

**STRUCTURAL CALCULATIONS FOR:**

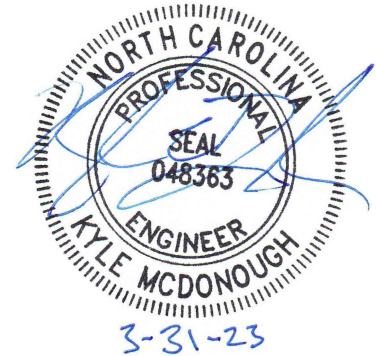
**Ruth L Stickley Building  
90 High Green Point  
Cameron, NC 28326**

Job # MMRC92693692

**(40' WIDE X 70' LONG BUILDING  
WITH 14' EAVE HEIGHT  
AND 3:12 ROOF PITCH)**

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Distributor:

**Spry Steel**

Structural Engineering by:

**Metal Building Engineering, LLC**

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Metal Building Engineering, LLC

**JOB INFORMATION:**

**JOB NAME:** Ruth L Stickley  
**JOB ADDRESS:** 90 High Green Point  
Cameron, NC 28326  
**JOB NUMBER:** MMRC92693692

MAIN BUILDING FRAME WIDTH (ft.): 40.00  
OVERALL ENCLOSED BUILDING WIDTH (ft.): 40.00  
BUILDING LENGTH (ft.): 70.00  
BUILDING FRAME EAVE HEIGHT (ft.): 14.00  
BUILDING FRAME ROOF SLOPE (?/12): 3.00  
Corner Wall Zones (ft): 8.00  
Sidewall Interior Zone (ft): 54.00

**MATERIAL SPECIFICATIONS:**

CONCRETE: 2500 psi (28-day Strength)  
CONCRETE REINFORCING: ASTM A615, Grade 60 (Fy = 60,000 psi)  
STRUCTURAL BOLTS: ASTM A325  
METAL ROOF PANELS: ASTM A653, Grade 80 (Fy = 80,000 psi min.)  
METAL WALL PANELS: ASTM A653, Grade 80 (Fy = 80,000 psi min.)  
CEE AND ZEE COLD-FORMED STEEL: ASTM A570, Grade 55 (Fy = 55,000 psi min.)

**PROJECT PARAMETERS:**

SITE CLASS: D  
RISK CATEGORY: II

**GOVERNING CODES:** -- 2021 International Building Code (Load Combinations per 2021 IBC Section 1605.3.1)  
-- AISI S100 (North American Specification for the Design of Cold-Formed Steel Structural Members)

**VERTICAL LOADS:**

**DEAD LOADS:**

METAL ROOF PANEL:	1.0	psf
PURLINS:	1.0	psf
MISC.:	0.0	psf
STEEL FRAMES:	1.0	psf
<hr/>		
TOTAL ROOF DEAD LOAD:	3.0	psf
WALL DEAD LOAD:	3.0	psf

**ROOF LIVE LOADS:**

ROOF LIVE LOAD REDUCTION FACTORS (R1 x R2): 0.60  
DESIGN LIVE LOAD FOR CLEARSPAN FRAMES: 12.0 psf  
DESIGN LIVE LOAD FOR PURLINS AND OTHER ELEMENTS: 20.0 psf

**ROOF SNOW LOADS:**

GROUND SNOW LOAD: 10.0 psf  
SNOW LOAD IMPORTANCE FACTOR, Is: 1.00  
Ce, Exposure Factor: 1.00  
Ct, Thermal Factor: 1.00  
Cs, Slope Factor: 1.00  
  
DESIGN SLOPED ROOF SNOW LOAD: 7.0 psf

Metal Building Engineering, LLC

**LATERAL LOADS:**  
**SEISMIC LOADS:**

(Based on ASCE 7-16, Chapter 12, using Site Class "D" and Risk Category "II")				
'Short' Period		1-sec. Period		
PERP. TO SIDEWALL (TRANSVERSE)	PERP. TO ENDWALL (LONGITUDINAL)		PERP. TO SIDEWALL	PERP. TO ENDWALL
Ss: 0.153	0.153	S1:	0.071	0.071
Fa: 1.600	1.600	Fv:	2.400	2.400
$S_{MS} = (F_a \times S_s) = 0.245$	0.245	$S_{M1} = 0.170$	0.170	0.170
$S_{DS} = (2/3) \times S_{MS} = 0.163$	0.163	$S_{D1} = 0.114$	0.114	0.114
R = 3.0	3.0		3.0	3.0
REDUNDANCY FACTOR, rho = 1.00	1.00		1.00	1.00
SEISMIC IMPORTANCE FACTOR, Ie = 1.00	1.00		1.00	1.00
Cs = 0.054	0.054		0.037	0.037
$E_h = C_s \times W \times \rho = 0.054 W$	0.054 W		0.037 W	0.037 W
$E_h (ASD) = E_h \times .7 = 0.037 W$	0.037 W		0.025 W	0.025 W
W = TOTAL SEISMIC DESIGN DEAD LOAD (lbs.) = 11340	11340		11340	11340
<b>LATERAL SYSTEM SEISMIC SHEAR EFFECT, E<sub>h</sub> (lbs.) = 420</b>	<b>420</b>		<b>284</b>	<b>284</b>
SEISMIC DESIGN CATEGORY (FOR BOTH PERIODS PER SEC. 1613.5.6.1): A				
.8 x Ts = 0.56			(ASCE 11.4.6)	
Ta (sec.) = 0.30	0.18		(ASCE 12.8.2.1)	

**WIND LOADS:**

ULTIMATE WIND SPEED (mph) = 117  
EXPOSURE = B  
BUILDING ENCLOSURE TYPE: ENCLOSED  
MEAN ROOF HEIGHT (ft.): 16.50

VELOCITY EXPOSURE COEFFICIENT, Kz = 0.590  
WIND TOPOGRAPHICAL FACTOR, Kt = 1.000  
WIND DIRECTIONALITY FACTOR, Kd = 0.850  
GROUND ELEVATION FACTOR, Ke = 0.990

**ULTIMATE WIND PRESSURE (psf): 17.40**

**MAIN FORCE RESISTING SYSTEM (MFRS) DESIGN WIND PRESSURES (Perp. to Sidewall):**

	G * Cp ± Gcpi	ULTIMATE WIND PRESSURE (psf):	
Coefficient for Windward Wall Ballooning:	0.500	8.70	(pressure)
Coefficient for Leeward Wall Ballooning:	-0.605	-10.53	(suction)
Coefficient for Windward Roof Upward Ballooning:	-0.748	-13.02	(suction)
Coefficient for Leeward Roof Upward Ballooning:	-0.594	-10.33	(suction)
Coefficient for Windward Roof Downward Ballooning:	0.000	0.00	
Coefficient for Leeward Roof Downward Ballooning:	-0.594	-10.33	(suction)
Coefficient for Windward Wall Deflation:	0.860	14.96	(pressure)
Coefficient for Leeward Wall Deflation:	-0.245	-4.26	(suction)
Coefficient for Windward Roof Upward Deflation:	-0.388	-6.76	(suction)
Coefficient for Leeward Roof Upward Deflation:	-0.234	-4.06	(suction)
Coefficient for Windward Roof Downward Deflation:	0.070	1.22	(pressure)
Coefficient for Leeward Roof Downward Deflation:	-0.234	-4.06	(suction)

**ALLOWABLE STRESS LATERAL SYSTEM WIND FORCE PERP. TO SIDEWALLS, W (lbs.) = 6178**

**MAIN FORCE RESISTING SYSTEM (MFRS) DESIGN WIND PRESSURES (Perp. to Endwall):**

Int. Zone Wall Pressure Horiz. Coefficient: 1.105  
Int. Zone Endwall Ultimate Wind Pressure (psf): 19.23

**ALLOWABLE STRESS LATERAL SYSTEM WIND FORCE PERP. TO ENDWALLS, W (lbs.) = 3371**

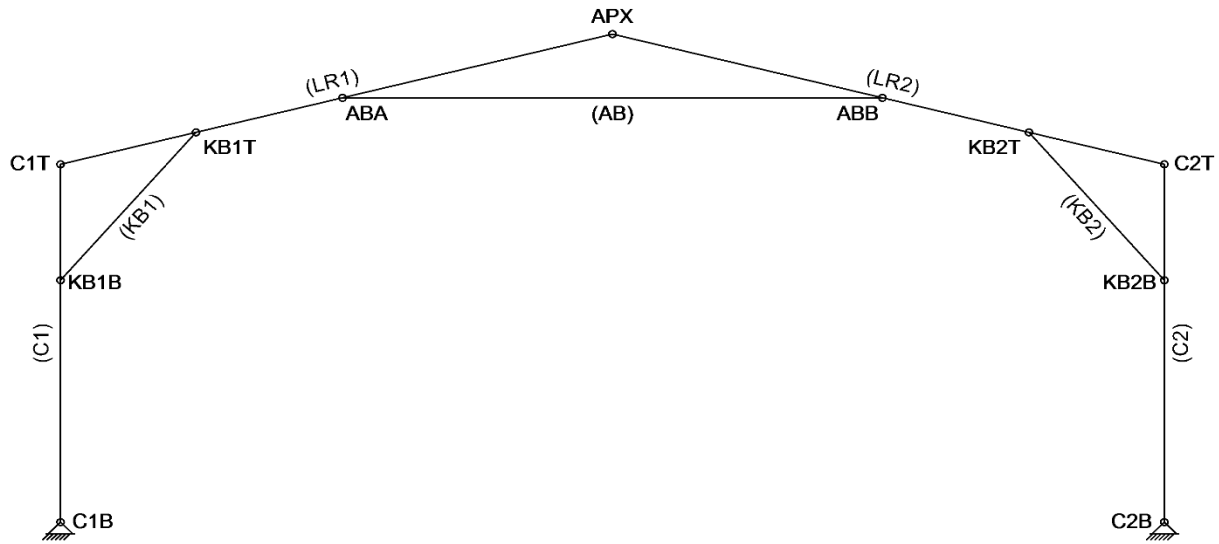
**CLADDING AND COMPONENT ALLOWABLE STRESS DESIGN WIND PRESSURES:**

Element	GCp ± Gcpi (FIELD)		Pressures (psf)	
	INWARD	OUTWARD	INWARD	OUTWARD
Roof Purlins:	0.512	-0.973	5.35	10.16
Sidewall Girts:	1.031	-1.131	10.76	11.80
Endwall Girts:	0.932	-1.032	9.73	10.77
Endwall Columns:	0.925	-1.025	9.66	10.70

**CLEARSPAN FRAME ANALYSIS:**

Analysis & Design Software: ACT Dimensions version 2.22.0.6 by ACT Building Systems

Applicable Frame Numbers: 3-5  
Overall Nominal Frame Width: 40' - 0"  
Nominal Eave Height: 14' - 0"  
Roof Pitch: 3:12  
Tributary Width: 180.00 in  
Design Roof Snow Load: 7.00 psf  
Roof Live Load: 20.00 psf  
Wind Speed AndAlso Exposure: 117 mph, B



X - JOINT LABEL (SEE RISA ANALYSIS NEXT PAGE)  
(X) - MEMBER LABEL (SEE RISA ANALYSIS NEXT PAGE)

