0.208 ft
F	= Wind Pressure: $q_z \cdot K_d \cdot G \cdot C_f A_s$ E:29.3-1	= 868 lb
M	= Overturning Moment: F•(h/2+0.05•h)	= 1,989 lb•ft

Case B: Resultant force acts normal to face at a distance from the geometric
center toward the windward edge equal to e times the average width
and since s/h = 1 then consider force acting 0.05*s above the geometric center

0.05•s	= Since s/h = 1, load applied at vertical offset from geom center	= 0.208 ft
D_x	= Force Offset from Center toward windward edge: e•B	= 1.000 ft
F	= Wind Pressure: $q_z \cdot K_d \cdot G \cdot C_f A_s$ E:29.3-1	= 868 lb
F_1	= Reduced Design Force: F•R	= 868 lb
T_1	= Torsion about Vertical Axis: F_1•e•b	= 868 lb•ft
M_1	= Overturning Moment: F_1•(h/2+0.05•h)	= 1,989 lb•ft

Project Name: Balcony Glass Railing
Customer Name: AG Construction
Project Location: 9841 SW 73 Court
Pinecrest
Prepared By: Farrokh Rasekhi, P.E.
Project Comments: 60" long Balcony
Glass Railing



Disclaimer

These calculations are based on the ASTM E1300-09, ASTM E1300-12, ASTM E1300-16 and ASTM E1300-24 Standard Practices for determining the load resistance of glass in buildings and provided to the customer as a guide only. WGD does NOT take responsibility for providing structural load calculations and providing load resistances for the customer's application.

The software used to generate this report has been developed by Standards Design Group (SDG), and can be used to determine the load resistance of specified glass types exposed to uniform lateral loads of short or long duration subject to the following condition(s):
- The glass is free of edge and surface damage and has been properly glazed in the opening in conformance with the manufacturer's recommendations.

The user has the responsibility for selecting the correct procedures for the required application from the software. The stiffness of members supporting any glass edge shall be sufficient that under design load, edge deflections shall not exceed L/175, where L denotes the length of the supported edge. The non-factored load values for laminated glass are representative of test data and calculations performed for an interlayer at a temperature of 50° C (122° F). For other limiting conditions that may apply, refer to Section 5 of ASTM E1300 and local building codes.

SDG disclaims any responsibility for any particular results relating to the use of the WGD Program. SDG disclaims any liability for any personal injury or any loss or damage of any kind, including all indirect, special, or consequential damages and lost profits, arising out of or relating to the use of the WGD Program.

Signature / Stamp

Glazing Information

Supported Edges:	One side Supported
Shape:	Rectangular
Unsupported Length:	50.0 in.
Supported Length:	60.0 in.
Glazing Angle:	90.0 °

Glazing Construction (Single Glazed Lite)

Single Lite Properties (5/8 in. Laminated)

Construction: 5/8 in. (FT) | 0.060 in. (PVB)

Applied Loads

Description	Load	Duration
Short Duration	41.7 psf	3.00 sec

16/17

Glazing Construction (Single Glazed Lite)

Single Lite Properties (5/8 in. Laminated)

Construction: 5/8 in. (FT) | 0.060 in. (PVB) (USE 9/16" LAMINATED GLASS)

Load Resistance

Short Duration (3 Sec)

Description	NFL	GTF	LR
Single Lite	12.2 psf	4.00	48.9 psf

Long Duration (30 Days)

