

Schletter, Inc.	Standard PVMax Racking System Representative Calculations - ASCE 7-05	20° Tilt w/o Seismic Design
HCV		

## 1. INTRODUCTION

### 1.1 Project Description

The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

### 1.2 Construction

Photovoltaic modules are attached to aluminum purlins using clamp fasteners. Purlins are clamped to inclined aluminum girders, which are then connected to aluminum struts. Each support structure is equally spaced.

PV modules are required to meet the following specifications:

	Maximum		Minimum
Height =	1700 mm	Height =	1550 mm
Width =	1050 mm	Width =	970 mm
Dead Load =	3.00 psf	Dead Load =	1.75 psf

Modules Per Row = 2  
Module Tilt = 20°  
Maximum Height Above Grade = 3 ft

### 1.3 Technical Codes

- ASCE 7-05 - Chapter 6, Wind Loads
- ASCE 7-05 - Chapter 7, Snow Loads
- ASCE 7-05 - Chapter 2, Combination of Loads
- International Building Code, IBC, 2003, 2006, 2009
- Aluminum Design Manual, Eighth Edition, 2005

## 2. LOAD ACTIONS

### 2.1 Permanent Loads

$g_{MAX}$ =	3.00 psf
$g_{MIN}$ =	1.75 psf

Self-weight of the PV modules.

### 2.2 Snow Loads

Ground Snow Load, $P_g$ =	30.00 psf	
Sloped Roof Snow Load, $P_s$ =	20.62 psf	(ASCE 7-05, Eq. 7-2)
$I_s$ =	1.00	
$C_s$ =	0.91	
$C_e$ =	0.90	
$C_t$ =	1.20	

### 2.3 Wind Loads

Design Wind Speed, $V$ =	110 mph	Exposure Category = C
Height <	15 ft	Importance Category = II

Peak Velocity Pressure,  $q_z$  = 19.00 psf Including the gust factor,  $G=0.85$ . (ASCE 7-05, Eq. 6-15)

### Pressure Coefficients

$C_{f+ TOP}$ =	1.050	(Pressure)
$C_{f+ BOTTOM}$ =	1.650	
$C_{f- TOP, OUTER PURLIN}$ =	-2.400	
$C_{f- TOP, INNER PURLIN}$ =	-1.840	(Suction)
$C_{f- BOTTOM}$ =	-1.000	

Provided pressure coefficients are the result of wind tunnel testing done by Ruscheweyh Consult. Coefficients are located in test report # 1127/0611-1e. Negative forces are applied away from the surface.

### 2.4 Seismic Loads - N/A

$S_S$ =	0.00	$R$ = 1.25
$S_{DS}$ =	0.00	$C_s$ = 0
$S_1$ =	0.00	$\rho$ = 1.3
$S_{D1}$ =	0.00	$\Omega$ = 1.25
$T_a$ =	0.00	$C_d$ = 1.25

ASCE 7, Section 12.8.1.3: A maximum  $S_S$  of 1.5 may be used to calculate the base shear,  $C_s$ , of structures under five stories and with a period,  $T$ , of 0.5 or less. Therefore, a  $S_{ds}$  of 1.0 was used to calculate  $C_s$ .



Typical loading conditions of the module dead loads, snow loads, and wind loads are shown on the left.

## 2.5 Combination of Loads

ASCE 7 requires that all structures be checked by specified combinations of loads. Applicable load combinations are provided below.

### Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

$$\begin{aligned}
 &1.2D + 1.6S + 0.8W \\
 &1.2D + 1.6W + 0.5S \\
 &0.9D + 1.6W^M \\
 &1.54D + 1.3E + 0.2S^R \quad (\text{ASCE 7, Eq 2.3.2-1 through 2.3.2-7}) \text{ \& } (\text{ASCE 7, Section 12.4.3.2}) \\
 &0.56D + 1.3E^R \\
 &1.54D + 1.25E + 0.2S^O \\
 &0.56D + 1.25E^O
 \end{aligned}$$

### Allowable Stress Design, ASD

Member deflection checks and foundation designs are done according to the following ASD load combinations:

$$\begin{aligned}
 &1.0D + 1.0S \\
 &1.0D + 1.0W \\
 &1.0D + 0.75L + 0.75W + 0.75S \\
 &0.6D + 1.0W^M \quad (\text{ASCE 7, Eq 2.4.1-1 through 2.4.1-8}) \text{ \& } (\text{ASCE 7, Section 12.4.3.2}) \\
 &1.238D + 0.875E^O \\
 &1.1785D + 0.65625E + 0.75S^O \\
 &0.362D + 0.875E^O
 \end{aligned}$$

<sup>M</sup> Uses the minimum allowable module dead load.

<sup>R</sup> Include redundancy factor of 1.3.

<sup>O</sup> Includes overstrength factor of 1.25. Used to check seismic drift.

## 3. STRUCTURAL ANALYSIS

### 3.1 RISA Results

Appendix B.1 contains outputs from the structural analysis software package, RISA. These outputs are used to accurately determine resultant member and reaction forces from the loads seen throughout Section 2.

### 3.2 RISA Components

A member and node list has been provided below to correlate the RISA components with the design calculations in Section 4. Items of significance have been listed.

<u>Purlins</u>	<u>Location</u>	<u>Diagonal Struts</u>	<u>Location</u>	<u>Front Reactions</u>	<u>Location</u>
M13	Top	M3	Outer	N7	Outer
M14	Mid-Top	M7	Inner	N15	Inner
M15	Mid-Bottom	M11	Outer	N23	Outer
M16	Bottom				
<u>Girders</u>	<u>Location</u>	<u>Rear Struts</u>	<u>Location</u>	<u>Rear Reactions</u>	<u>Location</u>
M1	Outer	M2	Outer	N8	Outer
M5	Inner	M6	Inner	N16	Inner
M9	Outer	M10	Outer	N24	Outer
<u>Front Struts</u>	<u>Location</u>				
M4	Outer				
M8	Inner				
M12	Outer				

## 4. MEMBER DESIGN CALCULATIONS

### 4.1 Purlin Design

Aluminum purlins are used to transfer loads to the support structure. Purlins are designed as continuous beams with cantilevers. These are considered beams with internal hinges that can be joined with splices at 25% of the support respective span. See Appendix A.1 for detailed member calculations. Section units are in (mm).

Purlin Type =	<b>S1.5</b>
Aluminum Type =	6105-T5
$F_{ty}$ =	35 ksi
$L_b$ =	117 in
$\Phi F_{ty}$ STRONG-AXIS =	25.07 ksi
$\Phi F_{ty}$ WEAK-AXIS =	23.08 ksi
$S_y$ =	1.33 in <sup>3</sup>
$S_x$ =	0.60 in <sup>3</sup>
$E$ =	10100 ksi
$I_y$ =	2.16 in <sup>4</sup>
$I_x$ =	1.07 in <sup>4</sup>
$A$ =	1.25 in <sup>2</sup>
$g$ =	1.50 lbs/ft
$M_y$ =	1.982 k-ft
$M_z$ =	0.288 k-ft
$M_{y \text{ allowable}}$ =	2.779 k-ft
$M_{z \text{ allowable}}$ =	1.154 k-ft
Utilization =	<b>96%</b>



DETAIL VIEW

### 4.2 Girder Design

Loads from purlins are transferred using an inclined girder, which is connected to a set of aluminum struts. Loads on the girder result from the support reactions of the purlins. See Appendix A.2 for detailed member calculations. Section units are in (mm).

Girder Type =	<b>BF0</b>
Aluminum Type =	6105-T5
$F_{ty}$ =	35 ksi
$L_b$ =	88.90 in
$\Phi F_{ty}$ AXIAL =	31.09 ksi
$\Phi F_{ty}$ STRONG-AXIS =	29.35 ksi
$\Phi F_{ty}$ WEAK-AXIS =	33.25 ksi
$S_y$ =	1.42 in <sup>3</sup>
$S_x$ =	1.41 in <sup>3</sup>
$E$ =	10100 ksi
$I_y$ =	2.39 in <sup>4</sup>
$I_x$ =	2.22 in <sup>4</sup>
$A$ =	1.88 in <sup>2</sup>
$g$ =	2.26 lbs/ft
$M_y$ =	-3.184 k-ft
$M_z$ =	0.000 k-ft
$P_n$ =	-0.644 k
$M_{y \text{ allowable}}$ =	3.464 k-ft
$M_{z \text{ allowable}}$ =	3.907 k-ft
$P_{n \text{ allowable}}$ =	58.535 k
Utilization =	<b>93%</b>



### 4.3 Front Strut Design

The front aluminum strut connects a portion of the girder to the foundation. Vertical girder forces are then transferred down through the strut into the foundation. The strut is attached with single M12 bolts at each end. See Appendix A.3 for detailed member calculations. Section units are in (mm).

