From: Brian Gaudet <BGaudet@allpointstech.com>
Sent: Wednesday, November 11, 2020 5:31 PM
To: CSC-DL Siting Council <Siting.Council@ct.gov>
Cc: Mike Libertine <mlibertine@allpointstech.com>; Lord, Andrew <andrew.lord@eversource.com>; Shanley, Kathleen M <kathleen.shanley@eversource.com>
Subject: RE: Notice of Exempt Modification - Eversource - 7 Hoskins Road (AKA 5 St. Andrews Road), Bloomfield, CT 06002 - Filing/Electronic Copy

Good evening,

After speaking with Ifeanyi regarding a previous site that was deemed incomplete due to the need for a Mount Analysis, we would like to submit a supplemental Mount Analysis that was performed for this site. Please see attached and let me know if you have any questions.

Best Regards,

Brian Gaudet
Project Manager

D: 860.581.4482
M: 860.798.6597
E: bgaudet@allpointstech.com

All-Points Technology Corporation, P.C.
567 Vauxhall Street Extension – Suite 311
Waterford, CT 06385

Please note our new corporate office address

From: Brian Gaudet
Sent: Wednesday, November 4, 2020 12:12 PM
To: 'CSC-DL Siting Council' <Siting.Council@ct.gov>
Cc: Mike Libertine <mlibertine@allpointstech.com>; 'Lord, Andrew' <andrew.lord@eversource.com>; 'Shanley, Kathleen M' <kathleen.shanley@eversource.com>
Subject: Notice of Exempt Modification - Eversource - 7 Hoskins Road (AKA 5 St. Andrews Road), Bloomfield, CT 06002 - Filing/Electronic Copy

Good Afternoon,

Please see attached the Notice of Exempt Modification for proposed modifications by Eversource on an existing self-support tower at 7 Hoskins Road (AKA 5 St. Andrews Road) in Bloomfield. Feel free to reach out to me with any questions or if anything further is needed from our end.

Best Regards,

EVERSOURCE ENERGY

BLACK & VEATCH
Building a world of difference.
BLACK & VEATCH CORPORATION
6800 W 115TH ST, SUITE 2292, OVERLAND PARK, KS 66211
+1 913-458-2522 | RILEYJJ@BV.COM

November 11, 2020

MOUNT EVALUATION LETTER

Site Number: ES-038
Site Name: TALCOTTRS
Site Data: 5 St Andrews Road
Bloomfield, CT 06002
Latitude: 41° 53' 33.6"
Longitude: -72° 45' 56.5"

Black & Veatch Corporation is pleased to submit this "Mount Evaluation Letter" to determine the structural integrity of antenna mounting system on the above-mentioned site. The purpose of this evaluation is to determine the capacity of the system in supporting the final loading in the attached "Loading Summary".

Based on our evaluation we have determined the antenna mounting system to be: **SUFFICIENT**

Structure Rating (max from all components) =	99.7%

The existing mounting system will be capable of supporting the existing and proposed equipment, under the assumptions described in Section 4 of the report and the following conditions:

- Contractor shall be responsible for the means and methods of construction.
- Contractor shall inspect the condition of all existing and proposed structural members, all relevant members and connections and report any deficiencies to the engineer prior to installation of any new antennas and other equipment.

The scope of this evaluation pertains only to the existing antenna mounting system and does not include examination of the loads imparted by the antenna mounting system to the existing tower and its structural components. This document was prepared based on information provided to Black & Veatch. If existing conditions do not reflect those represented, this analysis is no longer valid.

Please contact Josh Riley in our Overland Park Office
at 913-458-2522 if you have any questions or comments.

Sincerely,
Black & Veatch Corporation

Prepared By: Joohwan Jung
Submitted By: Josh Riley, P.E.

11/11/2020

TABLE OF CONTENTS

1. LOADING SUMMARY

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
Eversource	3	-	190.8	183	1	Omni	dbSpectra	DS2C03F36D-D
DESPP	1	-	190	183	1	Omni	dbSpectra	DS7C09P36D-D
DESPP	1, 4	-	176	183	1	Omni	dbSpectra	DS7C09P36D-D

2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 130 mph
WIND SPEED WITH ICE	50 mph with 2" radial ice thickness
EXPOSURE CATEGORY	B
RISK CATEGORY	III
TOPO CATEGORY	Ridge
CREST HEIGHT	200 ft
SPECTRAL RESPONSE FACTORS, Ss & S1	0.178 g & 0.064 g

3. REFERENCES

- American Institute of Steel Construction, AISC 15th Edition
- Telecommunications Industry Association Standard, TIA-222-H & 2018 Connecticut State Building Code
- Antenna Mount Assembly Drawing (Model: VFA10-HD) by SitePro 1, dated 01/25/2017

4. ASSUMPTIONS

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch should be notified to determine the effect on the structural integrity of the antenna mounting system.

- The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- The configuration of antennas, mounts, and other appurtenances are as specified in the Loading Summary and the referenced drawings.
- All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- Sector frame center line: located equidistant between top & bottom boom; Platform center line: located at the base perimeter of platform, unless otherwise specified.
- Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR B-35)
Connection Bolts	ASTM A325

- Mount is to be installed per manufacturer's recommendations.

5. RESULTS SUMMARY

Name	Bending Stress Ratio		Shear Stress Ratio	
Boom: Pipe 2.5 Std	46.2%	Pass	25.2%	Pass
Arm: Pipe 2.0 Std	40.4%	Pass	33.7%	Pass
Arm Vertical Brace: SR 5/8_HRA	86.3%	Pass	1.6%	Pass
Arm Connecting Plate: PL 3.5x5/8"	74.4%	Pass	22.4%	Pass
Arm Diagonal Brace: SR3/4	26.3%	Pass	3.9%	Pass
Stiff Arm: Pipe 2.0 Std	10.2%	Pass	0.7%	Pass
Mount Pipe: Pipe 2.0 Std	99.7%	Pass**	38.6%	Pass
Proposed Mount Pipe 2.5: Pipe 2.5 Std	60.1%	Pass	30.5%	Pass
*Von Mises SR**				
5/8" thick Gusset Plate (P86)	28.8%	Pass		

*Von Mises SR = (Max Von Mises Value From RISA-3D)/(0.9*Fy)

**Capacity rating per TIA-222-H Section 15.5.

APPENDIX 1:
MOUNT ANALYSIS REPORT

Dead and Live Loads

Maintenance Live Load: L_V = 250 lb
Installation Live Load: L_M = 500 lb

Appurtenance Dead Loads	
Name	Weight (lb)
DS7C09P36U-D	68
DS2C03F36D-D	75

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: TALCOTTRS (ES-038)		Date: 11/11/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 11/11/2020

Appurtenance Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Basic Wind Speed, V =	130	mph		
Height Above Ground, z =	192.3	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	200 ft	ft		
Velocity Pressure Coefficient, K_z =	1.19		$K_e = e^{-0.000032 z s}$	2.6.8
Topographic Factor, K_{zt} =	1.23			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factor, K_e =	0.985		$F_A = q_z G_h (EPA)$	2.6.11.2
Wind Velocity Pressure, q_z =	59.08	psf		
Gust Effect Factor, G_h =	1.00		$F_M = q_z G_h C_f D_p$	2.6.11.2

Appurtenance Wind Loads

Name	Height (ft)	Width (ft)	Depth (ft)	Normal			Tangential		
				C_a	EPA FT2	F_A (lb)	C_a	EPA FT2	F_A (lb)
DS7C09P36U-D	14.20	0.25	0.25	2.00	6.39	377.53	2.00	6.39	377.53
DS2C03F36D-D	18.50	0.25	0.25	2.00	8.33	491.85	2.00	8.33	491.85

Client:	Eversource	Computed By:	Joohwan Jung
Site Name:	TALCOTTRS (ES-038)	Date:	11/11/2020
		Verified By:	JW
Title:	MOUNT ANALYSIS REPORT	Date:	11/11/2020

BLACK & VEATCH

Member Wind Loading

Exposure Category =	B		
Risk Category =	III		
Topographic Category =	1		
Basic Wind Speed, V =	130	mph	
Height Above Ground, z =	192.3	ft	
Crest Height, H =	200 ft	ft	
Velocity Pressure Coefficient, K_z =	1.19		
Topographic Factor, K_{zt} =	1.23		
Wind Directionality Factor, K_d =	0.95		
Shielding Factor, K_a =	0.90		
Ground Elevation Factor, K_e =	0.985		
Wind Velocity Pressure, q_z =	59.08	psf	
Gust Effect Factor, G_h =	1.00		

Equations

	TIA-222-H
$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
$K_e = e^{-0.000032 \cdot zs}$	2.6.8
$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
$F_A = q_z G_h (EPA)$	2.6.11.2
$F_M = q_z G_h C_f D_p$	2.6.11.2

Member Wind Loads

Name	Depth (ft)	Width (ft)	C_f	D_p (ft)	F_M (lb)
Boom: Pipe 2.5 Std	0.24		1.2	0.24	16.99
Arm: Pipe 2.0 Std	0.20		1.2	0.20	14.03
Arm Vertical Brace: SR 5/8_HRA	0.05		1.2	0.05	3.69
Arm Connecting Plate: PL 3.5x5/8"	0.05	0.29	2	0.05	6.15
Arm Diagonal Brace: SR3/4	0.06		1.2	0.06	4.43
Stiff Arm: Pipe 2.0 Std	0.20		1.2	0.20	14.03
Mount Pipe: Pipe 2.0 Std	0.20		1.2	0.20	14.03
Proposed Mount Pipe 2.5: Pipe 2.5 Std	0.24		1.2	0.24	16.99

Appurtenance Ice Dead Loading

			Equations	TIA-222-H
Exposure Category =	B			
Risk Category =	III		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Topographic Category =	1			
Height Above Ground, z =	192.3	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	200 ft	ft		
Design Ice Thickness, T_i =	2.00	in	$K_{iz} = (z/33)^{0.10}$	2.6.10
Importance Factor, I =	1.15			
Topographic Factor, K_{zt} =	1.23		$T_{iz} = T_i I K_{iz}(K_{zt})^{0.35}$	2.6.10
Height Escalation Factor, K_{iz} =	1.19			
Factored Ice Thickness, T_{iz} =	2.95	in	$DL_{ice}=[(H_{ice}*D_{ice}*W_{ice}) - (H*W*D)]*56pcf$	
Grating Ice Dead Load, D_{Gice} =	13.74	psf		

Appurtenance Ice Dead Loads

Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V_{ice} (ft^3)	DL_{ice} (lb)
DS7C09P36U-D	14.69	0.74	0.74	7.18	401.88
DS2C03F36D-D	18.99	0.74	0.74	9.27	519.01

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: TALCOTTRS (ES-038)		Date: 11/11/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 11/11/2020

Member Ice Dead Loading

Exposure Category =	B	
Risk Category =	III	
Topographic Category =	1	
Height Above Ground, z =	192.3	ft
Crest Height, H =	200 ft	ft
Design Ice Thickness, T_i =	2.00	in
Importance Factor, I =	1.15	
Topographic Factor, K_{zt} =	1.23	
Height Escalation Factor, K_{iz} =	1.19	
Factored Ice Thickness, T_{iz} =	2.95	in
Grating Ice Dead Load, D_{Gice} =	13.74	psf

Equations

	TIA-222-H
$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
$K_{iz} = (z/33)^{0.10}$	2.6.10
$T_{iz} = T_i I K_{iz} (K_{zt})^{0.35}$	2.6.10
Aiz = pi*Tiz*(Dc+Tiz)	2.6.10
DL_{ice}=Aiz*56pcf	

Member Ice Dead Loads

Name	Depth w/ ice (ft)	Width w/ ice (ft)	Dc (ft)	Aiz (ft^2)	DL_{ice} (lb/ft)
Boom: Pipe 2.5 Std	0.73		0.24	0.37	20.94
Arm: Pipe 2.0 Std	0.69		0.20	0.34	19.14
Arm Vertical Brace: SR 5/8_HRA	0.54		0.05	0.23	12.85
Arm Connecting Plate: PL 3.5x5/8"	0.54	0.78	0.30	0.42	23.39
Arm Diagonal Brace: SR3/4	0.55		0.06	0.24	13.30
Stiff Arm: Pipe 2.0 Std	0.69		0.20	0.34	19.14
Mount Pipe: Pipe 2.0 Std	0.69		0.20	0.34	19.14
Proposed Mount Pipe 2.5: Pipe 2.5 Std	0.73		0.24	0.37	20.94

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: TALCOTTRS (ES-038)		Date: 11/11/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 11/11/2020

Appurtenance Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	50	mph		
Height Above Ground, z =	192.3	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	200 ft	ft		
Velocity Pressure Coefficient, K_z =	1.19	psf	$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.23			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factory, K_e =	0.985		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	8.740			
Factored Ice Thickness, T_{iz} =	2.95	in	$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$	2.6.11.2
Gust Effect Factor, G_h =	1			

Appurtenance Ice Wind Loads

Name	Height w/ Ice (ft)	Width w/ Ice (ft)	Depth w/ Ice (ft)	Normal			Tangential		
				C_a	EPA FT2	F_A (lb)	C_a	EPA FT2	F_A (lb)
DS7C09P36U-D	14.69	0.74	0.74	-	12.98	113.40	-	12.98	113.40
DS2C03F36D-D	18.99	0.74	0.74	-	18.46	161.33	-	18.46	161.33

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: TALCOTTRS (ES-038)		Date: 11/11/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 11/11/2020

Member Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	50	mph		
Height Above Ground, z =	192.3	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	200 ft	ft		
Velocity Pressure Coefficient, K_z =	1.19	psf	$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.23			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factory, K_e =	0.985		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	8.740			
Factored Ice Thickness, T_{iz} =	2.95	in	$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$	2.6.11.2
Gust Effect Factor, G_h =	1			

Member Ice Wind Loads

Name	Depth w/ Ice (ft)	Width w/ Ice (ft)	C_f	$D_{p(ice)}$ (ft)	$F_{M(ice)}$ (lb/ft)
Boom: Pipe 2.5 Std	0.73		1.2	0.73	7.66
Arm: Pipe 2.0 Std	0.69		1.2	0.69	7.22
Arm Vertical Brace: SR 5/8_HRA	0.54		1.2	0.54	5.69
Arm Connecting Plate: PL 3.5x5/8"	0.54	0.78	2	0.54	9.49
Arm Diagonal Brace: SR3/4	0.55		1.2	0.55	5.80
Stiff Arm: Pipe 2.0 Std	0.69		1.2	0.69	7.22
Mount Pipe: Pipe 2.0 Std	0.69		1.2	0.69	7.22
Proposed Mount Pipe 2.5: Pipe 2.5 Std	0.73		1.2	0.73	7.66

BLACK & VEATCH	Client:	Eversource	Computed By: Joohwan Jung
	Site Name:	TALCOTTRS (ES-038)	Date: 11/11/2020
			Verified By: JW
	Title:	MOUNT ANALYSIS REPORT	Date: 11/11/2020

