LAVALLEE | BRENSINGER ARCHITECTS

SHOP DRAWING TRANSMITTAL

The Park Danforth

Portland ME

Project No.: 13-059-00

Division: 05 40 00

Transmit To:

Mark Donovan
PC Construction
131 Presumpscot Street
Portland ME 04103

Submission No.: 59
Version: A
CM Reference No.: 05 40 00-003
Copies:

Ron Norton	Construction Management Consultin rvices
Andrew Pires	PC Construction
Kemp Carey	PC Construction

Submittal No.	Qty.	Description
59 - 1	1	CFMF - Calculations

Comments:

Note: Refer to attached submittals for review comments and requirements.

NH: 155 Dow Street, Suite 400 - Manchester, NH 03101 MA: 92 Montvale Ave, Suite 2150 - Stoneham, MA 02180 www.LBPA.com

CONSTRUCTION

Garret Bertolini
131 Presumpscot St
Portland, ME 04103
T: 207.874.2323
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E: gbertolini@pcconstruction.com

Project No. 14776
The Park Danforth Expansion & Renovations
789 Stevens Ave
Portland, ME 04103

Submittal 05 40 00-003
Review Cycle 1

Title	**Cold-Formed Metal Framing - Calculations**		
Type	**Calculations**		
Sent Date	**13-Jan-2016**	Spec Section	**05 40 00**
Due Date	**20-Jan-2016**	Spec Sub-Section	

Sent To For Review
Scott Timmons
Lavallee Brensinger Architects

Responsible Subcontractor / Vendor
Richard Fifield
Timberland Drywall, Inc.

Item Being Submitted
Cold-Formed Metal Framing - Calculations

Reviewed for conformance to specifications only. Calculations not reviewed.

Contractor's Review Stamp
I hereby certify that I have examined the enclosed submittal(s) and have determined and verified all field measurements, construction criteria, materials, catalog numbers, and similar data, coordinated the submittal(s) with other submissions and the work of other trades and contractors and, to the best of my knowledge and belief, the enclosed submittal(s) is/are in full compliance with the Contract requirements, except as noted above.

Signature [signature] Date 01/13/2016

Name
Andrew Pires
PC Construction Company

Architect's Review Stamp
- [x] Reviewed for Performance Criteria Only
- [ ] Reviewed
- [x] Furnish as Corrected
- [ ] Rejected
- [ ] Revise and Resubmit
- [ ] Submit Specific Item

This review is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of his or her Work with that of all other trades; and for performing all work in a safe and satisfactory manner.

Becker Structural Engineers, Inc
Date: 01/15/2016 By: ARW

Gage specified does not meet specifications, reference architectural specifications for minimum gage requirements.

Reference Architectural specifications for deflection requirements: L/720 horizontal deflection at brick.

GC confirm:
GC's intent is to place the CFMF before the slabs to heat the building for slab placement. To account for additional dead load deflections from the concrete slab placement.The vertical allowable deflections shall be 1 1/4" instead of 3/4". Redesign CFMF for 1 1/4" vertical deflection allowance.

This approval does not release subcontractor / vendor from the contractual responsibilities.

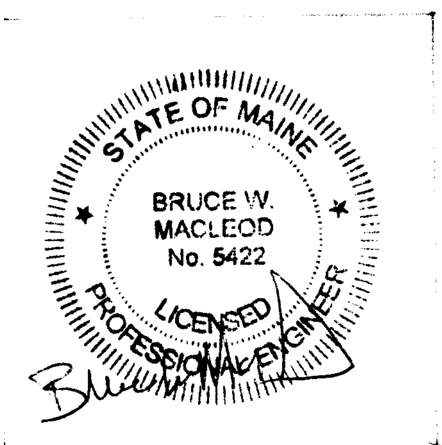
MacLeod Structural Engineers, P.A.
Structural Consultants
90 Bridge Street
Westbrook, Maine 04092
Phone (207) 839-0980
Fax (207) 839-0982

PARK DANFORTH
Portland, ME

LIGHT GAGE FRAMING CALCULATIONS
MSE Job #2015-287

PREPARED BY
MacLeod Structural Engineers, P.A.
Westbrook, Maine
DECEMBER 28, 2015

PREPARED FOR
TIMBERLAND DRYWALL
GORHAM, ME



MacLeod Structural Engineers, P.A.
Structural Consultants
90 Bridge Street
Westbrook, Maine 04092
Phone (207) 839-0980
Fax (207) 839-0982

Project: Park Danforth
Portland, ME
By: NED
Job ID: 2015-287
Date: 12/28/2015

DESIGN CRITERIA:

Building Design Code: Maine Uniform Building And Energy Code W/ 2009 IBC

Design Loads:

Dead Loads: Partition Weight - 10 psf

Roof Dead Load - 15 psf

22 psf

Design Wind: Location: Portland, ME

Basic Wind Speed = 100 mph

Exposure Category "B"

Importance Factor = 1.0

L/720, reference arch specificaitons

1.1 per S0.0

Snow Load: Ground Snow Load = 60 psf

Snow Exposure Factor = 1.0

Importance Factor = 1.0 Thermal Factor = 1.0

Deflection Criteria For Studs: Standard Per Code - Unless Job Specifications Are More Stringent

Walls: L/600 At Masonry Backup, L/360 At Non-masonry Backup.

Roof: L/240

Allowance For Vertical Movement Of Structure = 3/4"

GC's intent is to place the CFMF before the slabs to heat the building for slab placement. To account for additional dead load deflections from the concrete slab placement.The vertical allowable deflections shall be 1 1/4" instead of 3/4". Redesign CFMF for 1 1/4" vertical deflection allowance.

Materials:

Cold Formed Metal Framing Materials Based On SSMA Standards.
Calculation Based On Min. Fy = 33 ksi for all materials (Unless Noted)

Fasteners:

Unless Noted Otherwise: Use Only The Following Fasteners:

1.) P.A.F. = 0.145" Dia. (min.) Powder Actuated Fastener (Hilti)
Use 1 1/4" Length For Attachment To Concrete
Use 5/8" Length For Attachment To Steel

2.) Use #10-16 Screws Typical For All Light gage To Light Gage Connections

3.) Use #12 Screws for Manufacturers Clips Where Required/Indicated

Clark Western

Fastener Design Criteria

The following information is provided to assure that framing components you select can be fastened correctly. Your selection of fasteners or welds will depend on the members selected and the load requirements you anticipate

AISI Calculated Allowable Loads for Screw Connection

Material Thickness mils	Design Thickness in	Material Strength Fy (ksi)	Material Strength Fu (ksi)	#8-18 HWH Screw Dia.=0.16" Shear (lbs)	#8-18 HWH Screw Dia.=0.16" Tension (lbs)	#10-16 HWH Screw Dia.=0.190" Shear (lbs)	#10-16 HWH Screw Dia.=0.190" Tension (lbs)	#12-14 HWH Screw Dia.=0.21" Shear (lbs)	#12-14 HWH Screw Dia.=0.21" Tension (lbs)	1/4"-14 HWH Screw Dia.=0.240" Shear (lbs)	1/4"-14 HWH Screw Dia.=0.240" Tension (lbs)
33	0.0346	33	45	162	71	177	84	186	93	199	106
43	0.0451	33	45	241	92	263	109	277	121	296	138
54	0.0566	33	45	333	115	370	137	389	152	416	173
	0.0566	50	65	333	167	467	198	562	219	600	250
68	0.0713	33	45	n/a	n/a	467	173	550	191	588	218
	0.0713	50	65	n/a	n/a	467	249	625	276	849	315
97	0.1017	33	45	n/a	n/a	467	246	625	272	863	311
	0.1017	50	65	n/a	n/a	467	356	625	393	863	450
118	0.1242	33	45	n/a	n/a	n/a	n/a	625	333	863	380
	0.1242	50	65	n/a	n/a	n/a	n/a	625	480	863	549

AISI Allowable Loads for Welded Connections (lbs/inch of weld)

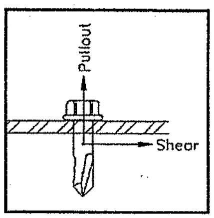
Material Thickness (mils)	Design Thickness (in)	Material Strength Fy (ksi)	Material Strength Fu (ksi)	Fillet Weld Long. (lbs)	Fillet Weld Trans. (lbs)	Groove Weld Trans. (lbs)	Groove Weld Long. (lbs)
L= 1 inch							
43	0.0451	33	45	619	864	663	544
	0.0451	50	65	895	1247	958	785
54	0.0566	33	45	822	1084	832	682
	0.0566	50	65	1188	1566	1202	985
68	0.0713	33	45	1082	1365	1048	859
	0.0713	50	65	1563	1972	1514	1241
97	0.1017	33	45	1618	1795	1495	1226
	0.1017	50	65	2337	1944	2159	1771
118	0.1242	33	45	2015	2192	1826	1497
	0.1242	50	65	2911	2374	2637	2162
L= 2 inch							
43	0.0451	33	45	998	1727	1326	1087
	0.0451	50	65	1442	2495	1915	1570
54	0.0566	33	45	1253	2168	1664	1364
	0.0566	50	65	1809	3131	2404	1971
68	0.0713	33	45	1578	2731	2096	1719
	0.0713	50	65	2279	3944	3028	2483
97	0.1017	33	45	2884	3589	2990	2452
	0.1017	50	65	4165	3889	4319	3541
118	0.1242	33	45	3678	4384	3651	2994
	0.1242	50	65	5312	4749	5274	4325

1. All values were calculated using the 2001 AISI Specification
2. Fxx values were based off of Fxx >= 60ksi and that Fxx > Fu from the 2001 AISI Specification Code
3. Values may be increased 1/3 for wind or seismic loading.
4. Values include a 2.5 factor of safety.

Minimum Required Allowable Load for Screws

Design Thickness in lbs	#12-24 HWH Screw Dia.=0.21" Shear lbs	#12-24 HWH Screw Dia.=0.21" Tension lbs	#1/4-28 HWH Screw Dia.=0.24" Shear lbs	#1/4-28 HWH Screw Dia.=0.24" Tension lbs
0.1875	725	1042	957	1100
0.25	725	1063	957	1425

Screw table notes:
1. All values were calculated using the 2001 AISI Specification
2. Shear values were based on the tilting and bearing modes of failure Eq. E4.3.1-1, E.4.3.1-2
3. Minimum Spacing of Screws is determined by E4.1 stating spacing shall not be less than 3d
4. Edge Distance is determined by E4.2 stating that edge distance shall not be less than 3d
5. Allowable loads are based on a Safety Factor of 3.0
6. E4.3.2 states that the Bearing Strength < Pns = t*e*Fu
7. For the screws into structural steel, the shear values are for the failure of the screw itself. Look at bearing of clip to determine minimum value of shear.
8. Bearing or Pullover values do not control in the above cases.



Hilti Anchors (PDF in Steel) Allowable Loads (lbs.)

Material Thickness mils	Yield Strength Fy ksi	Hilti X-EDNI (Dia.=0.145") 3/16" Shear	3/16" Tension	1/4" Shear	1/4" Tension	Hilti X-DNI (Dia.=0.145") 3/16" Shear	3/16" Tension	1/4" Shear	1/4" Tension	Hilti X-DS (Dia.=0.177") 3/16" Shear	3/16" Tension	1/4" Shear	1/4" Tension
33	33	203	234	203	234	203	234	203	234	248	234	248	234
43	33	265	304	265	304	265	304	265	304	323	304	323	304
54	33	332	382	332	382	332	360	332	382	406	382	406	382
	50	425	455	480	552	480	360	480	510	586	390	586	552
68	33	419	455	419	481	419	360	419	481	511	390	511	481
	50	425	455	605	695	490	360	590	510	738	390	625	620
97	33	425	455	597	686	490	360	590	510	729	390	625	620
	50	425	455	620	800	490	360	590	510	795	390	625	620
118	33	425	455	620	800	490	360	590	510	795	390	625	620
	50	425	455	620	800	490	360	590	510	795	390	625	620

Hilti Anchors (PDF in Concrete) Allowable Loads (lbs.) Hilti X-DNI (dia. = 0.145")

Material Thickness mils	Yield Strength Fy ksi	Min. Embedment 3/4" 2000 psi Shear	2000 psi Tension	3000 psi Shear	3000 psi Tension	4000 psi Shear	4000 psi Tension	Min. Embedment 1" 2000 psi Shear	2000 psi Tension	3000 psi Shear	3000 psi Tension	4000 psi Shear	4000 psi Tension
33	33	95	70	110	90	125	110	140	90	160	120	185	155
43	33	95	70	110	90	125	110	140	90	160	120	185	155
54	33	95	70	110	90	125	110	140	90	160	120	185	155
	50	95	70	110	90	125	110	140	90	160	120	185	155
68	33	95	70	110	90	125	110	140	90	160	120	185	155
	50	95	70	110	90	125	110	140	90	160	120	185	155
97	33	95	70	110	90	125	110	140	90	160	120	185	155
	50	95	70	110	90	125	110	140	90	160	120	185	155
118	33	95	70	110	90	125	110	140	90	160	120	185	155
	50	95	70	110	90	125	110	140	90	160	120	185	155

Hilti Anchors (PDF in Concrete) Allowable Loads (lbs.) Hilti X-DNI (dia. = 0.145")

Material Thickness mils	Yield Strength Fy ksi	Min. Embedment 1-1/2" 2000 psi Shear	2000 psi Tension	3000 psi Shear	3000 psi Tension	4000 psi Shear	4000 psi Tension
33	33	203	165	203	190	203	215
43	33	230	165	265	190	265	215
54	33	230	165	280	190	332	215
	50	230	165	280	190	335	215
68	33	230	165	280	190	335	215
	50	230	165	280	190	335	215
97	33	230	165	280	190	335	215
	50	230	165	280	190	335	215
118	33	230	165	280	190	335	215
	50	230	165	280	190	335	215

Material	Min. Edge Distance	Min. Spacing	Min. Material Thickness
Steel	1/4"	1"	1/8"
Concrete	2"	3"	3 x Embedment

Hilti table notes:
1. All values were calculated using the 2001 AISI Specification
2. Shear values were based on the tilting and bearing modes of failure Eq. E4.3.1-1, E.4.3.1-2
3. Allowable loads are based on a safety factor of 3.0
4. E4.3.2 states that the bearing strength < Pns = t*e*Fu

Screw Capacities

Table Notes

1. Capacities based on AISI S100 Section E4.
2. When connecting materials of different steel thicknesses or tensile strengths, use the lowest values. Tabulated values assume two sheets of equal thickness are connected.
3. Capacities are based on Allowable Strength Design (ASD) and include safety factor of 3.0.
4. Where multiple fasteners are used, screws are assumed to have a center-to-center spacing of at least 3 times the nominal diameter (d).
5. Screws are assumed to have a center-of-screw to edge-of-steel dimension of at least 1.5 times the nominal diameter (d) of the screw.
6. Pull-out capacity is based on the lesser of pull-out capacity in sheet closest to screw tip or tension strength of screw.
7. Pull-over capacity is based on the lesser of pull-over capacity for sheet closest to screw header or tension strength of screw.
8. Values are for pure shear or tension loads. See AISI Section E4.5 for combined shear and pull-over.
9. Screw Shear (Pss), tension (Pts), diameter, and head diameter are from CFSEI Tech Note (F701-12).
10. Screw shear strength is the average value, and tension strength is the lowest value listed in CFSEI Tech Note (F701-12).
11. Higher values for screw strength (Pss, Pts), may be obtained by specifying screws from a specific manufacturer.