**FRAME NODE AND MEMBER DIAGRAM**

**Cold Formed Steel Properties**

	Label	E[psi]	G[psi]	Nu	Therm(/1E5 F)	Density[lb/ft^3]	Yield[psi]	Fu[psi]
1	CF_STL	29500065	11300025	0.3	0.65	490	55000	70000

**Joint Coordinates**

	Label	X[ft]	Y[ft]
1	C1B	0.917	0.000
2	C1T	0.917	13.113
3	C2B	39.085	0.000
4	C2T	39.085	13.113
5	APX	20.001	17.884
6	KB1B	0.917	8.867
7	KB1T	5.600	14.284
8	KB2B	39.085	8.867
9	KB2T	34.402	14.284
10	ABA	10.667	15.551
11	ABB	29.335	15.551

**Member Primary Data**

	Label	I Joint	J Joint	Shape	Type	DesignList	Material	DesignRules
1	C1	C1B	C1T	14in x 4in 12G CEE	Beam	CS	CF_STL	Typical
2	C2	C2B	C2T	14in x 4in 12G CEE	Beam	CS	CF_STL	Typical
3	KB1	KB1B	KB1T	6in x 3.5in 16G CEE	Beam	CS	CF_STL	Typical
4	KB2	KB2B	KB2T	6in x 3.5in 16G CEE	Beam	CS	CF_STL	Typical
5	AB	ABA	ABB	6in x 3.5in 16G CEE	Beam	CS	CF_STL	Typical
6	LR1	C1T	APX	14in x 4in 12G CEE	Beam	CS	CF_STL	Typical
7	LR2	C2T	APX	14in x 4in 12G CEE	Beam	CS	CF_STL	Typical

**Member Advanced Data**

	Label	I Release	J Release	I Offset[ft]	J Offset[ft]	T/C Only	Physical
1	C1		PIN	0.000	0.000		Yes
2	C2		PIN	0.000	0.000		Yes
3	KB1	PIN	PIN	0.000	0.000		
4	KB2	PIN	PIN	0.000	0.000		
5	AB	PIN	PIN	0.000	0.000		
6	LR1		PIN	0.499	0.000		Yes
7	LR2		PIN	0.499	0.000		Yes

**Cold Formed Steel Design Parameters**

	Label	Shape	Length[ft]	Lb-out[ft]	Lb-in[ft]	Lcomp top[ft]	Lcomp bot[ft]	K-out	K-in	Cm	Out sway	In sway
1	C1	14in x 4in 12G CEE	13.113	4.667		4.667	4.667	0.8	1			Yes
2	C2	14in x 4in 12G CEE	13.113	4.667		4.667	4.667	0.8	1			Yes
3	KB1	6in x 3.5in 16G CEE	7.161									
4	KB2	6in x 3.5in 16G CEE	7.161									
5	AB	6in x 3.5in 16G CEE	18.669									
6	LR1	14in x 4in 12G CEE	19.672	4.868		9.750	4.868	0.8	1			Yes
7	LR2	14in x 4in 12G CEE	19.672	4.868		4.868	9.750	0.8	1			Yes

**Basic Load Cases**

	BLC Description	Category	Joint	Point	Distributed
1	Roof Dead	DL	0	0	2
2	Roof Snow	SL	0	0	2
3	Roof Live	RLL	0	0	2
4	Wall Dead	DL	0	0	0
5	Floor Dead	DL	0	0	0
6	Floor Live	LL	0	0	0
7	Wind To Right - Upward Balooing	OL1	0	0	6
8	Wind To Right - Upward Deflation	OL2	0	0	6
9	Wind To Right - Downward Balooing	OL3	0	0	4
10	Wind To Right - Downward Deflation	OL4	0	0	6
11	Wind To Left - Upward Balooing	OL5	0	0	6
12	Wind To Left - Upward Deflation	OL6	0	0	6
13	Wind To Left - Downward Balooing	OL7	0	0	4
14	Wind To Left - Downward Deflation	OL8	0	0	6
15	Earthquake+	None	0	0	4
16	Earthquake-	None	0	0	4

**Member Distributor Loads (BLC 1 : Roof Dead)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	LR1	Y	-45.000	-45.000	-0.000	19.672
2	LR2	Y	-45.000	-45.000	-0.000	19.672

**Member Distributor Loads (BLC 2 : Roof Snow)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	LR1	Y	-101.865	-101.865	-0.000	19.672
2	LR2	Y	-101.865	-101.865	-0.000	19.672

**Member Distributor Loads (BLC 3 : Roof Live)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	LR1	Y	-174.626	-174.626	-0.000	19.672
2	LR2	Y	-174.626	-174.626	-0.000	19.672

**Member Distributor Loads (BLC 7 : Wind To Right - Upward Balooing)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	130.620	130.620	0.000	13.113
2	C2	X	158.051	158.051	0.000	13.113
3	LR1	X	-47.410	-47.410	-0.000	19.672
4	LR1	Y	189.641	189.641	-0.000	19.672
5	LR2	X	37.606	37.606	-0.000	19.672
6	LR2	Y	150.425	150.425	-0.000	19.672

**Member Distributor Loads (BLC 8 : Wind To Right - Upward Deflation)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	224.667	224.667	0.000	13.113
2	C2	X	64.004	64.004	0.000	13.113
3	LR1	X	-24.601	-24.601	-0.000	19.672
4	LR1	Y	98.403	98.403	-0.000	19.672
5	LR2	X	14.797	14.797	-0.000	19.672
6	LR2	Y	59.186	59.186	-0.000	19.672

**Member Distributor Loads (BLC 9 : Wind To Right - Downward Ballooning)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	130.620	130.620	0.000	13.113
2	C2	X	158.051	158.051	0.000	13.113
3	LR2	X	37.606	37.606	-0.000	19.672
4	LR2	Y	150.425	150.425	-0.000	19.672

**Member Distributor Loads (BLC 10 : Wind To Right - Downward Deflation)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	224.667	224.667	0.000	13.113
2	C2	X	64.004	64.004	0.000	13.113
3	LR1	X	4.450	4.450	-0.000	19.672
4	LR1	Y	-17.799	-17.799	-0.000	19.672
5	LR2	X	14.797	14.797	-0.000	19.672
6	LR2	Y	59.186	59.186	-0.000	19.672

**Member Distributor Loads (BLC 11 : Wind To Left - Upward Ballooning)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-158.051	-158.051	0.000	13.113
2	C2	X	-130.620	-130.620	0.000	13.113
3	LR1	X	-37.606	-37.606	-0.000	19.672
4	LR1	Y	150.425	150.425	-0.000	19.672
5	LR2	X	47.410	47.410	-0.000	19.672
6	LR2	Y	189.641	189.641	-0.000	19.672

**Member Distributor Loads (BLC 12 : Wind To Left - Upward Deflation)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-64.004	-64.004	0.000	13.113
2	C2	X	-224.667	-224.667	0.000	13.113
3	LR1	X	-14.797	-14.797	-0.000	19.672
4	LR1	Y	59.186	59.186	-0.000	19.672
5	LR2	X	24.601	24.601	-0.000	19.672
6	LR2	Y	98.403	98.403	-0.000	19.672

**Member Distributor Loads (BLC 13 : Wind To Left - Downward Ballooning)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-158.051	-158.051	0.000	13.113
2	C2	X	-130.620	-130.620	0.000	13.113
3	LR1	X	-37.606	-37.606	-0.000	19.672
4	LR1	Y	150.425	150.425	-0.000	19.672

**Member Distributor Loads (BLC 14 : Wind To Left - Downward Deflation)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-64.004	-64.004	0.000	13.113
2	C2	X	-224.667	-224.667	0.000	13.113
3	LR1	X	-14.797	-14.797	-0.000	19.672
4	LR1	Y	59.186	59.186	-0.000	19.672
5	LR2	X	-4.450	-4.450	-0.000	19.672
6	LR2	Y	-17.799	-17.799	-0.000	19.672

**Member Distributor Loads (BLC 15 : Earthquake+)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	14.998	14.998	0.000	13.113
2	C2	X	14.998	14.998	0.000	13.113
3	LR1	X	14.998	14.998	-0.000	19.672
4	LR2	X	14.998	14.998	-0.000	19.672

**Member Distributor Loads (BLC 16 : Earthquake-)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-14.998	-14.998	0.000	13.113
2	C2	X	-14.998	-14.998	0.000	13.113
3	LR1	X	-14.998	-14.998	-0.000	19.672
4	LR2	X	-14.998	-14.998	-0.000	19.672

**Load Combinations**

	Description	PDelta	SRSS	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	DL ONLY			DL	1						
2	FLL ONLY			LL	1						
3	IBC 16-9			DL	1	LL	1				
4	IBC 16-10 (a)			DL	1	RLL	1				
5	IBC 16-10 (b)			DL	1	SL	1				
6	IBC 16-11 (a)			DL	1	LL	0.75	RLL	0.75		
7	IBC 16-11 (b)			DL	1	LL	0.75	SL	0.75		
8	IBC 16-12 (a) 1			DL	1	OL1	0.6				
9	IBC 16-12 (a) 2			DL	1	OL2	0.6				
10	IBC 16-12 (a) 3			DL	1	OL3	0.6				
11	IBC 16-12 (a) 4			DL	1	OL4	0.6				
12	IBC 16-12 (a) 5			DL	1	OL5	0.6				
13	IBC 16-12 (a) 6			DL	1	OL6	0.6				
14	IBC 16-12 (a) 7			DL	1	OL7	0.6				
15	IBC 16-12 (a) 8			DL	1	OL8	0.6				
16	IBC 16-12 (b) 1			DL	1	15	0.7				
17	IBC 16-12 (b) 2			DL	1	16	0.7				
18	IBC 16-13 (a) 1			DL	1	LL	0.75	RLL	0.75	OL1	0.45
19	IBC 16-13 (a) 2			DL	1	LL	0.75	RLL	0.75	OL2	0.45
20	IBC 16-13 (a) 3			DL	1	LL	0.75	RLL	0.75	OL3	0.45
21	IBC 16-13 (a) 4			DL	1	LL	0.75	RLL	0.75	OL4	0.45
22	IBC 16-13 (a) 5			DL	1	LL	0.75	RLL	0.75	OL5	0.45
23	IBC 16-13 (a) 6			DL	1	LL	0.75	RLL	0.75	OL6	0.45
24	IBC 16-13 (a) 7			DL	1	LL	0.75	RLL	0.75	OL7	0.45
25	IBC 16-13 (a) 8			DL	1	LL	0.75	RLL	0.75	OL8	0.45
26	IBC 16-13 (b) 1			DL	1	LL	0.75	SL	0.75	OL1	0.45
27	IBC 16-13 (b) 2			DL	1	LL	0.75	SL	0.75	OL2	0.45
28	IBC 16-13 (b) 3			DL	1	LL	0.75	SL	0.75	OL3	0.45
29	IBC 16-13 (b) 4			DL	1	LL	0.75	SL	0.75	OL4	0.45
30	IBC 16-13 (b) 5			DL	1	LL	0.75	SL	0.75	OL5	0.45
31	IBC 16-13 (b) 6			DL	1	LL	0.75	SL	0.75	OL6	0.45
32	IBC 16-13 (b) 7			DL	1	LL	0.75	SL	0.75	OL7	0.45
33	IBC 16-13 (b) 8			DL	1	LL	0.75	SL	0.75	OL8	0.45
34	IBC 16-14 (a) 1			DL	1	LL	0.75	SL	0.75	15	0.525
35	IBC 16-14 (a) 2			DL	1	LL	0.75	SL	0.75	16	0.525
36	IBC 16-15 (a) 1			DL	0.6	OL1	0.6				
37	IBC 16-15 (a) 2			DL	0.6	OL2	0.6				