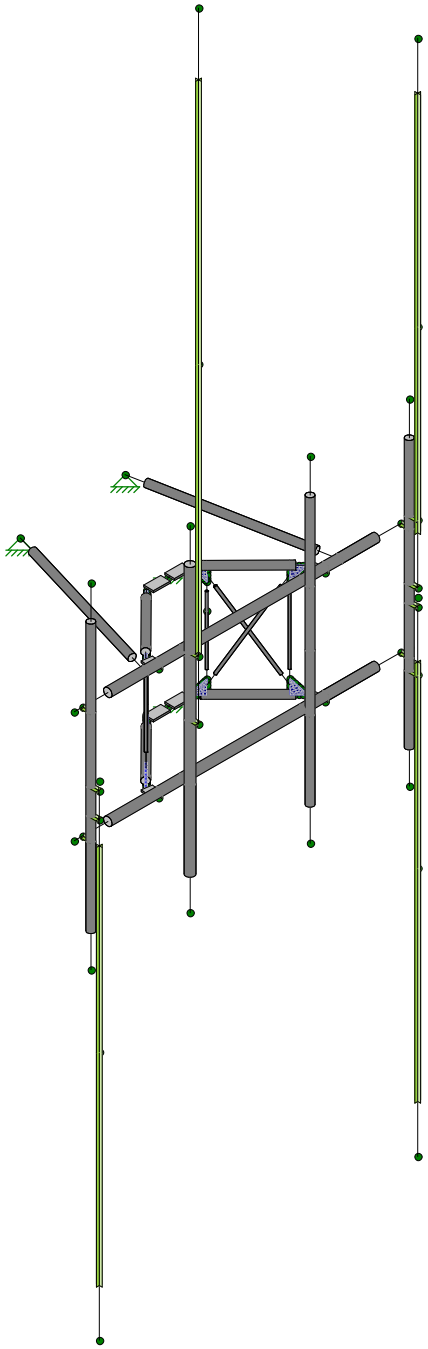
Seismic Loading

			Equations	TIA-222-H
Site Class =	D			
Spectral Response, S_s =	0.178	g	$S_{D1} = 2/3\ F_v S_1$	2.7.5
Max Spectral Response, S_1 =	0.064	g	$S_{DS} = 2/3\ F_a S_s \geq S_{D1}$	2.7.5
Accel. Site Coefficient, F_a =	1.60			
Vel. Site Coefficient, F_v =	2.40		$C_s = 1/2\ S_{DS}\ I \geq 0.03$	2.7.7.1.1
Design Spec. Response (1 sec), S_{D1} =	0.102			
Design Spec. Response, S_{DS} =	0.190		$E_H = A_s\ C_s\ W$	2.7.7
Importantance Factor, I =	1.25			
Seismic Response Coefficient, C_s =	0.119		$E_V = A_s\ 0.2\ S_{DS}\ W$	2.7.6
Amplification Factor, A_s =	3			

Appurtenance Seismic Loads

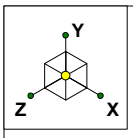
Name	Weight (lb)	E_H (lb)	E_V (lb)
DS7C09P36U-D	68	24.21	7.75
DS2C03F36D-D	75	26.70	8.54

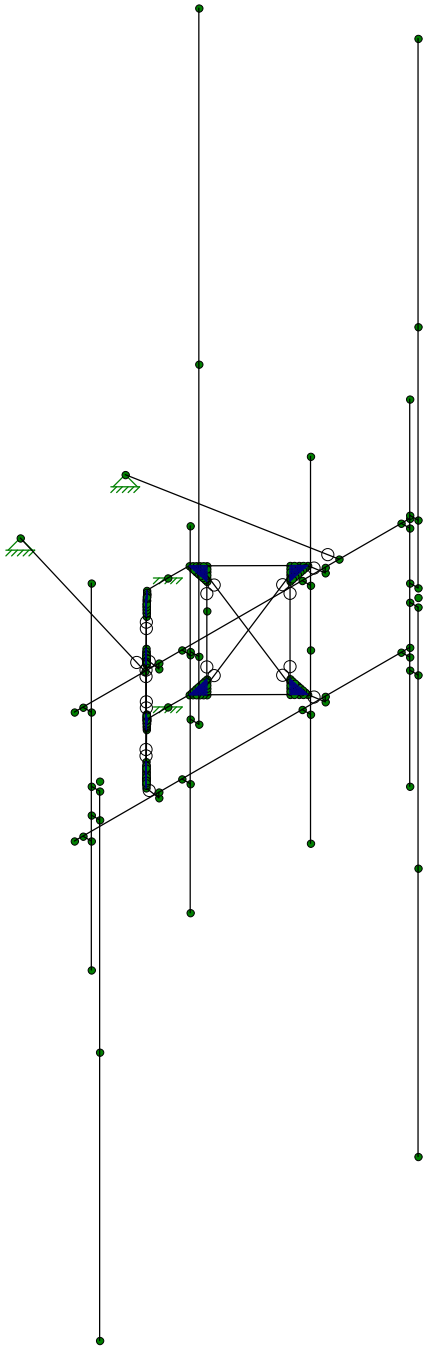
APPENDIX 2:
RISA PRINTOUTS



Envelope Only Solution

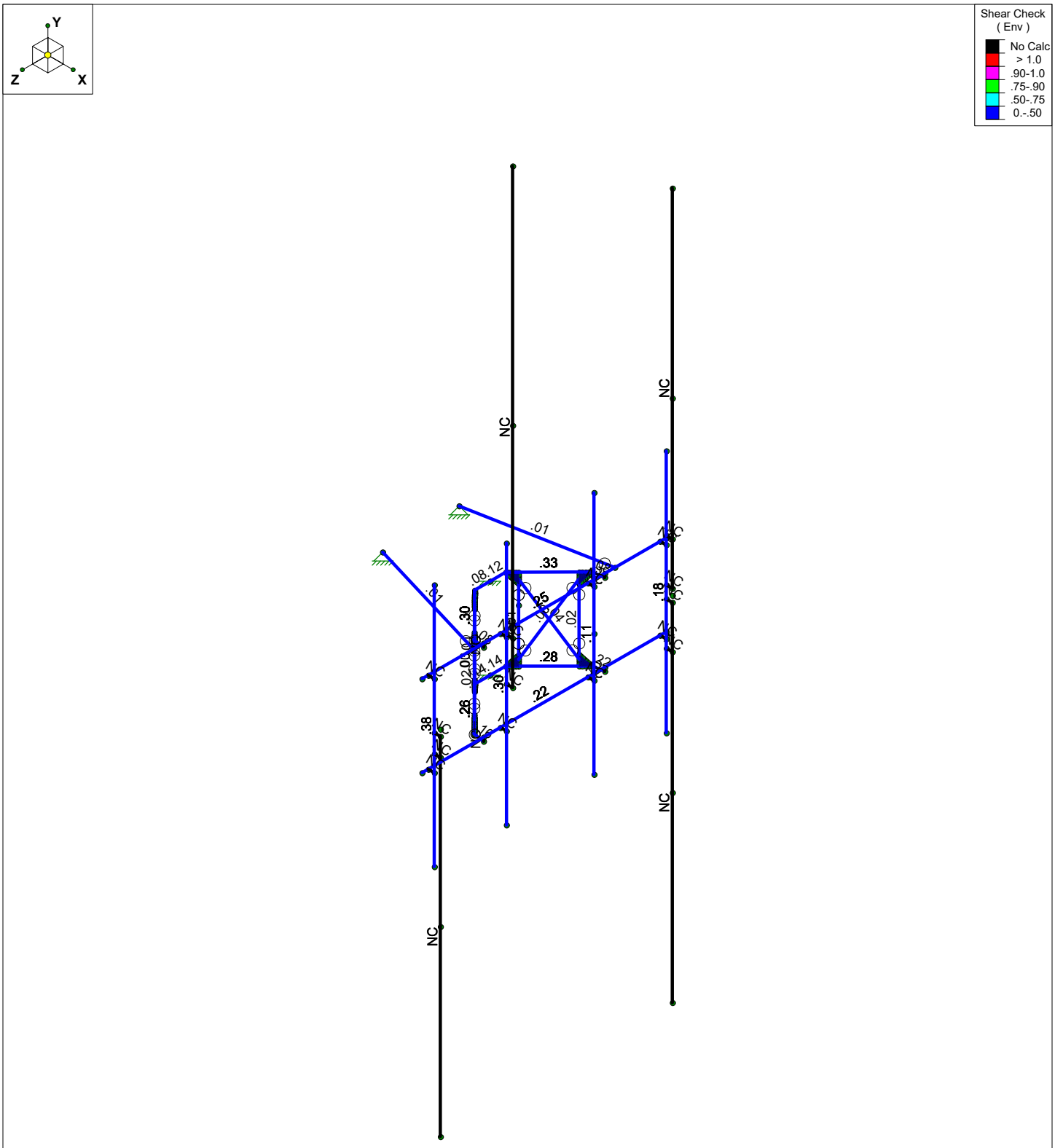
Black & Veatch Corp.	Talcott RS Risa Model	SK - 1
Joohwan Jung		Nov 11, 2020 at 12:03 AM
405025.2021.2200		TALCOTTRS VFA10-HD Risa mod...





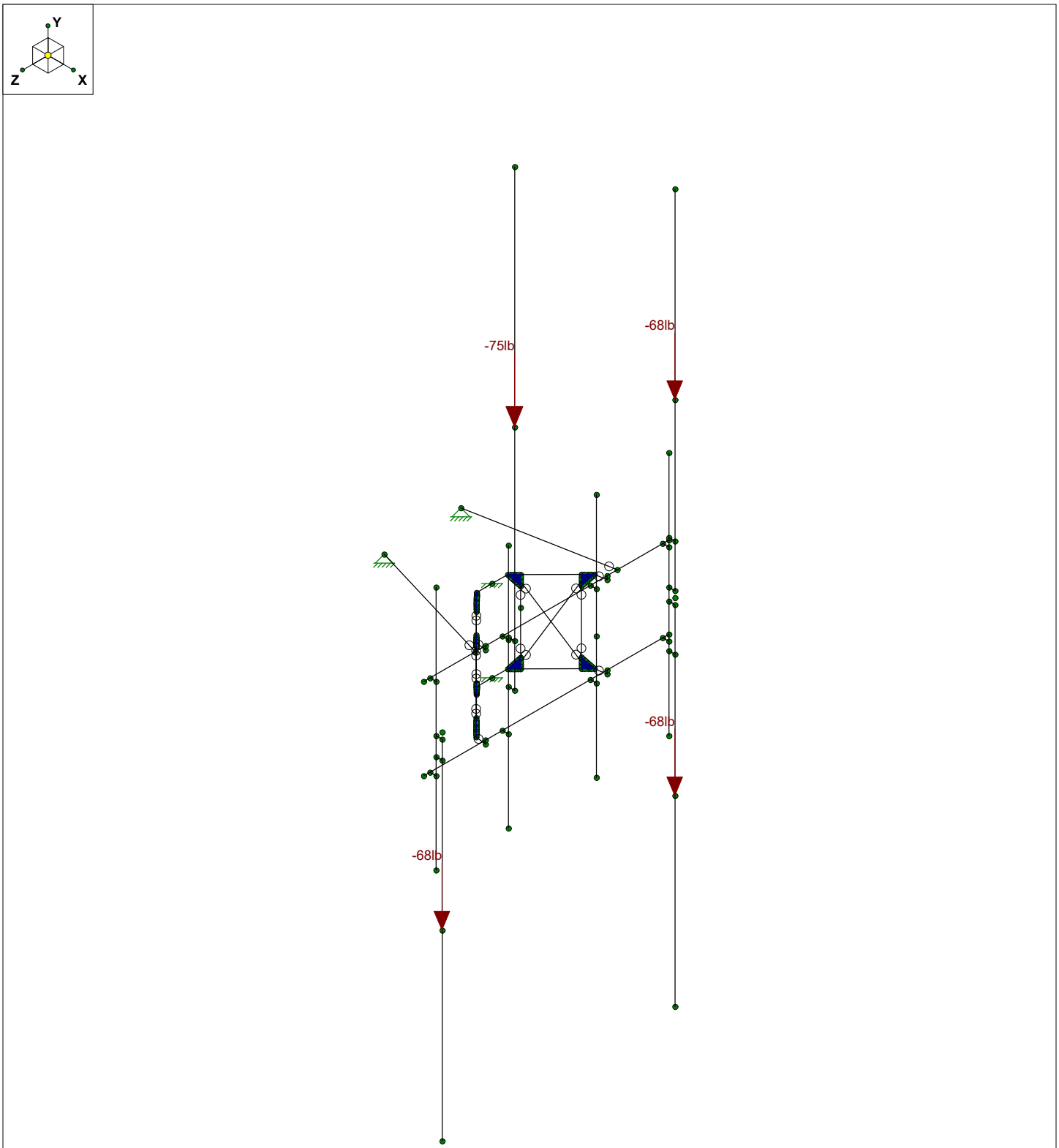
Envelope Only Solution

Black & Veatch Corp.	Talcott RS Risa Model	SK - 2
Joohwan Jung		Nov 11, 2020 at 12:04 AM
405025.2021.2200		TALCOTTRS VFA10-HD Risa mod...



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch Corp.	Talcott RS Risa Model	SK - 4
Joohwan Jung		Nov 11, 2020 at 12:04 AM
405025.2021.2200		TALCOTTRS VFA10-HD Risa mod...



Loads: BLC 1, DL
Envelope Only Solution

Black & Veatch Corp.	Talcott RS Risa Model	SK - 5
Joohwan Jung		Nov 11, 2020 at 12:04 AM
405025.2021.2200		TALCOTTRS VFA10-HD Risa mod...

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	No
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	None
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	60	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Boom	PIPE_2.5	Beam	Pipe	A53 Gr. B	Typical	1.61	1.45	1.45	2.89
2	Arm	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
3	Arm Vertical Brace	SR 5/8_HRA	VBrace	BAR	A36 Gr.36	Typical	.307	.007	.007	.015
4	Arm Connecting Plate	PL 3.5x5/8"	Beam	RECT	A36 Gr.36	Typical	2.188	.071	2.233	.253
5	Arm Diagonal Brace	SR3/4	VBrace	BAR	A36 Gr.36	Typical	.442	.016	.016	.031
6	Stiff Arm	PIPE_2.0	HBrace	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
7	Mount Pipe	PIPE_2.0	Column	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
8	Proposed Mount Pipe...	PIPE_2.5	Column	Pipe	A53 Gr. B	Typical	1.61	1.45	1.45	2.89

General Material Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]
1	gen_Steel	29000	11154	.3	.65	.49
2	RIGID	1e+6		.3	0	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N252	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N253	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N275	Reaction	Reaction	Reaction			
4	N276	Reaction	Reaction	Reaction			