Allowable Screw Connection Capacity (lbs)

Thickness (Mils)	Design Thickness	Fy Yield (ksi)	Fu Tensile (ksi)	#6 Screw (Pss = 643 lbs, Pts = 419 lbs) 0.138" dia, 0.272" Head			#8 Screw (Pss= 1278 lbs, Pts = 586 lbs) 0.164" dia, 0.272" Head			#10 Screw (Pss= 1644 lbs, Pts = 1168 lbs) 0.190" dia, 0.340" Head			#12 Screw (Pss= 2330 lbs, Pts = 2325 lbs) 0.216" dia, 0.340" Head			1/4" Screw (Pss= 3048 lbs, Pts = 3201 lbs) 0.250" dia, 0.409" Head		
				Shear	Pull-Out	Pull-Over	Shear	Pull-Out	Pull-Over	Shear	Pull-Out	Pull-Over	Shear	Pull-Out	Pull-Over	Shear	Pull-Out	Pull-Over
18	0.0188	33	33	44	24	84	48	29	84	52	33	105	55	38	105	60	44	127
27	0.0283	33	33	82	37	127	89	43	127	96	50	159	102	57	159	110	66	191
30	0.0312	33	33	95	40	140	103	48	140	111	55	175	118	63	175	127	73	211
33	0.0346	33	45	151	61	140	164	72	195	177	84	265	188	95	265	203	110	318
43	0.0451	33	45	214	79	140	244	94	195	263	109	345	280	124	345	302	144	415
54	0.0566	33	45	214	100	140	344	118	195	370	137	386	394	156	433	424	180	521
68	0.0713	33	45	214	125	140	426	149	195	523	173	386	557	196	545	600	227	656
97	0.1017	33	45	214	140	140	426	195	195	548	246	386	777	280	775	1,016	324	936
118	0.1242	33	45	214	140	140	426	195	195	548	301	386	777	342	775	1,016	396	1,067
54	0.0566	50	65	214	140	140	426	171	195	534	198	386	569	225	625	613	261	752
68	0.0713	50	65	214	140	140	426	195	195	548	249	386	777	284	775	866	328	948
97	0.1017	50	65	214	140	140	426	195	195	548	356	386	777	405	775	1,016	468	1,067
118	0.1242	50	65	214	140	140	426	195	195	548	386	386	777	494	775	1,016	572	1,067

Weld Capacities

Table Notes

1. Capacities based on the AISI S100 Specification Sections E2.4 for fillet welds and E2.5 for flare groove welds.
2. When connecting materials of different steel thicknesses or tensile strengths, use the lowest values.
3. Capacities are based on Allowable Strength Design (ASD).
4. Weld capacities are based on E60 electrodes. For material thinner than 68 mil, 0.030" to 0.035" diameter wire electrodes may provide best results.
5. Longitudinal capacity is considered to be loading in the direction of the length of the weld.
6. Transverse capacity is loading in perpendicular direction of the length of the weld.
7. For flare groove welds, the effective throat of weld is conservatively assumed to be less than 2t.
8. For longitudinal fillet welds, a minimum value of EQ E2.4-1, E2.4-2, and E2.4-4 was used.
9. For transverse fillet welds, a minimum value of EQ E2.4-3 and E2.4-4 was used.
10. For longitudinal flare groove welds, a minimum value of EQ E2.5-2 and E2.5-3 was used.

Allowable Weld Capacity (lbs / in)

Thickness (Mils)	Design Thickness	Fy Yield (ksi)	Fu Tensile (ksi)	Fillet Welds		Flare Groove Welds	
				Longitudinal	Transverse	Longitudinal	Transverse
43	0.0451	33	45	499	864	544	663
54	0.0566	33	45	626	1084	682	832
68	0.0713	33	45	789	1365	859	1048
97	0.1017	33	45	1125	1269	-[1]	-[1]
54	0.0566	50	65	905	1566	985	1202
68	0.0713	50	65	1140	1972	1241	1514
97	0.1017	50	65	1269	1269	-[1]	-[1]

[1] *Weld capacity for material thickness greater than 0.10" requires engineering judgment to determine leg of welds, W1 and W2.*

3.2.2 General Application Fasteners

3.2.2.2 Material Specifications

Fastener Designation	Fastener Material	Fastener Plating[1]	Steel Washer or Clip Material[2]	Washer or Clip Plating[1,2]
X-U	Carbon Steel	5 µm Zinc	Carbon Steel	5 µm Zinc
DS/EDS	Carbon Steel	5 µm Zinc	N/A	N/A
X-ZF	Carbon Steel	5 µm Zinc	Carbon Steel	5 µm Zinc
X-CR[3]	SAE 316	N/A	SAE 316	N/A
X-GN/X-GHP/X-EGN	Carbon Steel	5 µm Zinc	N/A	N/A
X-DNI	Carbon Steel	5 µm Zinc	Carbon Steel	5 µm Zinc
X-EDNI	Carbon Steel	5 µm Zinc	N/A	N/A
X-AL-H	Carbon Steel	5 µm Zinc	N/A	N/A
X-NK/ENK	Carbon Steel	5 µm Zinc	Carbon Steel	5 µm Zinc
SL Forming Nail	Carbon Steel	5 µm Zinc	N/A	N/A
BC ZF	Carbon Steel	5 µm Zinc	Carbon Steel	5 µm Zinc

1 The 5 µm zinc coating is in accordance with ASTM B 633, SC 1, Type III.

2 Most fasteners have a plastic washer for guidance when installing. Not all fastener lengths have a pre-mounted steel washer. Refer to Section 3.2.2.4 for more information on available fasteners.

3. The X-CR fastener material is a proprietary material, which provides a corrosion resistance equivalent to SAE 316 stainless steel. The steel washer material is SAE 316 stainless steel.

3.2.2.3 Technical Data

Allowable Loads in Normal Weight Concrete [1, 4]

Description	Fastener	Shank Diameter in. (mm)	Min. Embedment in. (mm)	2000 psi Tension lb (kN)	2000 psi Shear lb (kN)	4000 psi Tension lb (kN)	4000 psi Shear lb (kN)	6000 psi Tension lb (kN)	6000 psi Shear lb (kN)
Universal Knurled Shank Fasteners	X-U*	**0.157** (4.0)	**3/4** (19)	**100** (0.44)	**125** (0.57)	**100** (0.44)	**125** (0.57)	**105** (0.47)	**205** (0.91)
			1 (25)	**165** (0.73)	**190** (0.85)	**170** (0.76)	**225** (1.00)	**110** (0.49)	**280** (1.25)
			1-1/4 (32)	**240** (1.07)	**310** (1.38)	**280** (1.25)	**310** (1.38)	**180** (0.80)	**425** (1.89)
			1-1/2 (38)	**275** (1.22)	**420** (1.87)	**325** (1.45)	**420** (1.87)	–	–
X-U 47 P8 with DX-Kwik	X-U[3]	**0.157** (4.0)	**1-1/2** (38)	–	–	**395** (1.76)	**405** (1.80)	**360** (1.60)	**570** (2.54)
Standard Fastener	X-ZF[2]	**0.138** (3.5) & **0.145** (3.7)	**3/4** (19)	**45** (0.20)	**75** (0.33)	**60** (0.27)	**105** (0.47)	–	–
			1 (25)	**85** (0.38)	**150** (0.67)	**90** (0.40)	**200** (0.89)	–	–
			1-1/4 (32)	**130** (0.58)	**210** (0.93)	**130** (0.58)	**290** (1.29)	–	–
			1-1/2 (38)	**175** (0.78)	**260** (1.16)	**245** (1.09)	**360** (1.60)	–	–
Limited Purpose Fastener	X-CF	**0.145** (3.7)	**3/4** (19)	**25** (0.11)	**35** (0.16)	–	–	–	–
			1 (25)	**50** (0.22)	**160** (0.71)	–	–	–	–
			1-1/4 (32)	**130** (0.58)	**210** (0.93)	–	–	–	–
Heavy Duty Fastener	DS	**0.177** (4.5)	**3/4** (19)	**50** (0.22)	**120** (0.53)	**125** (0.56)	**135** (0.60)	–	–
			1 (25)	**130** (0.58)	**195** (0.87)	**155** (0.69)	**240** (1.07)	–	–
			1-1/4 (32)	**220** (0.98)	**385** (1.71)	**270** (1.20)	**425** (1.89)	–	–
			1-1/2 (38)	**300** (1.33)	**405** (1.80)	**355** (1.58)	**450** (2.00)	–	–
Stainless Steel Fastener	X-CR	**0.145** (3.7) & **0.157** (4.0)	**3/4** (19)	**30** (0.13)	**40** (0.18)	**65** (0.29)	**40** (0.18)	–	–
			1 (25)	**55** (0.24)	**185** (0.82)	**120** (0.53)	**190** (0.85)	**100** (0.44)	**170** (0.76)
			1-1/4 (32)	**110** (0.49)	**290** (1.29)	**125** (0.56)	**300** (1.33)	**120** (0.53)	**440** (1.96)
			1-1/2 (38)	**265** (1.18)	**405** (1.80)	**350** (1.56)	**450** (2.00)	–	–
Gas Fastener	X-GN	**0.118** (3.0)	**3/4** (19)	**95** (0.42)	**120** (0.53)	**95** (0.42)	**120** (0.53)	–	–
			1 (25)	**115** (0.51)	**220** (0.98)	**115** (0.51)	**220** (0.98)	–	–
Premium Gas Fastener	X-GHP	**0.118** (3.0)	**5/8** (16)	–	–	–	–	**50** (0.22)	**100** (0.44)
Universal Fastener	X-DNI	**0.145** (3.7)	**3/4** (19)	**60** (0.27)	**105** (0.47)	**110** (0.49)	**120** (0.53)	–	–
			1 (25)	**145** (0.64)	**185** (0.82)	**160** (0.71)	**240** (1.07)	**100** (0.44)	**125** (0.56)
			1-1/4 (32)	**160** (0.71)	**290** (1.29)	**230** (1.02)	**330** (1.47)	**200** (0.89)	**250** (1.11)
			1-1/2 (38)	**220** (0.98)	**330** (1.47)	**320** (1.42)	**425** (1.89)	–	–
High Performance Fastener	X-AL-H	**0.177** (4.5)	**3/4** (19)	**65** (0.29)	**70** (0.31)	**90** (0.40)	**95** (0.42)	**120** (0.53)	**125** (0.56)
			1 (25)	**130** (0.58)	**190** (0.85)	**165** (0.73)	**195** (0.87)	**180** (0.80)	**280** (1.25)
			1-1/4 (32)	**135** (0.60)	**265** (1.18)	**240** (1.07)	**270** (1.20)	**240** (1.07)	**440** (1.96)
			1-1/2 (38)	**200** (0.89)	**340** (1.51)	**240** (1.07)	**460** (2.05)	–	–
X-AL-H 42 P8 with DX-Kwik	X-AL-H[3]	**0.177** (4.5)	**1-1/2** (38)	**355** (1.60)	**470** (2.09)	**475** (2.11)	**565** (2.51)	–	–
Knob Head Fastener	X-NK[5]	**0.145** (3.7)	**1** (25)	**85** (0.38)	**165** (0.73)	**145** (0.64)	**215** (0.96)	–	–
Forming Fastener	SL 44/47[6]	**0.145** (3.7)	**1** (25)	**60** (0.27)	**65** (0.29)	–	–	–	–
	SL 62[6]	**0.145** (3.7)	**1** (25)	**75** (0.33)	**75** (0.33)	–	–	–	–

1 The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC 70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.

2 X-ZF fasteners with a shank length of 2-7/8" have a shank diameter of 0.145". All other X-ZF fasteners for concrete have shank diameters of 0.138".

3 Fastener installed with DX-Kwik drilled pilot hole installation found in Section 3.2.1.1.10.

4 Multiple fasteners are recommended for any attachment.

5 Available in Canada or by special order.

6 For temporary fastening of formwork only.

* More details about new the innovative X-U fastener can be found in Section 3.2.3.