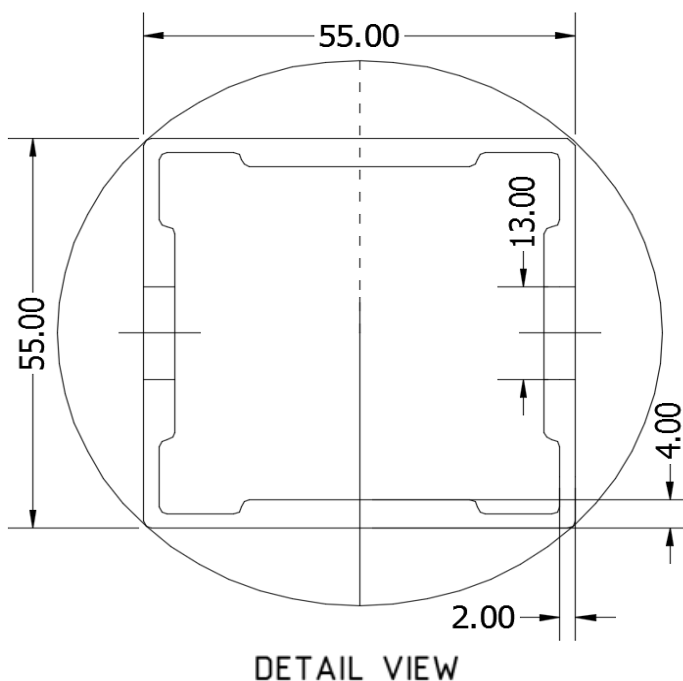
Strut Type =	<b>55x55</b>
Aluminum Type =	6105-T5
$F_{ty}$ =	35 ksi
$L_b$ =	24.80 in
$\Phi F_{ty \text{ AXIAL}}$ =	28.03 ksi
$\Phi F_{ty \text{ BENDING}}$ =	28.22 ksi
$S_y$ =	0.60 in <sup>3</sup>
$S_x$ =	0.60 in <sup>3</sup>
$E$ =	10100 ksi
$I_y$ =	0.67 in <sup>4</sup>
$I_x$ =	0.67 in <sup>4</sup>
$A$ =	0.98 in <sup>2</sup>
$g$ =	1.18 lbs/ft
$M_y$ =	0.000 k-ft
$M_z$ =	0.000 k-ft
$P_n$ =	3.478 k
$M_{y \text{ allowable}}$ =	1.408 k-ft
$M_{z \text{ allowable}}$ =	1.408 k-ft
$P_{n \text{ allowable}}$ =	27.532 k
Utilization =	<b>13%</b>



### 4.4 Diagonal Strut Design

A diagonal aluminum strut braces the support structure. It connects at a front portion of the girder and transfers horizontal forces to the rear foundation connection. The strut is attached with single M12 bolts at each end. See Appendix A.4 for detailed member calculations. Section units are in (mm).

Strut Type =	<b>55x55</b>
Aluminum Type =	6105-T5
$F_{ty}$ =	35 ksi
$L_b$ =	86.60 in
$\Phi F_{ty \text{ AXIAL}}$ =	7.50 ksi
$\Phi F_{ty \text{ BENDING}}$ =	28.22 ksi
$S_y$ =	0.60 in <sup>3</sup>
$S_x$ =	0.60 in <sup>3</sup>
$E$ =	10100 ksi
$I_y$ =	0.67 in <sup>4</sup>
$I_x$ =	0.67 in <sup>4</sup>
$A$ =	0.98 in <sup>2</sup>
$g$ =	1.18 lbs/ft
$M_y$ =	0.011 k-ft
$M_z$ =	0.000 k-ft
$P_n$ =	1.831 k
$M_{y \text{ allowable}}$ =	1.408 k-ft
$M_{z \text{ allowable}}$ =	1.408 k-ft
$P_{n \text{ allowable}}$ =	7.371 k
Utilization =	<b>26%</b>



#### 4.5 Rear Strut Design

An aluminum strut connects the rear portion of the girder to the rear foundation connection. Both vertical and horizontal forces are transferred from the girder. The strut is attached with single M12 bolts at each end. See Appendix A.5 for detailed member calculations. Section units are in (mm).

Strut Type =	<b>55x55</b>
Aluminum Type =	6105-T5
$F_{ty}$ =	35 ksi
$L_b$ =	55.91 in
$\Phi F_{ty \text{ AXIAL}}$ =	15.92 ksi
$\Phi F_{ty \text{ BENDING}}$ =	28.22 ksi
$S_y$ =	0.60 in <sup>3</sup>
$S_x$ =	0.60 in <sup>3</sup>
$E$ =	10100 ksi
$I_y$ =	0.67 in <sup>4</sup>
$I_x$ =	0.67 in <sup>4</sup>
$A$ =	0.98 in <sup>2</sup>
$g$ =	1.18 lbs/ft
$M_y$ =	-0.009 k-ft
$M_z$ =	0.000 k-ft
$P_n$ =	3.535 k
$M_{y \text{ allowable}}$ =	1.408 k-ft
$M_{z \text{ allowable}}$ =	1.408 k-ft
$P_{n \text{ allowable}}$ =	15.642 k
Utilization =	<u>23%</u>



## 5. FOUNDATION DESIGN CALCULATIONS

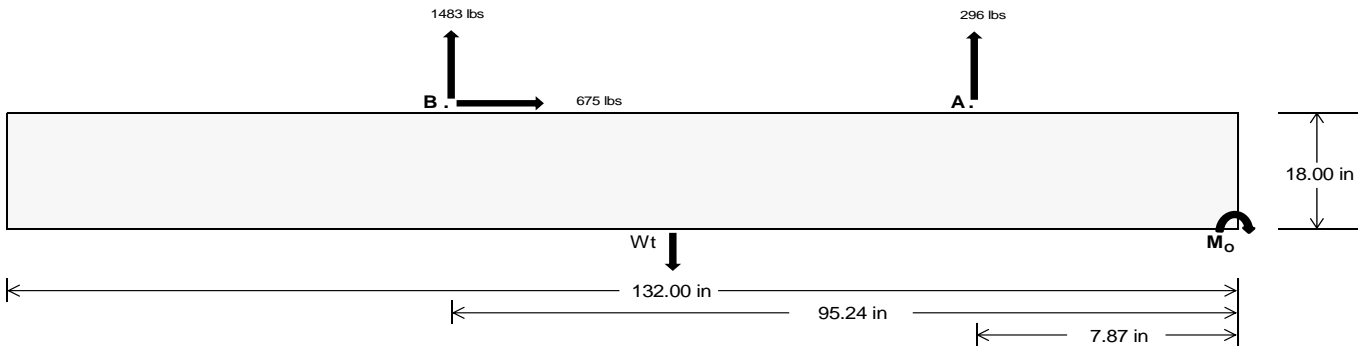
### 5.1 Helical Pile Foundations

The following LRFD loads include a safety factor of 1.3, and are to be used in conjunction with a Schletter, Inc. Geotechnical Investigation Report. The forces below should fall within the guidelines provided in the Geotechnical Investigation Report. If a Geotechnical Investigation Report is not present, please proceed to Section 5.2 for a concrete foundation design.

Maximum	Front	Rear
Tensile Load =	<u>1244.68</u>	<u>6181.61</u> k
Compressive Load =	<u>4521.54</u>	<u>4970.10</u> k
Lateral Load =	<u>11.57</u>	<u>2809.65</u> k
Moment (Weak Axis) =	<u>0.02</u>	<u>0.01</u> k

## 5.2 Design of Ballast Foundations

Ballast foundations are used to secure the racking structure in place. The foundations are checked for potential overturning and sliding. Bearing pressures applied by the racking and ballast foundations are checked against the allowable bearing pressures provided by the IBC tables 1804.2 (2003, 2006) & 1806.2 (2009).