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N10	N7			Boom	Beam	Pipe	A53 Gr. B	Typical
2	M2	N3	N6			Boom	Beam	Pipe	A53 Gr. B	Typical
3	M3	N18	N9		90	Arm Connectin...	Beam	RECT	A36 Gr.36	Typical
4	M4	N15	N4		90	Arm Connectin...	Beam	RECT	A36 Gr.36	Typical
5	M5	N35	N36			Mount Pipe	Column	Pipe	A53 Gr. B	Typical
6	M6	N9	N22			RIGID	None	None	RIGID	Typical
7	M7	N8	N21			RIGID	None	None	RIGID	Typical
8	M8	N5	N20			RIGID	None	None	RIGID	Typical
9	M9	N4	N19			RIGID	None	None	RIGID	Typical
10	M10	N24	N26			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
11	M11	N23	N25			RIGID	None	None	RIGID	Typical
12	M12	N28	N30			RIGID	None	None	RIGID	Typical
13	M13	N27	N29			RIGID	None	None	RIGID	Typical
14	M14	N32	N34			RIGID	None	None	RIGID	Typical
15	M15	N31	N33			RIGID	None	None	RIGID	Typical
16	M16	N38	N40			RIGID	None	None	RIGID	Typical
17	M17	N37	N39			RIGID	None	None	RIGID	Typical
18	M18	N41	N42			Mount Pipe	Column	Pipe	A53 Gr. B	Typical
19	M19	N43	N44			Proposed Mou...	Column	Pipe	A53 Gr. B	Typical
20	M20	N45	N46			Mount Pipe	Column	Pipe	A53 Gr. B	Typical
21	M21	N47	N276			Stiff Arm	HBrace	Pipe	A53 Gr. B	Typical
22	M22	N48	N275			Stiff Arm	HBrace	Pipe	A53 Gr. B	Typical
23	M23	N57	N55			Arm Vertical B...	VBrace	BAR	A36 Gr.36	Typical
24	M24	N58	N56			Arm Vertical B...	VBrace	BAR	A36 Gr.36	Typical
25	M25	N122	N89			Arm Diagonal ...	VBrace	BAR	A36 Gr.36	Typical
26	M26	N71	N148			Arm Diagonal ...	VBrace	BAR	A36 Gr.36	Typical
27	M27	N158	N156			Arm Vertical B...	VBrace	BAR	A36 Gr.36	Typical
28	M28	N222	N189			Arm Diagonal ...	VBrace	BAR	A36 Gr.36	Typical
29	M29	N171	N247			Arm Diagonal ...	VBrace	BAR	A36 Gr.36	Typical
30	M30	N11	N8		90	Arm Connectin...	Beam	RECT	A36 Gr.36	Typical
31	M31	N14	N5		90	Arm Connectin...	Beam	RECT	A36 Gr.36	Typical
32	M32	N18	N17			Arm	Beam	Pipe	A53 Gr. B	Typical
33	M33	N15	N16			Arm	Beam	Pipe	A53 Gr. B	Typical
34	M34	N11	N12			Arm	Beam	Pipe	A53 Gr. B	Typical
35	M35	N14	N13			Arm	Beam	Pipe	A53 Gr. B	Typical
36	M36	N159	N157			Arm Vertical B...	VBrace	BAR	A36 Gr.36	Typical
37	M37	N17	N252		90	Arm Connectin...	Beam	RECT	A36 Gr.36	Typical
38	M38	N16	N253		90	Arm Connectin...	Beam	RECT	A36 Gr.36	Typical
39	M39	N252	N12		90	Arm Connectin...	Beam	RECT	A36 Gr.36	Typical
40	M40	N253	N13		90	Arm Connectin...	Beam	RECT	A36 Gr.36	Typical
41	M41	N268	N262			RIGID	None	None	RIGID	Typical
42	M42	N266	N260			RIGID	None	None	RIGID	Typical
43	M43	N264	N258			RIGID	None	None	RIGID	Typical
44	M44	N259	N265			RIGID	None	None	RIGID	Typical
45	M45	N263	N269			RIGID	None	None	RIGID	Typical
46	M46	N261	N267			RIGID	None	None	RIGID	Typical
47	M47	N277	N258			RIGID	None	None	RIGID	Typical
48	M48	N261	N278			RIGID	None	None	RIGID	Typical
49	M49	N279	N260			RIGID	None	None	RIGID	Typical
50	M50	N280	N270			RIGID	None	None	RIGID	Typical
51	M51	N271	N274			RIGID	None	None	RIGID	Typical
52	M52	N270	N273			RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes				None
3	M3		BenPIN				Yes				None
4	M4		BenPIN				Yes				None
5	M5						Yes	** NA **			None
6	M6						Yes	** NA **			None
7	M7						Yes	** NA **			None
8	M8						Yes	** NA **			None
9	M9						Yes	** NA **			None
10	M10						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
11	M11						Yes	** NA **			None
12	M12						Yes	** NA **			None
13	M13						Yes	** NA **			None
14	M14						Yes	** NA **			None
15	M15						Yes	** NA **			None
16	M16						Yes	** NA **			None
17	M17						Yes	** NA **			None
18	M18						Yes	** NA **			None
19	M19						Yes	** NA **			None
20	M20						Yes	** NA **			None
21	M21	BenPIN					Yes	** NA **			None
22	M22	BenPIN					Yes	** NA **			None
23	M23	BenPIN	BenPIN				Yes	** NA **			None
24	M24	BenPIN	BenPIN				Yes	** NA **			None
25	M25	BenPIN	BenPIN			Tension ...	Yes	** NA **			None
26	M26	BenPIN	BenPIN			Tension ...	Yes	** NA **			None
27	M27	BenPIN	BenPIN				Yes	** NA **			None
28	M28	BenPIN	BenPIN			Tension ...	Yes	** NA **			None
29	M29	BenPIN	BenPIN			Tension ...	Yes	** NA **			None
30	M30		BenPIN				Yes				None
31	M31		BenPIN				Yes				None
32	M32						Yes				None
33	M33						Yes				None
34	M34						Yes				None
35	M35						Yes				None
36	M36	BenPIN	BenPIN				Yes	** NA **			None
37	M37						Yes				None
38	M38						Yes				None
39	M39						Yes				None
40	M40						Yes				None
41	M41						Yes	** NA **			None
42	M42						Yes	** NA **			None
43	M43						Yes	** NA **			None
44	M44						Yes	** NA **			None
45	M45						Yes	** NA **			None
46	M46						Yes	** NA **			None
47	M47						Yes	** NA **			None
48	M48						Yes	** NA **			None
49	M49						Yes	** NA **			None
50	M50						Yes	** NA **			None
51	M51						Yes	** NA **			None
52	M52						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Boom	120	59.496	48							Lateral
2	M2	Boom	120	59.496	48							Lateral
3	M3	Arm Conne...	5.5									Lateral
4	M4	Arm Conne...	5.5									Lateral
5	M5	Mount Pipe	120									Lateral
6	M18	Mount Pipe	120									Lateral
7	M19	Proposed M...	120									Lateral
8	M20	Mount Pipe	120									Lateral
9	M21	Stiff Arm	61.321									Lateral
10	M22	Stiff Arm	62.579									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
11	M23	Arm Vertical...	30.25									Lateral
12	M24	Arm Vertical...	30.25									Lateral
13	M25	Arm Diagon...	40.09									Lateral
14	M26	Arm Diagon...	40.09									Lateral
15	M27	Arm Vertical...	30.25									Lateral
16	M28	Arm Diagon...	40.09									Lateral
17	M29	Arm Diagon...	40.09									Lateral
18	M30	Arm Conne...	5.5									Lateral
19	M31	Arm Conne...	5.5									Lateral
20	M32	Arm	30			Lbyy						Lateral
21	M33	Arm	30			Lbyy						Lateral
22	M34	Arm	30			Lbyy						Lateral
23	M35	Arm	30			Lbyy						Lateral
24	M36	Arm Vertical...	30.25									Lateral
25	M37	Arm Conne...	7.634									Lateral
26	M38	Arm Conne...	7.634									Lateral
27	M39	Arm Conne...	7.634									Lateral
28	M40	Arm Conne...	7.634									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	DL	DL		-1		4				
2	Maintenance LL - LV	LL				1				
3	Installation LL - LM	LL				1				
4	Wind - 0 Deg (X)	WL				4		28		
5	Wind - 30 Deg (X)	WL				4		28		
6	Wind - 60 Deg (X)	WL				4		28		
7	Wind - 90 Deg (X)	WL				4		28		
8	Wind - 120 Deg (X)	WL				4		28		
9	Wind - 150 Deg (X)	WL				4		28		
10	Wind - 180 Deg (X)	WL				4		28		
11	Wind - 210 Deg (X)	WL				4		28		
12	Wind - 240 Deg (X)	WL				4		28		
13	Wind - 270 Deg (X)	WL				4		28		
14	Wind - 300 Deg (X)	WL				4		28		
15	Wind - 330 Deg (X)	WL				4		28		
16	Wind - 0 Deg (Z)	WL				4		28		
17	Wind - 30 Deg (Z)	WL				4		28		
18	Wind - 60 Deg (Z)	WL				4		28		
19	Wind - 90 Deg (Z)	WL				4		28		
20	Wind - 120 Deg (Z)	WL				4		28		
21	Wind - 150 Deg (Z)	WL				4		28		
22	Wind - 180 Deg (Z)	WL				4		28		
23	Wind - 210 Deg (Z)	WL				4		28		
24	Wind - 240 Deg (Z)	WL				4		28		
25	Wind - 270 Deg (Z)	WL				4		28		
26	Wind - 300 Deg (Z)	WL				4		28		
27	Wind - 330 Deg (Z)	WL				4		28		
28	Ice DL	DL				4		28		
29	Ice Wind - 0 Deg (X)	WL				4		28		
30	Ice Wind - 30 Deg (X)	WL				4		28		
31	Ice Wind - 60 Deg (X)	WL				4		28		
32	Ice Wind - 90 Deg (X)	WL				4		28		
33	Ice Wind - 120 Deg (X)	WL				4		28		
34	Ice Wind - 150 Deg (X)	WL				4		28		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
35	Ice Wind - 180 Deg (X)	WL				4		28		
36	Ice Wind - 210 Deg (X)	WL				4		28		
37	Ice Wind - 240 Deg (X)	WL				4		28		
38	Ice Wind - 270 Deg (X)	WL				4		28		
39	Ice Wind - 300 Deg (X)	WL				4		28		
40	Ice Wind - 330 Deg (X)	WL				4		28		
41	Ice Wind - 0 Deg (Z)	WL				4		28		
42	Ice Wind - 30 Deg (Z)	WL				4		28		
43	Ice Wind - 60 Deg (Z)	WL				4		28		
44	Ice Wind - 90 Deg (Z)	WL				4		28		
45	Ice Wind - 120 Deg (Z)	WL				4		28		
46	Ice Wind - 150 Deg (Z)	WL				4		28		
47	Ice Wind - 180 Deg (Z)	WL				4		28		
48	Ice Wind - 210 Deg (Z)	WL				4		28		
49	Ice Wind - 240 Deg (Z)	WL				4		28		
50	Ice Wind - 270 Deg (Z)	WL				4		28		
51	Ice Wind - 300 Deg (Z)	WL				4		28		
52	Ice Wind - 330 Deg (Z)	WL				4		28		
53	Lateral Seismic - Eh (X)	ELX	.356			4				
54	Lateral Seismic - Eh (Z)	ELZ			.356	4				
55	Vertical Seismic - Ev (Y)	ELY		-.114		4				

Load Combinations

	Description	S...	PDe...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	WIND LOAD COMBOS (130 MPH)																									
2	1.2DL + WL (0 DEG)	Y...	Y		1	1.2	4	1	16	1																
3	1.2DL + WL (30 DEG)	Y...	Y		1	1.2	5	1	17	1																
4	1.2DL + WL (60 DEG)	Y...	Y		1	1.2	6	1	18	1																
5	1.2DL + WL (90 DEG)	Y...	Y		1	1.2	7	1	19	1																
6	1.2DL + WL (120 DEG)	Y...	Y		1	1.2	8	1	20	1																
7	1.2DL + WL (150 DEG)	Y...	Y		1	1.2	9	1	21	1																
8	1.2DL + WL (180 DEG)	Y...	Y		1	1.2	10	1	22	1																
9	1.2DL + WL (210 DEG)	Y...	Y		1	1.2	11	1	23	1																
10	1.2DL + WL (240 DEG)	Y...	Y		1	1.2	12	1	24	1																
11	1.2DL + WL (270 DEG)	Y...	Y		1	1.2	13	1	25	1																
12	1.2DL + WL (300 DEG)	Y...	Y		1	1.2	14	1	26	1																
13	1.2DL + WL (330 DEG)	Y...	Y		1	1.2	15	1	27	1																
14																										
15	MOUNT LOAD COMBOS (30 MPH)																									
16	1.4DL	Y...	Y		1	1.4																				
17	1.2DL + 1.5LV	Y...	Y		1	1.2	2	1.5																		
18	1.2DL + 1.5LM + WL (0 DEG)	Y...	Y		1	1.2	3	1.5	4	.053	16	.053														
19	1.2DL + 1.5LM + WL (30 DEG)	Y...	Y		1	1.2	3	1.5	5	.053	17	.053														
20	1.2DL + 1.5LM + WL (60 DEG)	Y...	Y		1	1.2	3	1.5	6	.053	18	.053														
21	1.2DL + 1.5LM + WL (90 DEG)	Y...	Y		1	1.2	3	1.5	7	.053	19	.053														
22	1.2DL + 1.5LM + WL (120 DEG)	Y...	Y		1	1.2	3	1.5	8	.053	20	.053														
23	1.2DL + 1.5LM + WL (150 DEG)	Y...	Y		1	1.2	3	1.5	9	.053	21	.053														
24	1.2DL + 1.5LM + WL (180 DEG)	Y...	Y		1	1.2	3	1.5	10	.053	22	.053														
25	1.2DL + 1.5LM + WL (210 DEG)	Y...	Y		1	1.2	3	1.5	11	.053	23	.053														
26	1.2DL + 1.5LM + WL (240 DEG)	Y...	Y		1	1.2	3	1.5	12	.053	24	.053														
27	1.2DL + 1.5LM + WL (270 DEG)	Y...	Y		1	1.2	3	1.5	13	.053	25	.053														
28	1.2DL + 1.5LM + WL (300 DEG)	Y...	Y		1	1.2	3	1.5	14	.053	26	.053														
29	1.2DL + 1.5LM + WL (330 DEG)	Y...	Y		1	1.2	3	1.5	15	.053	27	.053														
30																										
31	ICE LOAD COMBOS (2", 50 MPH)																									

Load Combinations (Continued)

	Description	S...	PDe...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
32	1.2DL + Ice DL + Ice WL (0 DEG)	Y...	Y		1	1.2	28	1	29	1	41	1												
33	1.2DL + Ice DL + Ice WL (30 DEG)	Y...	Y		1	1.2	28	1	30	1	42	1												
34	1.2DL + Ice DL + Ice WL (60 DEG)	Y...	Y		1	1.2	28	1	31	1	43	1												
35	1.2DL + Ice DL + Ice WL (90 DEG)	Y...	Y		1	1.2	28	1	32	1	44	1												
36	1.2DL + Ice DL + Ice WL (120 DEG)	Y...	Y		1	1.2	28	1	33	1	45	1												
37	1.2DL + Ice DL + Ice WL (150 DEG)	Y...	Y		1	1.2	28	1	34	1	46	1												
38	1.2DL + Ice DL + Ice WL (180 DEG)	Y...	Y		1	1.2	28	1	35	1	47	1												
39	1.2DL + Ice DL + Ice WL (210 DEG)	Y...	Y		1	1.2	28	1	36	1	48	1												
40	1.2DL + Ice DL + Ice WL (240 DEG)	Y...	Y		1	1.2	28	1	37	1	49	1												
41	1.2DL + Ice DL + Ice WL (270 DEG)	Y...	Y		1	1.2	28	1	38	1	50	1												
42	1.2DL + Ice DL + Ice WL (300 DEG)	Y...	Y		1	1.2	28	1	39	1	51	1												
43	1.2DL + Ice DL + Ice WL (330 DEG)	Y...	Y		1	1.2	28	1	40	1	52	1												
44																								
45	SEISMIC LOAD COMBOS																							
46	1.2DL + Ev (Y) + Eh (X)	Y...	Y		1	1.2	55	1	53	1														
47	1.2DL - Ev (Y) + Eh (X)	Y...	Y		1	1.2	55	-1	53	1														
48	1.2DL + Ev (Y) - Eh (X)	Y...	Y		1	1.2	55	1	53	-1														
49	1.2DL - Ev (Y) - Eh (X)	Y...	Y		1	1.2	55	-1	53	-1														
50	1.2DL + Ev (Y) + Eh (Z)	Y...	Y		1	1.2	55	1	54	1														
51	1.2DL - Ev (Y) + Eh (Z)	Y...	Y		1	1.2	55	-1	54	1														
52	1.2DL + Ev (Y) - Eh (Z)	Y...	Y		1	1.2	55	1	54	-1														
53	1.2DL - Ev (Y) - Eh (Z)	Y...	Y		1	1.2	55	-1	54	-1														
54																								