General Application Fasteners 3.2.2

Allowable Loads in Minimum f'c = 3000 psi Structural Lightweight Concrete[1, 6]

Fastener Description	Fastener	Shank Diameter in. (mm)	Min. Embedment in. (mm)	Fastener Location: Installed into Concrete: Tension lb (kN)	Installed into Concrete: Shear lb (kN)	Installed through 3" deep Metal Deck into Concrete[2,3]: Tension lb (kN) Upper Flute	Tension lb (kN) Lower Flute	Shear lb (kN)
Universal Knurled Shank Fasteners	X-U*	0.157 (4.0)	3/4 (19)	125 (0.56)	115 (0.51)	130 (0.58)	95 (0.42)	245 (1.09)
			1 (25)	205 (0.91)	260 (1.16)	215 (0.96)	120 (0.53)	330 (1.47)
			1-1/4 (32)	315 (1.40)	435 (1.93)	295 (1.31)	120 (0.53)	375 (1.67)
			1-1/2 (38)	425 (1.89)	475 (2.11)	400 (1.78)	260 (1.16)	430 (191)
Standard Fastener	X-ZF[5]	0.138 (3.5) & 0.145 (3.7)	3/4 (19)	110 (0.49)	175 (0.78)	120 (0.53)	–	265 (1.18)
			1 (25)	135 (0.60)	180 (0.80)	215 (0.96)	145 (0.64)	315 (1.40)
			1-1/4 (32)	220 (0.98)	260 (1.16)	250 (1.11)	200 (0.89)	405 (1.80)
			1-1/2 (38)	285 (1.27)	315 (1.40)	285 (1.27)	210 (0.93)	415 (1.85)
Limited Purpose Fastener	X-CF	0.145 (3.7)	1 (25)	130 (0.58)	165 (0.73)	130 (0.58)	–	165 (0.73)
Heavy Duty Fastener	DS[4]	0.177 (4.5)	3/4 (19)	100 (0.44)	200 (0.89)	100 (0.44)	–	200 (0.89)
			1 (25)	180 (0.80)	360 (1.60)	180 (0.80)	180 (0.80)	405 (1.80)
			1-1/4 (32)	300 (1.33)	520 (2.31)	300 (1.33)	250 (1.11)	515 (2.29)
			1-1/2 (38)	450 (2.00)	680 (3.02)	450 (2.00)	325 (1.45)	625 (2.78)
Stainless Steel Fastener	X-CR	0.145 (3.7) & 0.157 (4.0)	1 (25)	230 (1.02)	240 (1.07)	230 (1.02)	–	240 (1.07)
			1-1/4 (32)	320 (1.42)	400 (1.78)	320 (1.42)	–	400 (1.78)
			1-1/2 (38)	405 (1.80)	500 (2.22)	405 (1.80)	–	500 (2.22)
Gas Fastener	X-GN	0.118 (3.0)	3/4 (19)	115 (0.51)	140 (0.62)	75 (0.33)	85 (0.38)	175 (0.78)
			1 (25)	170 (0.76)	220 (0.98)	155 (0.69)	160 (0.71)	255 (1.13)
Universal Fastener	X-DNI	0.145 (3.7)	3/4 (19)	120 (0.53)	180 (0.80)	–	–	–
			1 (25)	175 (0.78)	185 (0.82)	225 (1.00)	115 (0.51)	320 (1.42)
			1-1/4 (32)	240 (1.07)	315 (1.40)	365 (1.62)	205 (0.91)	420 (1.87)
			1-1/2 (38)	300 (1.33)	365 (1.62)	480 (2.14)	280 (1.25)	450 (2.00)
High Performance Fastener	X-AL-H	0.177 (4.5)	3/4 (19)	115 (0.51)	155 (0.69)	115 (0.51)	–	155 (0.69)
			1 (25)	225 (1.00)	350 (1.56)	225 (1.00)	120 (0.53)	340 (1.51)
			1-1/4 (32)	330 (1.47)	475 (2.11)	330 (1.47)	195 (0.87)	385 (1.71)
			1-1/2 (38)	–	–	–	285 (1.27)	585 (2.60)
Knob Head Fastener	X-NK[7]	0.145 (3.7)	1 (25)	175 (0.78)	185 (0.82)	175 (0.78)	–	185 (0.82)
			1-1/4 (32)	240 (1.07)	280 (1.25)	240 (1.07)	–	280 (1.25)
			1-1/2 (38)	300 (1.33)	295 (1.31)	300 (1.33)	–	295 (1.31)

1 The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC 70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.

2 The steel deck profile is 3" deep composite floor deck with a thickness of 20 gauge (0.0358"). Figure 1 (Section 3.2.1.1.6) shows the nominal flute dimensions, fastener locations, & load orientations for the deck profile.

3 Structural lightweight concrete fill above top of metal deck shall be a minimum of 3-1/4" deep.

4 DS fasteners installed at 1-1/2" embedment through steel deck into the lower flute must be installed at a minimum distance of 6" from the edge of the floor deck.

5 X-ZF fasteners with a shank length of 2-7/8" have a shank diameter of 0.145". All other X-ZF fasteners for concrete have shank diameters of 0.138".

6 Multiple fasteners are recommended for any attachment.

7 Available in Canada or by special order.

Allowable Loads Into Minimum f'c = 3000 psi Structural Lightweight Concrete Over 1-1/2" Deep, B-Type Steel Deck [1, 5]

Fastener Description	Fastener	Shank Diameter in. (mm)	Min. Embedment in. (mm)	Fastener Location, Installed Through Metal Deck into Concrete[2, 3]: Tension lb (kN) Upper Flute	Tension lb (kN) Lower Flute	Shear lb (kN)
Universal Knurled Shank Fastener	X-U*	0.157 (4.0)	3/4 (19)	95 (0.42)	95 (0.42)	370 (1.65)
			1 (25)	125 (0.56)	125 (0.56)	415 (1.85)
Standard Fastener	X-ZF[4]	0.138 (3.5) & 0.145 (3.7)	3/4 (19)	80 (0.36)	80 (0.36)	315 (1.40)
			1 (25)	205 (0.91)	205 (0.91)	445 (1.98)
Gas Fastener	X-GN	0.118 (3.0)	3/4 (19)	75 (0.33)	85 (0.38)	175 (0.78)
			1 (25)	155 (0.69)	160 (0.71)	255 (1.13)

1 The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC 70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria

2 Steel deck profiles are 1-1/2" deep, B-type deck with a thickness of 20 gauge (0.0358" thick steel). Fasteners may be installed through the metal deck into lightweight concrete having both nominal & inverted deck profile orientations with a minimum lower flute width of 1-3/4" or 3-1/2", respectively. Fasteners shall be placed at centerline of deck flutes. Refer to Figures 2 & 3 (Section 3.2.1.1.6) for additional flute dimensions, fastener locations, and load orientations for both deck profiles.

3 Structural lightweight concrete fill above top of metal deck shall be a minimum 2-1/2" deep.

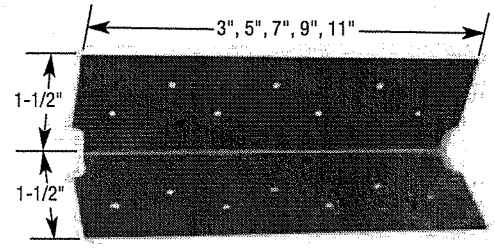
4 X-ZF fasteners with a shank length of 2-7/8" have a shank diameter of 0.145". All other X-ZF fasteners for concrete have shank diameters of 0.138".

5 Multiple fasteners are recommended for any attachment.

* More details about the new innovative X-U fastener can be found in Section 3.2.3.

EasyClip™ S-Series™ Support Clips are used in any rigid connection application not requiring a long leg.

- *1-1/2" x 1-1/2" legs.*
- *Lengths available in 3", 5", 7", 9" and 11".*
- *Available in 16, 14 and 12 gauge.*
- *Prepunched for faster and more accurate fastener placement.*



EasyClip™ S-Series™ Support Clip

Dietrich™ EasyClip™ S-Series™ support clips are used for rigid connections in window and door framing. These clips are also used in joist, bypass or other miscellaneous connections to secure one framing member to another or to secure framing members to the structural frame. EasyClip™ S-Series™ clips are prepunched for faster and more accurate fastener placement.

Alternative Products

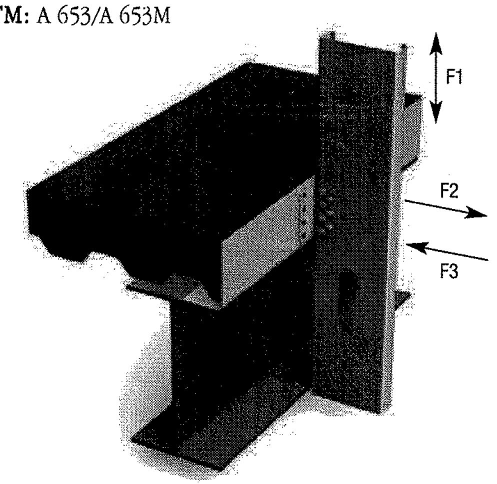
EasyClip™ U-Series™, EasyClip™ X-Series™, EasyClip™ D-Series™ or EasyClip™ B-Series™

Product Dimensions

1-1/2" x 1-1/2" x 3" (38.1mm x 38.1mm x 76.2 mm)
1-1/2" x 1-1/2" x 5" (38.1mm x 38.1mm x 127 mm)
1-1/2" x 1-1/2" x 7" (38.1mm x 38.1mm x 178 mm)
1-1/2" x 1-1/2" x 9" (38.1mm x 38.1mm x 229 mm)
1-1/2" x 1-1/2" x 11" (38.1mm x 38.1mm x 279 mm)

Material Specifications

Gauge: 16 gauge (54 mils)
Design Thickness: 0.0566 inches (1.438 mm)
Gauge: 14 gauge (68 mils)
Design Thickness: 0.0713 inches (1.811 mm)
Gauge: 12 gauge (97 mils)
Design Thickness: 0.1017 inches (2.583 mm)
Coating: G90 (Z275) hot-dipped galvanized coating
Yield Strength: Mill-certified SS Grade 50 ksi (340 MPa)
ASTM: A 653/A 653M



Installation

E-Series™ support clips are attached to the cold-formed steel (CFS) framing members using #10 minimum self-drilling screws driven through the clip holes into the steel framing. When not filling all holes, install fasteners symmetrically starting at the top and bottom edges and move toward the center of the clip. Clip can also be welded to the CFS framing. Connections to the building frame can be made with powder-actuated fasteners, drill-in concrete anchors or welding. When using the tabular values for a welded clip, provide a full weld to the structure, top to bottom, along the outside of the clip. A 3/4" minimum weld on the outside edge of the 1-1/2" leg is also required to control warping or to hold the clip in place before final welding.

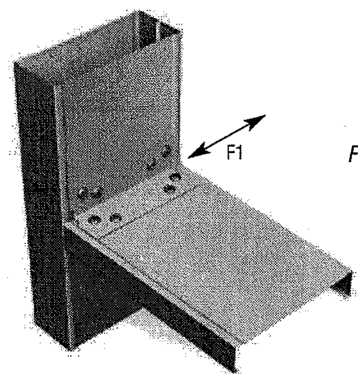
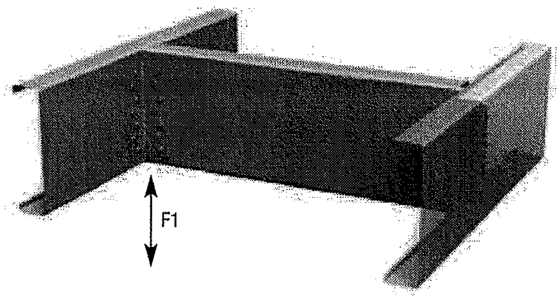


Figure 1



EasyClip™ S-Series™ Support Clips

DMF Product Code	Thickness				Size		Weight/Piece		Packaging
	Gauge	Mils	Design Thickness		Inches	mm	lbs	kg	Pcs/ Bucket
			Inches	mm					
S543	16	54	0.0566	1.438	1-1/2 x 1-1/2 x 3	38.1 x 38.1 x 76.2	0.140	0.064	400
[redacted]									
S547	16	54	0.0566	1.438	1-1/2 x 1-1/2 x 7	38.1 x 38.1 x 178	0.340	0.154	100
[redacted]									
S541	16	54	0.0566	1.438	1-1/2 x 1-1/2 x 11	38.1 x 38.1 x 279	0.530	0.240	100
[redacted]									
S685	14	68	0.0713	1.811	1-1/2 x 1-1/2 x 5	38.1 x 38.1 x 127	0.300	0.136	200
[redacted]									
S689	14	68	0.0713	1.811	1-1/2 x 1-1/2 x 9	38.1 x 38.1 x 229	0.540	0.245	100
[redacted]									
S973	12	97	0.1017	2.583	1-1/2 x 1-1/2 x 3	38.1 x 38.1 x 76.2	0.260	0.118	200
[redacted]									
S977	12	97	0.1017	2.583	1-1/2 x 1-1/2 x 7	38.1 x 38.1 x 178	0.600	0.272	100
[redacted]									
S971	12	97	0.1017	2.583	1-1/2 x 1-1/2 x 11	38.1 x 38.1 x 279	0.940	0.426	70

EasyClip™ S-Series™ Support Clips Allowable Clip Capacities (lbs) Using #10–16 Self-Drilling Screws

Clip	No. of Screws to Steel Framing (1)	Stud Thickness and Yield Strength											
		20 ga (33 mil)			18 ga (43 mil)			16 ga (54mil)					
		33 ksi			33 ksi			33 ksi			50 ksi		
		F1	F2	F3	F1	F2	F3	F1	F2	F3	F1	F2	F3
S543	3	295(295)	210(531)	531	437(437)	210(788)	788	616(555)	210(1110)	1110	777(555)	210(1195)	1400
S545	[redacted]												
	5	651(651)	371(885)	885	965(965)	371(1313)	1313	1361(1361)	371(1850)	1850	1716(1460)	371(2105)	2333
S547	[redacted]												
	7	1029(1029)	531(1239)	1239	1526(1526)	531(1838)	1838	2151(2151)	531(2591)	2591	2712(2456)	531(3015)	3267
S549	[redacted]												
	9	1408(1408)	692(1593)	1593	2090(2090)	692(2363)	2363	2945(2945)	692(3331)	3331	3714(3452)	692(3925)	4200
S541	[redacted]												
	11	1785(1785)	852(1947)	1947	2648(2648)	852(2889)	2889	3732(3732)	852(4071)	4071	4706(4432)	852(4835)	5133
S683	[redacted]												
S685	2	317(317)	354(354)	354	470(470)	525(525)	525	662(662)	587(740)	740	835(835)	587(933)	933
	[redacted]												
S687	4	653(653)	708(708)	708	969(969)	841(1050)	1050	1365(1365)	841(1480)	1480	1722(1722)	841(1867)	1867
	[redacted]												
S689	4	679(679)	708(708)	708	1007(1007)	1050(1050)	1050	1420(1420)	1095(1480)	1480	1790(1790)	1095(1867)	1867
	[redacted]												
S681	6	1015(1015)	1062(1062)	1062	1505(1505)	1349(1576)	1576	2121(2121)	1349(2221)	2221	2675(2675)	1349(2800)	2800
	[redacted]												
S973	3	295(295)	531(531)	531	437(437)	679(788)	788	616(616)	679(1110)	1110	777(777)	679(1400)	1400
S975	[redacted]												
	5	651(651)	885(885)	885	965(965)	1196(1313)	1313	1361(1361)	1196(1850)	1850	1716(1716)	1196(2333)	2333
S977	[redacted]												
	7	1029(1029)	1239(1239)	1239	1526(1526)	1713(1838)	1838	2151(2151)	1713(2591)	2591	2712(2712)	1713(3267)	3267
S979	[redacted]												
	9	1408(1408)	1593(1593)	1593	2090(2090)	2229(2363)	2363	2945(2945)	2229(3331)	3331	3714(3714)	2229(4200)	4200
S971	[redacted]												
	11	1785(1785)	1947(1947)	1947	2648(2648)	2746(2889)	2889	3732(3732)	2746(4071)	4071	4706(4706)	2746(5133)	5133