### Concrete Properties

Weight of Concrete = 145 pcf  
Compressive Strength = 2500 psi  
Yield Strength = 60000 psi

### Overturning Check

$M_o = 155737.5$  in-lbs  
Resisting Force Required = 2359.66 lbs  
S.F. = 1.67  
Weight Required = 3932.77 lbs  
Minimum Width = 34 in  
Weight Provided = 6778.75 lbs

### Sliding

Force = 675.24 lbs  
Friction = 0.4  
Weight Required = 1688.09 lbs  
Resisting Weight = 6778.75 lbs  
Additional Weight Required = 0 lbs

### Cohesion

Sliding Force = 675.24 lbs  
Cohesion = 130 psf  
Area = 31.17 ft<sup>2</sup>  
Resisting = 3389.38 lbs  
Additional Weight Required = 0 lbs

### Shear Key

Additional Force = 0 lbs  
Lateral Bearing Pressure = 200 psf/ft  
Required Depth = 0.00 ft  
 $f'_c = 2500$  psi  
Length = 8 in

### Footing Reinforcement

Use fiber reinforcing with (2) #5 rebar.

A minimum 132in long x 34in wide x 18in tall ballast foundation is required to resist overturning.

Use a 132in long x 34in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Use a 132in long x 34in wide x 18in tall ballast foundation. Cohesion is OK.

Shear key is not required.

### Bearing Pressure

Ballast Width  
34 in 35 in 36 in 37 in  
 $P_{ftg} = (145 \text{ pcf})(11 \text{ ft})(1.5 \text{ ft})(2.83 \text{ ft}) =$  6779 lbs 6978 lbs 7178 lbs 7377 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	34 in	35 in	36 in	37 in	34 in	35 in	36 in	37 in	34 in	35 in	36 in	37 in	34 in	35 in	36 in	37 in
$F_A$	1514 lbs	1514 lbs	1514 lbs	1514 lbs	1698 lbs	1698 lbs	1698 lbs	1698 lbs	2283 lbs	2283 lbs	2283 lbs	2283 lbs	-592 lbs	-592 lbs	-592 lbs	-592 lbs
$F_B$	1544 lbs	1544 lbs	1544 lbs	1544 lbs	2050 lbs	2050 lbs	2050 lbs	2050 lbs	2568 lbs	2568 lbs	2568 lbs	2568 lbs	-2966 lbs	-2966 lbs	-2966 lbs	-2966 lbs
$F_V$	171 lbs	171 lbs	171 lbs	171 lbs	1203 lbs	1203 lbs	1203 lbs	1203 lbs	1018 lbs	1018 lbs	1018 lbs	1018 lbs	-1350 lbs	-1350 lbs	-1350 lbs	-1350 lbs
$P_{total}$	9837 lbs	10036 lbs	10236 lbs	10435 lbs	10526 lbs	10725 lbs	10925 lbs	11124 lbs	11630 lbs	11830 lbs	12029 lbs	12228 lbs	509 lbs	628 lbs	748 lbs	867 lbs
$M$	3829 lbs-ft	3829 lbs-ft	3829 lbs-ft	3829 lbs-ft	5035 lbs-ft	5035 lbs-ft	5035 lbs-ft	5035 lbs-ft	6330 lbs-ft	6330 lbs-ft	6330 lbs-ft	6330 lbs-ft	2332 lbs-ft	2332 lbs-ft	2332 lbs-ft	2332 lbs-ft
$e$	0.39 ft	0.38 ft	0.37 ft	0.37 ft	0.48 ft	0.47 ft	0.46 ft	0.45 ft	0.54 ft	0.54 ft	0.53 ft	0.52 ft	4.59 ft	3.71 ft	3.12 ft	2.69 ft
$L/6$	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft
$f_{min}$	248.6 psf	247.7 psf	246.9 psf	246.1 psf	249.6 psf	248.7 psf	247.8 psf	247.0 psf	262.4 psf	261.1 psf	259.9 psf	258.7 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
$f_{max}$	382.6 psf	377.9 psf	373.5 psf	369.2 psf	425.8 psf	419.9 psf	414.3 psf	409.0 psf	483.9 psf	476.3 psf	469.1 psf	462.3 psf	130.9 psf	80.3 psf	69.8 psf	66.7 psf

Maximum Bearing Pressure = 484 psf  
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 34in wide x 18in tall ballast foundation for an acceptable bearing pressure.

# Weak Side Design

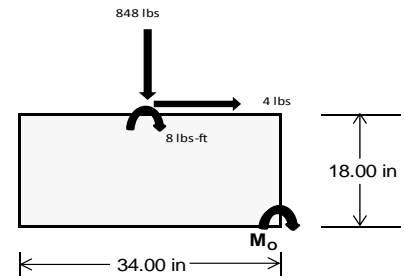
## Overturning Check

$M_o = 1187.1$  ft-lbs  
 Resisting Force Required = 837.95 lbs  
 S.F. = 1.67  
 Weight Required = 1396.58 lbs  
 Minimum Width = 34 in  
 Weight Provided = 6778.75 lbs

*A minimum 132in long x 34in wide x 18in tall ballast foundation is required to resist overturning.*

## Bearing Pressure

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	34 in			34 in			34 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
$F_v$	236 lbs	626 lbs	236 lbs	848 lbs	2510 lbs	848 lbs	69 lbs	183 lbs	69 lbs
$F_v$	1 lbs	0 lbs	1 lbs	4 lbs	0 lbs	4 lbs	0 lbs	0 lbs	0 lbs
$P_{total}$	8628 lbs	6779 lbs	8628 lbs	8837 lbs	6779 lbs	8837 lbs	2523 lbs	6779 lbs	2523 lbs
$M$	4 lbs-ft	0 lbs-ft	4 lbs-ft	15 lbs-ft	0 lbs-ft	15 lbs-ft	0 lbs-ft	0 lbs-ft	0 lbs-ft
$e$	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft
$L/6$	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft
$f_{min}$	276.6 psf	217.5 psf	276.6 psf	282.5 psf	217.5 psf	282.5 psf	80.9 psf	217.5 psf	80.9 psf
$f_{max}$	277.1 psf	217.5 psf	277.1 psf	284.5 psf	217.5 psf	284.5 psf	81.0 psf	217.5 psf	81.0 psf



Maximum Bearing Pressure = 285 psf  
 Allowable Bearing Pressure = 1500 psf

*Use a 132in long x 34in wide x 18in tall ballast foundation for an acceptable bearing pressure.*

**Foundation Requirements:** 132in long x 34in wide x 18in tall ballast foundation and fiber reinforcing with (2) #5 rebar.

## 5.3 Foundation Anchors

Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.



## 6. DESIGN OF JOINTS AND CONNECTIONS

### 6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

Modules are secured to the purlins with Schletter, Inc. Rapid2+ mounting clamps. Purlins are secured to the girders with the use of 80mm mounting clamps. The reliability of calculations is uncertain due to limited standards, therefore the strength of the clamp fasteners has been evaluated by load testing.

#### Fastening of Modules to Purlins

Maximum Uplifting Force =	0.686 k
Allowable Uplift =	1.214 k
Utilization =	<u>56%</u>



#### Fastening of Purlins to Girders

Maximum Uplifting Force =	2.379 k
Allowable Uplift =	4.357 k
Utilization =	<u>55%</u>



### 6.2 Strut Connections

The aluminum struts connect the aluminum girder ends to custom brackets with mounting holes. Single M12 bolts are used to attach each end of the strut to the girder and post. ASTM A193/A193M-86 equivalent stainless steel bolts are used.

#### Front Strut

Maximum Axial Load =	3.478 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	<u>47%</u>

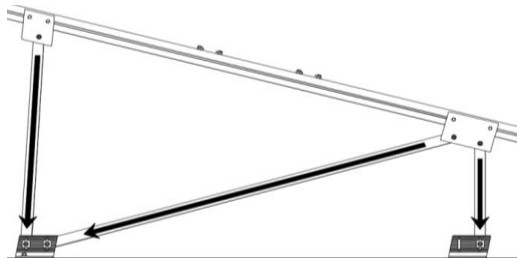
#### Rear Strut

Maximum Axial Load =	4.244 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	<u>57%</u>

#### Diagonal Strut

Maximum Axial Load =	1.944 k
M12 Bolt Shear Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	<u>26%</u>

Bolt and bearing capacities are accounting for double shear.  
(ASCE 8-02, Eq. 5.3.4-1)



Struts under compression are shown to demonstrate the load transfer from the girder. Single M12 bolts are located at each end of the strut and are subjected to double shear.