**Load Combinations (continued)**

	Description	PDelta	SRSS	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
38	IBC 16-15 (a) 3			DL	0.6	OL3	0.6				
39	IBC 16-15 (a) 4			DL	0.6	OL4	0.6				
40	IBC 16-15 (a) 5			DL	0.6	OL5	0.6				
41	IBC 16-15 (a) 6			DL	0.6	OL6	0.6				
42	IBC 16-15 (a) 7			DL	0.6	OL7	0.6				
43	IBC 16-15 (a) 8			DL	0.6	OL8	0.6				
44	IBC 16-16 (a) 1			DL	0.6	15	0.7				
45	IBC 16-16 (a) 2			DL	0.6	16	0.7				

**Envelope Joint Reactions**

	Joint		X[lb]	LC	Y[lb]	LC	Moment[ft-lb]	LC
1	C1B	max	1610	24	2833	24	0	4
2	C1B	min	-1557	24	-843	24	-0	4
3	C2B	max	-1610	41	-843	41	0	4
4	C2B	min	1557	41	2833	41	-0	4
5	Total	max	-0	42	-695	42	0	4
6	Total	min	2158	42	-5	42	-0	4

**Envelope Member Section Forces**

	Member	Sec		Axial[lb]	LC	Shear[lb]	LC	Moment[ft-lb]	LC
1	C1	1	max	4211	4	2104	24	0	43
2		1	min	-1892	36	-1560	37	-0	18
3	C1	2	max	2746	38	2692	36	0	36
4		2	min	-3017	24	-3886	24	-0	24
5	C2	1	max	4211	4	1560	41	0	11
6		1	min	-1892	40	-2104	20	-0	34
7	C2	2	max	2746	42	3886	20	0	40
8		2	min	-3017	20	-2692	40	-0	20
9	KB1	1	max	8096	25	0	20	-0	1
10		1	min	-4924	36	-0	42	-0	1
11	KB1	2	max	8096	25	0	20	0	42
12		2	min	-4924	36	-0	42	-0	20
13	KB2	1	max	8096	21	0	38	-0	1
14		1	min	-4924	40	-0	24	-0	1
15	KB2	2	max	8096	21	0	38	0	24
16		2	min	-4924	40	-0	24	-0	38
17	AB	1	max	1359	40	0	42	-0	1
18		1	min	-5312	4	-0	10	-0	1
19	AB	2	max	1359	40	0	42	0	10
20		2	min	-5312	4	-0	10	-0	42
21	LR1	1	max	3056	36	2059	14	0	39
22		1	min	-4502	24	-2080	38	-0	14
23	LR1	2	max	6716	4	1819	20	0	36
24		2	min	-2416	36	-1122	42	-0	4
25	LR2	1	max	3056	40	2080	42	0	44
26		1	min	-4502	20	-2059	10	-0	10
27	LR2	2	max	6716	4	1122	38	0	40
28		2	min	-2416	40	-1819	24	-0	4

**AISI S100-16 : ASD Cold Formed Steel Code Checks**

Member	Shape	H1.2 Check	Loc[ft]	LC	H2.2 Check	Loc[ft]	LC
1	C1	14in x 4in 12G CEE	0.98	8.866	3	0.86	8.866
2	C2	14in x 4in 12G CEE	0.98	8.866	3	0.86	8.866
3	KB1	6in x 3.5in 16G CEE	0.96	7.161	1	0.00	7.161
4	KB2	6in x 3.5in 16G CEE	0.96	7.161	1	0.00	7.161
5	AB	6in x 3.5in 16G CEE	0.68	18.668	1	0.00	18.668
6	LR1	14in x 4in 12G CEE	0.70	10.049	5	0.51	10.049
7	LR2	14in x 4in 12G CEE	0.70	10.049	5	0.51	10.049

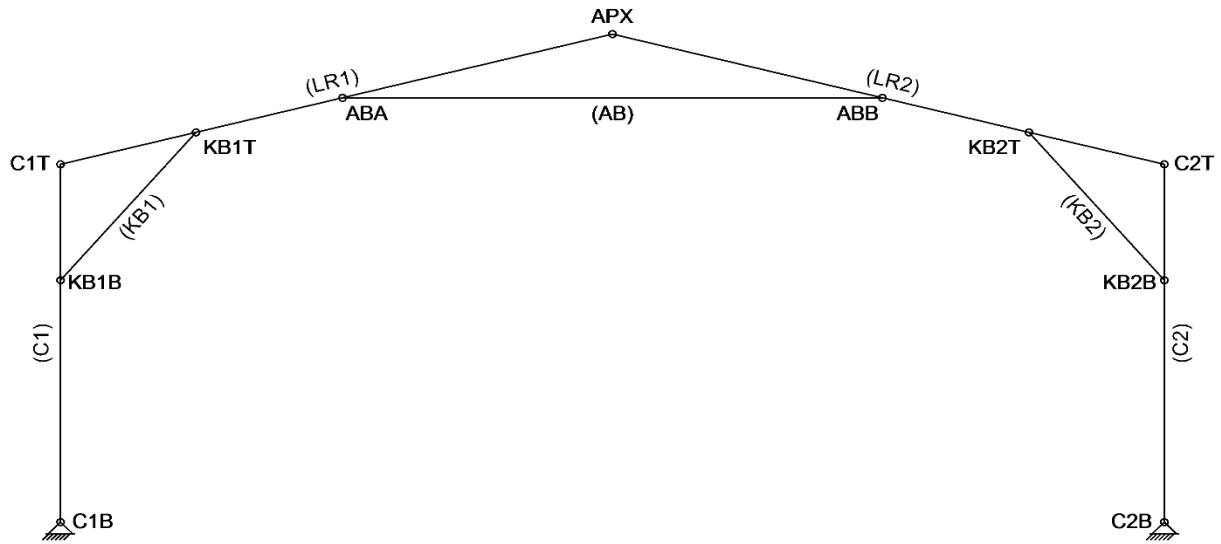
**AISI S100-16 : ASD Cold Formed Steel Allowable Member Load**

Member	Shape	Pn/Om[lb]	Tn/Om[lb]	Mn/Om[lb-ft]	Cb	Cm	
1	C1	14in x 4in 12G CEE	29966	73593	18196	1	1
2	C2	14in x 4in 12G CEE	29966	73593	18196	1	1
3	KB1	6in x 3.5in 16G CEE	8454	25126	3042	1	1
4	KB2	6in x 3.5in 16G CEE	8454	25126	3042	1	1
5	AB	6in x 3.5in 16G CEE	1988	25126	1179	1	1
6	LR1	14in x 4in 12G CEE	25858	73593	18196	1	1
7	LR2	14in x 4in 12G CEE	25858	73593	18196	1	1

**ENDWALL A FRAME ANALYSIS:**

Analysis & Design Software: ACT Dimensions version 2.22.0.6 by ACT Building Systems

Applicable Frame Numbers: 1  
Overall Nominal Frame Width: 40' - 0"  
Nominal Eave Height: 14' - 0"  
Roof Pitch: 3:12  
Tributary Width: 60.00 in  
Design Roof Snow Load: 7.00 psf  
Roof Live Load: 20.00 psf  
Wind Speed AndAlso Exposure: 117 mph, B



X - JOINT LABEL (SEE RISA ANALYSIS NEXT PAGE)  
(X) - MEMBER LABEL (SEE RISA ANALYSIS NEXT PAGE)

**FRAME NODE AND MEMBER DIAGRAM**

**Cold Formed Steel Properties**

	Label	E[psi]	G[psi]	Nu	Therm(/1E5 F)	Density[lb/ft^3]	Yield[psi]	Fu[psi]
1	CF_STL	29500065	11300025	0.3	0.65	490	55000	70000

**Joint Coordinates**

	Label	X[ft]	Y[ft]
1	C1B	0.917	0.000
2	C1T	0.917	13.113
3	C2B	39.085	0.000
4	C2T	39.085	13.113
5	APX	20.001	17.884
6	KB1B	0.917	8.867
7	KB1T	5.600	14.284
8	KB2B	39.085	8.867
9	KB2T	34.402	14.284
10	ABA	10.667	15.551
11	ABB	29.335	15.551

**Member Primary Data**

	Label	I Joint	J Joint	Shape	Type	DesignList	Material	DesignRules
1	C1	C1B	C1T	14in x 4in 12G CEE	Beam	CS	CF_STL	Typical
2	C2	C2B	C2T	14in x 4in 12G CEE	Beam	CS	CF_STL	Typical
3	KB1	KB1B	KB1T	6in x 3.5in 16G CEE	Beam	CS	CF_STL	Typical
4	KB2	KB2B	KB2T	6in x 3.5in 16G CEE	Beam	CS	CF_STL	Typical
5	AB	ABA	ABB	6in x 3.5in 16G CEE	Beam	CS	CF_STL	Typical
6	LR1	C1T	APX	14in x 4in 12G CEE	Beam	CS	CF_STL	Typical
7	LR2	C2T	APX	14in x 4in 12G CEE	Beam	CS	CF_STL	Typical

**Member Advanced Data**

	Label	I Release	J Release	I Offset[ft]	J Offset[ft]	T/C Only	Physical
1	C1		PIN	0.000	0.000		Yes
2	C2		PIN	0.000	0.000		Yes
3	KB1	PIN	PIN	0.000	0.000		
4	KB2	PIN	PIN	0.000	0.000		
5	AB	PIN	PIN	0.000	0.000		
6	LR1		PIN	0.499	0.000		Yes
7	LR2		PIN	0.499	0.000		Yes

**Cold Formed Steel Design Parameters**

	Label	Shape	Length[ft]	Lb-out[ft]	Lb-in[ft]	Lcomp top[ft]	Lcomp bot[ft]	K-out	K-in	Cm	Out sway	In sway
1	C1	14in x 4in 12G CEE	13.113					0.8	1			Yes
2	C2	14in x 4in 12G CEE	13.113					0.8	1			Yes
3	KB1	6in x 3.5in 16G CEE	7.161									
4	KB2	6in x 3.5in 16G CEE	7.161									
5	AB	6in x 3.5in 16G CEE	18.669									
6	LR1	14in x 4in 12G CEE	19.672	4.868			4.868	0.8	1			Yes
7	LR2	14in x 4in 12G CEE	19.672	4.868		4.868		0.8	1			Yes