Table Notes

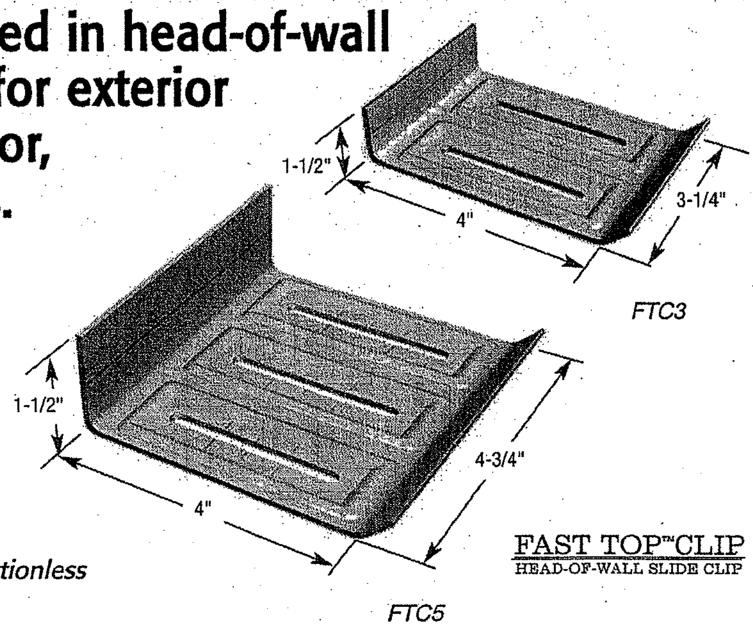
Screw Capacity Notes:

1) The tabulated value indicates the number of screws in a single clip leg attached to the cold-formed steel (CFS) framing.
2) Screws shall be attached in a symmetric manner, starting at the outside holes and moving to the center. Reference Figure 1 on opposite page
3) The allowable values for F1 are based only on the shear capacity of the clip leg attached to the CFS framing. The capacity of the attachment to other materials and structures must be checked separately.
4) The allowable values for F2 assume mechanical fasteners are attached to the structure, and are along the vertical centerline of the clip leg. Mechanical fasteners to other materials and structures must be checked separately.
5) The screw diameter must be 0.19" (min.) for #10 screws.
6) The ultimate screw shear strength must be a minimum of 1400 lbs. for #10 screws.
7) When clips have combinations of F1, F2, and F3, use a linear interaction for combinations of F1 and F3, and a squared interaction for combinations of F1 and F2.
8) Screws must be long enough so that at least 3 exposed threads are visible after installation.
9) Screw capacity is based on the 1996 AISI Specification.
10) Allowable loads have not been increased 33% for wind or seismic.
11) For connections made to 14 ga. (68 mils.) and 12 ga. (97 mils.), use the tabulated values for 16 ga. (54 mils.), 50 ksi.
12) It is the responsibility of the design professional to detail the drawings for proper clip attachment.
13) Contact Dietrich Design Group at 1-800-873-2443 for technical assistance.

Weld Capacity Notes:

1) F1 and F2 values in parentheses are maximum shear and tension capacities when the clips are welded to the base structure (min 3/16" — 36 ksi steel)
2) Listed weld capacities are computed assuming a E60XX welding rod or wire.
3) The clips are to be welded to the structure along the back corner and along the complete length of the clip. When secondary welds are used to hold the clip in place, they are not used in capacity calculations.

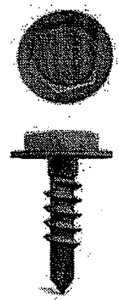
Fast Top™ Clips are used in head-of-wall deflection conditions for exterior curtain wall and interior, nonload-bearing walls.



FAST TOP™CLIP
HEAD-OF-WALL SLIDE CLIP

- *Vertical deflection up to 2-1/2" (1-1/4" up and 1-1/4" down).*
- *FastClip™ slip technology.*
- *Available in 3-1/4" and 4-3/4" widths.*
- *Positively attached. Eliminates friction-held and temporary fastening.*
- *Attaches within the wall cavity.*
- *FastClip™ deflection screws provide frictionless deflection connections.*
- *Embossed fastening patterns to ensure accurate placement of fasteners.*

Dietrich Fast Top™ Clips are used in head-of-wall deflection conditions for in-fill curtain wall assemblies to provide for vertical movement. These clips are used in place of or in combination with deflection track. They also make a positive attachment and do not require bridging installed continuously throughout the upper most punchouts. The Fast Top™ clip connectors can be attached to the underside of structural members, concrete decks or floor assemblies. Studs must be cut less than full height to enable vertical movement up to 2-1/2" (1-1/4" up and down). Fast Top™ Clips install quickly with welds, screws or power actuated fasteners. FastClip™ deflection screws are used to attach the clip to the cold-formed framing and to ensure frictionless deflection. These clips are also embossed with fastening patterns to ensure accurate placement of fasteners.



Alternative Products

SLP-TRK® Slotted Slip Track, Spazzer® 9200, Spazzer® 5400 Fast Strut™

Product Dimensions

1-1/2" x 4" x 3-1/4" (38.1mm x 102mm x 82.6mm)
1-1/2" x 4" x 4-3/4" (38.1mm x 102mm x 120mm)

Material Specifications

Gauge: 14 gauge (68 mils)
Design Thickness: 0.0713 inches (1.811 mm)
Coating: G90 (Z275) hot dipped galvanized
Yield Strength: Mill-certified SS Grade 50 ksi (340 MPa)
ASTM: A 653/ A 653M

Installation

Connections to the building can be made with screws, powder-actuated fasteners, drill-in concrete anchors or welding. Mechanical fasteners shall be equally spaced along the scored line of the 1.5" flange. When using the tabulated allowable loads indicated in the table on the following page, connections to the building structure must be made according to the table notes. FastClip™ deflection screws are used to attach the clip to the cold-formed steel framing. Screws shall be driven through the slotted holes and positioned to allow for the appropriate building deflection. Three FastClip™ deflection screws are required with the FTC5 and two FastClip™ deflection screws are required with the FTC3. *U.S. Patent No. 6, 688, 069*

Sizing and Packaging — Fast Top™ Clip (FTC3 and FTC5)

DMF Product Code	Thickness				Size		Weight/Piece		Packaging*
	Gauge	Mils	Design Thickness		Inches	mm	lbs	kg	Pcs/ Box
			Inches	mm					
FTC3	14	68	0.0713	1.811	1-1/2 x 4 x 3-1/4	38.1 x 102 x 82.6	0.410	0.186	25
FTC5	14	68	0.0713	1.811	1-1/2 x 4 x 4-3/4	38.1 x 102 x 120	0.610	0.277	30

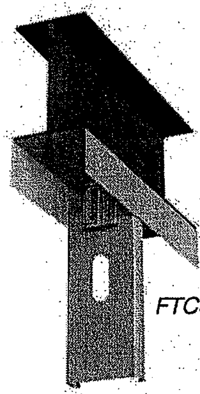
*FTC3 Includes 55 FastClip™ deflection screws per box.
*FTC5 Includes 110 FastClip™ deflection screws per box.

FTC3 Clip Allowable Loads (lbs)

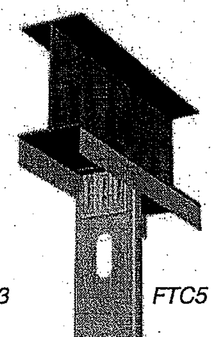
Stud Thickness and Yield Strength	Slip Allowance (Inches)	Welded Direct to Structural Steel	Mechanically Anchored				
			Number of Anchors	PAF in Steel (FS=5)	PAF in Steel (FS=10)	#12-24 Screws	1/4" x 1-3/4" Kwik-Cons
20 ga. (33 mil) 33 ksi	0.75	259	2	259	252	259	245
		259	3	259	259	259	–
	1.25	259	2	259	219	259	209
		259	3	259	241	259	–
18 ga. (43 mil) 33 ksi	0.75	471	2	471	252	471	245
		471	3	471	286	471	–
	1.25	471	2	437	219	471	209
		471	3	471	241	471	–
16 ga. (54 mil) 33 ksi	0.75	551	2	504	252	551	245
		551	3	551	286	551	–
	1.25	551	2	437	219	551	209
		551	3	482	241	551	–

FTC5 Clip Allowable Loads (lbs)

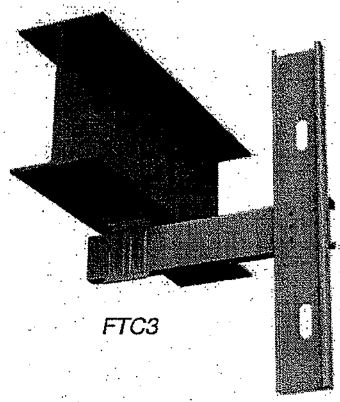
Stud Thickness and Yield Strength	Slip Allowance (Inches)	Welded Direct to Structural Steel	Mechanically Anchored				
			Number of Anchors	PAF in Steel (FS=5)	PAF in Steel (FS=10)	#12-24 Screws	1/4" x 1-3/4" Kwik-Cons
20 ga. (33 mil) 33 ksi	0.75	386	2	386	317	386	386
		386	3	386	386	386	386
		386	4	386	386	386	–
	1.25	386	2	386	286	386	386
		386	3	386	338	386	386
		386	4	386	371	386	–
18 ga. (43 mil) 33 ksi	0.75	505	2	505	317	505	477
		505	3	505	389	505	473
		505	4	505	440	505	–
	1.25	505	2	505	286	505	417
		505	3	505	338	505	404
		505	4	505	371	505	–
16 ga. (54 mil) 33 ksi	0.75	638	2	634	317	638	477
		638	3	638	389	638	473
		638	4	638	440	638	–
	1.25	638	2	571	286	638	417
		638	3	638	338	638	404
		638	4	638	371	638	–
16 ga. (54 mil) 50 ksi	0.75	1061	2	634	317	853	477
		1061	3	779	389	1061	473
		1061	4	879	440	1061	–
	1.25	1061	2	571	286	791	417
		1061	3	676	338	969	404
		1061	4	742	371	1061	–



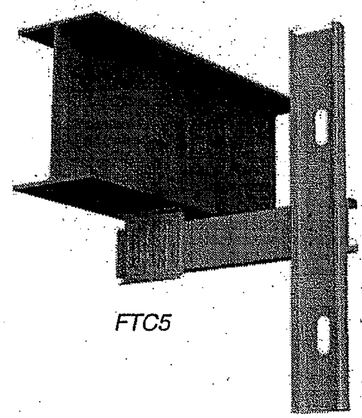
FTC3



FTC5



FTC3



FTC5

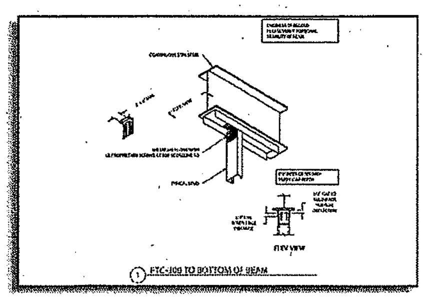
FTC3 and FTC5 Table Notes

1) For the FTC3, tabulated values for welds are based on 3.25" of weld along each edge of the 1.5" clip leg.
2) For the FTC3, tabulated values for the Hilti* PAF's and Buildex screws are based on the following: the outermost anchors are placed 1/2"(min.) away from the clip edge and/or bearing edge, anchors are spaced at 2.25" (min) when using two anchors, and 1-1/8" (min) when using three anchors.
3) For the FTC3, tabulated values for Hilti* Kwik-Cons are based on the following: anchors are spaced at 2.25" o/c (min.), anchors are placed 3/4" (min.) away from edge of building structure and 1/2" (min.) away from edge of the Fast Top Clip. The tabulated values are based on 3000 psi concrete.
4) For the FTC5, tabulated values for welds are based on 4.5" of weld along each edge of the 1.5" clip leg.
5) For the FTC5, tabulated values for the Hilti* PAF's and Buildex** screws are based on the following: the outermost anchors are placed 1/2"(min.) away from the clip edge and/or bearing edge, anchors are spaced at 3-3/4" (min) when using two anchors, 1-7/8" (min) when using three anchors, and 1-1/4" when using 4 anchors.
6) For the FTC5, tabulated values for Hilti* Kwik-Cons are based on the following: anchors are spaced at 3-3/4" (min.) when using 2 anchors, and 1-7/8" when using 3 anchors, anchors are placed 3/4" (min.) away from edge of building structure and 1/2" (min.) away from edge of the Fast Top Clip. The tabulated values are based on 3000 psi concrete.
7) The values given for PAF's are based on Hilti* X-EDNI 0.145" Dia. powder actuated fasteners with 15 mm washers in 3/16" steel.
8) #12-24 screws shall have an ultimate shear capacity no less than 2100 lb..
9) It is the responsibility of the design professional to detail the project drawings for proper clip attachment.
10) Contact Dietrich Design Group at 1-800-873-2443 for technical assistance.

* Hilti is a registered trademark of Hilti Aktiengeselschaft Corporation.

** Buildex is a registered trademark of Illinois Tool Works, Inc.

Typical Construction Details



Visit our CAD Library at

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to view or download construction details in .dwg, .dxf, and .pdf formats.

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Code Search

I. Code: ASCE 7 - 05

II. Occupancy:

Occupancy Group = B Business

III. Type of Construction:

Fire Rating:
Roof =
Floor =

IV. Live Loads:

Roof angle (θ) 0.00 / 12 0.0 deg
Roof 0 to 200 sf:
200 to 600 sf:
over 600 sf:

Floor
Stairs & Exitways
Balcony
Mechanical
Partitions

V. Wind Loads : ASCE 7 - 05

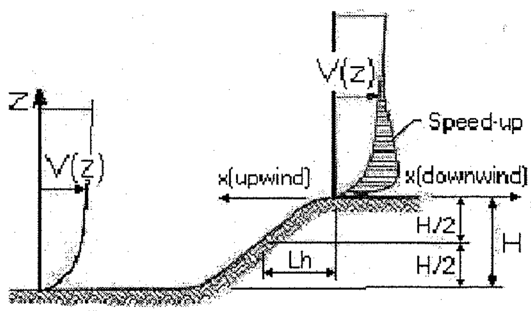
Importance Factor	1.00
Basic Wind speed	100 mph
Directionality (Kd)	0.85
Mean Roof Ht (h)	55.0 ft
Parapet ht above grd	19.0 ft
Exposure Category	B
Enclosure Classif.	Enclosed Building
Internal pressure	+/-0.18
Building length (L)	325.0 ft
Least width (B)	60.0 ft
Kh case 1	0.833
Kh case 2	0.833

Topographic Factor (Kzt)

Topography	Flat	
Hill Height (H)	0.0 ft	H< 60ft;exp B
Half Hill Length (Lh)	0.0 ft	∴ Kzt=1.0
Actual H/Lh =	0.00	
Use H/Lh =	0.00	
Modified Lh =	0.0 ft	
From top of crest: x=	0.0 ft	
Bldg up/down wind?	downwind	

H/Lh= 0.00	K_1 =	0.000
x/Lh = 0.00	K_2 =	0.000
z/Lh = 0.00	K_3 =	1.000

At Mean Roof Ht:
$K_{zt} = (1+K_1K_2K_3)^2 =$ 1.000



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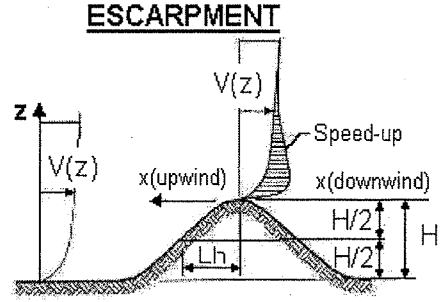

2D RIDGE or 3D AXISYMMETRICAL HILL

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Gorham, Maine
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V. Wind Loads - Components & Cladding: Buildings h≤60' & Alternate design 60'<h<90'

Kz = Kh (case 1) = 0.83 GCpi = +/-0.18
Base pressure (qh) = **18.1 psf** a = 6.0 ft
Minimum parapet height at building perimeter = 4.5 ft

NOTE: If tributary area is greater than 700sf, MWFRS pressure may be used.