## 7. SEISMIC DESIGN

### 7.1 Seismic Drift - N/A

The racking structure has been analyzed under seismic loading. The allowable story drift of the structure must fall within the limits provided by (ASCE 7, Table 12.12-1).

Mean Height, $h_{sx}$ =	40.12 in
Allowable Story Drift for All Other Structures, $\Delta$ = {	0.020 $h_{sx}$
Max Drift, $\Delta_{MAX}$ =	0.802 in
	<u>N/A</u>

The racking structure's reaction to seismic loads is shown to the right. The deflections have been magnified to provide a clear portrayal of potential story drift.



## APPENDIX A

### A.1 Design of Aluminum Purlins - Aluminum Design Manual, 2005 Edition

Purlin = **S1.5**

Strong Axis:

#### 3.4.14

$$L_b = 117 \text{ in}$$

$$J = 0.432$$

$$323.677$$

$$S1 = \left( \frac{Bc - \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dc} \right)^2$$

$$S1 = 0.51461$$

$$S2 = \left( \frac{C_c}{1.6} \right)^2$$

$$S2 = 1701.56$$

$$\phi F_L = \phi b [Bc - 1.6Dc \sqrt{((L_b S_c)/(C_b \sqrt{(I_y J)/2}))}]$$

$$\phi F_L = 27.5 \text{ ksi}$$

Weak Axis:

#### 3.4.14

$$L_b = 117$$

$$J = 0.432$$

$$205.839$$

$$S1 = \left( \frac{Bc - \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dc} \right)^2$$

$$S1 = 0.51461$$

$$S2 = \left( \frac{C_c}{1.6} \right)^2$$

$$S2 = 1701.56$$

$$\phi F_L = \phi b [Bc - 1.6Dc \sqrt{((L_b S_c)/(C_b \sqrt{(I_y J)/2}))}]$$

$$\phi F_L = 28.7$$

#### 3.4.16

$$b/t = 32.195$$

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dp}$$

$$S1 = 12.2$$

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

$$S2 = 46.7$$

$$\phi F_L = \phi b [Bp - 1.6Dp \cdot b/t]$$

$$\phi F_L = 25.1 \text{ ksi}$$

#### 3.4.16

$$b/t = 37.0588$$

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dp}$$

$$S1 = 12.2$$

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

$$S2 = 46.7$$

$$\phi F_L = \phi b [Bp - 1.6Dp \cdot b/t]$$

$$\phi F_L = 23.1 \text{ ksi}$$

#### 3.4.16.1 Not Used

$$Rb/t =$$

$$S1 = \left( \frac{Bt - 1.17 \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dt} \right)^2$$

$$S1 = 1.1$$

$$S2 = C_t$$

$$S2 = 141.0$$

$$\phi F_L = 1.17 \phi_y F_{cy}$$

$$\phi F_L = 38.9 \text{ ksi}$$

#### 3.4.16.1

N/A for Weak Direction

#### 3.4.18

$$h/t = 37.0588$$

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3F_{cy}}{mDbr}$$

$$S1 = 36.9$$

$$m = 0.65$$

$$C_0 = 40.985$$

$$Cc = 41.015$$

$$S2 = \frac{k_1 Bbr}{mDbr}$$

$$S2 = 77.2$$

$$\phi F_L = \phi b [Bbr - mDbr \cdot h/t]$$

$$\phi F_L = 43.2 \text{ ksi}$$

$$\phi F_L St = 25.1 \text{ ksi}$$

$$I_x = 897074 \text{ mm}^4$$

$$2.155 \text{ in}^4$$

$$y = 41.015 \text{ mm}$$

$$S_x = 1.335 \text{ in}^3$$

$$M_{\max} St = 2.788 \text{ k-ft}$$

#### 3.4.18

$$h/t = 32.195$$

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3F_{cy}}{mDbr}$$

$$S1 = 36.9$$

$$m = 0.65$$

$$C_0 = 45.5$$

$$Cc = 45.5$$

$$S2 = \frac{k_1 Bbr}{mDbr}$$

$$S2 = 77.3$$

$$\phi F_L = 1.3 \phi_y F_{cy}$$

$$\phi F_L = 43.2 \text{ ksi}$$

$$\phi F_L Wk = 23.1 \text{ ksi}$$

$$I_y = 446476 \text{ mm}^4$$

$$1.073 \text{ in}^4$$

$$x = 45.5 \text{ mm}$$

$$S_y = 0.599 \text{ in}^3$$

$$M_{\max} Wk = 1.152 \text{ k-ft}$$

## Compression

### 3.4.9

$$\begin{aligned} b/t &= 32.195 \\ S1 &= 12.21 \text{ (See 3.4.16 above for formula)} \\ S2 &= 32.70 \text{ (See 3.4.16 above for formula)} \\ \phi F_L &= \phi c [Bp - 1.6Dp \cdot b/t] \\ \phi F_L &= 25.1 \text{ ksi} \end{aligned}$$

$$\begin{aligned} b/t &= 37.0588 \\ S1 &= 12.21 \\ S2 &= 32.70 \\ \phi F_L &= (\phi c k_2 \cdot \sqrt{(BpE)}) / (1.6b/t) \\ \phi F_L &= 21.9 \text{ ksi} \end{aligned}$$

### 3.4.10

$$\begin{aligned} Rb/t &= 0.0 \\ S1 &= \left( \frac{Bt - \frac{\theta_y}{\theta_b} Fcy}{Dt} \right)^2 \\ S1 &= 6.87 \\ S2 &= 131.3 \\ \phi F_L &= \phi y Fcy \\ \phi F_L &= 33.25 \text{ ksi} \\ \phi F_L &= 21.94 \text{ ksi} \\ A &= 1215.13 \text{ mm}^2 \\ &= 1.88 \text{ in}^2 \\ P_{\max} &= 41.32 \text{ kips} \end{aligned}$$

## A.2 Design of Aluminum Girders - Aluminum Design Manual, 2005 Edition

Girder = **BF0**

Strong Axis:

### 3.4.14

$$\begin{aligned} L_b &= 88.9 \text{ in} \\ J &= 1.08 \\ &= 152.913 \\ S1 &= \left( \frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc} \right)^2 \\ S1 &= 0.51461 \\ S2 &= \left( \frac{C_c}{1.6} \right)^2 \\ S2 &= 1701.56 \\ \phi F_L &= \phi b [Bc - 1.6Dc \cdot \sqrt{((LbSc)/(Cb \cdot \sqrt{(IyJ)/2}))}] \\ \phi F_L &= 29.4 \text{ ksi} \end{aligned}$$

### 3.4.16

$$\begin{aligned} b/t &= 16.2 \\ S1 &= \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp} \\ S1 &= 12.2 \\ S2 &= \frac{k_1 Bp}{1.6Dp} \\ S2 &= 46.7 \\ \phi F_L &= \phi b [Bp - 1.6Dp \cdot b/t] \\ \phi F_L &= 31.6 \text{ ksi} \end{aligned}$$

Weak Axis:

### 3.4.14

$$\begin{aligned} L_b &= 88.9 \\ J &= 1.08 \\ &= 161.829 \\ S1 &= \left( \frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc} \right)^2 \\ S1 &= 0.51461 \\ S2 &= \left( \frac{C_c}{1.6} \right)^2 \\ S2 &= 1701.56 \\ \phi F_L &= \phi b [Bc - 1.6Dc \cdot \sqrt{((LbSc)/(Cb \cdot \sqrt{(IyJ)/2}))}] \\ \phi F_L &= 29.2 \end{aligned}$$

### 3.4.16

$$\begin{aligned} b/t &= 7.4 \\ S1 &= \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp} \\ S1 &= 12.2 \\ S2 &= \frac{k_1 Bp}{1.6Dp} \\ S2 &= 46.7 \\ \phi F_L &= \phi y Fcy \\ \phi F_L &= 33.3 \text{ ksi} \end{aligned}$$

### 3.4.16.1 Used

$$\begin{aligned} Rb/t &= 18.1 \\ S1 &= \left( \frac{Bt - 1.17 \frac{\theta_y}{\theta_b} Fcy}{1.6Dt} \right)^2 \\ S1 &= 1.1 \\ S2 &= C_t \\ S2 &= 141.0 \\ \phi F_L &= \phi b [Bt - Dt \sqrt{(Rb/t)}] \\ \phi F_L &= 31.1 \text{ ksi} \end{aligned}$$