**Basic Load Cases**

	BLC Description	Category	Joint	Point	Distributed
1	Roof Dead	DL	0	0	2
2	Roof Snow	SL	0	0	2
3	Roof Live	RLL	0	0	2
4	Wall Dead	DL	0	0	0
5	Floor Dead	DL	0	0	0
6	Floor Live	LL	0	0	0
7	Wind To Right - Upward Balooning	OL1	0	0	6
8	Wind To Right - Upward Deflation	OL2	0	0	6
9	Wind To Right - Downward Balooning	OL3	0	0	4
10	Wind To Right - Downward Deflation	OL4	0	0	6
11	Wind To Left - Upward Balooning	OL5	0	0	6
12	Wind To Left - Upward Deflation	OL6	0	0	6
13	Wind To Left - Downward Balooning	OL7	0	0	4
14	Wind To Left - Downward Deflation	OL8	0	0	6
15	Earthquake+	None	0	0	4
16	Earthquake-	None	0	0	4

**Member Distributor Loads (BLC 1 : Roof Dead)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	LR1	Y	-15.000	-15.000	-0.000	19.672
2	LR2	Y	-15.000	-15.000	-0.000	19.672

**Member Distributor Loads (BLC 2 : Roof Snow)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	LR1	Y	-33.955	-33.955	-0.000	19.672
2	LR2	Y	-33.955	-33.955	-0.000	19.672

**Member Distributor Loads (BLC 3 : Roof Live)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	LR1	Y	-97.014	-97.014	-0.000	19.672
2	LR2	Y	-97.014	-97.014	-0.000	19.672

**Member Distributor Loads (BLC 7 : Wind To Right - Upward Balooning)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	2.904	2.904	0.000	13.113
2	C2	X	3.514	3.514	0.000	13.113
3	LR1	X	-15.803	-15.803	-0.000	19.672
4	LR1	Y	63.214	63.214	-0.000	19.672
5	LR2	X	12.535	12.535	-0.000	19.672
6	LR2	Y	50.142	50.142	-0.000	19.672

**Member Distributor Loads (BLC 8 : Wind To Right - Upward Deflation)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	4.995	4.995	0.000	13.113
2	C2	X	1.423	1.423	0.000	13.113
3	LR1	X	-8.200	-8.200	-0.000	19.672
4	LR1	Y	32.801	32.801	-0.000	19.672
5	LR2	X	4.932	4.932	-0.000	19.672
6	LR2	Y	19.729	19.729	-0.000	19.672

**Member Distributor Loads (BLC 9 : Wind To Right - Downward Ballooning)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	2.904	2.904	0.000	13.113
2	C2	X	3.514	3.514	0.000	13.113
3	LR2	X	12.535	12.535	-0.000	19.672
4	LR2	Y	50.142	50.142	-0.000	19.672

**Member Distributor Loads (BLC 10 : Wind To Right - Downward Deflation)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	4.995	4.995	0.000	13.113
2	C2	X	1.423	1.423	0.000	13.113
3	LR1	X	1.483	1.483	-0.000	19.672
4	LR1	Y	-5.933	-5.933	-0.000	19.672
5	LR2	X	4.932	4.932	-0.000	19.672
6	LR2	Y	19.729	19.729	-0.000	19.672

**Member Distributor Loads (BLC 11 : Wind To Left - Upward Ballooning)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-3.514	-3.514	0.000	13.113
2	C2	X	-2.904	-2.904	0.000	13.113
3	LR1	X	-12.535	-12.535	-0.000	19.672
4	LR1	Y	50.142	50.142	-0.000	19.672
5	LR2	X	15.803	15.803	-0.000	19.672
6	LR2	Y	63.214	63.214	-0.000	19.672

**Member Distributor Loads (BLC 12 : Wind To Left - Upward Deflation)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-1.423	-1.423	0.000	13.113
2	C2	X	-4.995	-4.995	0.000	13.113
3	LR1	X	-4.932	-4.932	-0.000	19.672
4	LR1	Y	19.729	19.729	-0.000	19.672
5	LR2	X	8.200	8.200	-0.000	19.672
6	LR2	Y	32.801	32.801	-0.000	19.672

**Member Distributor Loads (BLC 13 : Wind To Left - Downward Ballooning)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-3.514	-3.514	0.000	13.113
2	C2	X	-2.904	-2.904	0.000	13.113
3	LR1	X	-12.535	-12.535	-0.000	19.672
4	LR1	Y	50.142	50.142	-0.000	19.672

**Member Distributor Loads (BLC 14 : Wind To Left - Downward Deflation)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-1.423	-1.423	0.000	13.113
2	C2	X	-4.995	-4.995	0.000	13.113
3	LR1	X	-4.932	-4.932	-0.000	19.672
4	LR1	Y	19.729	19.729	-0.000	19.672
5	LR2	X	-1.483	-1.483	-0.000	19.672
6	LR2	Y	-5.933	-5.933	-0.000	19.672

**Member Distributor Loads (BLC 15 : Earthquake+)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	4.999	4.999	0.000	13.113
2	C2	X	4.999	4.999	0.000	13.113
3	LR1	X	4.999	4.999	-0.000	19.672
4	LR2	X	4.999	4.999	-0.000	19.672

**Member Distributor Loads (BLC 16 : Earthquake-)**

	Member Label	Direction	Start Mag[lb/ft]	End Mag[lb/ft]	Start Loc[ft/%]	End Loc[ft/%]
1	C1	X	-4.999	-4.999	0.000	13.113
2	C2	X	-4.999	-4.999	0.000	13.113
3	LR1	X	-4.999	-4.999	-0.000	19.672
4	LR2	X	-4.999	-4.999	-0.000	19.672

**Load Combinations**

	Description	PDelta	SRSS	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	DL ONLY			DL	1						
2	FLL ONLY			LL	1						
3	IBC 16-9			DL	1	LL	1				
4	IBC 16-10 (a)			DL	1	RLL	1				
5	IBC 16-10 (b)			DL	1	SL	1				
6	IBC 16-11 (a)			DL	1	LL	0.75	RLL	0.75		
7	IBC 16-11 (b)			DL	1	LL	0.75	SL	0.75		
8	IBC 16-12 (a) 1			DL	1	OL1	0.6				
9	IBC 16-12 (a) 2			DL	1	OL2	0.6				
10	IBC 16-12 (a) 3			DL	1	OL3	0.6				
11	IBC 16-12 (a) 4			DL	1	OL4	0.6				
12	IBC 16-12 (a) 5			DL	1	OL5	0.6				
13	IBC 16-12 (a) 6			DL	1	OL6	0.6				
14	IBC 16-12 (a) 7			DL	1	OL7	0.6				
15	IBC 16-12 (a) 8			DL	1	OL8	0.6				
16	IBC 16-12 (b) 1			DL	1	15	0.7				
17	IBC 16-12 (b) 2			DL	1	16	0.7				
18	IBC 16-13 (a) 1			DL	1	LL	0.75	RLL	0.75	OL1	0.45
19	IBC 16-13 (a) 2			DL	1	LL	0.75	RLL	0.75	OL2	0.45
20	IBC 16-13 (a) 3			DL	1	LL	0.75	RLL	0.75	OL3	0.45
21	IBC 16-13 (a) 4			DL	1	LL	0.75	RLL	0.75	OL4	0.45
22	IBC 16-13 (a) 5			DL	1	LL	0.75	RLL	0.75	OL5	0.45
23	IBC 16-13 (a) 6			DL	1	LL	0.75	RLL	0.75	OL6	0.45
24	IBC 16-13 (a) 7			DL	1	LL	0.75	RLL	0.75	OL7	0.45
25	IBC 16-13 (a) 8			DL	1	LL	0.75	RLL	0.75	OL8	0.45
26	IBC 16-13 (b) 1			DL	1	LL	0.75	SL	0.75	OL1	0.45
27	IBC 16-13 (b) 2			DL	1	LL	0.75	SL	0.75	OL2	0.45
28	IBC 16-13 (b) 3			DL	1	LL	0.75	SL	0.75	OL3	0.45
29	IBC 16-13 (b) 4			DL	1	LL	0.75	SL	0.75	OL4	0.45
30	IBC 16-13 (b) 5			DL	1	LL	0.75	SL	0.75	OL5	0.45
31	IBC 16-13 (b) 6			DL	1	LL	0.75	SL	0.75	OL6	0.45
32	IBC 16-13 (b) 7			DL	1	LL	0.75	SL	0.75	OL7	0.45
33	IBC 16-13 (b) 8			DL	1	LL	0.75	SL	0.75	OL8	0.45
34	IBC 16-14 (a) 1			DL	1	LL	0.75	SL	0.75	15	0.525
35	IBC 16-14 (a) 2			DL	1	LL	0.75	SL	0.75	16	0.525
36	IBC 16-15 (a) 1			DL	0.6	OL1	0.6				
37	IBC 16-15 (a) 2			DL	0.6	OL2	0.6				

**Load Combinations (continued)**

	Description	PDelta	SRSS	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
38	IBC 16-15 (a) 3			DL	0.6	OL3	0.6				
39	IBC 16-15 (a) 4			DL	0.6	OL4	0.6				
40	IBC 16-15 (a) 5			DL	0.6	OL5	0.6				
41	IBC 16-15 (a) 6			DL	0.6	OL6	0.6				
42	IBC 16-15 (a) 7			DL	0.6	OL7	0.6				
43	IBC 16-15 (a) 8			DL	0.6	OL8	0.6				
44	IBC 16-16 (a) 1			DL	0.6	15	0.7				
45	IBC 16-16 (a) 2			DL	0.6	16	0.7				

**Envelope Joint Reactions**

	Joint		X[lb]	LC	Y[lb]	LC	Moment[ft-lb]	LC
1	C1B	max	821	4	2148	4	0	4
2	C1B	min	-184	4	-509	4	-0	4
3	C2B	max	-821	40	-509	40	0	4
4	C2B	min	184	40	2148	40	-0	4
5	Total	max	-0	45	345	45	0	4
6	Total	min	-13	45	575	45	-0	4

**Envelope Member Section Forces**

	Member	Sec		Axial[lb]	LC	Shear[lb]	LC	Moment[ft-lb]	LC
1	C1	1	max	2148	4	821	4	0	16
2		1	min	-509	36	-184	36	-0	20
3	C1	2	max	410	38	372	40	0	40
4		2	min	-824	24	-1715	4	-0	4
5	C2	1	max	2148	4	184	40	0	11
6		1	min	-509	40	-821	4	-0	22
7	C2	2	max	410	42	1715	4	0	36
8		2	min	-824	20	-372	36	-0	4
9	KB1	1	max	3878	4	0	20	-0	1
10		1	min	-872	40	-0	42	-0	1
11	KB1	2	max	3878	4	0	20	0	42
12		2	min	-872	40	-0	42	-0	20
13	KB2	1	max	3878	4	0	38	-0	1
14		1	min	-872	36	-0	24	-0	1
15	KB2	2	max	3878	4	0	38	0	24
16		2	min	-872	36	-0	24	-0	38
17	AB	1	max	478	36	0	42	-0	1
18		1	min	-2709	4	-0	10	-0	1
19	AB	2	max	478	36	0	42	0	10
20		2	min	-2709	4	-0	10	-0	42
21	LR1	1	max	411	40	480	24	0	45
22		1	min	-1854	4	-331	38	-0	10
23	LR1	2	max	3425	4	856	4	0	36
24		2	min	-807	40	-258	42	-0	4
25	LR2	1	max	411	36	331	42	0	38
26		1	min	-1854	4	-480	20	-0	14
27	LR2	2	max	3425	4	258	38	0	40
28		2	min	-807	36	-856	4	-0	4