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-in]	LC	MY [k-in]	LC	MZ [k-in]	LC
1	N252	max	317.641	8	2630.842	32	3427.713	5	3.035	23	28.957	5	.074	2
2		min	-1627.834	43	302.964	8	-3331.918	11	-.243	13	-28.325	11	-.892	38
3	N253	max	3278.552	32	1747.699	34	383.363	5	2.035	23	6.523	11	1.326	40
4		min	-392.61	8	291.859	51	-1025.65	27	-.129	13	-6.823	5	.122	7
5	N275	max	2237.529	4	186.044	10	635.514	10	0	53	0	53	0	53
6		min	-2488.205	10	-147.105	4	-572.535	4	0	2	0	2	0	2
7	N276	max	2044.606	12	175.091	6	476.565	12	0	53	0	53	0	53
8		min	-2315.834	6	-136.327	12	-538.001	6	0	2	0	2	0	2
9	Totals:	max	2910.359	2	4526.191	43	2910.381	5						
10		min	-2910.361	8	756.754	47	-2910.381	11						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear...	Loc[...	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	M1	PIPE_2.5	.357	37.5	7	.247	26.25		7	41473....	50715	43.155	43.155	2...	H1-1b
2	M2	PIPE_2.5	.454	37.5	2	.218	30		2	41473....	50715	43.155	43.155	1...	H1-1b
3	M3	PL 3.5x5/8"	.442	0	34	.078	0	y	6	67490....	70875	11.074	62.016	1...	H1-1b
4	M4	PL 3.5x5/8"	.500	0	34	.158	0	y	36	67490....	70875	11.074	62.016	1...	H1-1b
5	M5	PIPE_2.0	1.028	57.5	2	.175	40		4	9836.5...	32130	22.459	22.459	1...	H1-1b
6	M18	PIPE_2.0	.196	80	3	.110	80		9	9836.5...	32130	22.459	22.459	2...	H1-1b
7	M19	PIPE_2.5	.589	60	8	.299	40		8	22373....	50715	43.155	43.155	1...	H3-6
8	M20	PIPE_2.0	.672	62.5	2	.379	80		2	9836.5...	32130	22.459	22.459	1...	H3-6
9	M21	PIPE_2.0	.090	61.321	12	.006	0		35	23492....	32130	22.459	22.459	1...	H1-1b*
10	M22	PIPE_2.0	.100	62.579	4	.007	0		34	23190....	32130	22.459	22.459	1...	H1-1b*
11	M23	SR 5/8_HRA	.759	13.234	32	.015	0		23	1849.1...	9940.19	1.243	1.243	1...	H1-1a
12	M24	SR 5/8_HRA	.678	13.234	35	.013	30.25		11	1849.1...	9940.19	1.243	1.243	1	H1-1a
13	M25	SR3/4	.232	40.09	32	.031	0		35	2183.1...	14313....	2.147	2.147	1...	H1-1a*
14	M26	SR3/4	.000	0	53	.000	0		53	2183.1...	14313....	2.147	2.147	1	H1-1a
15	M27	SR 5/8_HRA	.855	13.234	43	.016	0		22	1849.1...	9940.19	1.243	1.243	1...	H1-1a

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear..	Loc[...	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
16	M28	SR3/4	.261	40.09	34	.039	0		41	2183.1...	14313....	2.147	2.147	1...	H1-1a*
17	M29	SR3/4	.000	0	53	.000	0		53	2183.1...	14313....	2.147	2.147	1	H1-1a
18	M30	PL 3.5x5/8"	.505	0	41	.077	0	y	11	67490....	70875	11.074	62.016	1...	H1-1b
19	M31	PL 3.5x5/8"	.576	0	34	.222	0	y	38	67490....	70875	11.074	62.016	1...	H1-1b
20	M32	PIPE_2.0	.375	0	5	.300	4.375		32	29810....	32130	22.459	22.459	1...	H1-1b
21	M33	PIPE_2.0	.256	25.313	34	.257	26.25		32	29810....	32130	22.459	22.459	1...	H1-1b
22	M34	PIPE_2.0	.400	4.688	41	.334	4.375		42	29810....	32130	22.459	22.459	1...	H1-1b
23	M35	PIPE_2.0	.304	25.313	41	.279	26.25		35	29810....	32130	22.459	22.459	1...	H1-1b
24	M36	SR 5/8_HRA	.818	19.852	37	.014	30.25		4	1849.1...	9940.19	1.243	1.243	1...	H1-1a
25	M37	PL 3.5x5/8"	.637	7.634	41	.078	0	y	5	64500....	70875	11.074	62.016	1...	H1-1b
26	M38	PL 3.5x5/8"	.537	7.634	43	.141	7.634	y	33	64500....	70875	11.074	62.016	1...	H1-1b
27	M39	PL 3.5x5/8"	.737	0	34	.118	0	y	35	64500....	70875	11.074	62.016	1...	H1-1b
28	M40	PL 3.5x5/8"	.611	0	33	.142	0	y	43	64500....	70875	11.074	62.016	1...	H1-1b

Envelope Plate/Shell Principal Stresses

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
1	P87	max	T	8.974	35	.043	3	4.832	35	2.342	53	9.338	35
2		min		.667	9	-1.599	11	.627	9	-.707	8	1.086	9
3		max	B	3.375	35	.064	5	2.154	35	2.335	34	3.926	35
4		min		-.315	12	-1.914	10	.235	12	-.737	6	.494	51
5	P103	max	T	7.584	37	-.174	9	4.591	36	2.325	5	8.493	37
6		min		.875	12	-1.957	43	.738	53	-.783	9	1.353	49
7		max	B	3.716	38	-.157	10	2.5	37	2.327	49	4.496	37
8		min		.54	10	-1.294	37	.349	10	-.73	10	.633	10
9	P112	max	T	7.429	36	-.125	10	4.136	36	1.585	7	7.885	36
10		min		.569	12	-.855	43	.45	11	.778	13	.805	11
11		max	B	5.565	41	-.139	47	3.214	42	1.762	13	6.042	42
12		min		.843	53	-.893	33	.491	53	1.352	7	.92	53
13	P97	max	T	7.589	35	-.035	53	3.899	35	1.589	6	7.695	35
14		min		.832	11	-.312	12	.494	10	.911	12	.924	10
15		max	B	3.429	42	-.039	5	1.879	43	1.695	2	3.604	42
16		min		.322	8	-.355	32	.214	6	.797	8	.399	6
17	P68	max	T	5.316	5	-.487	7	3.839	41	2.109	2	7.534	41
18		min		.05	51	-7.38	41	.443	53	-.692	3	.803	53
19		max	B	1.959	11	-.038	47	1.475	11	2.187	13	2.601	11
20		min		.109	47	-1.853	5	.073	47	-.784	12	.132	47
21	P115	max	T	1.445	5	-.681	7	3.223	41	2.335	6	6.418	41
22		min		-.073	2	-6.39	41	.392	53	-.774	4	.774	53
23		max	B	1.93	10	-.051	51	1.489	4	1.643	13	2.721	4
24		min		-.022	13	-2.355	4	.044	51	-.643	12	.076	51
25	P80	max	T	.377	43	-.316	7	3.231	42	2.329	8	6.282	42
26		min		.051	53	-6.085	42	.195	7	-.766	5	.358	7
27		max	B	.212	43	-.32	7	3.214	32	2.29	11	6.327	32
28		min		-.026	8	-6.221	32	.155	7	1.89	7	.315	7
29	P101	max	T	.061	12	-.388	7	3.029	42	1.266	7	6.167	42
30		min		-.299	36	-6.271	42	.149	7	.889	13	.352	7
31		max	B	.046	6	-.309	7	3.01	32	.941	13	6.126	32
32		min		-.223	41	-6.227	32	.173	7	.622	7	.329	7
33	P122	max	T	.212	39	-.646	13	3.103	38	1.61	11	6.109	38
34		min		-.054	4	-6.008	38	.327	13	1.214	3	.65	13
35		max	B	.244	34	-.684	13	3.106	35	1.59	3	6.093	35
36		min		-.05	10	-5.971	36	.333	12	1.178	11	.679	12
37	P82	max	T	.128	4	-.651	13	3.007	38	1.204	11	6.045	38
38		min		-.078	40	-6.074	38	.323	13	.731	3	.648	13
39		max	B	.102	10	-.643	12	2.891	36	1.183	3	5.882	35
40		min		-.221	32	-5.978	35	.31	12	.698	11	.632	12
41	P2	max	T	1.16	6	.073	8	3.004	32	2.139	8	5.907	32
42		min		-.056	13	-5.832	43	.151	8	-.463	7	.345	8
43		max	B	3.686	11	-.247	51	2.586	5	1.635	8	4.803	5
44		min		-.324	37	-4.32	5	.162	47	-.374	9	.317	51
45	P109	max	T	.942	34	-.296	7	3.1	42	-.283	5	5.842	42
46		min		-.087	10	-5.403	42	.22	7	-.508	9	.389	7
47		max	B	1.569	41	-.307	8	3.349	43	-.24	11	6.087	32
48		min		-.025	5	-5.227	32	.218	7	-.735	6	.397	7
49	P75	max	T	5.043	5	.289	3	2.893	11	1.784	5	5.713	11
50		min		-.052	8	-5.638	11	.183	53	.288	10	.344	53
51		max	B	2.896	41	1.047	41	1.01	5	2.288	8	2.54	41
52		min		-.167	5	-2.187	5	.148	47	-.517	51	.323	53
53	P74	max	T	3.391	5	-.17	7	2.965	41	1.743	2	5.662	41
54		min		.033	8	-5.348	41	.253	53	-.691	3	.458	53
55		max	B	2.508	10	.177	13	1.554	4	1.074	28	2.955	4
56		min		.143	47	-2.774	4	.051	51	-.638	13	.13	51

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
57	P13	max	T	.434	7	-.004	8	2.885	43	2.282	37	5.646	43
58		min		.02	3	-5.512	43	.122	9	-.739	5	.213	9
59		max	B	.255	8	-.218	8	2.776	32	2.324	13	5.433	32
60		min		-.033	17	-5.305	32	.134	9	1.139	8	.252	9
61	P34	max	T	.288	7	-.178	8	2.674	43	2.207	7	5.474	43
62		min		-.327	37	-5.593	43	.11	6	.86	2	.211	9
63		max	B	.269	7	-.031	7	2.633	32	.979	13	5.339	32
64		min		-.162	42	-5.408	32	.114	9	-.063	8	.204	9
65	P42	max	T	1.312	34	.147	7	2.962	32	2.033	9	5.406	32
66		min		-.08	10	-4.701	43	.05	7	-.588	10	.213	9
67		max	B	.909	42	-.065	8	2.732	32	2.075	6	5.097	32
68		min		-.119	5	-4.632	33	.11	8	-.67	5	.196	8
69	P50	max	T	.73	5	-.728	8	2.513	42	2.348	19	5.379	42
70		min		-.645	42	-5.672	42	.391	21	-.777	24	.773	8
71		max	B	1.112	11	-.208	20	1.041	35	2.346	34	2.38	35
72		min		-.581	37	-2.595	35	.124	51	-.77	52	.264	51
73	P55	max	T	.232	41	-.532	27	2.683	43	1.626	11	5.267	43
74		min		-.048	5	-5.167	32	.282	21	1.232	5	.551	19
75		max	B	.171	35	-.542	29	2.705	36	1.578	5	5.328	36
76		min		-.045	11	-5.241	36	.271	28	1.195	11	.542	29
77	P73	max	T	.625	33	-.225	7	2.731	42	1.486	9	5.199	42
78		min		-.025	9	-4.889	42	.145	7	1.425	6	.264	7
79		max	B	.695	41	-.212	7	2.86	43	1.514	6	5.415	43
80		min		-.098	5	-5.057	32	.093	7	1.404	8	.201	7
81	P104	max	T	5.009	36	-.006	10	2.604	36	1.709	7	5.112	36
82		min		.472	11	-.448	13	.315	10	.759	12	.595	11
83		max	B	4.397	42	-.029	4	2.355	42	1.756	13	4.561	42
84		min		.407	7	-.339	33	.24	6	1.416	7	.45	7
85	P92	max	T	5.066	35	.026	9	2.559	35	1.66	6	5.092	35
86		min		.489	11	-.218	12	.284	10	.895	12	.553	10
87		max	B	2.684	41	.02	5	1.405	41	1.945	4	2.749	41
88		min		.034	5	-.223	7	.007	5	.323	5	.03	5
89	P15	max	T	.071	6	-.548	21	2.493	43	1.193	11	5.081	43
90		min		-.186	43	-5.171	43	.267	18	.76	5	.542	20
91		max	B	.115	11	-.525	28	2.604	36	1.161	5	5.237	36
92		min		-.069	34	-5.264	36	.261	29	.699	11	.524	28
93	P96	max	T	5.049	35	.03	8	2.525	35	2.329	38	5.05	35
94		min		.67	9	-1.837	11	.379	47	-.778	33	.74	51
95		max	B	1.542	4	-.077	53	.936	4	1.731	38	1.739	10
96		min		-.343	42	-1.639	10	.022	16	-.611	25	.072	16
97	P84	max	T	5.292	33	.653	40	2.37	33	1.016	6	5.038	33
98		min		.57	9	-.086	5	.195	9	.236	10	.505	9
99		max	B	5.349	40	.629	43	2.406	39	.962	10	5.101	40
100		min		.755	6	-.103	7	.363	53	.555	4	.769	53
101	P45	max	T	4.612	34	-.046	18	2.675	34	1.709	3	5.022	34
102		min		.128	27	-.746	33	.09	27	1.139	10	.161	27
103		max	B	6.422	41	-.068	18	3.55	41	1.615	9	6.786	41
104		min		.841	19	-.724	34	.455	19	1.052	3	.877	19
105	P91	max	T	.869	35	-.533	2	2.585	37	-.146	7	4.829	38
106		min		-.143	11	-4.419	39	.263	12	-.473	12	.556	13
107		max	B	1.411	40	-.401	12	2.698	37	-.118	12	4.9	36
108		min		-.032	5	-4.193	35	.389	2	-.224	5	.684	13
109	P6	max	T	.606	34	.066	7	2.526	32	1.627	24	4.789	32
110		min		-.084	10	-4.475	43	.074	6	-.663	9	.141	9
111		max	B	.56	42	-.048	8	2.389	32	1.495	4	4.535	32
112		min		-.111	6	-4.245	32	.027	6	.078	7	.146	6
113	P70	max	T	4.668	5	1.014	4	2.299	11	2.267	53	4.783	11

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
114		min		-.496	10	-4.95	11	.122	53	-.44	2	.339	53
115		max	B	2.447	41	1.2	11	.991	36	1.537	5	2.223	40
116		min		-.785	5	-2.113	5	.146	8	.218	10	.294	53
117	P69	max	T	3.749	5	-.3	53	2.5	11	1.22	8	4.734	11
118		min		-.292	39	-4.415	11	.204	47	-.372	7	.384	53
119		max	B	.877	11	-.36	8	3.332	43	1.09	6	6.512	32
120		min		-.011	3	-6.409	32	.234	8	-.06	9	.425	8
121	P124	max	T	1.137	5	-.205	3	2.348	40	1.962	7	4.602	40
122		min		.034	8	-4.504	40	.224	2	-.766	3	.418	2
123		max	B	1.567	10	.065	26	1.025	4	1.068	5	1.932	4
124		min		.088	49	-1.788	4	.036	51	-.463	10	.087	51
125	P105	max	T	4.675	34	.315	37	2.226	33	2.148	3	4.565	34
126		min		.488	11	-.206	13	.304	11	1.689	9	.558	11
127		max	B	5.006	39	.361	36	2.336	39	2.34	2	4.848	39
128		min		.672	3	-.197	12	.304	3	-.756	11	.642	3
129	P133	max	T	.557	36	-.419	13	2.349	38	1.579	11	4.451	38
130		min		.025	12	-4.156	38	.23	13	1.426	3	.441	13
131		max	B	.556	38	-.423	12	2.353	35	1.554	4	4.463	35
132		min		.06	2	-4.171	35	.257	12	1.403	11	.475	12
133	P17	max	T	4.57	34	.571	32	2.01	34	1.149	6	4.321	34
134		min		.392	8	-.061	7	.149	23	.459	11	.358	24
135		max	B	4.738	43	.543	33	2.117	43	1.108	8	4.507	43
136		min		.135	7	-.163	9	.066	7	.161	6	.133	7
137	P125	max	T	1.64	5	-.02	3	2.187	41	1.515	4	4.249	41
138		min		.023	9	-4.113	41	.211	53	.108	12	.39	53
139		max	B	2.032	10	.148	8	1.371	34	1.865	8	2.376	34
140		min		.226	53	-2.144	4	.117	13	-.592	51	.253	13
141	P24	max	T	1.195	35	-.389	21	2.345	33	-.115	5	4.242	32
142		min		-.104	11	-3.631	42	.218	26	-.298	11	.418	26
143		max	B	.817	41	-.365	28	2.223	38	-.128	9	4.156	37
144		min		-.151	5	-3.817	36	.251	20	-.362	3	.453	19
145	P38	max	T	4.23	35	.373	37	1.944	34	2.346	3	4.068	35
146		min		.331	28	-.146	2	.138	21	1.593	9	.308	28
147		max	B	4.136	43	.241	38	2.004	43	2.283	11	4.074	43
148		min		.51	22	-.16	13	.261	23	1.532	6	.517	22
149	P66	max	T	.469	36	-.373	24	2.022	43	1.578	11	3.841	43
150		min		.033	27	-3.6	42	.204	27	1.424	4	.392	27
151		max	B	.493	40	-.363	29	2.046	37	1.566	4	3.878	37
152		min		.05	5	-3.62	36	.213	29	1.403	11	.398	29
153	P40	max	T	3.494	37	.118	5	2.047	38	1.583	12	3.829	37
154		min		-.095	13	-.854	41	.073	13	.641	2	.211	13
155		max	B	.86	9	-.042	10	.917	32	2.187	13	1.799	33
156		min		-.185	36	-1.762	33	.033	17	-.567	12	.062	17
157	P37	max	T	3.622	34	.005	12	1.941	34	1.753	4	3.759	34
158		min		.07	25	-.271	32	.045	24	.866	10	.083	24
159		max	B	4.471	42	-.03	47	2.326	42	1.743	9	4.564	42
160		min		.525	5	-.229	3	.296	6	.982	4	.577	6
161	P71	max	T	2.379	5	.073	3	2.033	41	1.403	2	3.74	41
162		min		.012	8	-3.294	41	.146	53	-.709	3	.255	53
163		max	B	2.44	10	.151	13	1.494	4	1.061	5	2.828	4
164		min		.134	7	-2.633	4	.1	51	-.439	10	.204	51
165	P31	max	T	3.409	33	.159	12	1.9	34	2.325	11	3.617	34
166		min		.074	7	-.709	5	.075	8	-.647	12	.148	8
167		max	B	1.95	11	.058	2	1.014	11	2.193	2	1.991	11
168		min		-.435	36	-1.977	5	.014	47	-.577	32	.027	49
169	P36	max	T	2.956	36	-.152	20	2.01	36	2.313	49	3.607	36
170		min		.144	19	-1.094	39	.148	19	-.745	6	.257	19