Roof Angle = 0.0 deg
Type of roof = Monoslope

Roof

	GCp +/- GCpi			Surface Pressure (psf)			**User input**	
Area	10 sf	50 sf	100 sf	10 sf	50 sf	100 sf	20 sf	70 sf
Negative Zone 1	-1.18	-1.11	-1.08	-21.4 psf	-20.1 psf	-19.6 psf	-20.8 psf	-19.9 psf
Negative Zone 2	-1.98	-1.49	-1.28	-35.9 psf	-27.0 psf	-23.2 psf	-32.1 psf	-25.2 psf
Negative Zone 3	-1.98	-1.49	-1.28	-35.9 psf	-27.0 psf	-23.2 psf	-32.1 psf	-25.2 psf
Positive All Zones	0.48	0.41	0.38	10.0 psf	10.0 psf	10.0 psf	10.0 psf	10.0 psf
Overhang Zone 1&2	-1.70	-1.63	-1.60	-30.8 psf	-29.5 psf	-29.0 psf	-30.3 psf	-29.3 psf
Overhang Zone 3	-1.70	-1.63	-1.60	-30.8 psf	-29.5 psf	-29.0 psf	-30.3 psf	-29.3 psf

Negative zone 3 = zone 2, since parapet >= 3ft.

Walls

	GCp +/- GCpi			Surface Pressure (psf)			**User input**	
Area	10 sf	100 sf	500 sf	10 sf	100 sf	500 sf	35 sf	50 sf
Negative Zone 4	-1.17	-1.01	-0.90	-21.2 psf	-18.3 psf	-16.3 psf	-19.6 psf	-19.2 psf
Negative Zone 5	-1.44	-1.12	-0.90	-26.1 psf	-20.3 psf	-16.3 psf	-23.0 psf	-22.1 psf
Positive Zone 4 & 5	1.08	0.92	0.81	19.6 psf	16.7 psf	14.7 psf	18.0 psf	17.6 psf

Note: GCp reduced by 10% due to roof angle <= 10 deg.

Parapet

qp = 15.2 psf

CASE A = pressure towards building
CASE B = pressure away from building

Solid Parapet Pressure	10 sf	100 sf	500 sf
CASE A : Interior zone :	41.2 psf	31.3 psf	26.4 psf
Corner zone :	41.2 psf	31.3 psf	26.4 psf
CASE B : Interior zone :	-28.8 psf	-24.0 psf	-20.6 psf
Corner zone :	-32.9 psf	-25.7 psf	-20.6 psf

Rooftop Structures & Equipment

Dist from mean roof height to centroid of Af =
Height of equipment (he) =

Gust Effect Factor (G) = 0.85
Base pressure (qz) = **21.3 Kd** psf

Cross-Section Square
Directionality (Kd) 0.90

Width (D) 10.0 ft
Type of Surface N/A

h/D = 0.00

Square (wind along diagonal)

Cf = 1.00
Af = 10.0 sf
Adjustment Factor (Adj) = 1.90
F = qz G Cf Af Adj= **16.3 Af**
F = 163 lbs

Square (wind normal to face)

C_f = 1.30
A_f = 10.0 sf
Adjustment Factor (Adj) = 1.900
F = q_z G C_f A_f Adj= **21.2 Af**
F = 212 lbs

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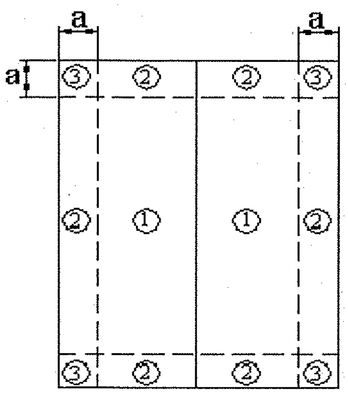
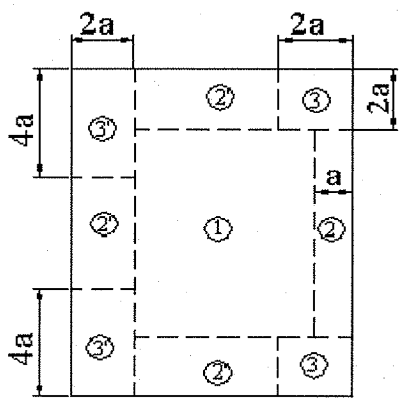
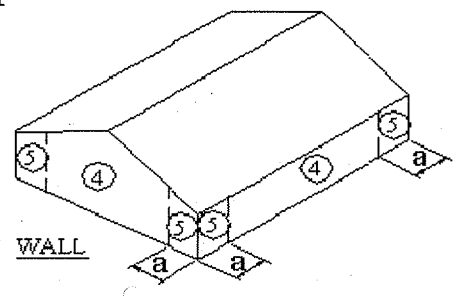
Location of Wind Pressure Zones

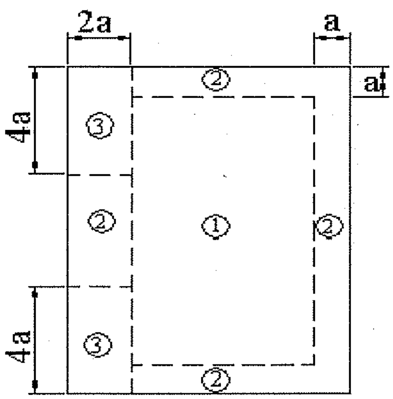


$\theta \le 7$ degrees and
Monoslope ≤ 3 degrees

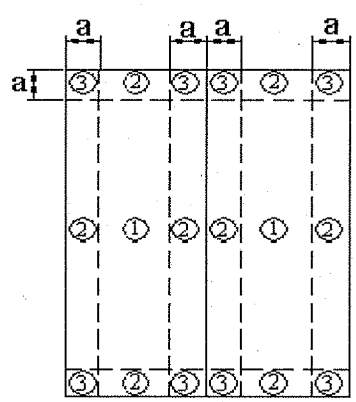


Monoslope roofs
$3° < \theta \le 10°$

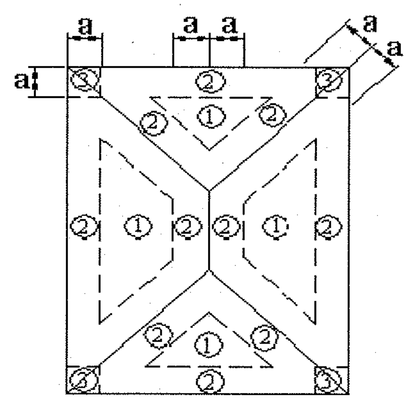




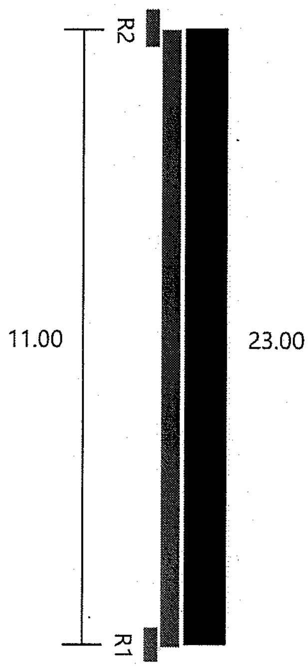
Monoslope roofs $10° < \theta \le 30°$



$\theta > 7$ degrees



$\theta > 7$ degrees



Section : 600S162-33 Single C Stud
Maxo = 950.6 Ft-Lb **Moment of Intertia, I =** 1.79 in^4
Fy = 33.0 ksi
Va = 638.1 lb

Loads have not been modified for strength checks
Loads have been multiplied by 0.70 for deflection calculations

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Deflection Ratio
Span	347.9	0.366	347.9	60.0	856.1	0.406	0.100	L/1316

Distortional Buckling Check

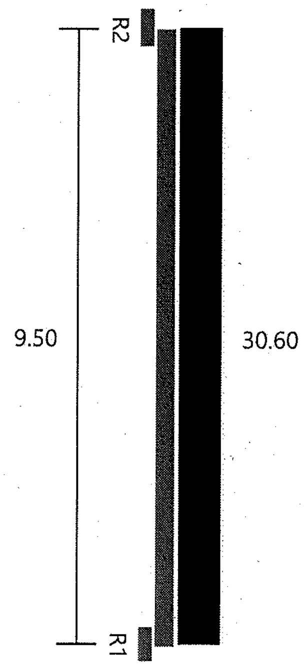
Span	K-phi lb-in/in	Lm Brac in	Ma-d Ft-Lb	Mmax/ Ma-d
Span	0.00	132.0	788.8	0.441

Combined Bending and Web Crippling

Reaction or Pt Load	Load P(lb)	Bearing (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffeners Required?
R1	126.5	1.00	152.8	267.4	0.0	0.43	NO
R2	126.5	1.00	152.8	267.4	0.0	0.43	NO

Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	Intr. Unstiffened	Intr. Stiffened
R1	126.5	0.0	1.00	0.20	0.00	0.20	N/A
R2	126.5	0.0	1.00	0.20	0.00	0.20	N/A



Section : 600S162-33 Single C Stud
Maxo = 950.6 Ft-Lb **Moment of Intertia, I =** 1.79 in^4
Fy = 33.0 ksi
Va = 638.1 lb

Loads have not been modified for strength checks
Loads have been multiplied by 0.70 for deflection calculations

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Deflection Ratio
Span	345.2	0.363	345.2	60.0	857.4	0.403	0.074	L/1536

Distortional Buckling Check

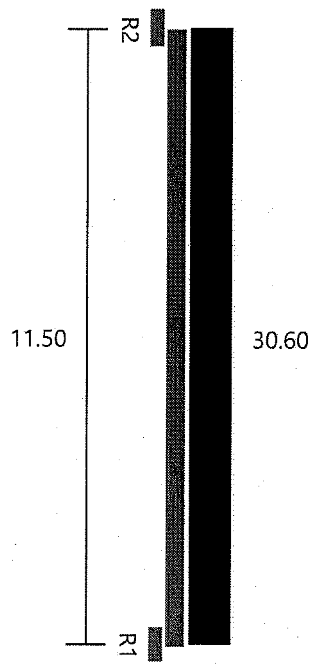
Span	K-phi lb-in/in	Lm Brac in	Ma-d Ft-Lb	Mmax/ Ma-d
Span	0.00	114.0	788.8	0.438

Combined Bending and Web Crippling

Reaction or Pt Load	Load P(lb)	Bearing (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffeners Required?
R1	145.4	1.00	152.8	267.4	0.0	0.49	NO
R2	145.4	1.00	152.8	267.4	0.0	0.49	NO

Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	Intr. Unstiffened	Intr. Stiffened
R1	145.4	0.0	1.00	0.23	0.00	0.23	N/A
R2	145.3	0.0	1.00	0.23	0.00	0.23	N/A



Section : 600S162-43 Single C Stud
Maxo = 1390.0 Ft-Lb **Moment of Intertia, I =** 2.32 in^4

Fy = 33.0 ksi
Va = 1415.7 lb

Loads have not been modified for strength checks
Loads have been multiplied by 0.70 for deflection calculations

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Deflection Ratio
Span	505.9	0.364	505.9	Full	1390.0	0.364	0.123	L/1118

Distortional Buckling Check

Span	K-phi lb-in/in	Lm Brac in	Ma-d Ft-Lb	Mmax/ Ma-d
Span	0.00	138.0	1205.1	0.420

Combined Bending and Web Crippling

Reaction or Pt Load	Load P(lb)	Bearing (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffeners Required?
R1	176.0	1.00	259.1	453.4	0.0	0.35	NO
R2	176.0	1.00	259.1	453.4	0.0	0.35	NO

Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	Intr. Unstiffened	Intr. Stiffened
R1	176.0	0.0	1.00	0.12	0.00	0.12	N/A
R2	176.0	0.0	1.00	0.12	0.00	0.12	N/A

MacLeod Structural Engineers, P.A.
Structural Consultants
90 Bridge Street
Westbrook, Maine 04092
Phone (207) 839-0980
Fax (207) 839-0982

Connection Of Track To Steel / Concrete (Non-slip track):

General Design Criteria:

Maximum Reaction, Rmax: $R_{max} := 225lbf$

Stud Spacing, Ss: $S_s := 16in$

Fastener Spacing, Fs: $F_s := 16in$

Track Design Criteria:

Thickness of Track (Gage), Ga.: $T_g := 0.0346in$

Track Leg Length, L: $L := 1.25in$

Track Width, Tw: $T_w := 6.0in$

Bending Stress, Fb: (Typ.) $F_b := 36ksi$

Ultimate Stress, Fu: (Typ.) $F_u := 50ksi$

***Use:* 600T125-33 Track**

Stud Design Criteria:

Width of Stud, Sf: $S_f := 1.625in$

Thickness of Stud (Gage), Ts: $T_s := 0.0346in$

Inside Radius Bend, r: $r = 0.0764\cdot in$

Yield Strength of Stud, Fys $F_{ys} := 36ksi$

PAF Design Criteria:

Number of PAFs, No: $No := 1$

Diameter of Shank of PAF, ds: $d_s := 0.145in$

Diameter of Head of PAF, dh: $d_h := 0.3in$

PAF Shear Capacity, Concrete $Vc_{paf} := 260lbf$

PAF Tension/ Pullout Cap., Conc. $Tc_{paf} := 185lbf$

PAF Shear Capacity, Steel $Vs_{paf} := 590lbf$

PAF Tension/ Pullout Cap., Steel $Ts_{paf} := 510lbf$

Note Concrete, F'c = 3000 psi
min. Steel thickness 1/4"

***Use:* (1) 0.145" Dia. PAF per Stud**

Design Of Connection includes:

A.) Check PAF For Shear Bearing On Track

Bearing Capacity of Steel Sheet, Pas: $P_{as} = 226\cdot lbf$ $Cap_A = "OK"$

B.) Check PAF For Shear

Shear Capacity of PAF, Concrete $Vc_{paft} = 260\cdot lbf$ $Cap_B = "OK"$

Shear Capacity of PAF, Steel $Vs_{paft} = 590\cdot lbf$ $Cap_s = "OK"$

C.) Check Web Crippling of Studs

Stud Web Crippling Capacity, Pa: $P_a = 295.3\cdot lbf$ $Cap_C = "OK"$

D.) Check Track Punch-through

Track Punch-through Capacity, Ppt: $P_{pt} = 361\cdot lbf$ $Cap_D = "OK"$

ClarkWestern Building Systems
CW Tech Support: (888) 437-3244
clarkwestern.com

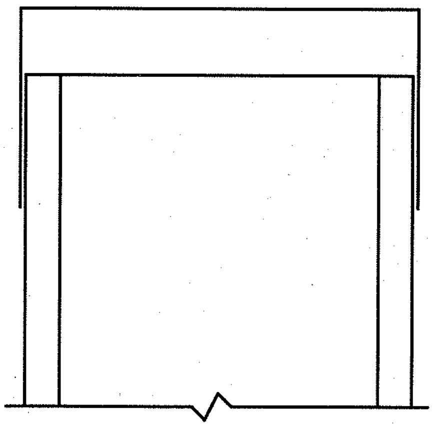
AISI Standard for Cold-Formed Steel Framing
Wall Stud Design - 2007 Edition
DATE: 12/28/2015

2015-287 Park Danforth

Section Designation: 600T200-54 [50] Single

Input Properties:

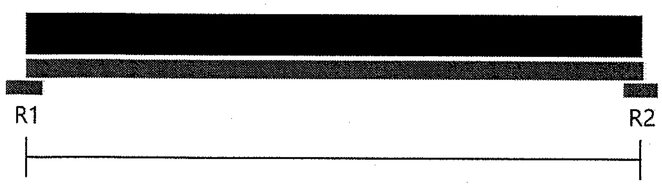
Web Height =	6.198 in	Design Thickness =	0.0566 in
Top Flange =	2.000 in	Inside Corner Radius =	0.0849 in
Bottom Flange =	2.000 in	Yield Point, Fy =	50.0 ksi



Deflection Track Design

Method: AISI Std 'Wall Stud Design' - B2.3

Deflection Clear Gap = 0.75 in
Stud Spacing = 16 in
e = 0.75 in
Wdt = 12.57 in
Pndt = 671 lb/stud
Padt = 240 lb/stud



Section : 250S162-33 Single C Stud
Maxo = 296.1 Ft-Lb **Moment of Intertia, I =** 0.24 in^4

Fy = 33.0 ksi
Va = 975.3 lb

Loads have not been modified for strength checks
Loads have been multiplied by 0.70 for deflection calculations

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Deflection Ratio
Span	120.0	0.405	120.0	None	295.1	0.407	0.035	L/1377

Distortional Buckling Check

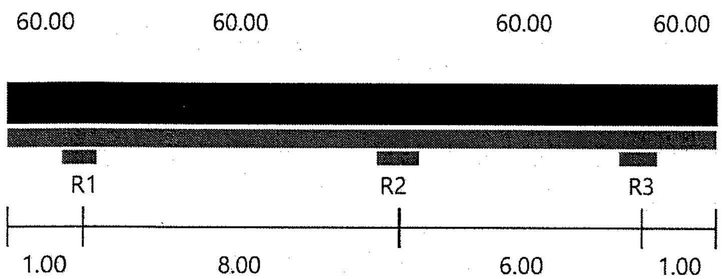
Span	K-phi lb-in/in	Lm Brac in	Ma-d Ft-Lb	Mmax/ Ma-d
Span	0.00	48.0	296.9	0.404

Combined Bending and Web Crippling

Reaction or Pt Load	Load P(lb)	Bearing (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffeners Required?
R1	120.0	1.00	172.6	302.1	0.0	0.36	NO
R2	120.0	1.00	172.6	302.1	0.0	0.36	NO

Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	Intr. Unstiffened	Intr. Stiffened
R1	120.0	0.0	1.00	0.12	0.00	0.12	N/A
R2	120.0	0.0	1.00	0.12	0.00	0.12	N/A



Section : 362S162-43 Single C Stud
Maxo = 612.0 Ft-Lb **Moment of Intertia, I =** 0.71 in^4

Fy = 33.0 ksi
Va = 1739.1 lb

Loads have not been modified for strength checks
Loads have been multiplied by 0.70 for deflection calculations

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Deflection Ratio
Left Cantilever	30.0	0.049	19.2	None	612.0	0.031	0.040	L/600
Left Span	375.0	0.613	293.0	None	442.2	0.663	0.093	L/1036
Right Span	375.0	0.613	132.2	None	555.3	0.238	0.008	L/8498
Right Cantilever	30.0	0.049	19.2	None	612.0	0.031	0.006	L/4261

Distortional Buckling Check

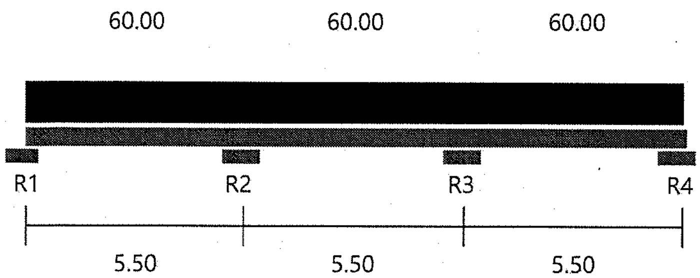
Span	K-phi lb-in/in	Lm Brac in	Ma-d Ft-Lb	Mmax/ Ma-d
Left Cantilever	0.00	12.0	639.6	0.047
Left Span	0.00	96.0	634.9	0.591
Right Span	0.00	72.0	634.9	0.591
Right Cantilever	0.00	12.0	639.6	0.047

Combined Bending and Web Crippling

Reaction or Pt Load	Load P(lb)	Bearing (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffeners Required?
R1	256.9	6.00	526.4	921.2	30.0	0.28	NO
R2	520.6	6.00	897.9	1481.6	375.0	0.69	NO
R3	182.5	6.00	526.4	921.2	30.0	0.21	NO

Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	Intr. Unstiffened	Intr. Stiffened
R1	196.9	30.0	1.00	0.11	0.05	0.12	N/A
R2	283.1	375.0	1.00	0.16	0.61	0.63	N/A
R3	122.5	30.0	1.00	0.07	0.05	0.09	N/A



Section : 250S162-33 Single C Stud
Maxo = 296.1 Ft-Lb **Moment of Intertia, I =** 0.24 in^4
Fy = 33.0 ksi
Va = 975.3 lb

Loads have not been modified for strength checks
Loads have been multiplied by 0.70 for deflection calculations

Flexural and Deflection Check

Span	Mmax Ft-Lb	Mmax/ Maxo	Mpos Ft-Lb	Bracing (in)	Ma(Brc) Ft-Lb	Mpos/ Ma(Brc)	Deflection (in)	Deflection Ratio
Left Span	181.5	0.613	145.2	None	278.7	0.521	0.066	L/1002
Middle Span	181.5	0.613	45.4	None	285.8	0.159	0.005	L/13243
Right Span	181.5	0.613	145.2	None	278.7	0.521	0.066	L/1002

Distortional Buckling Check

Span	K-phi lb-in/in	Lm Brac in	Ma-d Ft-Lb	Mmax/ Ma-d
Left Span	0.00	66.0	296.9	0.611
Middle Span	0.00	66.0	296.9	0.611
Right Span	0.00	66.0	296.9	0.611

Combined Bending and Web Crippling

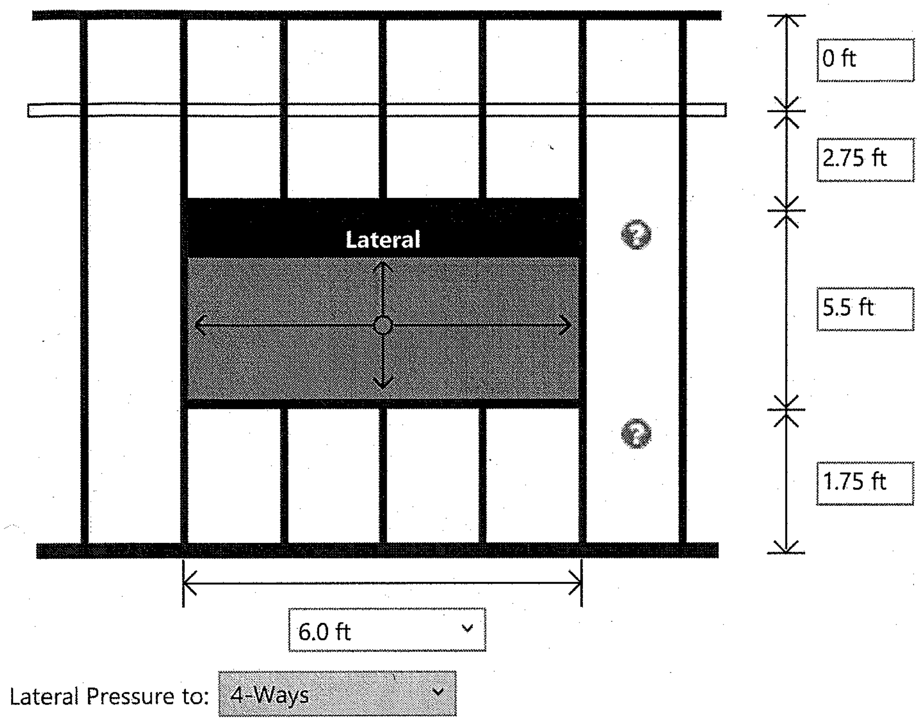
Reaction or Pt Load	Load P(lb)	Bearing (in)	Pa (lb)	Pn (lb)	Mmax (Ft-Lb)	Intr. Value	Stiffeners Required?
R1	132.0	6.00	336.0	588.0	0.0	0.20	NO
R2	363.0	6.00	535.2	883.1	181.5	0.74	NO
R3	363.0	6.00	535.2	883.1	181.5	0.74	NO
R4	132.0	6.00	336.0	588.0	0.0	0.20	NO

Combined Bending and Shear

Reaction or Pt Load	Vmax (lb)	Mmax (Ft-Lb)	Va Factor	V/Va	M/Ma	Intr. Unstiffened	Intr. Stiffened
R1	132.0	0.0	1.00	0.14	0.00	0.14	N/A
R2	198.0	181.5	1.00	0.20	0.61	0.65	N/A
R3	198.0	181.5	1.00	0.20	0.61	0.65	N/A
R4	132.0	0.0	1.00	0.14	0.00	0.14	N/A

Project Name: 2015-287 Park Danforth
Model: Window A
Code: 2007 NASPEC [AISI S100-2007]

Date: 12/28/2015
Simpson Strong-Tie® CFS Designer™ 1.4.1.0



Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Vertical Header	600T300-54(50), Y-Y Axis	Full	N/A	N/A	0	None	N/A
Lateral Header	600T300-54(50), Single	Full	N/A	N/A	0	None	N/A
Sill	600T125-33(33), Single	Full	N/A	N/A	0	None	N/A

Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	326.7	130.7	130.7	130.7
Jamb Studs	600S200-54(50), Single	82.5	813.1	307.9	307.9	278.5
Vertical Header	600T300-54(50), Y-Y Axis	N/A	123.7	82.5	N/A	82.5
Lateral Header	600T300-54(50), Single	N/A	295.9	168.4	N/A	168.4
Sill	600T125-33(33), Single	N/A	251.8	139.0	N/A	139.0

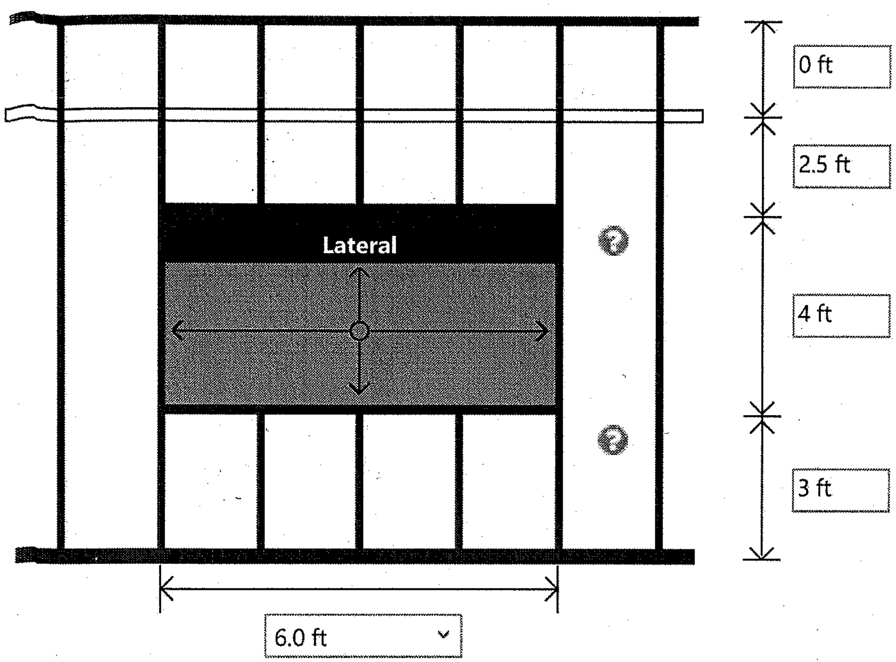
Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33), Single@16 in o/c	L/1542	0.41	0.20	No	Yes

Jamb Studs	600S200-54(50), Single	L/1129	0.37	0.31	No	Yes
Vertical Header	600T300-54(50), Y-Y Axis	L/305	0.84	0.01	No	Yes
Lateral Header	600T300-54(50), Single	L/5033	0.16	0.06	No	Yes
Sill	600T125-33(33), Single	L/2403	0.51	0.22	R1, R2	Yes

Project Name: 2015-287 Park Danforth
Model: Window B
Code: 2007 NASPEC [AISI S100-2007]

Date: 12/28/2015
Simpson Strong-Tie® CFS Designer™ 1.4.1.0



Lateral Pressure to: 4-Ways

Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Vertical Header	600T300-54(50), Y-Y Axis	Full	N/A	N/A	0	None	N/A
Lateral Header	600T300-54(50), Single	Full	N/A	N/A	0	None	N/A
Sill	600T125-33(33), Single	Full	N/A	N/A	0	None	N/A