**AISI S100-16 : ASD Cold Formed Steel Code Checks**

Member	Shape	H1.2 Check	Loc[ft]	LC	H2.2 Check	Loc[ft]	LC
1	C1	14in x 4in 12G CEE	0.59	8.866	3	0.40	8.866
2	C2	14in x 4in 12G CEE	0.59	8.866	3	0.40	8.866
3	KB1	6in x 3.5in 16G CEE	0.46	7.161	1	0.00	7.161
4	KB2	6in x 3.5in 16G CEE	0.46	7.161	1	0.00	7.161
5	AB	6in x 3.5in 16G CEE	0.24	18.668	1	0.00	18.668
6	LR1	14in x 4in 12G CEE	0.53	10.085	7	0.18	10.085
7	LR2	14in x 4in 12G CEE	0.53	10.085	7	0.18	10.085

**AISI S100-16 : ASD Cold Formed Steel Allowable Member Load**

Member	Shape	Pn/Om[lb]	Tn/Om[lb]	Mn/Om[lb-ft]	Cb	Cm
1	C1	14in x 4in 12G CEE	18239	73593	15299	1
2	C2	14in x 4in 12G CEE	18239	73593	15299	1
3	KB1	6in x 3.5in 16G CEE	8454	25126	3042	1
4	KB2	6in x 3.5in 16G CEE	8454	25126	3042	1
5	AB	6in x 3.5in 16G CEE	1988	25126	1179	1
6	LR1	14in x 4in 12G CEE	10430	73593	18196	1
7	LR2	14in x 4in 12G CEE	10430	73593	18196	1

## FRAME BRACE END SCREW CONNECTION DESIGN

Brace results apply at Frames 1, 3-5

**Gable Frame Columns:** Single 14in x 4in 12G CEE

**Gable Frame Rafters:** Single 14in x 4in 12G CEE

**Gable Frame Typ. Knee Braces:** Single 6in x 3.5in 16G CEE

**Gable Frame Apex Braces:** Single 6in x 3.5in 16G CEE

**Knee Brace Vert. Intersection Dimension per Detail A/2 (ft.):** 9' - 1 7/8"

**Knee Brace Horiz. Intersection Dimension per Detail A/2 (ft.):** 3' - 10 1/4"

**Apex Brace Horiz. Intersection Dimension per Detail B/2 (ft.):** 7' - 11 1/8"

**Screw Size:** #14

**Ultimate Single Shear Screw Strength (lbs.):** 2450

$\Omega = 2.5$

	n Screws	R3d (group effect factor)	V single screw (lbs.)	P (design allowable, lbs.)
Knee Brace	16	0.65	532	8520
Apex Brace	10	0.68	558	5577

**MAX. KNEE BRACE FORCE (lbs.): 8096** (INSTALL (16) #14 SCREWS AT EACH END OF EACH KNEE BRACE)

**\* MAX. APEX BRACE FORCE (lbs.): 5312** (INSTALL (10) #14 SCREWS AT EACH END OF EACH APEX BRACE)

## FRAME BRACE END ALTERNATE BOLT CONNECTION DESIGN

NOTATIONS

Fu = Tensile strength of connected part (psi)

Fy = Yield strength of connected part (psi)

db = Nominal bolt diameter (in.)

g1 = Nominal gauge of thinnest connected part (in.)

t1 = Thickness of thinnest connected part (in.)

Pn = Nominal bearing strength per bolt (lbs.)

ALLOWABLE SHEAR BASED ON CONNECTED MATERIALS:

Fu (psi) = 70000

Fy (psi) = 55000

d/t = 9.53

C = 3.00

Pn = 6969

db = 0.563

g1 = 16

t1 = 0.059

Allowable shear based on connected material bearing (lbs.): 2800

Bolt Grade: A325

Allowable shear based on A325 bolt in shear (lbs.): 5219

**Allowable Shear on Each Bolt (lbs.): 2800**

**\* MAX. KNEE BRACE FORCE (lbs.): 8096** (USE MIN. (3) 9/16" DIAM. A325 BOLTS AT EACH END OF EACH KNEE BRACE)

**MAX. APEX BRACE FORCE (lbs.): 5312** (USE MIN. (2) 9/16" DIAM. A325 BOLTS AT EACH END OF EACH APEX BRACE)

## LATERAL FORCE RESISTANCE DIAPHRAGM ANALYSIS

Reports verifying diaphragm capacity available upon request.

<p><b>'ENDWALL A' X-BRACING TOTAL SHEAR FORCE, ASD, LBS.:</b> <b>569</b></p>	<p>(ADD KNEE AND APEX BRACES TO ENDWALL FRAME IN LIEU OF X-</p>
<p><b>'ENDWALL B' TOTAL SHEAR FORCE, ASD, LBS.:</b> <b>839</b></p> <p style="padding-left: 40px;">PANEL #: 1</p> <p style="padding-left: 40px;">PANEL WIDTH (ft.): 40.00</p> <p style="padding-left: 40px;">PANEL WIDTH RELATIVE STIFFNESS: 1600</p> <p style="padding-left: 40px;">HEIGHT (ft.): 14.00</p> <p style="padding-left: 40px;">MAX. PANEL SHEAR FORCE, ASD (lbs.): 839</p> <p style="padding-left: 40px;">PANEL SHEAR, ASD (plf): 21</p> <p style="padding-left: 40px;">ALLOWABLE PANEL SHEAR, ASD (plf): 169</p> <p style="padding-left: 40px;">OK</p> <p style="padding-left: 40px;">MAX. BASE OF PANEL UPLIFT, UNFACTORED (lbs.): 489</p> <p style="padding-left: 40px;">D.L. TRIB. TO END OF PANEL, UNFACTORED (lbs.): 2880</p> <p style="padding-left: 40px;">BASE OF NET PANEL UPLIFT, ULT (lbs.): 0</p> <p style="padding-left: 40px;">PANEL EDGE CONCRETE ANCHOR: N/A, NO NET PANEL UPLIFT</p>	<p>(SHEETING DIAPHRAGM ACTION USED TO RESIST LOAD)</p>
<p><b>'PARTITION UNDER ROOF, FRAME 2' TOTAL SHEAR FORCE, ASD, LBS.:</b> <b>1389</b></p> <p style="padding-left: 40px;">PANEL #: 1</p> <p style="padding-left: 40px;">PANEL WIDTH (ft.): 5.83</p> <p style="padding-left: 40px;">PANEL WIDTH RELATIVE STIFFNESS: 34</p> <p style="padding-left: 40px;">HEIGHT (ft.): 16.29</p> <p style="padding-left: 40px;">MAX. PANEL SHEAR FORCE, ASD (lbs.): 665</p> <p style="padding-left: 40px;">PANEL SHEAR, ASD (plf): 114</p> <p style="padding-left: 40px;">ALLOWABLE PANEL SHEAR, ASD (plf): 169</p> <p style="padding-left: 40px;">OK</p> <p style="padding-left: 40px;">MAX. BASE OF PANEL UPLIFT, UNFACTORED (lbs.): 3096</p> <p style="padding-left: 40px;">D.L. TRIB. TO END OF PANEL, UNFACTORED (lbs.): 219</p> <p style="padding-left: 40px;">BASE OF NET PANEL UPLIFT, ULT (lbs.): 2965</p> <p style="padding-left: 40px;">PANEL EDGE CONCRETE ANCHOR: 1/2in x 5in DeWALT 'Screw-Bolt+' Anchor</p> <p style="padding-left: 40px;">ANCHOR ALLOWABLE TENSION, <math>\Phi N_n</math> (lbs.): 4806</p> <p style="padding-left: 40px;">OK</p>	<p>(SHEETING DIAPHRAGM ACTION USED TO RESIST LOAD)</p> <p style="padding-left: 40px;">2</p> <p style="padding-left: 40px;">6.08</p> <p style="padding-left: 40px;">37</p> <p style="padding-left: 40px;">16.23</p> <p style="padding-left: 40px;">723</p> <p style="padding-left: 40px;">119</p> <p style="padding-left: 40px;">169</p> <p style="padding-left: 40px;">OK</p> <p style="padding-left: 40px;">3217</p> <p style="padding-left: 40px;">228</p> <p style="padding-left: 40px;">3080</p> <p style="padding-left: 40px;">OK</p>

<b>'SIDEWALL A' TOTAL SHEAR FORCE, ASD, LBS.:</b>	<b>1685</b>	<b>(SHEETING DIAPHRAGM ACTION USED TO RESIST LOAD)</b>	
PANEL #:	1	2	3
PANEL WIDTH (ft.):	11.00	11.00	11.00
PANEL WIDTH RELATIVE STIFFNESS:	121	121	121
HEIGHT (ft.):	14.00	14.00	14.00
MAX. PANEL SHEAR FORCE, ASD (lbs.):	562	562	562
PANEL SHEAR, ASD (plf):	51	51	51
ALLOWABLE PANEL SHEAR, ASD (plf):	185	185	185
	OK	OK	OK
MAX. BASE OF PANEL UPLIFT, UNFACTORED (lbs.):	1192	1192	1192
D.L. TRIB. TO END OF PANEL, UNFACTORED (lbs.):	660	660	660
BASE OF NET PANEL UPLIFT, ULT (lbs.):	796	796	796
PANEL EDGE CONCRETE ANCHOR:	1/2in x 5in DeWALT 'Screw-Bolt+' Anchor		
ANCHOR ALLOWABLE TENSION, $\Phi N_n$ (lbs.):	4806	4806	4806
	OK	OK	OK

<b>'SIDEWALL B' TOTAL SHEAR FORCE, ASD, LBS.:</b>	<b>1685</b>	<b>(SHEETING DIAPHRAGM ACTION USED TO RESIST LOAD)</b>	
PANEL #:	1	2	
PANEL WIDTH (ft.):	17.50	20.00	
PANEL WIDTH RELATIVE STIFFNESS:	306.3	400	
HEIGHT (ft.):	14.00	14.00	
MAX. PANEL SHEAR FORCE, ASD (lbs.):	731	955	
PANEL SHEAR, ASD (plf):	42	48	
ALLOWABLE PANEL SHEAR, ASD (plf):	185	185	
	OK	OK	
MAX. BASE OF PANEL UPLIFT, UNFACTORED (lbs.):	974	1114	
D.L. TRIB. TO END OF PANEL, UNFACTORED (lbs.):	1050	1200	
BASE OF NET PANEL UPLIFT, ULT (lbs.):	344	394	
PANEL EDGE CONCRETE ANCHOR:	1/2in x 5in DeWALT 'Screw-Bolt+' Anchor		
ANCHOR ALLOWABLE TENSION, $\Phi N_n$ (lbs.):	4806	4806	
	OK	OK	