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
171		max	B	6.506	41	-.055	27	4.013	33	2.354	20	7.368	33
172		min		.866	19	-1.57	33	.464	18	-.78	18	.899	19
173	P88	max	T	3.192	35	.042	7	1.928	35	1.85	13	3.57	35
174		min		.018	12	-1.774	11	.256	51	-.746	2	.447	51
175		max	B	1.071	3	-.164	47	.734	33	1.537	7	1.362	33
176		min		-.35	39	-1.226	34	.051	47	-.073	6	.144	47
177	P118	max	T	1.776	5	.625	4	1.921	41	2.088	8	3.567	41
178		min		-.349	10	-3.208	41	.15	3	-.279	7	.326	53
179		max	B	2.067	40	.67	10	1.265	34	1.663	4	2.196	34
180		min		-.244	4	-2.133	4	.133	13	.283	10	.313	47
181	P111	max	T	2.235	36	-.131	9	2.002	32	2.197	47	3.469	32
182		min		.334	49	-1.965	43	.294	47	-.559	9	.516	47
183		max	B	.604	12	-.012	13	.412	43	1.744	4	.776	32
184		min		-.354	36	-.808	34	.022	9	-.302	22	.108	47
185	P83	max	T	3.274	35	-.019	4	1.741	35	2.306	7	3.383	35
186		min		.27	11	-.291	40	.19	11	1.711	12	.338	11
187		max	B	2.398	41	-.021	53	1.306	41	2.322	11	2.512	41
188		min		.074	4	-.256	43	.071	4	-.753	12	.123	4
189	P20	max	T	2.775	41	.037	11	1.788	41	2.345	41	3.251	41
190		min		-.188	5	-1.842	5	.048	26	-.784	51	.128	26
191		max	B	8.017	42	.014	9	4.333	42	2.329	51	8.36	42
192		min		.33	8	-1.809	6	.308	8	-.781	2	.535	8
193	P7	max	T	2.936	5	.506	35	1.69	11	1.092	2	3.21	11
194		min		.128	47	-3.005	11	.042	53	-.536	3	.142	47
195		max	B	3.215	11	-.206	9	2.759	35	2.263	13	5.305	35
196		min		-.049	8	-5.064	35	.111	8	-.675	12	.251	8
197	P130	max	T	1.154	5	.128	4	1.707	41	1.533	4	3.151	41
198		min		.094	10	-2.798	41	.101	7	.068	11	.228	7
199		max	B	1.382	10	.189	9	1.164	35	2.292	8	2.039	35
200		min		.066	2	-1.634	4	.111	51	-.493	51	.207	51
201	P117	max	T	.921	5	-.333	3	1.423	41	2.35	32	3.129	41
202		min		-.608	39	-3.355	40	.155	53	-.779	40	.348	53
203		max	B	.851	10	-.882	12	2.759	35	2.298	2	5.877	34
204		min		-.694	34	-6.193	34	.404	13	-.767	6	.85	13
205	P123	max	T	.141	4	-.298	13	1.535	38	1.777	11	3.117	38
206		min		-.139	41	-3.172	39	.122	13	1.216	3	.275	13
207		max	B	.17	11	-.34	12	1.6	35	1.652	5	3.245	35
208		min		-.108	5	-3.289	35	.215	13	1.137	11	.402	13
209	P30	max	T	2.951	37	-.009	8	1.594	37	1.609	28	3.077	37
210		min		.264	19	-.312	43	.146	19	1.452	5	.279	19
211		max	B	6.801	43	-.033	51	3.499	43	1.566	10	6.902	43
212		min		.219	8	-.455	6	.152	8	.533	7	.271	8
213	P4	max	T	2.801	5	.222	35	1.629	11	1.057	11	3.068	11
214		min		.127	9	-2.834	11	.094	53	-.458	6	.182	47
215		max	B	2.253	11	.149	13	1.903	35	2.288	13	3.536	35
216		min		-.08	8	-3.184	35	.071	8	-.693	12	.194	8
217	P114	max	T	2.62	36	-.072	10	1.658	36	.848	8	3.029	36
218		min		.139	11	-.75	42	.128	10	-.334	12	.228	10
219		max	B	2.836	42	-.073	47	1.645	43	.907	4	3.087	42
220		min		.066	6	-.556	33	.082	6	.44	7	.144	6
221	P9	max	T	1.357	6	.102	8	1.406	43	1.978	8	2.984	43
222		min		-.358	42	-3.137	42	.091	8	-.714	7	.25	8
223		max	B	.934	11	-.088	8	.787	34	2.017	8	1.937	34
224		min		-.651	36	-2.163	34	.055	27	-.563	9	.133	8
225	P119	max	T	1.053	5	-.015	2	1.525	40	1.94	7	2.937	40
226		min		.039	47	-2.811	40	.03	2	-.627	6	.054	2
227		max	B	1.42	11	.089	8	.852	5	1.047	5	1.601	5

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
228		min		.093	2	-1.474	5	.088	51	-.407	10	.173	47
229	P53	max	T	.412	5	-.389	7	1.358	42	2.2	11	2.895	42
230		min		-.333	41	-3.046	42	.185	21	1.184	5	.392	21
231		max	B	.495	11	-.173	2	.969	38	2.277	4	2.104	37
232		min		-.383	35	-2.245	37	.068	2	1.041	12	.157	2
233	P78	max	T	2.299	5	.314	3	1.5	41	1.507	5	2.894	11
234		min		-.168	9	-2.93	11	.09	53	-.028	11	.155	53
235		max	B	1.523	10	.005	8	1.118	35	2.048	13	2.081	35
236		min		.073	49	-1.911	4	.101	51	-.534	51	.175	51
237	P128	max	T	1.594	5	.589	4	1.586	41	1.191	5	2.875	41
238		min		-.289	10	-2.432	41	.131	3	-.181	12	.293	53
239		max	B	1.61	10	.505	10	1.069	35	2.352	28	2.03	34
240		min		-.384	4	-1.931	4	.109	13	-.78	24	.209	13
241	P95	max	T	2.888	34	.118	5	1.427	34	1.193	9	2.871	34
242		min		-.105	10	-.306	12	.006	10	-.086	11	.111	10
243		max	B	2.33	41	.247	34	1.048	40	2.156	4	2.221	41
244		min		.263	4	-.237	8	.017	4	-.223	5	.247	4
245	P106	max	T	.884	7	-.316	5	1.129	32	.9	7	2.836	43
246		min		-1.114	40	-3.188	43	.129	47	-.472	13	.335	47
247		max	B	.614	12	.312	12	.739	34	2.087	6	1.639	35
248		min		-.528	6	-1.766	36	.115	51	1.237	12	.217	3
249	P56	max	T	.149	5	-.307	21	1.384	43	1.779	10	2.819	43
250		min		-.125	41	-2.875	42	.133	21	1.2	5	.289	21
251		max	B	.17	11	-.272	29	1.364	37	1.702	4	2.754	37
252		min		-.11	5	-2.779	37	.159	19	1.168	11	.299	19
253	P110	max	T	2.716	34	0	10	1.444	35	2.277	4	2.805	34
254		min		.215	10	-.209	38	.107	10	-.733	5	.215	10
255		max	B	3.189	41	-.007	5	1.72	42	2.312	9	3.315	42
256		min		.215	6	-.322	33	.112	6	-.78	10	.219	6
257	P1	max	T	2.221	5	.142	38	1.565	5	2.339	35	2.789	5
258		min		.102	49	-2.024	11	.045	47	-.779	36	.098	47
259		max	B	5.318	11	-.524	8	3.882	5	2.321	13	7.292	5
260		min		.037	17	-7.047	35	.328	8	-.688	12	.601	8
261	P43	max	T	2.647	34	.02	21	1.427	34	2.354	13	2.756	34
262		min		.058	25	-.248	32	.023	23	-.777	37	.054	24
263		max	B	2.517	42	-.012	6	1.342	42	2.356	26	2.604	42
264		min		.135	6	-.225	38	.073	6	-.785	23	.141	6
265	P48	max	T	1.671	6	.064	8	1.475	41	2.307	3	2.651	42
266		min		.042	53	-2.202	42	.049	53	-.627	4	.085	53
267		max	B	1.675	11	-.484	22	2.709	35	2.334	9	5.405	35
268		min		-.05	2	-5.393	35	.344	51	-.745	12	.648	17
269	P58	max	T	1.825	5	.143	3	1.469	41	2.224	8	2.552	41
270		min		.216	51	-2.063	11	.137	53	-.515	53	.27	53
271		max	B	1.829	11	-.053	13	1.754	35	1.534	11	3.401	35
272		min		.008	7	-3.282	35	.177	51	.127	4	.315	51
273	P47	max	T	2.323	34	-.009	20	1.349	34	.823	4	2.532	34
274		min		.018	20	-.444	43	.013	20	-.677	26	.023	20
275		max	B	2.46	41	-.085	18	1.53	41	.876	8	2.809	41
276		min		.081	5	-.679	36	.138	6	-.182	4	.239	6
277	P8	max	T	2.804	35	.962	35	1.071	5	2.294	17	2.482	5
278		min		-.17	10	-2.193	11	.132	47	-.734	53	.281	51
279		max	B	5.193	11	.351	13	2.91	5	1.698	10	5.858	5
280		min		-.223	7	-5.895	5	.177	51	.18	7	.323	51
281	P121	max	T	.874	5	.148	4	1.291	41	1.273	5	2.443	41
282		min		-.016	10	-2.279	40	.056	7	-.175	10	.124	7
283		max	B	1.006	11	.174	9	1.015	35	1.625	13	1.911	35
284		min		-.07	3	-1.768	34	.102	51	-.687	8	.177	51

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
285	P25	max	T	2.379	36	.049	9	1.227	36	2.334	11	2.418	36
286		min		.054	12	-.168	43	.055	11	-.758	12	.099	11
287		max	B	4.535	43	.008	3	2.294	42	1.643	10	4.562	42
288		min		.11	8	-.332	6	.099	8	.524	7	.172	8
289	P107	max	T	1.151	7	.072	5	1.273	32	2.052	11	2.408	43
290		min		-.223	10	-2.304	43	.109	47	.607	8	.21	47
291		max	B	3.837	38	.123	10	2.262	37	1.385	6	4.22	38
292		min		.179	2	-.869	35	.204	2	.315	13	.354	2
293	P120	max	T	.417	4	-.155	2	1.073	38	2.356	13	2.405	39
294		min		-.508	40	-2.608	39	.102	13	-.765	12	.185	2
295		max	B	.467	11	-.369	12	1.536	35	2.083	5	3.236	34
296		min		-.305	34	-3.377	34	.22	2	1.123	11	.459	13
297	P113	max	T	1.62	36	-.169	53	1.35	37	1.927	7	2.354	37
298		min		.051	11	-1.192	42	.145	10	.605	12	.253	10
299		max	B	1.748	43	.05	12	1.397	32	2.277	8	2.438	32
300		min		-.268	7	-1.226	35	.106	7	-.726	5	.329	9
301	P76	max	T	1.042	5	-.194	7	.965	41	.91	9	2.339	41
302		min		-.682	40	-2.601	41	.121	8	-.51	6	.301	53
303		max	B	1.066	10	-.102	8	1.55	33	.87	6	3.325	33
304		min		-.443	34	-3.512	33	.168	8	-.523	9	.298	8
305	P51	max	T	1.887	5	.648	5	1.309	41	1.664	11	2.305	41
306		min		-.305	11	-2.105	11	.15	53	.296	5	.299	53
307		max	B	1.946	11	.581	11	1.535	35	2.193	51	2.797	35
308		min		-.311	5	-2.427	5	.133	13	-.73	8	.258	51
309	P11	max	T	1.833	5	.009	8	1.189	11	2.06	17	2.248	11
310		min		.061	49	-2.089	11	.077	53	-.769	53	.135	53
311		max	B	2.225	11	.375	12	1.426	35	1.509	12	2.77	5
312		min		-.265	6	-2.857	5	.088	51	-.033	3	.152	51
313	P16	max	T	2.156	36	.049	9	1.159	35	2.324	18	2.235	36
314		min		.012	13	-.238	32	.048	13	-.774	3	.09	13
315		max	B	2.943	43	-.025	9	1.574	43	2.26	11	3.05	43
316		min		.073	7	-.267	36	.068	8	1.365	7	.119	8
317	P89	max	T	1.928	5	.053	5	1.264	35	1.749	6	2.224	35
318		min		-.257	10	-1.764	11	.164	51	.374	10	.299	51
319		max	B	.924	3	-.046	13	.562	33	2.334	33	1.025	3
320		min		-.058	7	-.945	9	.07	47	-.764	49	.128	51
321	P63	max	T	1.311	5	.17	7	1.244	41	1.838	3	2.206	41
322		min		.08	2	-1.715	41	.118	53	-.421	53	.212	53
323		max	B	1.333	11	.122	13	1.347	35	1.545	11	2.474	35
324		min		.066	7	-2.168	35	.086	17	.069	4	.168	17
325	P81	max	T	1.803	32	-.013	7	1.226	32	.4	10	2.2	32
326		min		.039	8	-.654	43	.033	8	-.122	7	.058	8
327		max	B	1.657	41	-.052	8	1.16	41	.747	6	2.07	41
328		min		.031	6	-.671	43	.062	7	.246	11	.108	7
329	P61	max	T	1.466	5	.454	6	1.122	41	2.256	8	2.194	41
330		min		-.385	12	-2.14	41	.134	53	-.778	53	.232	53
331		max	B	1.73	11	.572	12	1.279	34	1.225	11	2.247	34
332		min		-.263	6	-2.002	5	.121	13	-.17	4	.254	51
333	P3	max	T	2.425	5	1.018	5	.912	41	1.525	10	2.109	5
334		min		-.598	11	-2.151	11	.099	8	.09	7	.224	8
335		max	B	4.824	11	1.242	12	2.284	5	2.226	51	4.937	5
336		min		-.825	6	-5.238	5	.124	51	-.131	13	.32	51
337	P54	max	T	.934	5	.15	7	1.086	40	1.682	7	2.04	41
338		min		-.069	13	-1.912	41	.111	53	-.563	53	.194	53
339		max	B	1.037	11	.142	12	1.008	35	1.295	11	1.897	35
340		min		-.028	7	-1.749	35	.065	17	-.171	5	.128	17
341	P98	max	T	1.934	5	.235	3	1.063	5	2.313	49	2.037	5