Description	NFL	GTF	LR
Single Lite	12.2 psf	3.00	36.7 psf

Comparisons

Short Duration

41.7 psf 3.00 sec <= 48.9 psf — OK

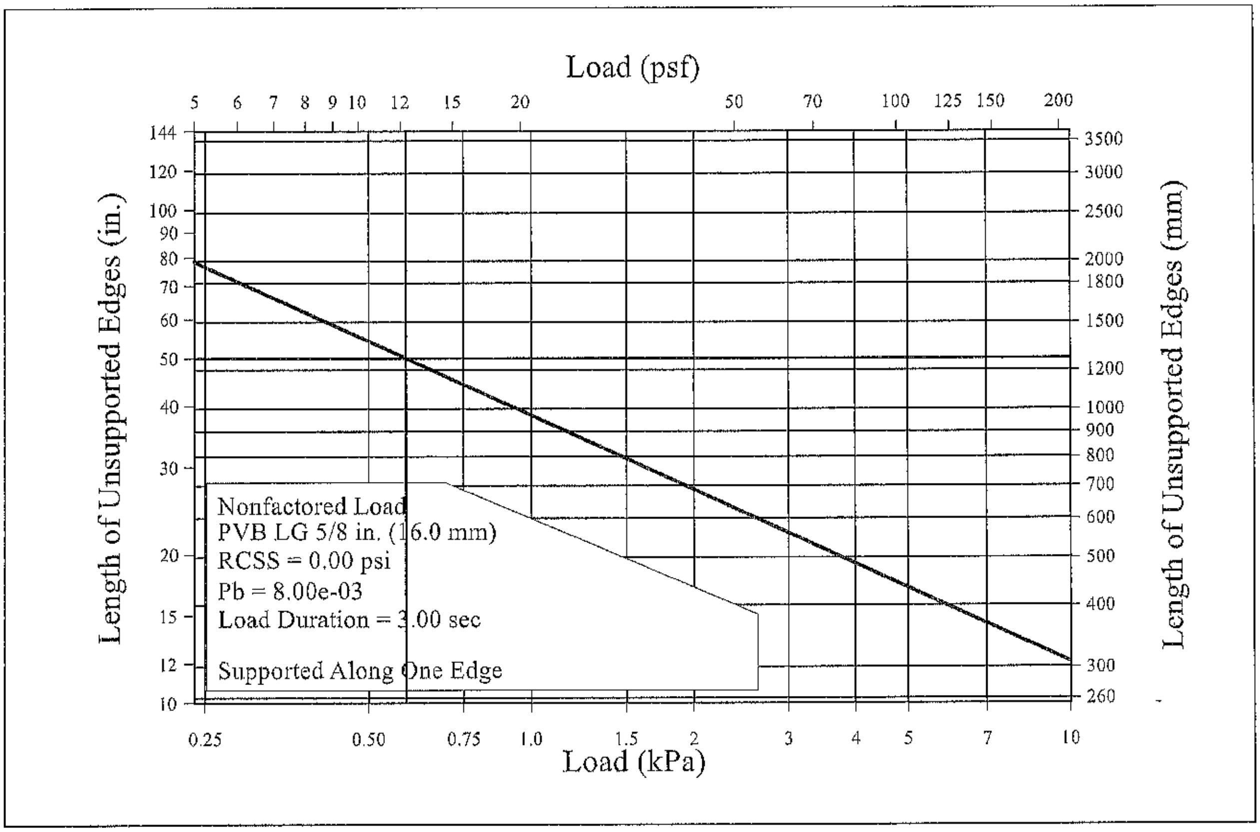
Single Lite

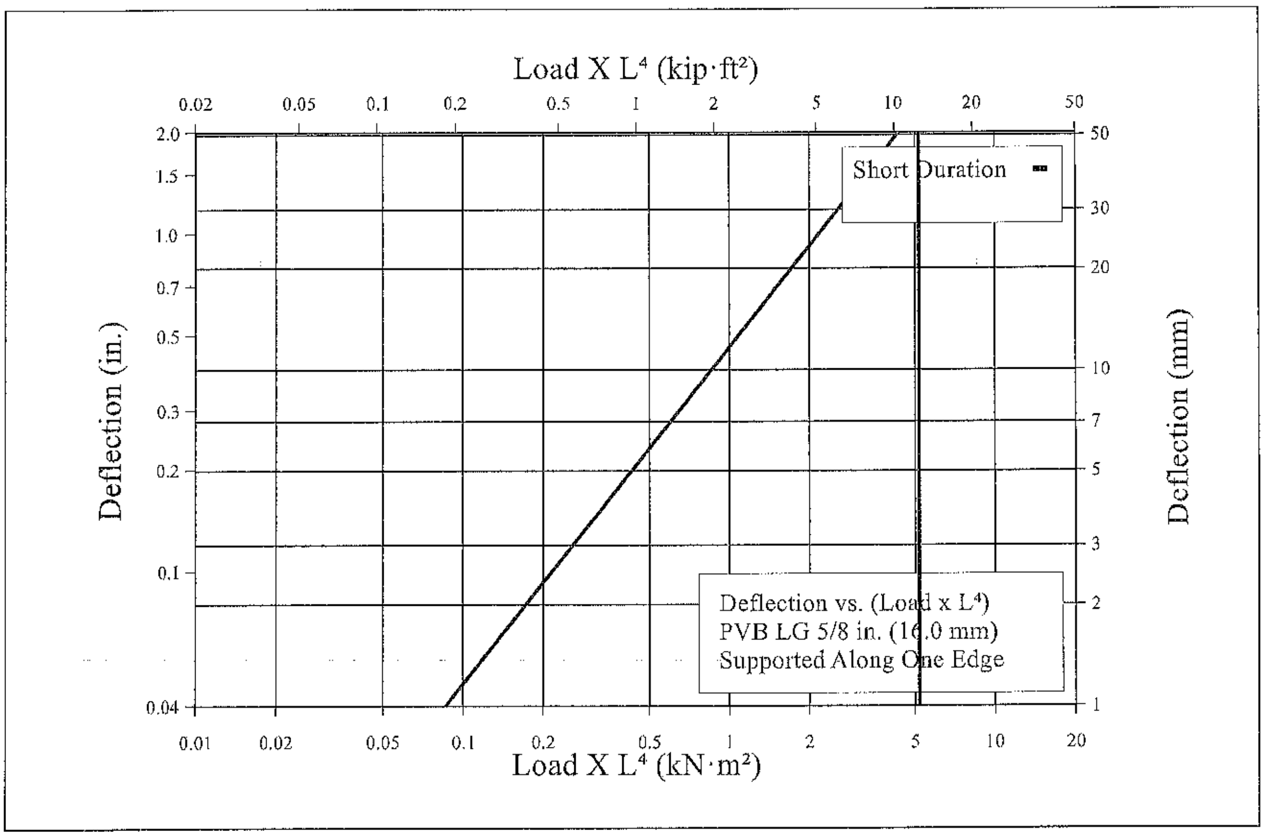
Approximate edge of glass deflection:	2.38 in. *
Glass bite reduction/pullout:	0.00 in.

Notes

Load resistance values are computed in accordance with ASTM E1300-16 Section 6.2 and are based on non-factored load values calculated in a manner consistent with those presented in ASTM E1300-16.

* Deflection value extends beyond deflection chart


Load (psf)
5 6 7 8 9 10 12 15 20 50 70 100 125 150 200
Length of Unsupported Edges (in.)
144 120 100 90 80 70 60 50 40 30 20 15 12 10
Length of Unsupported Edges (mm)
3500 3000 2500 2000 1800 1500 1200 1000 900 800 700 600 500 400 300 260
Nonfactored Load
PVB LG 5/8 in. (16.0 mm)
RCSS = 0.00 psi
Pb = 8.00e-03
Load Duration = 3.00 sec
Supported Along One Edge
0.25 0.50 0.75 1.0 1.5 2 3 4 5 7 10
Load (kPa)


Load X L⁴ (kip·ft²)
0.02 0.05 0.1 0.2 0.5 1 2 5 10 20 50
Deflection (in.)
2.0 1.5 1.0 0.7 0.5 0.3 0.2 0.1 0.04
Deflection (mm)
50 30 20 10 7 5 3 2 1
Short Duration
Deflection vs. (Load x L⁴)
PVB LG 5/8 in. (16.0 mm)
Supported Along One Edge
0.01 0.02 0.05 0.1 0.2 0.5 1 2 5 10 20
Load X L⁴ (kN·m²)