<b>'ROOF' TOTAL SHEAR FORCE, ASD, LBS.:</b>	<b>1123</b>	<b>(SHEETING DIAPHRAGM ACTION USED TO RESIST LOAD)</b>	
PANEL #:	1		
PANEL WIDTH (ft.):	70.00		
PANEL WIDTH RELATIVE STIFFNESS:	4900		
HEIGHT (ft.):	20.62		
MAX. PANEL SHEAR FORCE, ASD (lbs.):	1123		
PANEL SHEAR, ASD (plf):	16		
ALLOWABLE PANEL SHEAR, ASD (plf):	177		
	OK		
REACTION AT PANEL END, ASD:	331		

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**ROOF PURLIN DESIGN**

MEMBER SIZE USED -->		6in x 2.125/2.375in 14G ZEE				
	BAY #1	BAY #2	BAY #3	BAY #4	BAY #5	
SPAN (ft.):	9.83	15.00	15.00	15.00	14.83	
DOWNWARD LOAD TRIB. WIDTH (ft.):	4.87	4.87	4.87	4.87	4.87	
DOWNWARD DISTRIBUTED LOAD (lbs./ft.):	104	104	104	104	104	
UPWARD LOAD TRIB. WIDTH (ft.):	4.87	4.87	4.87	4.87	4.87	
UPWARD DISTRIBUTED LOAD (lbs./ft.):	40	40	40	40	40	
DESIGN DOWNWARD BENDING MOMENT, Mu (ft.-lbs.):	2097	4893	4893	4893	4785	
DESIGN DOWNWARD END SHEAR (lbs.):	511	781	781	781	773	
DESIGN UPWARD BENDING MOMENT, Mu (ft.-lbs.):	896	1865	1865	1865	1910	
DESIGN UPWARD END SHEAR (lbs.):	246	298	298	298	350	
PURLIN BRACING LOCATIONS:	---	M/S	M/S	M/S	M/S	
INSIDE FLANGE UNBRACED LENGTH (FT.):	9.67	7.50	7.50	7.50	7.33	
(Mn values from NASPEC Section C3.1) -->						
+Mn allow (ft.-lbs.):	5760	5760	5760	5760	5760	
-Mn allow (ft.-lbs.):	3237	4971	4971	4971	4971	
	OK	OK	OK	OK	OK	
DOWNWARD DEFLECTION (in.):	0.16	0.88	0.88	0.88	0.84	
	= (L/726)	= (L/204)	= (L/204)	= (L/204)	= (L/211)	
UPWARD DEFLECTION (in.):	0.06	0.33	0.33	0.33	0.32	
	(> L/1000)	= (L/535)	= (L/535)	= (L/535)	= (L/553)	
6in x 3.5in 16G Eave Strut Typ. OK						

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**WALL GIRT DESIGN**

<b>SIDEWALL 'A' AND 'B' GIRT DESIGN</b>					
MEMBER SIZE USED -->	4in x 2.125/2.375in 16G ZEE				
	<b>BAY #1</b>	<b>BAY #2</b>	<b>BAY #3</b>	<b>BAY #4</b>	<b>BAY #5</b>
BAY WIDTH (ft.):	15.00	15.00	15.00	15.00	14.83
MAX. GIRT SPAN (ft.):	15.00	15.00	15.00	15.00	14.83
TRIB. WIDTH (ft.):	4.67	4.67	4.67	4.67	
INWARD DISTRIBUTED LOAD (lbs./ft.):	50	50	50	50	
OUTWARD DISTRIBUTED LOAD (lbs./ft.):	55	55	55	55	
DESIGN INWARD BENDING MOMENT, Mu (ft.-lbs.):	2359	2359	2359	2359	
DESIGN INWARD END SHEAR (lbs.):	377	377	377	396	
DESIGN OUTWARD BENDING MOMENT, Mu (ft.-lbs.):	2587	2587	2587	2551	
DESIGN OUTWARD END SHEAR (lbs.):	413	413	413	434	
GIRT BRACING LOCATIONS:	1/3 PTS.	1/3 PTS.	1/3 PTS.	1/3 PTS.	
INSIDE FLANGE UNBRACED LENGTH (FT.):	5.00	5.00	5.00	4.94	
(Mn values from NASPEC Section C3.1) -->					
+Mn allow (ft.-lbs.):	2878	2878	2878	2878	
-Mn allow (ft.-lbs.):	2750	2750	2750	2750	
	OK	OK	OK	OK	
INWARD DEFLECTION (in.):	1.27	1.27	1.27	1.22	
	= (L/140)	= (L/140)	= (L/140)	= (L/145)	
OUTWARD DEFLECTION (in.):	1.40	1.40	1.40	1.34	
	= (L/128)	= (L/128)	= (L/128)	= (L/132)	

<b>ENDWALL 'A' GIRT DESIGN</b>	
MEMBER SIZE USED -->	
BAY WIDTH (ft.):	
MAX. GIRT SPAN (ft.):	
TRIB. WIDTH (ft.):	
INWARD DISTRIBUTED LOAD (lbs./ft.):	
OUTWARD DISTRIBUTED LOAD (lbs./ft.):	
DESIGN INWARD BENDING MOMENT, Mu (ft.-lbs.):	
DESIGN INWARD END SHEAR (lbs.):	
DESIGN OUTWARD BENDING MOMENT, Mu (ft.-lbs.):	
DESIGN OUTWARD END SHEAR (lbs.):	
GIRT BRACING LOCATIONS:	
INSIDE FLANGE UNBRACED LENGTH (FT.):	
(Mn values from NASPEC Section C3.1) -->	
+Mn allow (ft.-lbs.):	
-Mn allow (ft.-lbs.):	
INWARD DEFLECTION (in.):	
OUTWARD DEFLECTION (in.):	

<b>ENDWALL 'B' GIRT DESIGN</b>			
MEMBER SIZE USED -->	4in x 2.125/2.375in 16G ZEE		
	<b>BAY #1</b>	<b>BAY #2</b>	<b>BAY #3</b>
BAY WIDTH (ft.):	12.33	12.33	12.33
MAX. GIRT SPAN (ft.):	12.33	12.33	12.33
TRIB. WIDTH (ft.):	6.33	6.33	6.33
INWARD DISTRIBUTED LOAD (lbs./ft.):	62	62	62
OUTWARD DISTRIBUTED LOAD (lbs./ft.):	68	68	68
DESIGN INWARD BENDING MOMENT, Mu (ft.-lbs.):	1977	1957	1977
DESIGN INWARD END SHEAR (lbs.):	390	380	390
DESIGN OUTWARD BENDING MOMENT, Mu (ft.-lbs.):	2189	2167	2189
DESIGN OUTWARD END SHEAR (lbs.):	432	421	432
GIRT BRACING LOCATIONS:	M/S	M/S	M/S
INSIDE FLANGE UNBRACED LENGTH (FT.):	6.17	6.17	6.17
(Mn values from NASPEC Section C3.1) -->			
+Mn allow (ft.-lbs.):	2878	2878	2878
-Mn allow (ft.-lbs.):	2750	2750	2750
	OK	OK	OK
INWARD DEFLECTION (in.):	0.71	0.71	0.71
	= (L/206)	= (L/206)	= (L/206)
OUTWARD DEFLECTION (in.):	0.79	0.79	0.79
	= (L/186)	= (L/186)	= (L/186)

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**ENDWALL COLUMN DESIGN**

<b>LOCATION: ENDWALL 'A' (LEFT ENDWALL)</b>	
COLUMN #:	
END BAY (Y/N?):	
DISTANCE FROM BLDG. CORNER:	
BAY WIDTH TO SIDE 1 (ft.):	
BAY WIDTH TO SIDE 2 (ft.):	
MAX. ENDWALL COLUMN HT. (ft.):	
MAX. TRIB. WIDTH (ft.):	
MAX. DISTRIBUTED LOAD (plf):	
MAX DESIGN MOMENT, with $Q_f = 1.67$ (ft.-lbs.):	
V horiz. (lbs.):	
# OF #14 TOP END CONN. SCREWS:	
COMPOSITE DESIGN (Y/N)?	
ENDWALL COLUMN MEMBER -->	
DESIGN SECTION -->	
FLYBRACING ELEV. (ft.):	
INSIDE FLANGE UNBRACED LENGTH (FT.):	
(Mn values from NASPEC Section C3.1) -->	
+Mn allow =	
-Mn allow =	
DEFLECTION :	
DEFLECTION (L/?):	

<b>LOCATION: ENDWALL 'B' (RIGHT ENDWALL)</b>		
COLUMN #:	1-2	2-3
END BAY (Y/N?):	Y	Y
DISTANCE FROM BLDG. CORNER:	13.83	26.17
BAY WIDTH TO SIDE 1 (ft.):	13.83	12.33
BAY WIDTH TO SIDE 2 (ft.):	12.33	13.83
MAX. ENDWALL COLUMN HT. (ft.):	16.94	16.94
MAX. TRIB. WIDTH (ft.):	12.63	12.63
MAX. DISTRIBUTED LOAD (plf):	135	135
MAX DESIGN MOMENT, with $Q_f = 1.67$ (ft.-lbs.):	8098	8098
V horiz. (lbs.):	1145	1145
# OF #14 TOP END CONN. SCREWS:	5	5
COMPOSITE DESIGN (Y/N)?	N	N
ENDWALL COLUMN MEMBER -->	Sgl. 12in x 3.5in 14G CEE	Sgl. 12in x 3.5in 14G CEE
DESIGN SECTION -->	12in x 3.5in 14G CEE	12in x 3.5in 14G CEE
FLYBRACING ELEV. (ft.):	12.67	12.67
INSIDE FLANGE UNBRACED LENGTH (FT.):	12.67	12.67
(Mn values from NASPEC Section C3.1) -->		
+Mn allow =	14915	14915
-Mn allow =	9539	9539
DEFLECTION :	OK	OK
DEFLECTION (L/?):	0.29 L/691	0.29 L/691
	<b>OK</b>	<b>OK</b>





**FOUNDATION DESIGN**

CONCRETE STRENGTH (f'c): 2500 psi  
 REINF. YIELD STRENGTH: 60000 psi  
 ALLOW. SOIL PRESSURE: 1500 psf

**NOTE: FOOTING SHALL EXTEND BELOW LOCAL FROST DEPTH. CONSULT LOCAL BUILDING DEPARTMENT FOR REQUIREMENTS.**

**SIDEWALL CONTINUOUS FOOTING**

CONCRETE SLAB THICKNESS 4 in. (MIN.)  
 DEPTH OF FTG. BELOW GRADE 12 in. (MIN.)  
 DESIGN SOIL PRESSURE 1350 psf  
 FOOTING WIDTH 12 IN. (MIN.)  
 FOOTING DEPTH 12 IN. (MIN.)  
 DOWNWARD LOAD AT C.S. FRAME 4413 lbs.  
 FOOTING AREA REQUIRED 3.3 ft.^2  
 NET UPLIFT LOAD AT C.S. FRAME 1353 lbs. \*  
 NET UPLIFT FROM SIDEWALL X-BRACE 0 lbs.  
 DESIGN d top 10.0 in.  
 DESIGN d bottom 8.5 in.  
 LENGTH FTG. REQ'D. (DL+RLL) 3.3 ft. **OK**  
 LENGTH FTG. REQ'D (UPLIFT) 4.9 ft. **OK**

Mu DESIGN MOMENT (ft.-lbs.):