### 3.4.18

$$\begin{aligned} h/t &= 7.4 \\ S1 &= \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr} \\ S1 &= 35.2 \\ m &= 0.68 \\ C_0 &= 41.067 \\ Cc &= 43.717 \\ S2 &= \frac{k_1 Bbr}{mDbr} \\ S2 &= 73.8 \\ \phi F_L &= 1.3\phi y Fcy \\ \phi F_L &= 43.2 \text{ ksi} \\ \phi F_L St &= 29.4 \text{ ksi} \\ I_x &= 984962 \text{ mm}^4 \\ &= 2.366 \text{ in}^4 \\ y &= 43.717 \text{ mm} \\ S_x &= 1.375 \text{ in}^3 \\ M_{max} St &= 3.363 \text{ k-ft} \end{aligned}$$

### 3.4.16.1 N/A for Weak Direction

### 3.4.18

$$\begin{aligned} h/t &= 16.2 \\ S1 &= \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr} \\ S1 &= 36.9 \\ m &= 0.65 \\ C_0 &= 40 \\ Cc &= 40 \\ S2 &= \frac{k_1 Bbr}{mDbr} \\ S2 &= 77.3 \\ \phi F_L &= 1.3\phi y Fcy \\ \phi F_L &= 43.2 \text{ ksi} \\ \phi F_L Wk &= 33.3 \text{ ksi} \\ I_y &= 923544 \text{ mm}^4 \\ &= 2.219 \text{ in}^4 \\ x &= 40 \text{ mm} \\ S_y &= 1.409 \text{ in}^3 \\ M_{max} Wk &= 3.904 \text{ k-ft} \end{aligned}$$

### Compression

### 3.4.9

$$\begin{aligned} b/t &= 16.2 \\ S1 &= 12.21 \text{ (See 3.4.16 above for formula)} \\ S2 &= 32.70 \text{ (See 3.4.16 above for formula)} \\ \phi F_L &= \phi c [Bp - 1.6Dp \cdot b/t] \\ \phi F_L &= 31.6 \text{ ksi} \end{aligned}$$

$$\begin{aligned} b/t &= 7.4 \\ S1 &= 12.21 \\ S2 &= 32.70 \\ \phi F_L &= \phi y Fcy \\ \phi F_L &= 33.3 \text{ ksi} \end{aligned}$$

### 3.4.10

$$\begin{aligned} Rb/t &= 18.1 \\ S1 &= \left( \frac{Bt - \frac{\theta_y}{\theta_b} Fcy}{Dt} \right)^2 \\ S1 &= 6.87 \\ S2 &= 131.3 \\ \phi F_L &= \phi c [Bt - Dt \sqrt{(Rb/t)}] \\ \phi F_L &= 31.09 \text{ ksi} \\ \phi F_L &= 31.09 \text{ ksi} \\ A &= 1215.13 \text{ mm}^2 \\ &= 1.88 \text{ in}^2 \\ P_{max} &= 58.55 \text{ kips} \end{aligned}$$

### A.3 Design of Aluminum Struts (Front) - Aluminum Design Manual, 2005 Edition

Strut = **55x55**

Strong Axis:

#### 3.4.14

$$L_b = 24.8 \text{ in}$$

$$J = \frac{0.942}{38.7028}$$

$$S1 = \left( \frac{Bc - \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dc} \right)^2$$

$$S1 = 0.51461$$

$$S2 = \left( \frac{C_c}{1.6} \right)^2$$

$$S2 = 1701.56$$

$$\phi F_L = \phi b [Bc - 1.6Dc \sqrt{((L_b S_c) / (C_b \sqrt{(I_y J) / 2}))}]$$

$$\phi F_L = 31.4 \text{ ksi}$$

#### 3.4.16

$$b/t = 24.5$$

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dp}$$

$$S1 = 12.2$$

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

$$S2 = 46.7$$

$$\phi F_L = \phi b [Bp - 1.6Dp \cdot b/t]$$

$$\phi F_L = 28.2 \text{ ksi}$$

#### 3.4.16.1 Not Used

$$Rb/t = 0.0$$

$$S1 = \left( \frac{Bt - 1.17 \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dt} \right)^2$$

$$S1 = 1.1$$

$$S2 = C_t$$

$$S2 = 141.0$$

$$\phi F_L = 1.17 \phi_y F_{cy}$$

$$\phi F_L = 38.9 \text{ ksi}$$

#### 3.4.18

$$h/t = 24.5$$

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3F_{cy}}{mDbr}$$

$$S1 = 36.9$$

$$m = 0.65$$

$$C_0 = 27.5$$

$$Cc = 27.5$$

$$S2 = \frac{k_1 Bbr}{mDbr}$$

$$S2 = 77.3$$

$$\phi F_L = 1.3 \phi_y F_{cy}$$

$$\phi F_L = 43.2 \text{ ksi}$$

$$\phi F_L St = 28.2 \text{ ksi}$$

$$I_x = 279836 \text{ mm}^4$$

$$0.672 \text{ in}^4$$

$$y = 27.5 \text{ mm}$$

$$S_x = 0.621 \text{ in}^3$$

$$M_{\max} St = 1.460 \text{ k-ft}$$

Weak Axis:

#### 3.4.14

$$L_b = 24.8$$

$$J = \frac{0.942}{38.7028}$$

$$S1 = \left( \frac{Bc - \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dc} \right)^2$$

$$S1 = 0.51461$$

$$S2 = \left( \frac{C_c}{1.6} \right)^2$$

$$S2 = 1701.56$$

$$\phi F_L = \phi b [Bc - 1.6Dc \sqrt{((L_b S_c) / (C_b \sqrt{(I_y J) / 2}))}]$$

$$\phi F_L = 31.4$$

#### 3.4.16

$$b/t = 24.5$$

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} F_{cy}}{1.6Dp}$$

$$S1 = 12.2$$

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

$$S2 = 46.7$$

$$\phi F_L = \phi b [Bp - 1.6Dp \cdot b/t]$$

$$\phi F_L = 28.2 \text{ ksi}$$

#### 3.4.16.1

N/A for Weak Direction

#### 3.4.18

$$h/t = 24.5$$

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3F_{cy}}{mDbr}$$

$$S1 = 36.9$$

$$m = 0.65$$

$$C_0 = 27.5$$

$$Cc = 27.5$$

$$S2 = \frac{k_1 Bbr}{mDbr}$$

$$S2 = 77.3$$

$$\phi F_L = 1.3 \phi_y F_{cy}$$

$$\phi F_L = 43.2 \text{ ksi}$$

$$\phi F_L Wk = 28.2 \text{ ksi}$$

$$I_y = 279836 \text{ mm}^4$$

$$0.672 \text{ in}^4$$

$$x = 27.5 \text{ mm}$$

$$S_y = 0.621 \text{ in}^3$$

$$M_{\max} Wk = 1.460 \text{ k-ft}$$

## Compression

### 3.4.7

$$\lambda = 0.57371$$

$$r = 0.81 \text{ in}$$

$$S1^* = \frac{Bc - Fcy}{1.6Dc^*}$$

$$S1^* = 0.33515$$

$$S2^* = \frac{Cc}{\pi} \sqrt{Fcy/E}$$

$$S2^* = 1.23671$$

$$\phi_{cc} = 0.87952$$

$$\phi_{FL} = \phi_{cc}(Bc - Dc^*\lambda)$$

$$\phi_{FL} = 28.0279 \text{ ksi}$$

### 3.4.9

$$b/t = 24.5$$

$$S1 = 12.21 \text{ (See 3.4.16 above for formula)}$$

$$S2 = 32.70 \text{ (See 3.4.16 above for formula)}$$

$$\phi_{FL} = \phi_c[Bp - 1.6Dp*b/t]$$

$$\phi_{FL} = 28.2 \text{ ksi}$$

$$b/t = 24.5$$

$$S1 = 12.21$$

$$S2 = 32.70$$

$$\phi_{FL} = \phi_c[Bp - 1.6Dp*b/t]$$

$$\phi_{FL} = 28.2 \text{ ksi}$$

### 3.4.10

$$Rb/t = 0.0$$

$$S1 = \left( \frac{Bt - \frac{\theta_y}{\theta_b} Fcy}{Dt} \right)^2$$

$$S1 = 6.87$$

$$S2 = 131.3$$

$$\phi_{FL} = \phi_y Fcy$$

$$\phi_{FL} = 33.25 \text{ ksi}$$

$$\phi_{FL} = 28.03 \text{ ksi}$$

$$A = 663.99 \text{ mm}^2$$

$$1.03 \text{ in}^2$$

$$P_{\max} = 28.85 \text{ kips}$$

## A.4 Design of Aluminum Struts (Diagonal) - Aluminum Design Manual, 2005 Edition

$$\text{Strut} = \underline{\underline{55 \times 55}}$$

### Strong Axis:

#### 3.4.14

$$L_b = 86.60 \text{ in}$$

$$J = 0.942$$

$$135.148$$

$$S1 = \left( \frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc} \right)^2$$