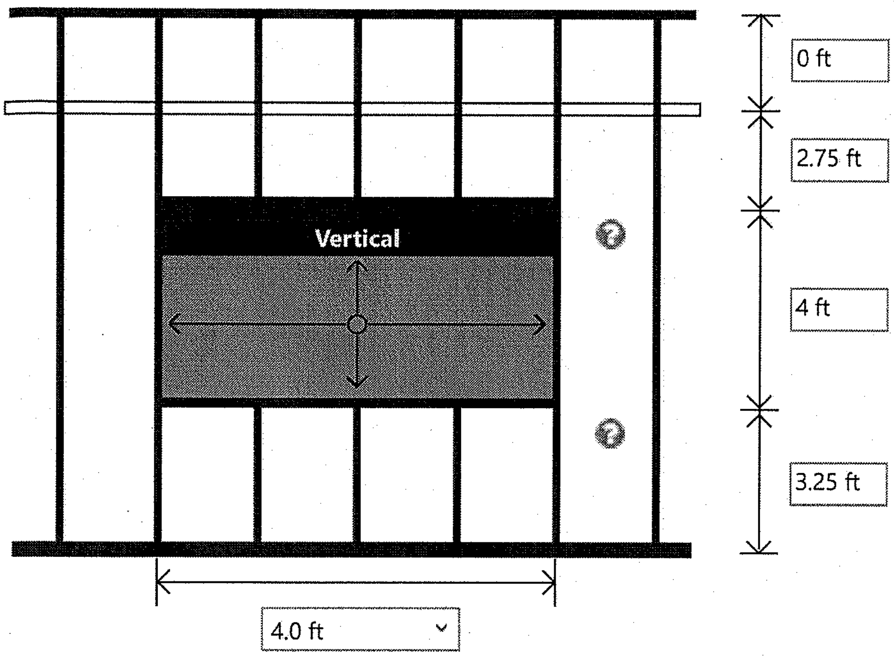
Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	294.8	124.1	124.1	124.1
Jamb Studs	600S200-54(50), Single	75.0	746.4	267.9	253.2	267.9
Vertical Header	600T300-54(50), Y-Y Axis	N/A	112.5	75.0	N/A	75.0
Lateral Header	600T300-54(50), Single	N/A	260.5	151.9	N/A	151.9
Sill	600T125-33(33), Single	N/A	282.6	166.6	N/A	166.6

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33), Single@16 in o/c	L/1798	0.37	0.19	No	Yes

Jamb Studs	600S200-54(50), Single	L/1297	0.34	0.30	No	Yes
Vertical Header	600T300-54(50), Y-Y Axis	L/336	0.77	0.01	No	Yes
Lateral Header	600T300-54(50), Single	L/5670	0.14	0.06	No	Yes
Sill	600T125-33(33), Single	L/2113	0.58	0.27	R1, R2	Yes



Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Vertical Header	600T200-54(50), Y-Y Axis	Full	N/A	N/A	0	None	N/A
Lateral Header	600T200-54(50), Single	Full	N/A	N/A	0	None	N/A
Sill	600T125-33(33), Single	Full	N/A	N/A	0	None	N/A

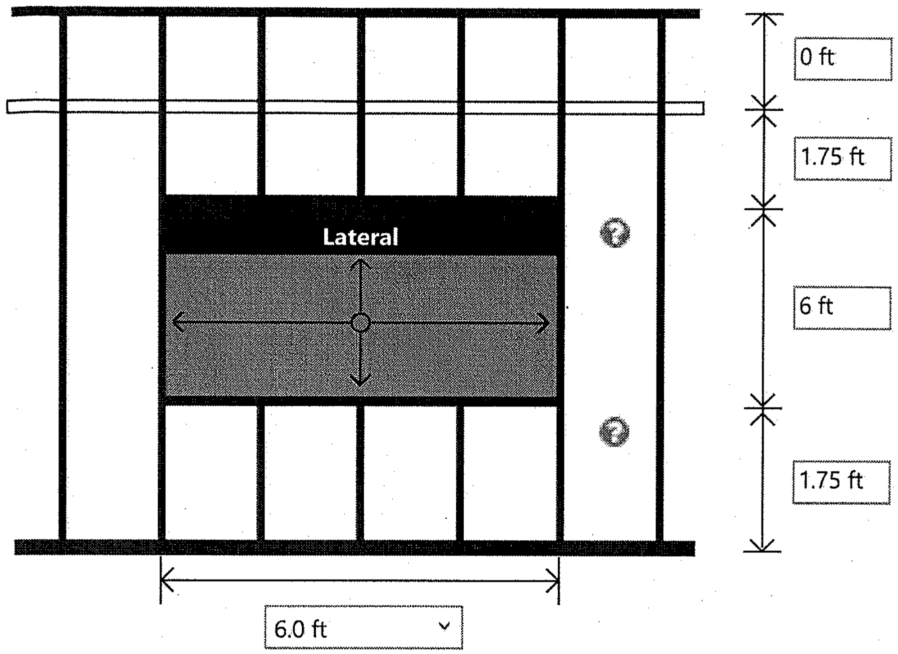
Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	326.7	130.7	130.7	130.7
Jamb Studs	600S200-54(50), Single	55.0	627.3	207.4	197.6	207.4
Vertical Header	600T200-54(50), Y-Y Axis	N/A	55.0	55.0	N/A	55.0
Lateral Header	600T200-54(50), Single	N/A	106.2	93.1	N/A	93.1
Sill	600T125-33(33), Single	N/A	116.0	102.9	N/A	102.9

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33), Single@16 in o/c	L/1542	0.41	0.20	No	Yes

Jamb Studs	600S200-54(50), Single	L/1494	0.28	0.24	No	Yes
Vertical Header	600T200-54(50), Y-Y Axis	L/673	0.49	0.01	No	Yes
Lateral Header	600T200-54(50), Single	L/17824	0.06	0.03	No	Yes
Sill	600T125-33(33), Single	L/7757	0.24	0.17	R1, R2	Yes



Lateral Pressure to: 4-Ways

Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Vertical Header	600T200-54(50), Y-Y Axis	Full	N/A	N/A	0	None	N/A
Lateral Header	600T200-54(50), Single	Full	N/A	N/A	0	None	N/A
Sill	600T125-33(33), Single	Full	N/A	N/A	0	None	N/A

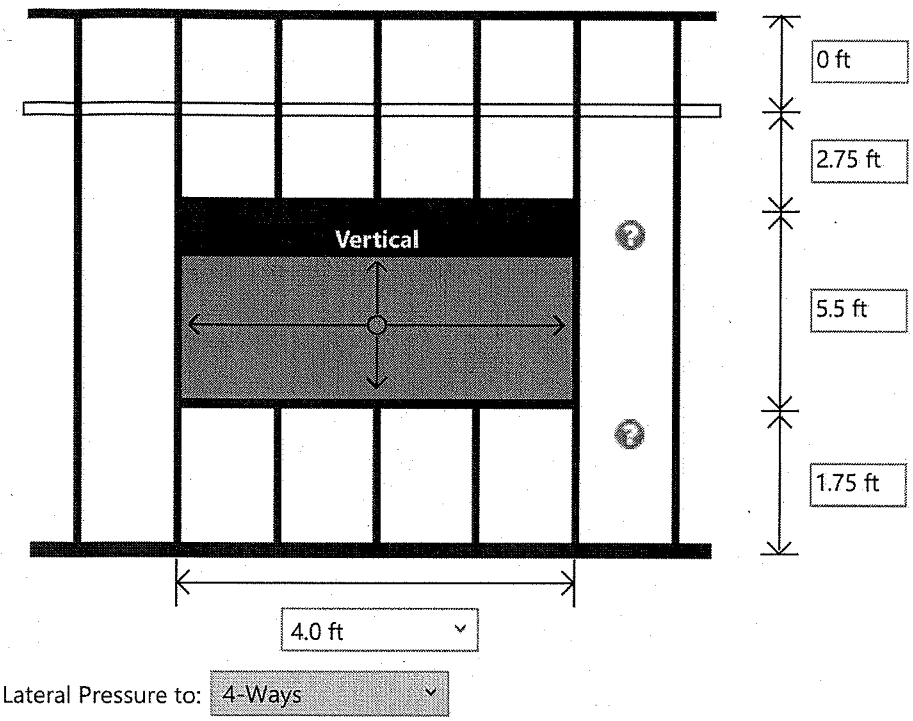
Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	294.8	124.1	124.1	124.1
Jamb Studs	600S200-54(50), Single	52.5	722.5	289.9	289.9	289.9
Vertical Header	600T200-54(50), Y-Y Axis	N/A	78.8	52.5	N/A	52.5
Lateral Header	600T200-54(50), Single	N/A	253.6	139.7	N/A	139.7
Sill	600T125-33(33), Single	N/A	253.6	139.7	N/A	139.7

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33), Single@16 in o/c	L/1798	0.37	0.19	No	Yes

Jamb Studs	600S200-54(50), Single	L/1339	0.33	0.24	No	Yes
Vertical Header	600T200-54(50), Y-Y Axis	L/313	0.70	0.01	No	Yes
Lateral Header	600T200-54(50), Single	L/5017	0.14	0.05	No	Yes
Sill	600T125-33(33), Single	L/2389	0.52	0.22	R1, R2	Yes



Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Vertical Header	600T200-54(50), Y-Y Axis	Full	N/A	N/A	0	None	N/A
Lateral Header	600T200-54(50), Single	Full	N/A	N/A	0	None	N/A
Sill	600T125-33(33), Single	Full	N/A	N/A	0	None	N/A

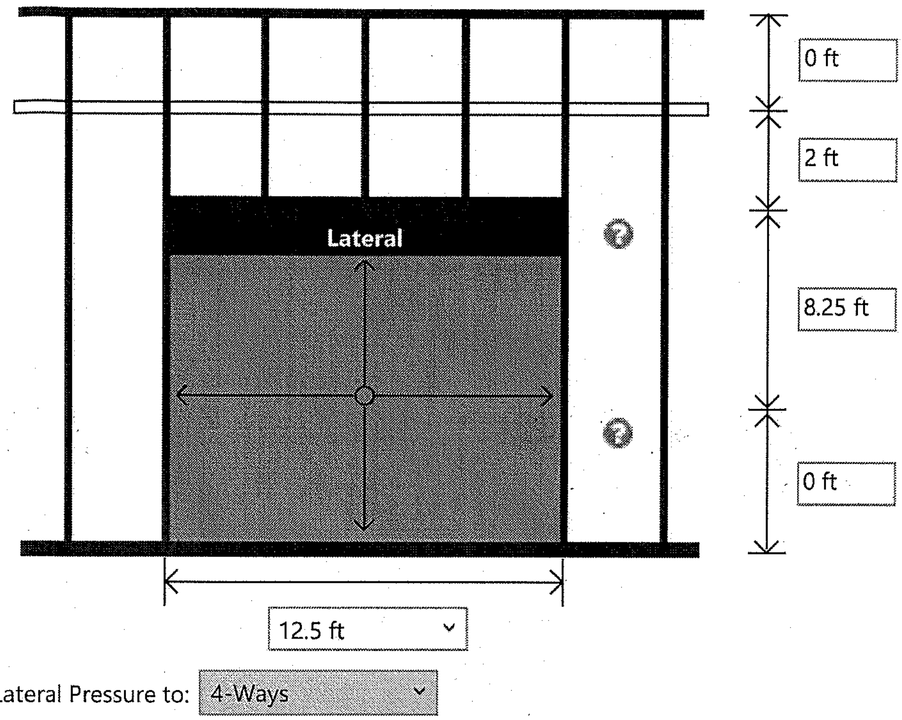
Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	326.7	130.7	130.7	130.7
Jamb Studs	600S200-54(50), Single	55.0	627.2	227.0	227.0	207.4
Vertical Header	600T200-54(50), Y-Y Axis	N/A	55.0	55.0	N/A	55.0
Lateral Header	600T200-54(50), Single	N/A	106.2	93.1	N/A	93.1
Sill	600T125-33(33), Single	N/A	86.6	73.5	N/A	73.5

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33), Single@16 in o/c	L/1542	0.41	0.20	No	Yes

Jamb Studs	600S200-54(50), Single	L/1488	0.28	0.22	No	Yes
Vertical Header	600T200-54(50), Y-Y Axis	L/673	0.49	0.01	No	Yes
Lateral Header	600T200-54(50), Single	L/17824	0.06	0.03	No	Yes
Sill	600T125-33(33), Single	L/10457	0.18	0.12	No	Yes



Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Built-Up Members

Components	Section 1	Section 2	Section 3	Section 4
Lateral Header	600S200-54(50)	600S162-43(33)		

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Lateral Header	Built-Up	Full	N/A	N/A	0	None	N/A

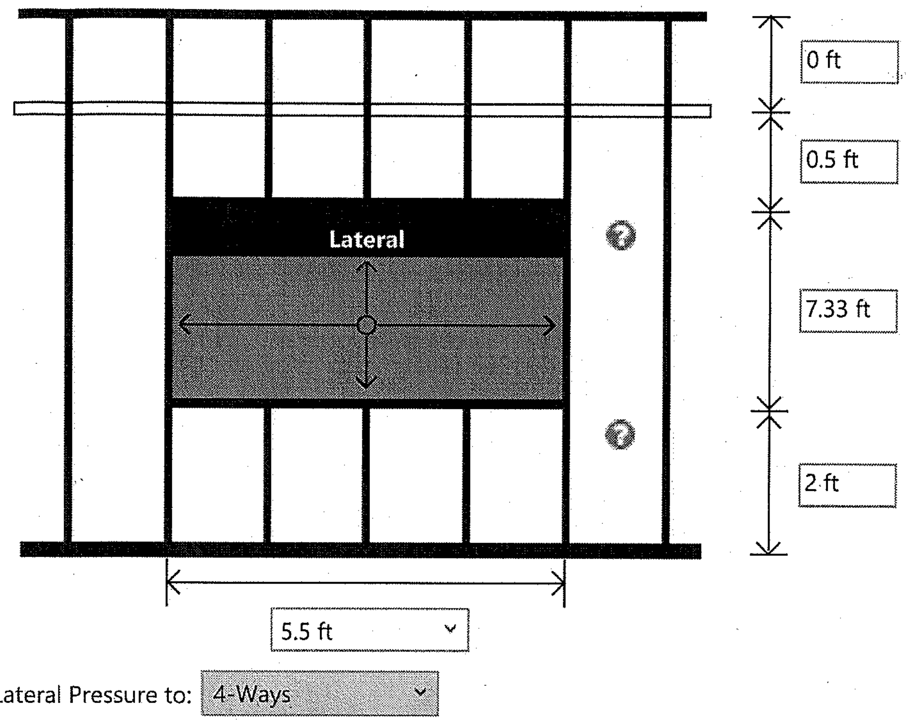
Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	343.2	133.9	133.9	133.9
Jamb Studs	600S200-54(50), Single	125.0	1239.9	572.3	356.2	572.3
Lateral Header	Built-Up	N/A	1732.7	461.1	N/A	461.1