	TOP	BOTTOM
a=	1165	3065
	0.06	0.19
	0.03	0.11
	<b>0.20</b>	<b>0.20</b>

(ACTUAL MOMENT AT ANCHOR BOLT LOCATION = 832 FT.-LBS.,  
 f(t) top = 34 psi AND f(r) = 375 psi, THEREFORE DESIGN  
 ANCHOR BOLTS IN UNCRACKED CONCRETE (SEE CALC PG. F3)  
 (FROM A.C.I. FLEXURE TABLES)  
**OK**

**AREA OF REINF. REQUIRED:**  
**AREA OF REINF. PROVIDED:**

USE -----> **12" WIDE BY 12" DEEP FOOTING W/ (1)-#4 TOP AND (1)-#4 BTM.**

(NO SHEAR REINF. REQ'D)

**FOUNDATION DESIGN**

CONCRETE STRENGTH (f'c): 2500 psi  
 REINF. YIELD STRENGTH: 60000 psi  
 ALLOW. SOIL PRESSURE: 1500 psf

**NOTE: FOOTING SHALL EXTEND BELOW LOCAL FROST DEPTH. CONSULT LOCAL BUILDING DEPARTMENT FOR REQUIREMENTS.**

**ENDWALL CONTINUOUS FOOTING**

CONCRETE SLAB THICKNESS 4 in. (MIN.)  
 DEPTH OF FTG. BELOW GRADE 12 in. (MIN.)  
 DESIGN SOIL PRESSURE 1350 psf  
 FOOTING WIDTH 12 IN. (MIN.)  
 FOOTING DEPTH 12 IN. (MIN.)  
 DOWNWARD LOAD AT ENDWALL COLUMN 2206 lbs.  
 FOOTING AREA REQUIRED 1.6 ft.^2  
 NET UPLIFT LOAD FROM ENDWALL COLUMN 1905 lbs.  
 NET UPLIFT FROM ENDWALL X-BRACE 0 lbs.  
 DESIGN d top 10.0 in.  
 DESIGN d bottom 8.5 in.  
 LENGTH FTG. REQ'D. (DL+RLL) 1.6 ft. **OK**  
 LENGTH FTG. REQ'D (UPLIFT) 6.9 ft. **OK**

Mu DESIGN MOMENT (ft.-lbs.):

**AREA OF STEEL REQ.**  
**AREA OF STL. PROVIDED**

	TOP	BOTTOM
a=	2309	766
	0.12	0.05
	0.07	0.03
	<b>0.20</b>	<b>0.20</b>

(ACTUAL MOMENT AT ANCHOR BOLT LOCATION = 1649 FT.-LBS.,  
 f(t) top = 68 psi AND f(r) = 375 psi, THEREFORE DESIGN  
 ANCHOR BOLTS IN UNCRACKED CONCRETE (SEE CALC PG. F4)  
 (FROM A.C.I. FLEXURE TABLES)  
**OK**

USE -----> **12" WIDE BY 12" DEEP FOOTING W/ (1)-#4 TOP AND (1)-#4 BTM.**

(NO SHEAR REINF. REQ'D)

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**CONCRETE ANCHOR DESIGN PER ACI 318-19, CHAPTER 17**

ANCHOR LOCATION: SIDEWALL C.S. FRAME COLUMNS

**DESIGN LOADS (from RISA analysis),**

**ALLOWABLE STRESS LEVELS :**

	SIDE #1	SIDE #2
D.L. SHEAR FORCE (LBS.), POSITIVE SHEAR LOADS ARE TOWARD EDGE OF SLAB:	<b>330</b>	<b>330</b>
D.L. VERTICAL FORCE (LBS.):	<b>-863</b>	<b>-863</b>
F.L.L. SHEAR FORCE (LBS.):	<b>0</b>	<b>0</b>
F.L.L. VERTICAL FORCE (LBS.):	<b>0</b>	<b>0</b>
RLL SHEAR FORCE (LBS.):	<b>1280</b>	<b>1280</b>
RLL VERTICAL FORCE (LBS.):	<b>-3348</b>	<b>-3348</b>
SL SHEAR FORCE (LBS.):	<b>747</b>	<b>747</b>
SL VERTICAL FORCE (LBS.):	<b>-1953</b>	<b>-1953</b>
WIND L-R SHEAR FORCE (LBS.):	<b>-1755</b>	<b>404</b>
WIND L-R VERTICAL FORCE (LBS.):	<b>2410</b>	<b>1502</b>
WIND R-L SHEAR FORCE (LBS.):	<b>404</b>	<b>-1755</b>
WIND R-L VERTICAL FORCE (LBS.):	<b>1502</b>	<b>2410</b>
SEISMIC SHEAR FORCE (LBS.):	<b>339</b>	<b>-339</b>
SEISMIC VERTICAL FORCE (LBS.):	<b>-211</b>	<b>211</b>

CONCRETE ANCHOR		
MANUFACTURER AND TYPE: DEWALT 'SCREW-BOLT+' ANCHOR		
(VALUES FROM ESR-3889 REPORT, EFF. THRU 11/2023)		
STEEL CONCRETE ANCHOR		
TENSILE STRENGTH:	115000	PSI
NORMAL WT. CONCRETE		
STRENGTH (f'c):	2500	PSI
CONCRETE ANCHOR TENSION REINFORCING PROVIDED?		
	<b>N</b>	
CONCRETE ANCHOR SHEAR REINFORCING PROVIDED?		
	<b>N</b>	

	(Eqn. 9-2) (9-2a.2)	(Eqn. 9-3) (9-3c.2)	(Eqn. 9-4) (9-4a.2)	(Eqn. 9-5) (9-5a.1)	(Eqn. 9-6) (9-6b.2)	(Eqn. 9-7) (9-7a.1)
ACI 318-19 Table 5.3.1:						
GOVERNING LOAD COMB. EQUATION:						
ULT. SHEAR FORCE (LBS.), Vu:	<b>1036</b>	<b>2571</b>	<b>1288</b>	<b>1030</b>	<b>-1458</b>	<b>781</b>
ULT. TENSION FORCE (LBS.), Tu:	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1634</b>	<b>0</b>

**CONCRETE ANCHOR TYPE (diam. x length):**

	<b>.5X3.0</b>					
CONCRETE ANCHOR DIAM. (IN.):	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>
CONCRETE ANCHOR LENGTH (IN.):	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>
NUMBER OF CONCRETE ANCHORS:	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
SPECIAL INSPECTION REQUIRED?	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>
X' CONCRETE ANCHOR SPACING:	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>
EFFECTIVE EMBEDMENT:	<b>2.17</b>	<b>2.17</b>	<b>2.17</b>	<b>2.17</b>	<b>2.17</b>	<b>2.17</b>
LOAD EDGE DISTANCE, c1:	<b>7.00</b>	<b>7.00</b>	<b>7.00</b>	<b>7.00</b>	<b>36.00</b>	<b>7.00</b>
PERP. EDGE DISTANCE, c2:	<b>48.0</b>	<b>48.0</b>	<b>48.0</b>	<b>48.0</b>	<b>48.0</b>	<b>48.0</b>
DEPTH OF CONCRETE EDGE (IN.):	<b>12.0</b>	<b>12.0</b>	<b>12.0</b>	<b>12.0</b>	<b>12.0</b>	<b>12.0</b>
CRACKED CONCRETE CONDITION (Y/N)?	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>

e eccentricity (IN.) =	0.00	0.00	0.00	0.00	0.00	0.00
psi [ec,N] ((Eqn. 17.4.2.5a) =	1.00	1.00	1.00	1.00	1.00	1.00
psi [ed,N] ((Eqn. 17.4.2.7a, 17.4.2.7b) =	1.00	1.00	1.00	1.00	1.00	1.00
psi [c,N] ((Sec. 17.4.2.6) =	1.40	1.40	1.40	1.40	1.40	1.40
psi [cp,N] (Eqn.17.4.2.7b, 17.4.3.1) =	1.00	1.00	1.00	1.00	1.00	1.00
psi [c,P] (Sec. 17.4.3.6) =	1.40	1.40	1.40	1.40	1.40	1.40
V eccentricity (IN.) =	0.00	0.00	0.00	0.00	0.00	0.00
psi [ec,V] (Eqn. 17.5.2.5) =	1.00	1.00	1.00	1.00	1.00	1.00
psi [ed,V] (Eqn. 17.5.2.6a, 17.5.2.6b) =	1.00	1.00	1.00	1.00	0.97	1.00
psi [c,V] (Sec. 17.5.2.7) =	1.40	1.40	1.40	1.40	1.40	1.40
ANo (IN.^2) =	42.4	42.4	42.4	42.4	42.4	42.4
AN (IN.^2) =	42.4	42.4	42.4	42.4	42.4	42.4
Nb (LBS.) =	3836	3836	3836	3836	3836	3836
Ncbg (LBS.) =	5370	5370	5370	5370	5370	5370
Ns (LBS.) =	40950	40950	40950	40950	40950	40950
Npn (LBS.) =	0	0	0	0	0	0
SEISMIC TENSION DUCTILITY FACTOR:	1.00	1.00	1.00	0.40	1.00	0.40
<b>ΦNn (LBS.) =</b>	<b>5370</b>	<b>5370</b>	<b>5370</b>	<b>2148</b>	<b>5370</b>	<b>2148</b>
	0.00%	0.00%	0.00%	0.00%	30.42%	0.00%
Avc (IN.^2) =	304.5	304.5	304.5	304.5	1320.0	304.5
Avco (IN.^2) =	220.5	220.5	220.5	220.5	5832.0	220.5
Vb (LBS.) =	6147	6147	6147	6147	71698	6147
Vcbg (LBS.) =	11885	11885	11885	11885	21962	11885
Vs (LBS.) =	17720	17720	17720	17720	17720	17720
SEISMIC SHEAR DUCTILITY FACTOR:	1.00	1.00	1.00	0.40	1.00	0.40
<b>ΦVn (LBS.) =</b>	<b>11885</b>	<b>11885</b>	<b>11885</b>	<b>4754</b>	<b>17720</b>	<b>4754</b>
	8.72%	21.63%	10.84%	21.66%	8.23%	16.43%
MAX. UNITY VALUE (Sec. 17.6):	0.09	0.22	0.11	0.22	0.30	0.16

MAX. UNITY: 0.30

**USE ----> (2) - 1/2" DIAM. X 3" LONG DEWALT 'SCREW-BOLT+' ANCHOR CONCRETE ANCHORS IN 3.5 IN. DEEP HOLES**

(SIDEWALL CONCRETE ANCHOR DESIGN GOVERNS AT THIS LOCATION)

**CONCRETE ANCHOR DESIGN PER ACI 318-19, CHAPTER 17**

ANCHOR LOCATION: ENDWALL COLUMNS

**DESIGN LOADS AT**

**ALLOWABLE STRESS LEVELS :**

D.L. SHEAR FORCE (LBS.), POSITIVE SHEAR LOADS ARE TOWARD EDGE OF SLAB:	<b>1</b>
D.L. TENSION FORCE (LBS.):	<b>-321</b>
F.L.L. SHEAR FORCE (LBS.):	<b>0</b>
F.L.L. TENSION FORCE (LBS.):	<b>0</b>
SL (RLL) SHEAR FORCE (LBS.):	<b>0</b>
SL (RLL) TENSION FORCE (LBS.):	<b>-2138</b>
WIND SHEAR FORCE (LBS.):	<b>1145</b>
WIND TENSION FORCE (LBS.):	<b>1086</b>
SEISMIC SHEAR FORCE (LBS.):	<b>12</b>
SEISMIC TENSION FORCE (LBS.):	<b>0</b>