$$S1 = 0.51461$$

$$S2 = \left( \frac{Cc}{1.6} \right)^2$$

$$S2 = 1701.56$$

$$\phi_{FL} = \phi_b[Bc - 1.6Dc^*\sqrt{((LbSc)/(Cb^*\sqrt{(IyJ)/2}))}]$$

$$\phi_{FL} = 29.6 \text{ ksi}$$

### Weak Axis:

#### 3.4.14

$$L_b = 86.6$$

$$J = 0.942$$

$$135.148$$

$$S1 = \left( \frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc} \right)^2$$

$$S1 = 0.51461$$

$$S2 = \left( \frac{Cc}{1.6} \right)^2$$

$$S2 = 1701.56$$

$$\phi_{FL} = \phi_b[Bc - 1.6Dc^*\sqrt{((LbSc)/(Cb^*\sqrt{(IyJ)/2}))}]$$

$$\phi_{FL} = 29.6$$

### 3.4.16

$$b/t = 24.5$$

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

$$S1 = 12.2$$

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

$$S2 = 46.7$$

$$\phi F_L = \phi b [Bp - 1.6Dp \cdot b/t]$$

$$\phi F_L = 28.2 \text{ ksi}$$

### 3.4.16.1 Not Used

$$Rb/t = 0.0$$

$$S1 = \left( \frac{Bt - 1.17 \frac{\theta_y}{\theta_b} Fcy}{1.6Dt} \right)^2$$

$$S1 = 1.1$$

$$S2 = C_t$$

$$S2 = 141.0$$

$$\phi F_L = 1.17 \phi y Fcy$$

$$\phi F_L = 38.9 \text{ ksi}$$

### 3.4.18

$$h/t = 24.5$$

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$$

$$S1 = 36.9$$

$$m = 0.65$$

$$C_0 = 27.5$$

$$Cc = 27.5$$

$$S2 = \frac{k_1 Bbr}{mDbr}$$

$$S2 = 77.3$$

$$\phi F_L = 1.3 \phi y Fcy$$

$$\phi F_L = 43.2 \text{ ksi}$$

$$\phi F_L St = 28.2 \text{ ksi}$$

$$I_x = 279836 \text{ mm}^4$$

$$0.672 \text{ in}^4$$

$$y = 27.5 \text{ mm}$$

$$S_x = 0.621 \text{ in}^3$$

$$M_{\max} St = 1.460 \text{ k-ft}$$

### Compression

### 3.4.7

$$\lambda = 2.00335$$

$$r = 0.81 \text{ in}$$

$$S1^* = \frac{Bc - Fcy}{1.6Dc^*}$$

$$S1^* = 0.33515$$

$$S2^* = \frac{Cc}{\pi} \sqrt{Fcy/E}$$

$$S2^* = 1.23671$$

$$\phi_{cc} = 0.86047$$

$$\phi F_L = (\phi_{cc} Fcy) / (\lambda^2)$$

$$\phi F_L = 7.50396 \text{ ksi}$$

### 3.4.16

$$b/t = 24.5$$

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

$$S1 = 12.2$$

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

$$S2 = 46.7$$

$$\phi F_L = \phi b [Bp - 1.6Dp \cdot b/t]$$

$$\phi F_L = 28.2 \text{ ksi}$$

### 3.4.16.1

N/A for Weak Direction

### 3.4.18

$$h/t = 24.5$$

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$$

$$S1 = 36.9$$

$$m = 0.65$$

$$C_0 = 27.5$$

$$Cc = 27.5$$

$$S2 = \frac{k_1 Bbr}{mDbr}$$

$$S2 = 77.3$$

$$\phi F_L = 1.3 \phi y Fcy$$

$$\phi F_L = 43.2 \text{ ksi}$$

$$\phi F_L Wk = 28.2 \text{ ksi}$$

$$I_y = 279836 \text{ mm}^4$$

$$0.672 \text{ in}^4$$

$$x = 27.5 \text{ mm}$$

$$S_y = 0.621 \text{ in}^3$$

$$M_{\max} Wk = 1.460 \text{ k-ft}$$

### 3.4.9

$$\begin{aligned} b/t &= 24.5 \\ S1 &= 12.21 \text{ (See 3.4.16 above for formula)} \\ S2 &= 32.70 \text{ (See 3.4.16 above for formula)} \\ \phi F_L &= \phi c [Bp - 1.6Dp \cdot b/t] \\ \phi F_L &= 28.2 \text{ ksi} \end{aligned}$$

$$\begin{aligned} b/t &= 24.5 \\ S1 &= 12.21 \\ S2 &= 32.70 \\ \phi F_L &= \phi c [Bp - 1.6Dp \cdot b/t] \\ \phi F_L &= 28.2 \text{ ksi} \end{aligned}$$

### 3.4.10

$$\begin{aligned} Rb/t &= 0.0 \\ S1 &= \left( \frac{Bt - \frac{\theta_y}{\theta_b} Fcy}{Dt} \right)^2 \\ S1 &= 6.87 \\ S2 &= 131.3 \\ \phi F_L &= \phi y Fcy \\ \phi F_L &= 33.25 \text{ ksi} \\ \phi F_L &= 7.50 \text{ ksi} \\ A &= 663.99 \text{ mm}^2 \\ &= 1.03 \text{ in}^2 \\ P_{\max} &= 7.72 \text{ kips} \end{aligned}$$

## A.5 Design of Aluminum Struts (Rear) - Aluminum Design Manual, 2005 Edition

Strut = **55x55**

Strong Axis:

### 3.4.14

$$\begin{aligned} L_b &= 55.91 \text{ in} \\ J &= 0.942 \\ &= 87.2529 \\ S1 &= \left( \frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc} \right)^2 \\ S1 &= 0.51461 \\ S2 &= \left( \frac{C_c}{1.6} \right)^2 \\ S2 &= 1701.56 \\ \phi F_L &= \phi b [Bc - 1.6Dc \cdot \sqrt{((LbSc)/(Cb \cdot \sqrt{(IyJ)/2}))}] \\ \phi F_L &= 30.4 \text{ ksi} \end{aligned}$$

Weak Axis:

### 3.4.14

$$\begin{aligned} L_b &= 55.91 \\ J &= 0.942 \\ &= 87.2529 \\ S1 &= \left( \frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc} \right)^2 \\ S1 &= 0.51461 \\ S2 &= \left( \frac{C_c}{1.6} \right)^2 \\ S2 &= 1701.56 \\ \phi F_L &= \phi b [Bc - 1.6Dc \cdot \sqrt{((LbSc)/(Cb \cdot \sqrt{(IyJ)/2}))}] \\ \phi F_L &= 30.4 \end{aligned}$$

### 3.4.16

$$\begin{aligned} b/t &= 24.5 \\ S1 &= \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp} \\ S1 &= 12.2 \\ S2 &= \frac{k_1 Bp}{1.6Dp} \\ S2 &= 46.7 \\ \phi F_L &= \phi b [Bp - 1.6Dp \cdot b/t] \\ \phi F_L &= 28.2 \text{ ksi} \end{aligned}$$

### 3.4.16

$$\begin{aligned} b/t &= 24.5 \\ S1 &= \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp} \\ S1 &= 12.2 \\ S2 &= \frac{k_1 Bp}{1.6Dp} \\ S2 &= 46.7 \\ \phi F_L &= \phi b [Bp - 1.6Dp \cdot b/t] \\ \phi F_L &= 28.2 \text{ ksi} \end{aligned}$$