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
342		min		-.491	40	-1.852	11	.018	40	-.679	32	.052	49
343		max	B	3.903	41	.135	6	2.121	40	2.273	3	4.079	40
344		min		.471	7	-.831	9	.197	6	-.758	2	.475	6
345	P94	max	T	1.876	34	.011	12	1.06	34	2.271	3	2.009	34
346		min		.077	11	-.284	38	.035	11	-.783	4	.074	11
347		max	B	2.102	40	0	3	1.231	40	2.163	7	2.304	40
348		min		.047	4	-.401	33	.049	3	-.738	8	.098	3
349	P27	max	T	1.801	35	.006	27	1.052	35	2.228	13	1.969	35
350		min		.098	12	-.353	32	.064	27	-.634	38	.129	9
351		max	B	1.714	42	.067	4	.969	42	2.35	2	1.836	42
352		min		.017	7	-.304	38	.023	4	-.782	13	.098	4
353	P57	max	T	1.48	5	.014	3	1.097	41	1.063	12	1.968	41
354		min		.093	53	-1.796	11	.051	53	-.46	5	.098	53
355		max	B	1.357	11	-.211	13	1.962	35	2.356	9	3.84	35
356		min		.029	53	-3.752	35	.206	17	-.641	12	.364	17
357	P46	max	T	1.328	34	-.068	2	1.118	33	2.254	13	1.945	33
358		min		-.213	9	-1.036	42	.06	12	-.752	8	.149	17
359		max	B	1.698	40	-.076	12	1.34	40	1.989	8	2.348	40
360		min		-.096	5	-1.151	35	.166	6	.787	4	.321	6
361	P28	max	T	1.996	36	.325	39	.882	35	1.074	27	1.889	35
362		min		.178	27	-.201	5	.042	9	-.428	11	.155	27
363		max	B	2.598	42	.158	12	1.307	42	.791	11	2.606	42
364		min		-.164	6	-.427	6	.08	8	-.424	6	.159	8
365	P5	max	T	.642	5	.136	7	.925	33	1.109	9	1.883	32
366		min		-.452	12	-1.964	43	.05	8	-.32	7	.153	8
367		max	B	.437	11	-.083	9	.699	42	2.304	21	1.489	33
368		min		-.479	35	-1.654	34	.026	20	-.776	24	.139	8
369	P93	max	T	1.826	34	.011	5	.913	35	.382	8	1.826	34
370		min		.076	11	-.05	12	.052	11	-.247	12	.093	11
371		max	B	1.807	40	-.002	53	.924	40	2.331	5	1.828	40
372		min		.053	3	-.184	5	.046	3	-.591	6	.08	3
373	P72	max	T	.458	5	-.095	6	.808	34	.895	9	1.803	41
374		min		-.461	41	-1.989	41	.039	8	-.29	7	.166	8
375		max	B	.545	10	-.079	8	1.015	42	1.145	6	2.083	43
376		min		-.436	35	-2.187	32	.094	7	-.262	9	.165	8
377	P14	max	T	1.463	35	.013	6	.991	34	.407	12	1.778	34
378		min		.062	9	-.564	43	.038	9	-.501	8	.07	9
379		max	B	1.57	43	-.045	10	1.081	43	1.624	8	1.934	43
380		min		-.007	6	-.6	32	.044	9	.227	12	.085	9
381	P19	max	T	1.903	35	.289	35	.807	35	2.225	7	1.776	35
382		min		.069	9	-.119	11	.013	8	-.442	6	.069	8
383		max	B	1.428	43	.355	33	.545	43	2.175	7	1.292	43
384		min		-.026	8	-.272	9	.052	47	-.591	6	.113	22
385	P10	max	T	1.579	5	.079	3	.935	11	.936	10	1.744	11
386		min		.095	9	-1.581	11	.085	53	-.549	6	.163	47
387		max	B	.966	11	.152	13	.903	34	1.626	8	1.583	34
388		min		-.02	7	-1.26	5	.074	51	-.739	9	.13	51
389	P77	max	T	1.024	5	.134	3	.969	41	1.091	8	1.698	41
390		min		0	8	-1.314	11	.08	53	-.702	7	.142	53
391		max	B	1.393	10	.063	13	.896	35	.96	5	1.609	4
392		min		.109	7	-1.476	4	.101	51	-.491	10	.195	51
393	P52	max	T	1.353	5	.058	7	.924	41	1.055	11	1.626	41
394		min		.092	2	-1.512	11	.084	53	-.397	5	.162	53
395		max	B	1.223	11	-.028	13	1.216	35	2.334	19	2.341	35
396		min		.033	47	-2.239	35	.091	51	-.782	24	.164	51
397	P26	max	T	1.611	36	.013	8	.816	36	2.346	10	1.622	36
398		min		.011	13	-.235	11	.054	13	-.33	9	.102	13

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
399		max	B	1.646	42	.01	13	.828	42	.332	11	1.652	42
400		min		.075	7	-.065	37	.059	7	-.274	6	.104	7
401	P39	max	T	.486	4	.056	3	.75	43	2.35	11	1.619	41
402		min		-.322	9	-1.725	41	.118	2	1.339	4	.231	2
403		max	B	.757	10	-.034	11	.913	32	.961	8	2.252	33
404		min		-.942	35	-2.541	34	.098	6	-.38	4	.276	17
405	P29	max	T	1.35	10	.043	8	.808	5	1.474	7	1.542	5
406		min		-.325	33	-1.46	4	.012	47	-.516	8	.041	47
407		max	B	4.535	42	.019	2	2.301	42	2.347	43	4.569	42
408		min		.119	8	-1.943	6	.231	8	-.762	40	.414	8
409	P32	max	T	1.759	37	.885	33	.478	37	1.737	5	1.525	37
410		min		.075	12	-.066	13	.027	12	-.755	12	.067	12
411		max	B	1.448	42	.5	38	.592	43	2.167	11	1.333	43
412		min		.188	21	-.274	2	.05	9	-.777	10	.174	22
413	P99	max	T	1.66	34	.614	37	.664	33	1.856	13	1.506	33
414		min		.044	11	-.421	13	.047	10	.477	8	.12	10
415		max	B	1.969	38	1.077	32	.516	38	2.297	11	1.706	38
416		min		.249	49	-.112	13	.033	49	-.51	12	.223	49
417	P33	max	T	1.496	35	.23	37	.773	32	2.356	28	1.488	33
418		min		.01	12	-.18	43	.054	12	-.784	24	.104	12
419		max	B	.774	40	-.079	51	.664	38	1.589	6	1.151	38
420		min		-.059	5	-.666	36	.077	5	-.159	5	.148	53
421	P127	max	T	1.25	34	-.013	3	.785	34	.226	12	1.438	34
422		min		.049	11	-.356	39	.07	12	-.042	6	.122	12
423		max	B	1.288	39	.004	11	.814	39	.109	6	1.488	39
424		min		.089	2	-.371	36	.073	13	-.286	13	.129	2
425	P86	max	T	1.567	33	.444	38	.608	33	2.212	8	1.424	33
426		min		.182	47	-.183	4	.054	47	-.728	9	.159	47
427		max	B	2.228	40	.303	42	.986	40	.574	7	2.111	40
428		min		.136	5	-.273	6	.12	4	-.346	2	.216	4
429	P59	max	T	1.358	36	.063	6	.724	37	1.888	12	1.399	37
430		min		.037	13	-.382	11	.059	2	.717	4	.109	2
431		max	B	1.205	42	.063	41	.575	42	1.936	6	1.179	42
432		min		.053	7	-.364	5	.047	8	.682	27	.089	8
433	P60	max	T	1.143	37	-.01	5	.73	37	.177	27	1.33	37
434		min		.049	13	-.337	40	.062	13	-.172	3	.107	13
435		max	B	1.109	42	.001	11	.687	42	.124	5	1.262	42
436		min		.078	6	-.3	35	.064	23	-.139	26	.119	22
437	P126	max	T	1.315	34	.075	5	.655	34	1.965	11	1.313	34
438		min		.054	11	-.395	11	.085	47	.793	4	.16	51
439		max	B	1.576	39	.064	10	.81	39	1.798	4	1.598	39
440		min		.055	3	-.336	5	.057	2	.661	12	.1	2
441	P129	max	T	.894	4	.015	2	.706	40	1.125	9	1.299	40
442		min		.048	8	-1.142	40	.048	53	-.36	5	.085	53
443		max	B	1.374	40	.017	9	.781	40	1.018	4	1.477	40
444		min		.06	2	-.948	5	.105	2	-.345	11	.187	2
445	P62	max	T	1.129	36	.017	7	.709	37	1.045	12	1.289	36
446		min		.073	13	-.999	11	.081	2	-.323	4	.14	2
447		max	B	.947	11	.013	13	.587	5	1.198	8	1.124	5
448		min		.011	8	-1.065	5	.033	51	-.506	22	.067	51
449	P35	max	T	1.233	34	.03	7	.646	33	.845	10	1.255	34
450		min		0	11	-.149	43	.01	11	-.72	36	.019	11
451		max	B	1.005	42	.03	43	.49	42	2.355	40	.992	42
452		min		-.006	6	-.109	8	.04	6	-.782	26	.083	6
453	P131	max	T	.623	5	.045	3	.675	41	2.282	2	1.245	40
454		min		.045	47	-1.113	40	.02	7	-.267	34	.07	7
455		max	B	.851	40	.078	9	.578	36	1.826	9	1.005	37

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
456		min		-.009	2	-.811	5	.072	51	-.781	27	.135	49
457	P21	max	T	.836	10	.113	8	.649	42	1.657	7	1.236	42
458		min		-.278	3	-1.204	43	.052	53	-.389	8	.13	47
459		max	B	2.802	42	-.03	13	1.74	42	2.34	53	3.196	42
460		min		-.121	8	-1.831	5	.121	8	-.775	35	.32	8
461	P108	max	T	.86	33	.008	4	.694	33	2.347	40	1.214	33
462		min		.068	9	-.654	40	.094	5	-.773	10	.176	53
463		max	B	.874	40	.078	10	.508	39	2.314	7	.953	40
464		min		.081	4	-.269	34	.06	10	-.763	3	.136	49
465	P100	max	T	.848	7	-.065	4	.684	38	1.431	9	1.185	38
466		min		-.033	10	-.783	13	.059	10	.01	12	.137	10
467		max	B	1.722	43	.267	39	.959	33	2.263	9	1.818	32
468		min		.245	9	-.241	33	.025	9	-.769	7	.224	9
469	P64	max	T	.761	36	.066	7	.633	40	1.932	7	1.102	40
470		min		-.003	2	-.827	11	.053	2	-.664	53	.108	2
471		max	B	.701	11	.047	13	.5	35	1.697	13	.922	35
472		min		.013	8	-.87	5	.021	51	-.391	2	.04	51
473	P65	max	T	.583	5	-.002	7	.388	11	1.48	11	1.046	41
474		min		-.736	42	-1.206	41	.036	49	.009	4	.109	53
475		max	B	.687	11	-.012	13	.37	11	2.347	36	.816	36
476		min		-.434	35	-.942	36	.029	2	-.725	47	.065	2
477	P132	max	T	.599	5	-.054	3	.365	11	2.304	34	1.019	40
478		min		-.592	40	-1.176	40	.038	49	-.785	36	.1	53
479		max	B	.633	11	-.022	9	.365	11	1.476	6	1.024	34
480		min		-.792	34	-1.157	34	.029	8	.007	10	.051	8
481	P90	max	T	.522	34	-.062	6	.579	33	2.338	12	1.005	33
482		min		-.002	8	-.749	41	.055	7	-.614	40	.096	7
483		max	B	.492	39	.018	12	.458	39	2.27	5	.794	39
484		min		.025	5	-.527	34	.04	12	-.659	6	.077	13
485	P22	max	T	.666	10	.143	8	.559	42	2.25	13	.983	42
486		min		-.056	3	-.774	43	.044	8	-.761	41	.116	47
487		max	B	1.883	11	.025	12	1.149	42	1.742	9	2.01	42
488		min		-.261	6	-1.795	5	.093	8	.275	7	.27	47
489	P116	max	T	.31	5	-.069	2	.436	38	1.99	13	.98	39
490		min		-.253	9	-1.07	39	.005	9	-.165	2	.105	13
491		max	B	.345	11	-.077	10	.519	32	1.311	5	1.07	33
492		min		-.254	4	-1.118	33	.029	3	-.037	12	.13	8
493	P102	max	T	1.001	33	.057	33	.473	34	2.356	18	.974	34
494		min		-.002	10	-.082	8	.023	10	-.783	28	.046	10
495		max	B	1.545	41	.01	8	.797	42	2.348	8	1.564	41
496		min		.036	6	-.185	33	.025	6	-.779	10	.044	6
497	P18	max	T	.988	36	.142	38	.428	36	2.221	10	.929	36
498		min		.037	27	-.198	12	.006	27	-.394	9	.033	27
499		max	B	.827	42	.183	32	.337	41	2.03	7	.759	41
500		min		.018	7	-.17	5	.026	53	.296	8	.068	7
501	P49	max	T	.323	5	-.06	7	.417	32	1.455	12	.906	43
502		min		-.261	41	-.985	43	.014	17	-.165	13	.095	8
503		max	B	.34	11	-.046	13	.461	38	1.751	6	.943	37
504		min		-.238	6	-.977	36	.026	3	-.356	7	.076	2
505	P41	max	T	.71	36	.082	4	.464	37	2.356	39	.835	37
506		min		.081	28	-.342	41	.031	5	-.783	47	.124	5
507		max	B	.79	43	.057	10	.598	32	2.281	6	1.051	43
508		min		.019	7	-.465	34	.019	10	-.759	37	.08	9
509	P85	max	T	.891	34	.2	32	.354	35	1.903	13	.813	34
510		min		.06	9	-.21	11	.027	51	.249	2	.07	13
511		max	B	1.152	40	.148	39	.506	40	2.167	5	1.088	40
512		min		.052	4	-.151	4	.053	53	-.537	6	.116	53

Envelope Plate/Shell Principal Stresses (Continued)

	Plate		Surf...	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [ksi]	LC	Angle [rad]	LC	Von Mises [ksi]	LC
513	P12	max	T	.48	36	.03	7	.418	34	1.884	12	.725	34
514		min		-.154	12	-.507	43	.041	12	-.322	13	.088	51
515		max	B	.315	12	-.053	10	.313	43	2.308	17	.542	43
516		min		-.064	5	-.439	37	.025	17	-.488	9	.059	17
517	P23	max	T	.42	37	-.015	4	.401	37	2.306	10	.694	37
518		min		.03	2	-.492	42	.037	3	-.685	28	.064	3
519		max	B	.484	42	-.029	26	.513	43	2.302	4	.89	43
520		min		-.039	7	-.635	35	.018	8	-.71	3	.054	24
521	P79	max	T	.404	34	-.037	5	.4	34	2.202	9	.692	34
522		min		-.123	11	-.522	39	.02	9	-.251	8	.083	8
523		max	B	.412	41	.007	8	.418	42	1.754	4	.725	42
524		min		-.135	3	-.539	33	.009	3	-.555	3	.074	8
525	P44	max	T	.473	4	-.051	13	.31	4	1.459	10	.614	41
526		min		-.473	40	-.704	42	.016	47	-.052	4	.046	13
527		max	B	2.152	42	-.01	11	1.746	32	2.243	12	3.042	32
528		min		.226	6	-1.48	33	.251	17	-.75	17	.462	51
529	P67	max	T	.301	38	-.006	6	.317	38	2.191	6	.549	38
530		min		-.006	3	-.408	42	.014	6	.084	5	.025	6
531		max	B	.248	42	-.002	12	.258	43	1.984	13	.448	43
532		min		-.002	9	-.38	36	.017	12	-.57	12	.032	27
533	P134	max	T	.28	34	-.011	5	.3	36	1.687	13	.53	39
534		min		.009	2	-.431	40	.011	5	-.67	2	.019	5
535		max	B	.294	39	-.015	9	.334	37	2.204	9	.583	36
536		min		.009	12	-.459	34	.018	9	-.216	10	.032	9