CONCRETE ANCHOR  
MANUFACTURER AND TYPE: DEWALT 'SCREW-BOLT+' ANCHOR  
(VALUES FROM ESR-3889 REPORT, EFF. THRU 11/2023)

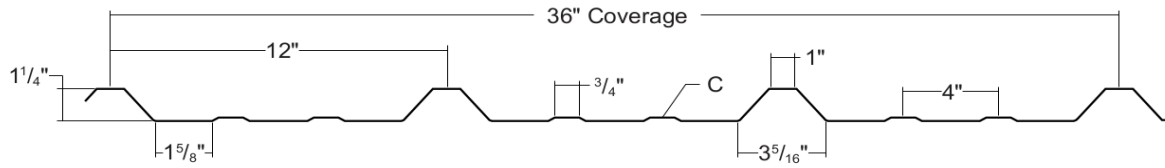
STEEL ANCHOR TENSILE STRENGTH:	115000	PSI
NORMAL WT. CONCRETE STRENGTH:	2500	PSI
ANCHOR TENSION REINFORCING PROVIDED?	N	
ANCHOR SHEAR REINFORCING PROVIDED?	N	

ACI 318-19 Table 5.3.1:	(EQ. 9-2)	(EQ. 9-3)	(EQ. 9-4)	(EQ. 9-5)	(EQ. 9-6)	(EQ. 9-7)
ULT. SHEAR FORCE (LBS.), Vu:	<b>1</b>	<b>917</b>	<b>1146</b>	<b>13</b>	<b>1145</b>	<b>13</b>
ULT. TENSION FORCE (LBS.), Tu:	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>797</b>	<b>0</b>
<b>ANCHOR TYPE (diam. x length):</b>	<b>.5X3.0</b>					
ANCHOR DIAM. (IN.):	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>
ANCHOR LENGTH (IN.):	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>
NUMBER OF ANCHORS:	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
SPECIAL INSPECTION REQUIRED?	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>
X' ANCHOR SPACING:	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>	<b>8.00</b>
EFFECTIVE EMBEDMENT:	<b>2.17</b>	<b>2.17</b>	<b>2.17</b>	<b>2.17</b>	<b>2.17</b>	<b>2.17</b>
LOAD EDGE DISTANCE, c1:	<b>6.00</b>	<b>6.00</b>	<b>6.00</b>	<b>6.00</b>	<b>6.00</b>	<b>6.00</b>
PERP. EDGE DISTANCE, c2:	<b>48.00</b>	<b>48.00</b>	<b>48.00</b>	<b>48.00</b>	<b>48.00</b>	<b>48.00</b>
DEPTH OF CONCRETE EDGE (IN.):	<b>12.0</b>	<b>12.0</b>	<b>12.00</b>	<b>12.00</b>	<b>12.00</b>	<b>12.00</b>
CRACKED CONCRETE CONDITION (Y/N)?	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>
e eccentricity (IN.) =	0.00	0.00	0.00	0.00	0.00	0.00
psi [ec,N] ((Eqn. 17.4.2.5a) =	1.00	1.00	1.00	1.00	1.00	1.00
psi [ed,N] ((Eqn. 17.4.2.7a, 17.4.2.7b) =	1.00	1.00	1.00	1.00	1.00	1.00
psi [c,N] ((Sec. 17.4.2.6) =	1.40	1.40	1.40	1.40	1.40	1.40
psi [cp,N] (Eqn.17.4.2.7b, 17.4.3.1) =	1.00	1.00	1.00	1.00	1.00	1.00
psi [c,P] (Sec. 17.4.3.6) =	1.40	1.40	1.40	1.40	1.40	1.40
V eccentricity (IN.) =	0.00	0.00	0.00	0.00	0.00	0.00
psi [ec,V] (Eqn. 17.5.2.5) =	1.00	1.00	1.00	1.00	1.00	1.00
psi [ed,V] (Eqn. 17.5.2.6a, 17.5.2.6b) =	0.73	0.73	0.73	0.73	0.73	0.73
psi [c,V] (Sec. 17.5.2.7) =	1.40	1.40	1.40	1.40	1.40	1.40
ANo (IN.^2) =	42.4	42.4	42.4	42.4	42.4	42.4
AN (IN.^2) =	42.4	42.4	42.4	42.4	42.4	42.4
Nb (LBS.) =	3836	3836	3836	3836	3836	3836
Ncbg (LBS.) =	5370	5370	5370	5370	5370	5370
Ns (LBS.) =	40950	40950	40950	40950	40950	40950
Npn (LBS.) =	0	0	0	0	0	0
SEISMIC TENSION DUCTILITY FACTOR:	1.00	1.00	1.00	0.40	1.00	0.40
<b>ΦNn (LBS.) =</b>	<b>5370</b>	<b>5370</b>	<b>5370</b>	<b>2148</b>	<b>5370</b>	<b>2148</b>
	0.00%	0.00%	0.00%	0.00%	14.85%	0.00%
Avc (IN.^2) =	234.0	234.0	234.0	234.0	234.0	234.0
Avco (IN.^2) =	162.0	162.0	162.0	162.0	162.0	162.0
Vb (LBS.) =	4878	4878	4878	4878	4878	4878
Vcbg (LBS.) =	7152	7152	7152	7152	7152	7152
Vs (LBS.) =	17720	17720	17720	17720	17720	17720
SEISMIC SHEAR DUCTILITY FACTOR:	1.00	1.00	1.00	0.40	1.00	0.40
<b>ΦVn (LBS.) =</b>	<b>7152</b>	<b>7152</b>	<b>7152</b>	<b>2861</b>	<b>7152</b>	<b>2861</b>
	0.01%	12.82%	16.02%	0.45%	16.01%	0.44%
MAX. UNITY VALUE (Sec. 17.6):	0.00	0.13	0.16	0.00	0.16	0.00
MAX. UNITY:	0.16					
USE ---->	<b>(2) - 1/2" DIAM. X 3" LONG DEWALT 'SCREW-BOLT+' ANCHOR ANCHORS IN 3.5 IN. DEEP HOLES</b>					

(ENDWALL ANCHOR DESIGN GOVERNS AT THIS LOCATION)

# PBR-PANEL

**Condensed  
Technical  
Reference**



SECTION PROPERTIES								ALLOWABLE UNIFORM LIVE LOADS, psf For various fastener spacings													
Ga	Width in	Yield ksi	Weight psf	Top in Compression		Bottom in Compression		Inward Load							Outward Load						
				I <sub>xx</sub> in <sup>3</sup> /ft	S <sub>xx</sub> in <sup>3</sup> /ft	I <sub>xx</sub> in <sup>3</sup> /ft	S <sub>xx</sub> in <sup>3</sup> /ft	2'	3'	4'	5'	6'	7'	2'	3'	4'	5'	6'	7'		
26	36	80	0.84	0.0367	0.0367	0.0317	0.0458	261	129	76	49	35	23	223	107	62	40	28	21		
24	36	50	1.09	0.0560	0.0579	0.0457	0.0613	330	153	88	57	39	29	314	145	83	53	37	27		
22	36	50	1.43	0.0800	0.0860	0.0633	0.0816	453	207	118	76	53	39	474	217	124	80	55	41		

- Theoretical section properties have been calculated per AISI 2016 'North American Specification for the Design of Cold-Formed Steel Structural Members'. I<sub>xx</sub> and S<sub>xx</sub> are effective section properties for deflection and bending.
- Allowable load is calculated in accordance with AISI 2016 specifications considering bending, shear, combined bending and shear & deflection. Allowable load does not address web crippling, fasteners, support material or load testing. Allowable load considers the three or more equal spans condition. Panel weight is not considered.
- Deflection consideration is limited by a maximum deflection ratio of L/180 of span.
- Allowable loads do not include a 1/3 stress increase for wind.

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## TESTING AND APPROVALS

- ▶ UL 2218 Impact Resistance - Class 4
- ▶ UL 790 Fire Resistance Rating - Class A, per building code
- ▶ UL 263 Fire Resistance Rating - per assembly
- ▶ ASTM E 1592 Structural Performance
- ▶ UL 580 Uplift Resistance - Class 90 Construction: #161
- ▶ Texas Windstorm - Evaluations RC-198, RC-265 and RC-279
- ▶ 2020 FBC Approvals - FL9482.4, FL 10999.7 and FL14645.12
- ▶ Miami-Dade County, Florida NOA 20-0331.02 - Wall expires 4/22/2025
- ▶ Miami-Dade County, Florida NOA 20-0331.03 - Roof expires 6/2/2025
- ▶ ICC Evaluation Report - ESR-2385



**SCREW CONNECTION DESIGN**

NOTATIONS

- ds = Nominal screw diameter (in.)
- $\Omega$  Omega = 3.0
- Pns = Nominal shear strength per screw (lbs.)
- Pnt = Nominal tension strength per screw (lbs.)
- Pnot = Nominal pull-out strength per screw (lbs.)
- Pnov = Nominal pull-over strength per screw (lbs.)
- g1 = nominal gauge of member in contact with the screw head (in.)
- t1 = Thickness of member in contact with the screw head (in.)
- g2 = nominal gauge of member NOT in contact with the screw head (in.)
- t2 = Thickness of member NOT in contact with the screw head (in.)
- Fu1 = Tensile strength of member in contact with the screw head (lbs.)
- Fu2 = Tensile strength of member NOT in contact with the screw head (lbs.)

ROOF PANEL (PBR-Panel 26G)

g1 =	26
g2 =	14
t1 =	0.0179
t2 =	0.0747
Fu1 =	80000
Fu2 =	67000
Screw # =	12
ds (in.) =	0.216

WALL PANEL (PBR-Panel 26G)

g1 =	26
g2 =	16
t1 =	0.0179
t2 =	0.057
Fu1 =	80000
Fu2 =	67000
Screw # =	12
ds (in.) =	0.216

ALLOWABLE SHEAR BASED ON CONNECTED MATERIALS:

t2/t1 = 4.17

t2/t1 = 3.18

Pns (eq. E4.3.1-4) = 835

Pns (eq. E4.3.1-4) = 835

Allowable Shear per Screw ( $\Omega$  Omega = 3.0): 278

Allowable Shear per Screw = 278

ALLOWABLE SHEAR BASED ON SCREW:

Allowable Shear per Screw = 625

Allowable Shear per Screw = 625

**Design Shear per Screw = 278**

**Design Shear per Screw = 278**

ALLOWABLE TENSION BASED ON CONNECTED MATERIALS:

Pullout Strength, Pnot (eq. E4.4.1.1) = 919

701

Pullover Strength, Pnov (eq. E4.4.2.1) = 537

537

Allowable Tension per Screw (lbs.) = **179**

**179**

Nominal Screw Tension Strength (lbs) = 860

860