### 3.4.16.1 Not Used

$$Rb/t = 0.0$$

$$S1 = \left( \frac{Bt - 1.17 \frac{\theta_y}{\theta_b} Fcy}{1.6Dt} \right)^2$$

$$S1 = 1.1$$

$$S2 = C_t$$

$$S2 = 141.0$$

$$\phi F_L = 1.17 \phi_y Fcy$$

$$\phi F_L = 38.9 \text{ ksi}$$

### 3.4.18

$$h/t = 24.5$$

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$$

$$S1 = 36.9$$

$$m = 0.65$$

$$C_0 = 27.5$$

$$Cc = 27.5$$

$$S2 = \frac{k_1 Bbr}{mDbr}$$

$$S2 = 77.3$$

$$\phi F_L = 1.3 \phi_y Fcy$$

$$\phi F_L = 43.2 \text{ ksi}$$

$$\phi F_L St = 28.2 \text{ ksi}$$

$$I_x = 279836 \text{ mm}^4$$

$$0.672 \text{ in}^4$$

$$y = 27.5 \text{ mm}$$

$$S_x = 0.621 \text{ in}^3$$

$$M_{\max} St = 1.460 \text{ k-ft}$$

### 3.4.16.1

N/A for Weak Direction

### 3.4.18

$$h/t = 24.5$$

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$$

$$S1 = 36.9$$

$$m = 0.65$$

$$C_0 = 27.5$$

$$Cc = 27.5$$

$$S2 = \frac{k_1 Bbr}{mDbr}$$

$$S2 = 77.3$$

$$\phi F_L = 1.3 \phi_y Fcy$$

$$\phi F_L = 43.2 \text{ ksi}$$

$$\phi F_L Wk = 28.2 \text{ ksi}$$

$$I_y = 279836 \text{ mm}^4$$

$$0.672 \text{ in}^4$$

$$x = 27.5 \text{ mm}$$

$$S_y = 0.621 \text{ in}^3$$

$$M_{\max} Wk = 1.460 \text{ k-ft}$$

### Compression

### 3.4.7

$$\lambda = 1.29339$$

$$r = 0.81 \text{ in}$$

$$S1^* = \frac{Bc - Fcy}{1.6Dc^*}$$

$$S1^* = 0.33515$$

$$S2^* = \frac{Cc}{\pi} \sqrt{Fcy/E}$$

$$S2^* = 1.23671$$

$$\phi_{cc} = 0.76107$$

$$\phi F_L = (\phi_{cc} Fcy)/(\lambda^2)$$

$$\phi F_L = 15.9235 \text{ ksi}$$

### 3.4.9

$$b/t = 24.5$$

$$S1 = 12.21 \text{ (See 3.4.16 above for formula)}$$

$$S2 = 32.70 \text{ (See 3.4.16 above for formula)}$$

$$\phi F_L = \phi_c [Bp - 1.6Dp^* b/t]$$

$$\phi F_L = 28.2 \text{ ksi}$$

$$b/t = 24.5$$

$$S1 = 12.21$$

$$S2 = 32.70$$

$$\phi F_L = \phi_c [Bp - 1.6Dp^* b/t]$$

$$\phi F_L = 28.2 \text{ ksi}$$

### 3.4.10

$$Rb/t = 0.0$$

$$S1 = \left( \frac{Bt - \frac{\theta_y}{\theta_b} Fcy}{Dt} \right)^2$$

$$S1 = 6.87$$

$$S2 = 131.3$$

$$\phi F_L = \phi_y Fcy$$

$$\phi F_L = 33.25 \text{ ksi}$$
  

$$\phi F_L = 15.92 \text{ ksi}$$

$$A = 663.99 \text{ mm}^2$$

$$1.03 \text{ in}^2$$

$$P_{\max} = 16.39 \text{ kips}$$

## APPENDIX B

### B.1

The following pages will contain the results from RISA. Please refer back to Section 2 for load information and Section 4-5 for member and foundation design.



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

Checked By: \_\_\_\_\_

### Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead Load, Max	DL		-1				4		
2	Dead Load, Min	DL		-1				4		
3	Snow Load	SL						4		
4	Wind Load - Pressure	WL						4		
5	Wind Load - Suction	WL						4		
6	Seismic - Lateral	EL								

### Member Distributed Loads (BLC 1 : Dead Load, Max)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft, %]	End Location[ft, %]
1	M13	Y	-8.366	-8.366	0	0
2	M14	Y	-8.366	-8.366	0	0
3	M15	Y	-8.366	-8.366	0	0
4	M16	Y	-8.366	-8.366	0	0

### Member Distributed Loads (BLC 2 : Dead Load, Min)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft, %]	End Location[ft, %]
1	M13	Y	-4.45	-4.45	0	0
2	M14	Y	-4.45	-4.45	0	0
3	M15	Y	-4.45	-4.45	0	0
4	M16	Y	-4.45	-4.45	0	0

### Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft, %]	End Location[ft, %]
1	M13	Y	-54.031	-54.031	0	0
2	M14	Y	-54.031	-54.031	0	0
3	M15	Y	-54.031	-54.031	0	0
4	M16	Y	-54.031	-54.031	0	0

### Member Distributed Loads (BLC 4 : Wind Load - Pressure)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft, %]	End Location[ft, %]
1	M13	y	-55.629	-55.629	0	0
2	M14	y	-55.629	-55.629	0	0
3	M15	y	-87.418	-87.418	0	0
4	M16	y	-87.418	-87.418	0	0

### Member Distributed Loads (BLC 5 : Wind Load - Suction)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft, %]	End Location[ft, %]
1	M13	y	127.153	127.153	0	0
2	M14	y	97.484	97.484	0	0
3	M15	y	52.98	52.98	0	0
4	M16	y	52.98	52.98	0	0

### Load Combinations

	Description	S... P...	S... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...	Fa... B...
1	LRFD 1.2D + 1.6S + 0.8W	Yes Y		1 1.2	3 1.6	4 .8													
2	LRFD 1.2D + 1.6W + 0.5S	Yes Y		1 1.2	3 .5	4 1.6													
3	LRFD 0.9D + 1.6W	Yes Y		2 .9				5 1.6											
4	LATERAL - LRFD 1.54D + 1.3E ...	Yes Y		1 1.54	3 .2			6 1.3											
5	LATERAL - LRFD 0.56D + 1.3E	Yes Y		1 .56				6 1.3											
6	LATERAL - LRFD 1.54D + 1.25...	Yes Y		1 1.54	3 .2			6 1.25											
7	LATERAL - LRFD 0.56D + 1.25E	Yes Y		1 .56				6 1.25											



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Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