APPENDIX 3:
ATTACHMENTS

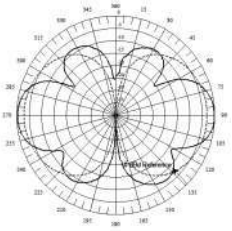
VHF Omni Antennas (160-222 MHz)

		160-174 MHz						217-222 MHz									
	Model Number	**DS1G03F36U-N**	**DS1G03F36U-D**	**DS1G06F36U-N**	**DS1G06F36U-D**	**DS1G03F36D-N**	**DS1G03F36D-D**	**DS2C00F36U-N**	**DS2C00F36U-D**	**DS2C03F36U-N**	**DS2C03F36U-D**	**DS2C06F36U-N**	**DS2C06F36U-D**	**DS2C00F36D-N**	**DS2C00F36D-D**	**DS2C03F36D-N**	**DS2C03F36D-D**
	Input Connector	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN
	Type	Single		Single		Dual		Single		Single		Single		Dual		Dual	
ELECTRICAL	**Bandwidth**, MHz	14		14		14		5		5		5		5		5	
ELECTRICAL	**Power**, Watts	500		500		350		500		500		500		350		350	
ELECTRICAL	**Gain**, dBd	3		6		3		0		3		6		0		3	
ELECTRICAL	**Horizontal Beamwidth**, degrees	360		360		360		360		360		360		360		360	
ELECTRICAL	**Vertical Beamwidth**, degrees	30		16		30		60		30		16		60		30	
ELECTRICAL	**Beam Tilt**, degrees	0		0		0		0		0		0		0		0	
ELECTRICAL	**Isolation (minimum)**, dB	N/A		N/A		30		N/A		N/A		N/A		30		30	
MECHANICAL	**Number of Connectors**	1		1		2		1		1		1		2		2	
MECHANICAL	**Flat Plate Area**, ft^2	2.10		3.63		3.69		1.28		1.64		2.58		2.09		3.08	
MECHANICAL	**Lateral Windload Thrust**lbf	88		152		155		54		69		109		88		129	
MECHANICAL	**Wind Speed Rating without ice**, mph	190		150		150		250		225		175		190		160	
MECHANICAL	**Mounting Hardware** included	DSH3V3R		DSH3V3N		DSH3V3N		DSH2V3R		DSH2V3R		DSH3V3N		DSH3V3R		DSH3V3N	
DIMENSIONS	**Length**, ft(m)	12.7 (3.9)		21.9 (6.7)		22.3 (6.8)		7.7 (2.3)		9.9 (3)		15.6 (4.8)		12.6 (3.8)		18.6 (5.7)	
DIMENSIONS	**Radome O.D.**, in(cm)	3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)	
DIMENSIONS	**Mast O.D.**, in(cm)	2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)	
DIMENSIONS	**Net Weight** w/o bracket, lb(kg)	37 (16.8)		60 (27.2)		63 (28.6)		19 (8.6)		26 (11.8)		47 (21.3)		40 (18.1)		70 (31.8)	
DIMENSIONS	**Shipping Weight**, lb(kg)	67 (30.4)		90 (40.8)		93 (42.2)		39 (17.7)		56 (25.4)		77 (34.9)		70 (31.8)		100 (45.4)	

DS2C03F36D-D

VERTICAL PATTERNS

DS1G03F36U-N
DS1G03F36U-D



DS1G06F36U-N
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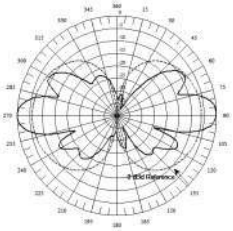

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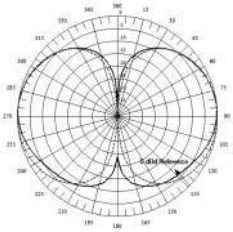

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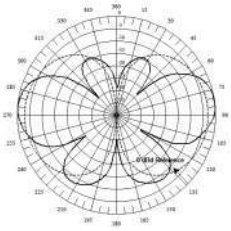

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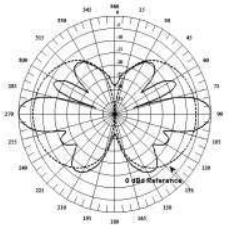

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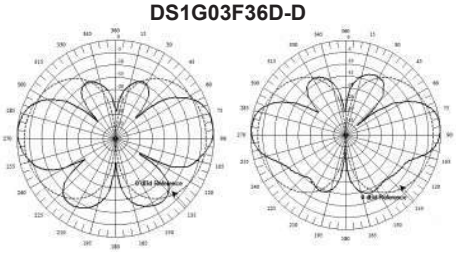

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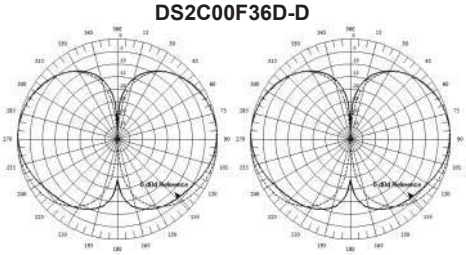

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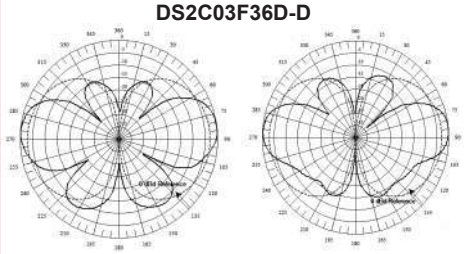

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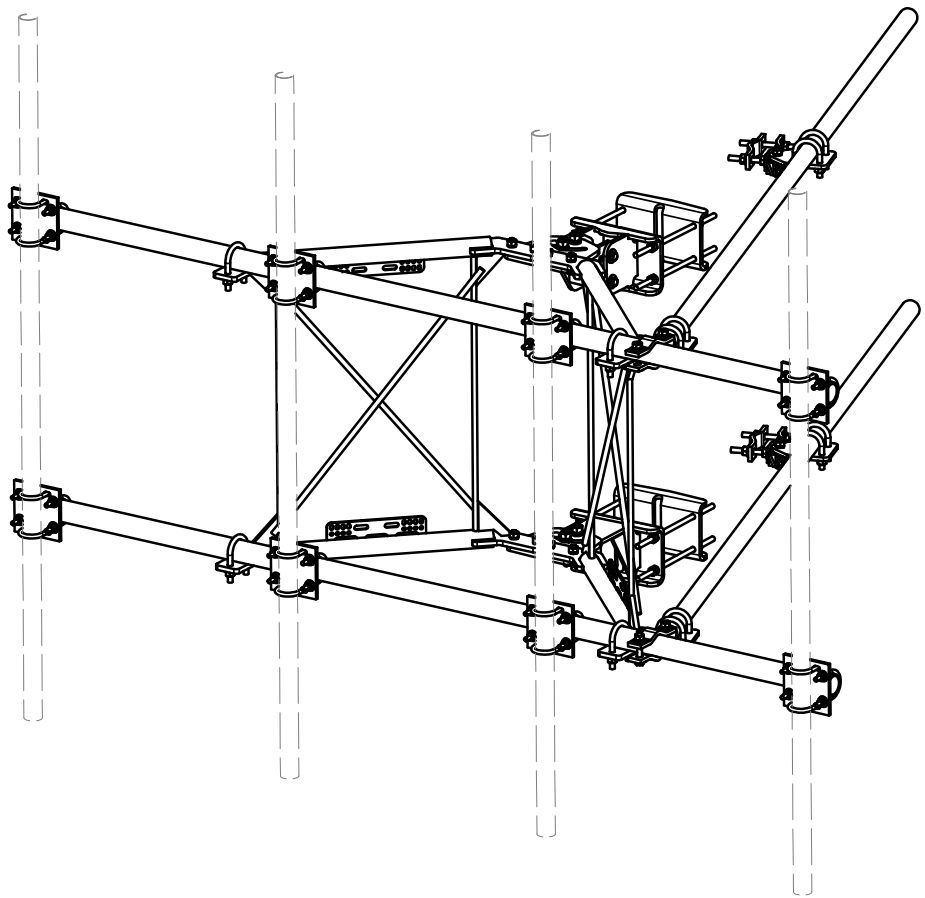

PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	X-VFAW	SUPPORT ARM		71.41	142.81
2	1	X-HDCAMTBW	CLAMP WELDMENT FOR BCAM-HD		33.86	33.86
3	1	X-MHTPHD	MULTI-HOLE TAPER PLATE WELDMENT		36.24	36.24
4	2	X-VFAPL4	VFA-HD PIVOT PLATE	12 in	15.88	31.77
5	2	X-LCBP4	BENT BACKING PLATE	13 in	19.00	38.01
6	1	X-HDCAMSS	ANGLE ADJUSTMENT WELDMENT FOR BCAM-HD		16.39	16.39
7	4	X-SPTB	SLIDING PIPE TIE BACK PLATE	5 1/2 in	5.87	23.49
8	1	X-HDCAMSP	POSITIONING PLATE WELDMENT FOR BCAM-HD		2.58	2.58
9	4	X-TBCA	TIE BACK CLIP ANGLE		2.01	8.02
10	8	SCX2	CROSSOVER PLATE	7 in	4.80	38.37
11	4	MCP	CLAMP HALF 1/2" THICK, 11-5/8" LONG	12 1/16 in	3.59	14.37
12	8	DCP	1/2" THICK, 5-3/4" CNTER TO CENTER CLAMP HALF	8 1/8 in	2.36	18.90
13	2	P2126	2-3/8" X 126" (2" SCH. 40) GALVANIZED PIPE	126 in	40.75	81.50
14	2	P30126	2-7/8" O.D. X 126" SCH. 40 PIPE	126 in	64.63	129.25
15	4	A34212	3/4" x 2-1/2" UNC HEX BOLT (A325)	2 1/2 in	0.48	1.92
16	4	G34FW	3/4" HDG USS FLATWASHER		0.06	0.24
17	4	G34LW	3/4" HDG LOCKWASHER		0.04	0.17
18	4	G34NUT	3/4" HDG HEAVY 2H HEX NUT		0.21	0.85
19	8	G58R-18	5/8" x 18" THREADED ROD (HDG.)	18 in	0.40	3.19
20	4	G58R-12	5/8" x 12" THREADED ROD (HDG.)		1.05	4.18
21	4	G58R-8	5/8" x 8" THREADED ROD (HDG.)		0.70	2.79
22	4	X-UB5300	5/8" X 3" X 5-1/4" X 2-1/2" U-BOLT (HDG.)		1.15	4.60
23	8	X-UB5258	5/8" X 2-5/8" X 4-1/2" X 2" U-BOLT (HDG.)		1.00	8.00
24	2	G5807	5/8" x 7" HDG HEX BOLT GR5 FULL THREAD	7 in	0.70	1.41
25	1	G5806	5/8" x 6" HDG HEX BOLT GR5 FULL THREAD	6 in	0.62	0.62
26	8	G5804	5/8" x 4" HDG HEX BOLT GR5		0.44	3.55
27	4	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.08
28	8	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	2.50
29	25	G58FW	5/8" HDG USS FLATWASHER	1/8 in	0.07	1.76
30	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
31	71	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	9.22
32	32	X-UB1300	1/2" X 3" X 5" X 2" GALV U-BOLT		0.74	23.64
33	16	X-UB1212	1/2" X 2" X 3" X 1-1/4" U-BOLT (HDG.)		0.60	9.56
34	64	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	2.18
35	64	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.89
36	64	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	4.58
					TOTAL WT. #	713.44

REVISION HISTORY

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
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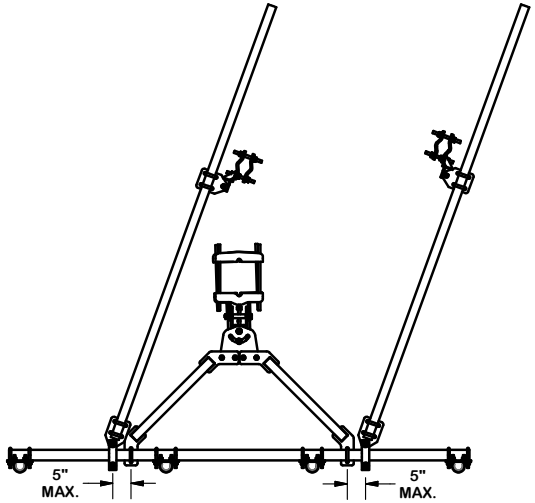
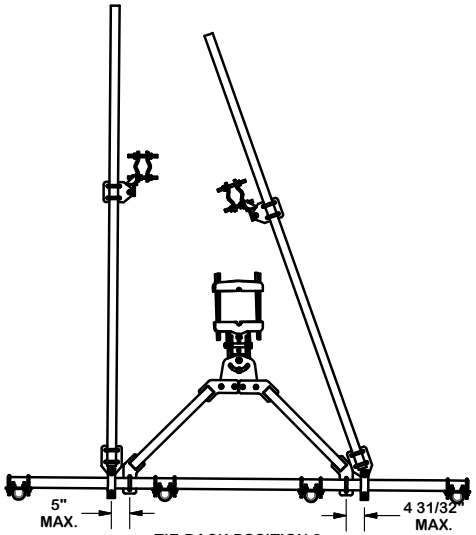
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 12/14/2017	VFA10-HD

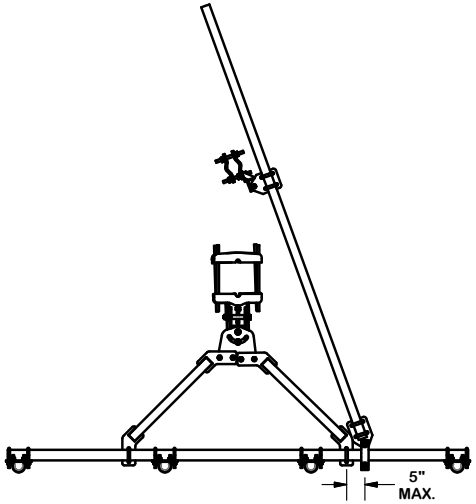
TIE-BACK POSITIONS



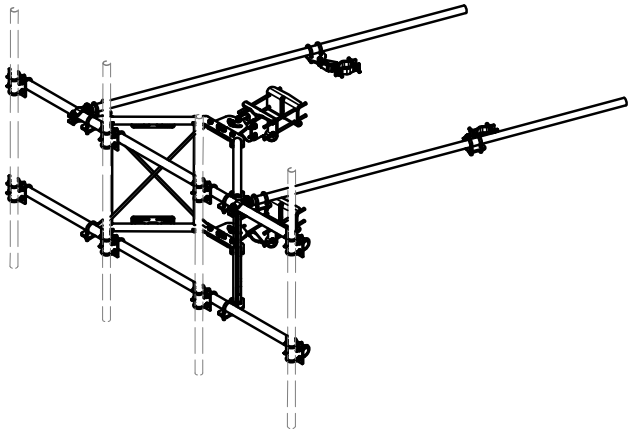
TIE-BACK POSITION 1
-20° / +20° TOP PARALLEL

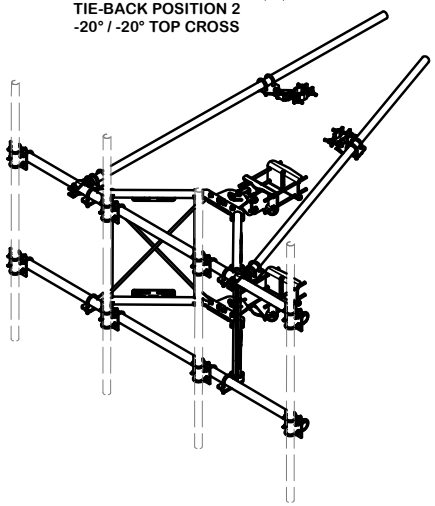


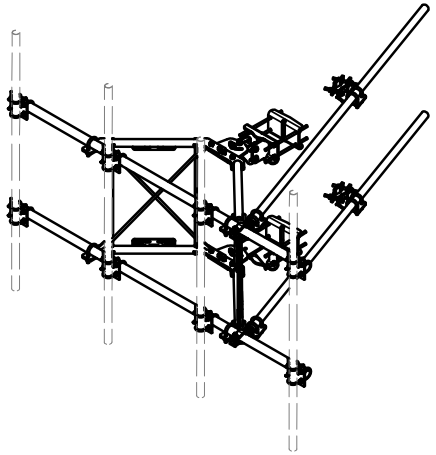
TIE-BACK POSITION 2
-20° / -20° TOP CROSS