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33),	L/1432	0.44	0.21	No	Yes

	Single@16 in o/c					
Jamb Studs	600S200-54(50), Single	L/721	0.58	0.52	No	Yes
Lateral Header	Built-Up	L/746	0.591	0.13	No	Yes



Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Vertical Header	600T125-33(33), Y-Y Axis	Full	N/A	N/A	0	None	N/A
Lateral Header	600T125-33(33), Single	Full	N/A	N/A	0	None	N/A
Sill	600T125-33(33), Single	Full	N/A	N/A	0	None	N/A

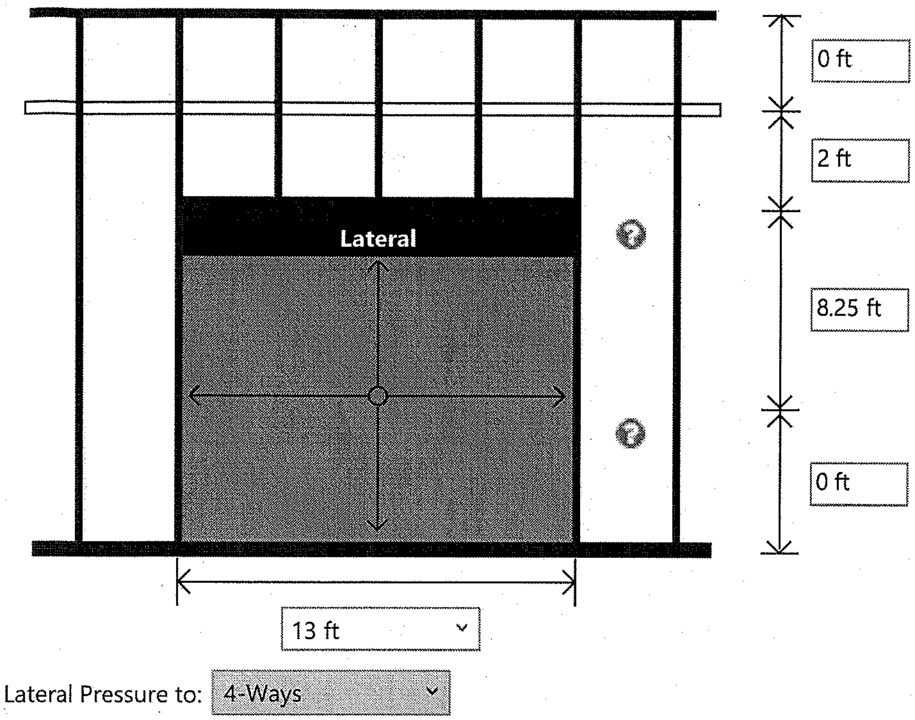
Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	315.7	128.5	128.5	128.4
Jamb Studs	600S200-54(50), Single	13.8	618.0	289.6	173.3	289.6
Vertical Header	600T125-33(33), Y-Y Axis	N/A	18.9	13.8	N/A	13.8
Lateral Header	600T125-33(33), Single	N/A	154.4	87.6	N/A	87.6
Sill	600T125-33(33), Single	N/A	210.0	128.0	N/A	128.0

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33), Single@16 in o/c	L/1623	0.40	0.20	No	Yes

Jamb Studs	600S200-54(50), Single	L/1591	0.27	0.16	No	Yes
Vertical Header	600T125-33(33), Y-Y Axis	L/290	0.87	0.01	No	Yes
Lateral Header	600T125-33(33), Single	L/4313	0.32	0.14	No	Yes
Sill	600T125-33(33), Single	L/3141	0.43	0.21	R1, R2	Yes



Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Built-Up Members

Components	Section 1	Section 2	Section 3	Section 4
Lateral Header	600S200-54(50)	600S162-43(33)		

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Lateral Header	Built-Up	Full	N/A	N/A	0	None	N/A

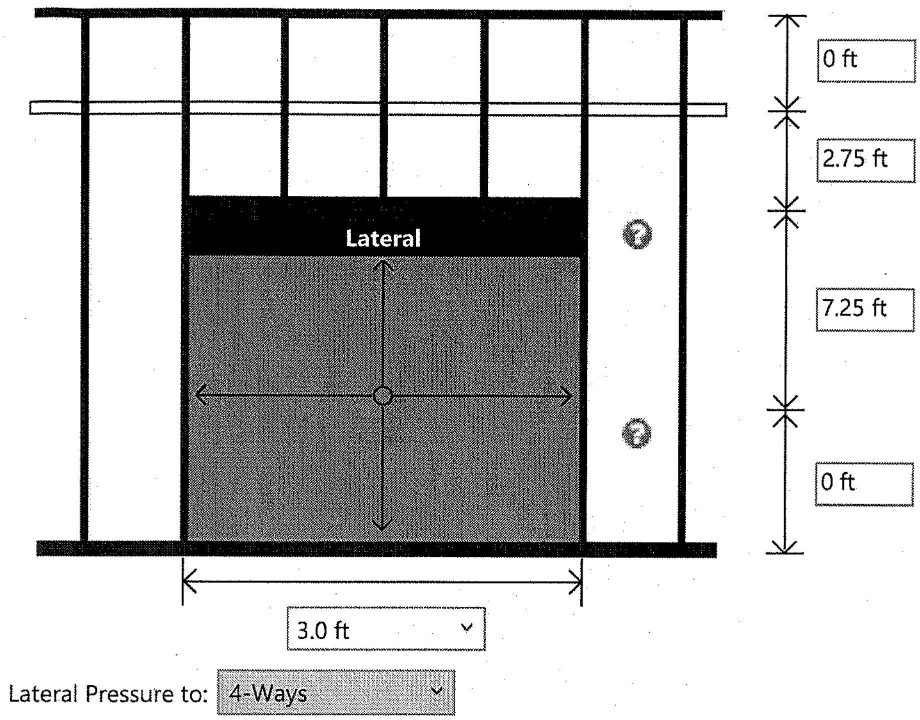
Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	343.2	133.9	133.9	133.9
Jamb Studs	600S200-54(50), Single	130.0	1269.0	592.5	361.1	592.5
Lateral Header	Built-Up	N/A	1892.6	486.2	N/A	486.2

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33),	L/1432	0.44	0.21	No	Yes

	Single@16 in o/c					
Jamb Studs	600S200-54(50), Single	L/705	0.59	0.54	No	Yes
Lateral Header	Built-Up	L/655	0.645	0.14	No	Yes



Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Vertical Header	600T200-54(50), Y-Y Axis	Full	N/A	N/A	0	None	N/A
Lateral Header	600T200-54(50), Single	Full	N/A	N/A	0	None	N/A

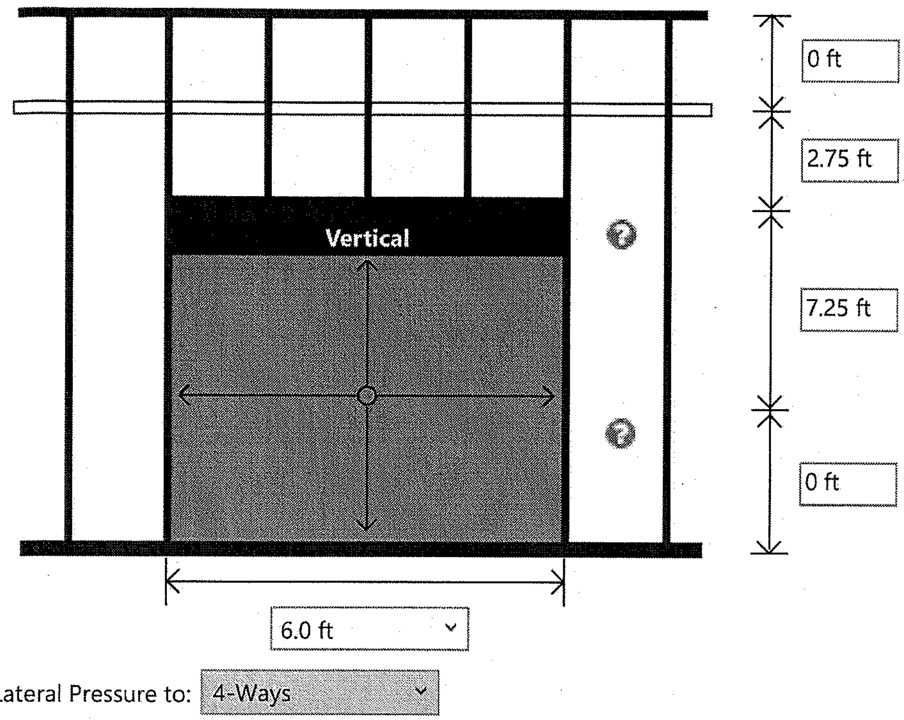
Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	326.7	130.7	130.7	130.7
Jamb Studs	600S200-54(50), Single	41.3	519.8	190.3	190.3	171.9
Vertical Header	600T200-54(50), Y-Y Axis	N/A	30.9	41.3	N/A	41.3
Lateral Header	600T200-54(50), Single	N/A	52.4	62.5	N/A	62.5

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33), Single@16 in o/c	L/1542	0.41	0.20	No	Yes
Jamb Studs	600S200-54(50), Single	L/1804	0.24	0.18	No	Yes
Vertical Header	600T200-54(50), Y-Y Axis	L/1594	0.27	0.01	No	Yes

Lateral Header	600T200-54(50), Single	L/48041	0.03	0.02	No	Yes



Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Vertical Header	600S200-54(50), Y-Y Axis	Full	N/A	N/A	0	None	N/A
Lateral Header	600T125-33(33), Single	Full	N/A	N/A	0	None	N/A

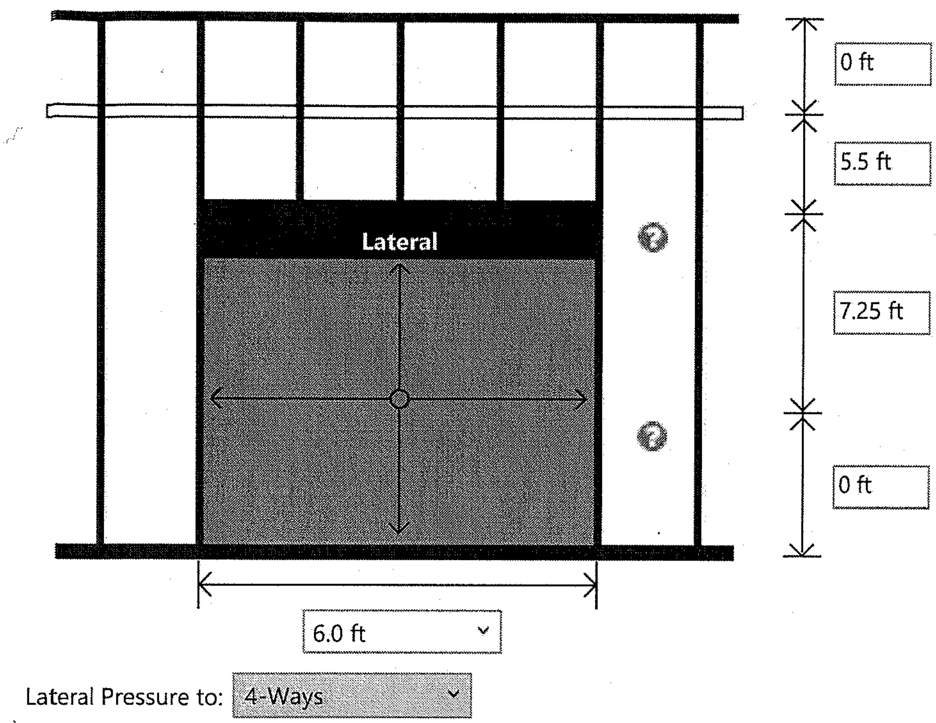
Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	326.7	130.7	130.7	130.7
Jamb Studs	600S200-54(50), Single	82.5	811.8	278.5	271.1	278.5
Vertical Header	600S200-54(50), Y-Y Axis	N/A	123.7	82.5	N/A	82.5
Lateral Header	600T125-33(33), Single	N/A	297.7	169.1	N/A	169.1

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33), Single@16 in o/c	L/1542	0.41	0.20	No	Yes
Jamb Studs	600S200-54(50), Single	L/1145	0.38	0.31	No	Yes
Vertical Header	600S200-54(50), Y-Y Axis	L/645	0.25	0.02	No	Yes

Lateral Header	600T125-33(33), Single	L/2026	0.61	0.27	R1, R2	Yes



Design Loads

Wall Lateral Pressure : **19.6 psf**

RO Lateral Pressure : **4-Ways**

Lateral Element Forces multiplied by 1 for strength checks

Lateral Forces multiplied by 0.7 for deflection determination

Reactions have been multiplied by 1.00 for opposite load direction for Connection Design

Gravity Load at Header: **10 psf**

Brace Settings

Component(s)	Members(s)	Flexural Bracing (in)	Axial KyLy (in)	Axial KtLt (in)	Distortional K-Phi(lb-in/in)	Distortional LM(in)	Interconnection Spacing(in)
Wall Studs	600S162-33(33), Single@16 in o/c	Full	None	None	0	None	N/A
Jamb Studs	600S200-54(50), Single	Full	Head/Sill	Head/Sill	0	None	N/A
Vertical Header	362S162-33(33), Boxed	Full	N/A	N/A	0	None	N/A
Lateral Header	600T125-33(33), Boxed	Full	N/A	N/A	0	None	N/A

Summary Analysis Results

Component(s)	Members(s)	Axial Load (lb)	Max. Moment (Ft-Lb)	Max. Shear(lb)	Bottom Reaction (lb)	Top or End Reaction (lb)
Wall Studs	600S162-33(33), Single@16 in o/c	0.0	531.0	166.6	166.6	166.6
Jamb Studs	600S200-54(50), Single	165.0	1432.8	370.0	370.0	296.5
Vertical Header	362S162-33(33), Boxed	N/A	247.5	165.0	N/A	165.0
Lateral Header	600T125-33(33), Boxed	N/A	418.9	249.9	N/A	249.9

Summary Design Results

Component(s)	Members(s)	Deflection	Bending +Axial Interaction	Shear Interaction	Web Stiffners	Design OK
Wall Studs	600S162-33(33), Single@16 in o/c	L/744	0.67	0.26	R1, R2	Yes
Jamb Studs	600S200-54(50), Single	L/546	0.67	0.58	No	Yes
Vertical Header	362S162-33(33), Boxed	L/1460	0.28	0.08	No	Yes

Lateral Header	600T125-33(33), Boxed	L/2859	0.43	0.20	R1, R2	Yes