TIE-BACK POSITION 3
-20° SAME SIDE STACKED







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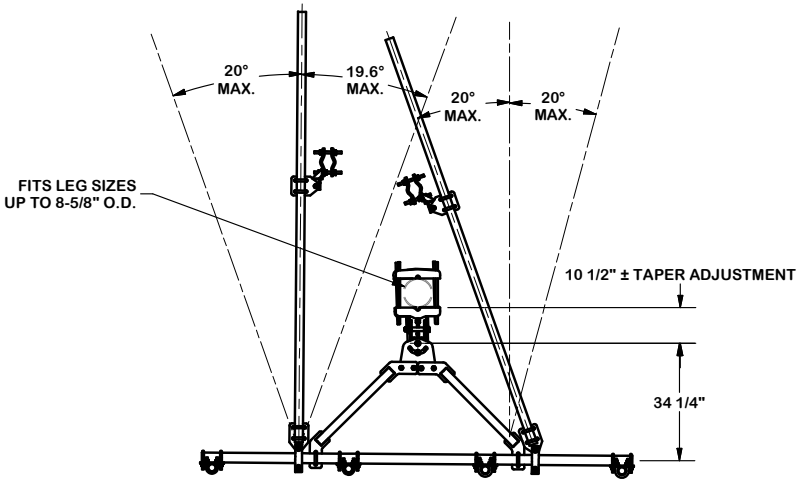
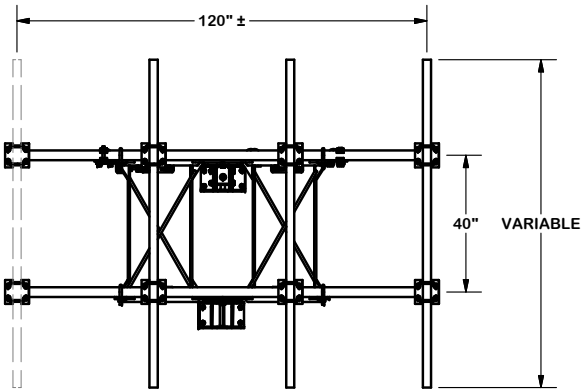
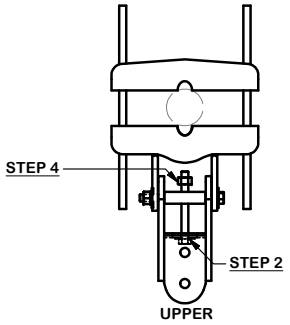
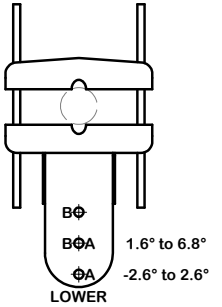


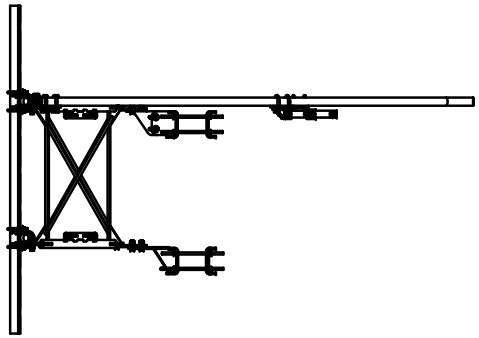


ANGLE CALIBRATING PROCEDURE:

1. MEASURE TOWER TAPER AND PICK LOWER BRACKET HOLE:
   - HOLE A = -2.6° TO 2.6°
   - HOLE B = 1.6° TO 6.8°
2. USE CALIBRATING BOLT TO ADJUST FRAME TO DESIRED TAPER
3. TORQUE LOCKING BOLTS TO 100 ft.-lbs.
4. ADVANCE LOCKING NUT TO POSITIONING PLATE, THEN TIGHTEN.







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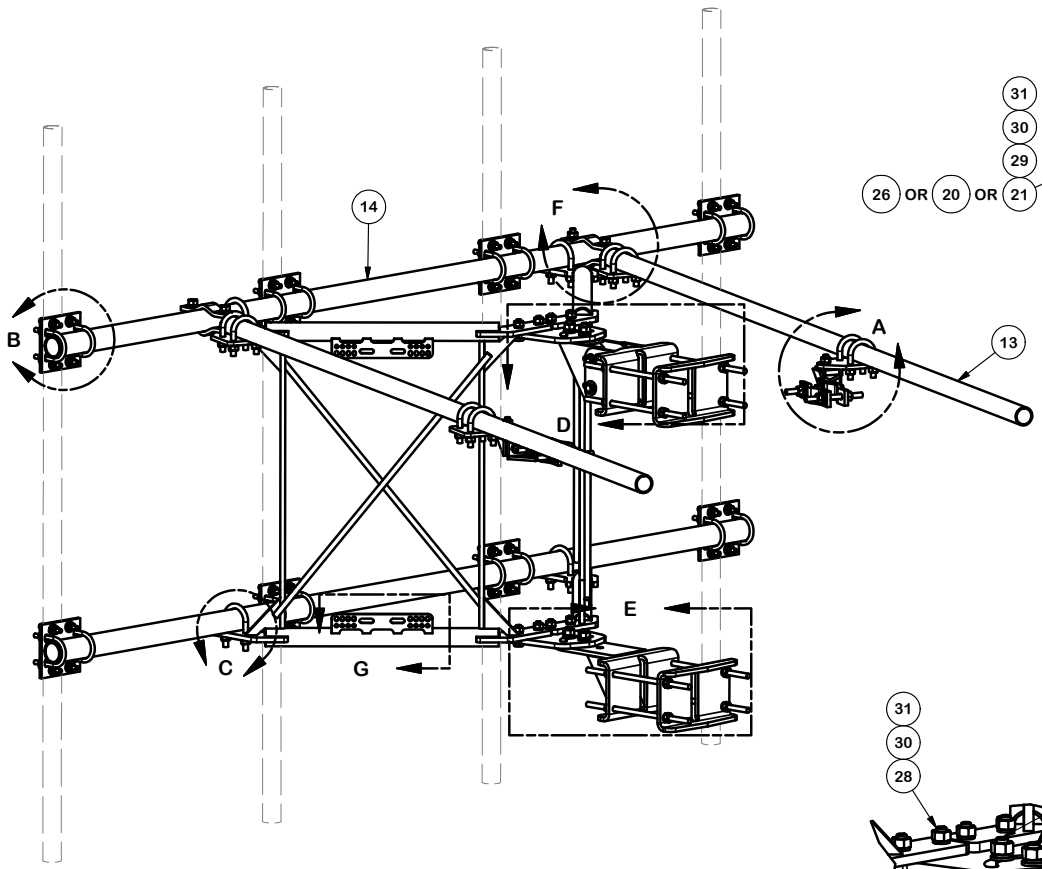
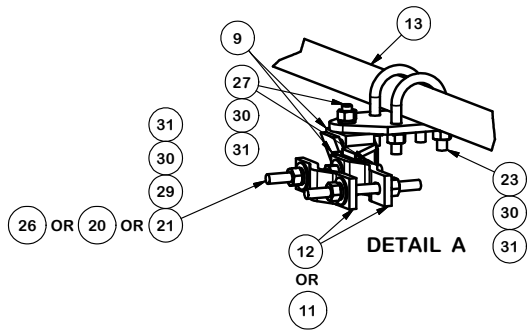
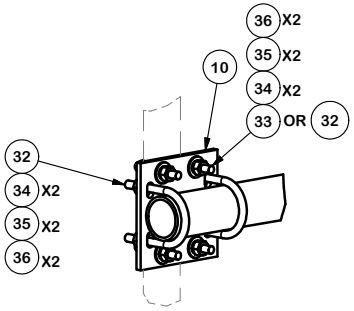
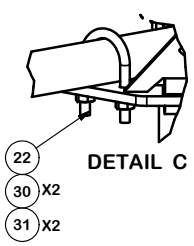




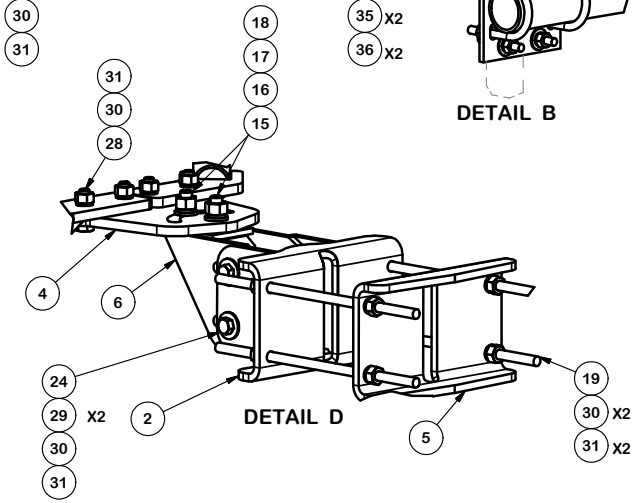
DETAIL A



DETAIL B



DETAIL C

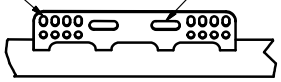


DETAIL D

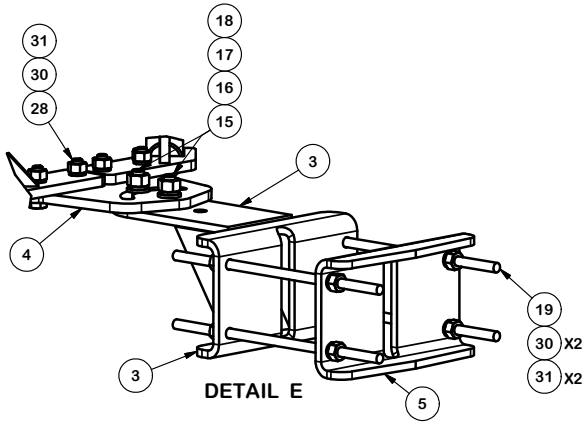
7/16" LUG HOLES

REVIEW CARRIER STANDARDS FOR PROPER SURFACE PREPARTION AND ASSEMBLY OF ELECTRICAL CONNECTIONS

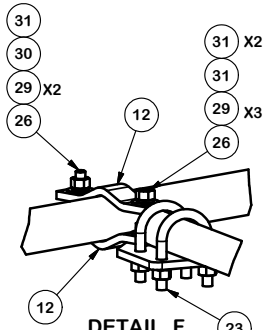
9/16" SLOTTED HOLE FOR EQUIPMENT PIPE U-BOLT



DETAIL G



DETAIL E



DETAIL F

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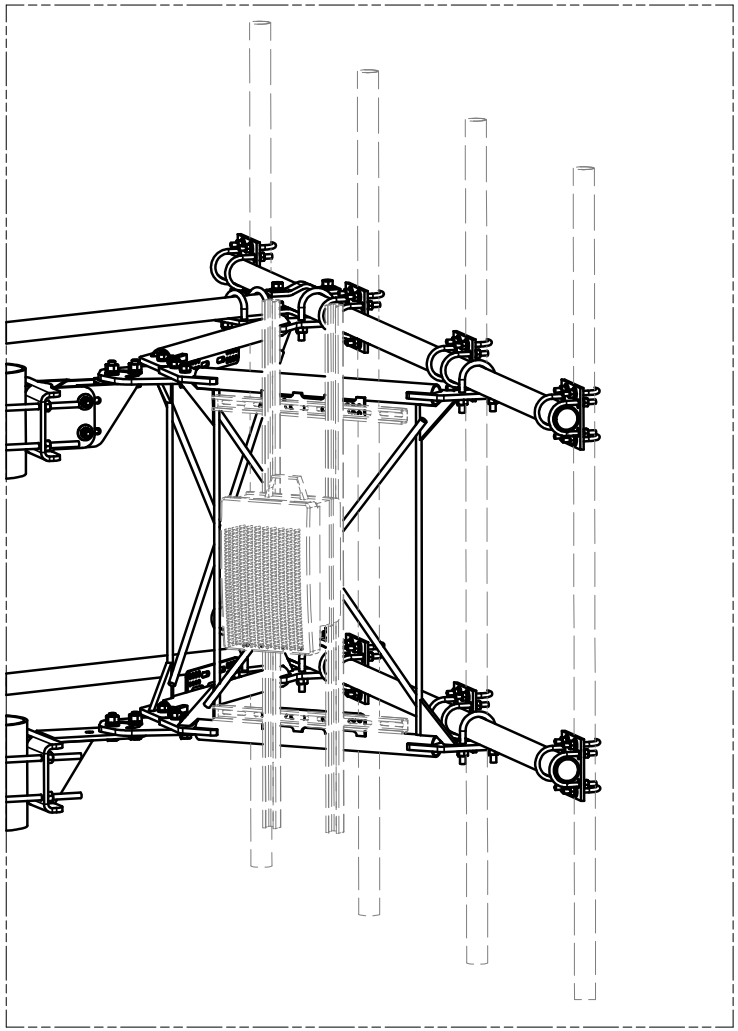
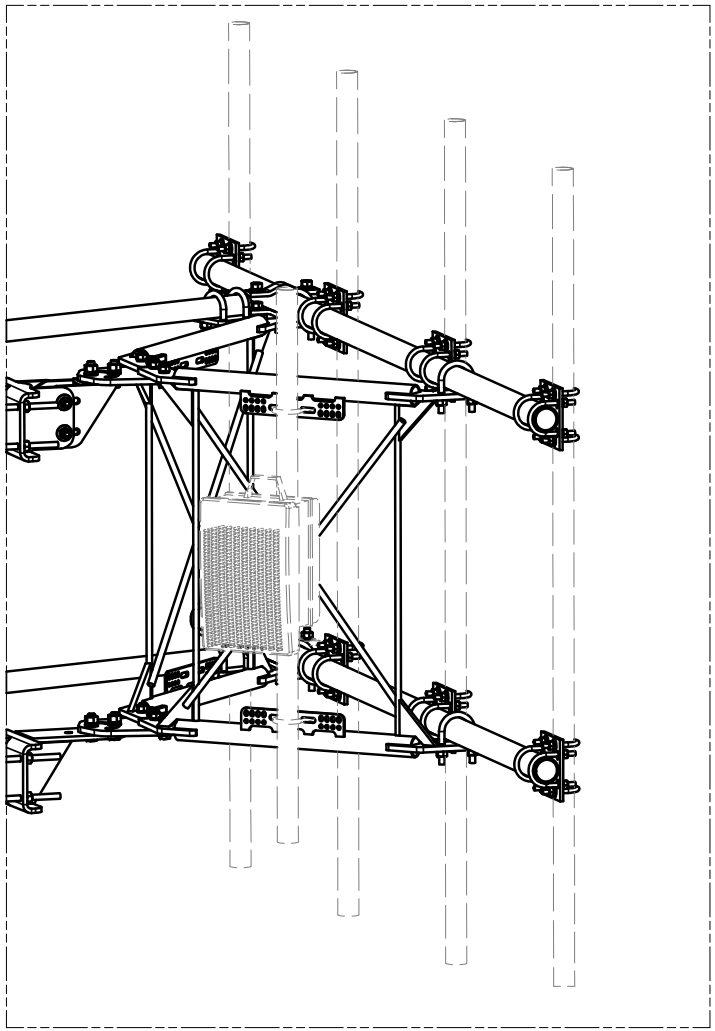


UNISTRUT AND HARDWARE
SOLD SEPARATELY.

REQUIRES 3/8" HARDWARE



EQUIPMENT PIPE AND HARDWARE
SOLD SEPARATELY.

REQUIRES 1/2" HARDWARE
AND 2-3/8" TO 4-1/2" O.D. PIPE

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