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### Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
27		14	max	93.962	1	246.801	1	-253	12	.014	2	-.005	15	1.019	3
28			min	3.443	15	-349.221	3	-24.862	1	0	3	-.135	1	-.671	1
29		15	max	93.962	1	98.526	1	11.558	1	.014	2	-.005	12	1.281	3
30			min	3.443	15	-134.278	3	.434	15	0	3	-.142	1	-.858	1
31		16	max	93.962	1	80.666	3	47.978	1	.014	2	-.003	12	1.31	3
32			min	3.443	15	-49.748	1	1.758	15	0	3	-.11	1	-.885	1
33		17	max	93.962	1	295.609	3	84.398	1	.014	2	0	3	1.106	3
34			min	3.443	15	-198.023	1	3.081	15	0	3	-.038	1	-.75	1
35		18	max	93.962	1	510.552	3	120.818	1	.014	2	.073	1	.67	3
36			min	3.443	15	-346.298	1	4.405	15	0	3	.003	15	-.455	1
37		19	max	93.962	1	725.496	3	157.238	1	.014	2	.224	1	0	1
38			min	3.443	15	-494.573	1	5.729	15	0	3	.008	15	0	3
39	M14	1	max	44.377	1	525.916	1	-5.91	15	.009	3	.256	1	0	1
40			min	1.628	15	-569.313	3	-162.212	1	-.012	1	.009	15	0	3
41		2	max	44.377	1	377.641	1	-4.586	15	.009	3	.1	1	.528	3
42			min	1.628	15	-405.796	3	-125.792	1	-.012	1	.004	15	-.489	1
43		3	max	44.377	1	229.367	1	-3.262	15	.009	3	.002	3	.879	3
44			min	1.628	15	-242.279	3	-89.372	1	-.012	1	-.016	1	-.818	1
45		4	max	44.377	1	81.092	1	-1.938	15	.009	3	-.002	12	1.053	3
46			min	1.628	15	-78.762	3	-52.952	1	-.012	1	-.094	1	-.986	1
47		5	max	44.377	1	84.755	3	-.615	15	.009	3	-.004	12	1.05	3
48			min	1.628	15	-67.183	1	-16.532	1	-.012	1	-.131	1	-.994	1
49		6	max	44.377	1	248.273	3	19.888	1	.009	3	-.005	15	.869	3
50			min	1.628	15	-215.458	1	.055	3	-.012	1	-.129	1	-.841	1
51		7	max	44.377	1	411.79	3	56.308	1	.009	3	-.003	15	.512	3
52			min	1.628	15	-363.733	1	1.402	12	-.012	1	-.088	1	-.527	1
53		8	max	44.377	1	575.307	3	92.728	1	.009	3	0	10	0	15
54			min	1.628	15	-512.008	1	2.725	12	-.012	1	-.007	1	-.064	2
55		9	max	44.377	1	738.824	3	129.148	1	.009	3	.113	1	.582	1
56			min	1.628	15	-660.283	1	4.049	12	-.012	1	.002	12	-.735	3
57		10	max	44.377	1	808.558	1	-5.373	12	.009	3	.272	1	1.378	1
58			min	1.628	15	-902.341	3	-165.568	1	-.012	1	.007	12	-1.624	3
59		11	max	44.377	1	660.283	1	-4.049	12	.012	1	.113	1	.582	1
60			min	1.628	15	-738.824	3	-129.148	1	-.009	3	.002	12	-.735	3
61		12	max	44.377	1	512.008	1	-2.725	12	.012	1	0	10	0	15
62			min	1.628	15	-575.307	3	-92.728	1	-.009	3	-.007	1	-.064	2
63		13	max	44.377	1	363.733	1	-1.402	12	.012	1	-.003	15	.512	3
64			min	1.628	15	-411.79	3	-56.308	1	-.009	3	-.088	1	-.527	1
65		14	max	44.377	1	215.458	1	-.055	3	.012	1	-.005	15	.869	3
66			min	1.628	15	-248.273	3	-19.888	1	-.009	3	-.129	1	-.841	1
67		15	max	44.377	1	67.183	1	16.532	1	.012	1	-.004	12	1.05	3
68			min	1.628	15	-84.755	3	.615	15	-.009	3	-.131	1	-.994	1
69		16	max	44.377	1	78.762	3	52.952	1	.012	1	-.002	12	1.053	3
70			min	1.628	15	-81.092	1	1.938	15	-.009	3	-.094	1	-.986	1
71		17	max	44.377	1	242.279	3	89.372	1	.012	1	.002	3	.879	3
72			min	1.628	15	-229.367	1	3.262	15	-.009	3	-.016	1	-.818	1
73		18	max	44.377	1	405.796	3	125.792	1	.012	1	.1	1	.528	3
74			min	1.628	15	-377.641	1	4.586	15	-.009	3	.004	15	-.489	1
75		19	max	44.377	1	569.313	3	162.212	1	.012	1	.256	1	0	1
76			min	1.628	15	-525.916	1	5.91	15	-.009	3	.009	15	0	3
77	M15	1	max	-1.711	15	670.401	2	-5.909	15	.012	2	.256	1	0	2
78			min	-46.57	1	-309.234	3	-162.194	1	-.008	3	.009	15	0	3
79		2	max	-1.711	15	479.318	2	-4.585	15	.012	2	.1	1	.288	3
80			min	-46.57	1	-222.857	3	-125.774	1	-.008	3	.004	15	-.623	2
81		3	max	-1.711	15	288.234	2	-3.261	15	.012	2	.002	3	.483	3
82			min	-46.57	1	-136.48	3	-89.354	1	-.008	3	-.017	1	-1.039	2
83		4	max	-1.711	15	97.15	2	-1.937	15	.012	2	-.002	12	.584	3



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

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### Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
84			min	-46.57	1	-50.104	3	-52.934	1	-.008	3	-.094	1	-1.247	2
85		5	max	-1.711	15	36.273	3	-.613	15	.012	2	-.004	12	.591	3
86			min	-46.57	1	-93.933	2	-16.514	1	-.008	3	-.131	1	-1.249	2
87		6	max	-1.711	15	122.65	3	19.906	1	.012	2	-.005	15	.505	3
88			min	-46.57	1	-285.017	2	.127	12	-.008	3	-.129	1	-1.044	2
89		7	max	-1.711	15	209.027	3	56.326	1	.012	2	-.003	15	.326	3
90			min	-46.57	1	-476.101	2	1.451	12	-.008	3	-.088	1	-.631	2
91		8	max	-1.711	15	295.404	3	92.746	1	.012	2	0	10	.052	3
92			min	-46.57	1	-667.184	2	2.774	12	-.008	3	-.007	1	-.027	1
93		9	max	-1.711	15	381.781	3	129.166	1	.012	2	.113	1	.814	2
94			min	-46.57	1	-858.268	2	4.098	12	-.008	3	.002	12	-.314	3
95		10	max	-1.711	15	1049.352	2	-5.422	12	.012	1	.272	1	1.847	2
96			min	-46.57	1	-468.157	3	-165.586	1	-.012	2	.007	12	-.775	3
97		11	max	-1.711	15	858.268	2	-4.098	12	.008	3	.113	1	.814	2
98			min	-46.57	1	-381.781	3	-129.166	1	-.012	2	.002	12	-.314	3
99		12	max	-1.711	15	667.184	2	-2.774	12	.008	3	0	10	.052	3
100			min	-46.57	1	-295.404	3	-92.746	1	-.012	2	-.007	1	-.027	1
101		13	max	-1.711	15	476.101	2	-1.451	12	.008	3	-.003	15	.326	3
102			min	-46.57	1	-209.027	3	-56.326	1	-.012	2	-.088	1	-.631	2
103		14	max	-1.711	15	285.017	2	-.127	12	.008	3	-.005	15	.505	3
104			min	-46.57	1	-122.65	3	-19.906	1	-.012	2	-.129	1	-1.044	2
105		15	max	-1.711	15	93.933	2	16.514	1	.008	3	-.004	12	.591	3
106			min	-46.57	1	-36.273	3	.613	15	-.012	2	-.131	1	-1.249	2
107		16	max	-1.711	15	50.104	3	52.934	1	.008	3	-.002	12	.584	3
108			min	-46.57	1	-97.15	2	1.937	15	-.012	2	-.094	1	-1.247	2
109		17	max	-1.711	15	136.48	3	89.354	1	.008	3	.002	3	.483	3
110			min	-46.57	1	-288.234	2	3.261	15	-.012	2	-.017	1	-1.039	2
111		18	max	-1.711	15	222.857	3	125.774	1	.008	3	.1	1	.288	3
112			min	-46.57	1	-479.318	2	4.585	15	-.012	2	.004	15	-.623	2
113		19	max	-1.711	15	309.234	3	162.194	1	.008	3	.256	1	0	2
114			min	-46.57	1	-670.401	2	5.909	15	-.012	2	.009	15	0	3
115	M16	1	max	-3.662	15	639.961	2	-5.735	15	.012	1	.225	1	0	2
116			min	-99.849	1	-286.633	3	-157.47	1	-.011	3	.008	15	0	3
117		2	max	-3.662	15	448.878	2	-4.411	15	.012	1	.074	1	.264	3
118			min	-99.849	1	-200.256	3	-121.05	1	-.011	3	.003	15	-.59	2
119		3	max	-3.662	15	257.794	2	-3.087	15	.012	1	0	3	.434	3
120			min	-99.849	1	-113.88	3	-84.63	1	-.011	3	-.037	1	-.973	2
121		4	max	-3.662	15	66.71	2	-1.763	15	.012	1	-.003	12	.51	3
122			min	-99.849	1	-27.503	3	-48.21	1	-.011	3	-.109	1	-1.148	2
123		5	max	-3.662	15	58.874	3	-.439	15	.012	1	-.005	12	.493	3
124			min	-99.849	1	-124.373	2	-11.79	1	-.011	3	-.142	1	-1.117	2
125		6	max	-3.662	15	145.251	3	24.63	1	.012	1	-.005	15	.383	3
126			min	-99.849	1	-315.457	2	.417	12	-.011	3	-.135	1	-.879	2
127		7	max	-3.662	15	231.628	3	61.05	1	.012	1	-.003	15	.179	3
128			min	-99.849	1	-506.541	2	1.741	12	-.011	3	-.088	1	-.434	2
129		8	max	-3.662	15	318.004	3	97.47	1	.012	1	0	10	.219	2
130			min	-99.849	1	-697.624	2	3.065	12	-.011	3	-.002	1	-.119	3
131		9	max	-3.662	15	404.381	3	133.89	1	.012	1	.123	1	1.078	2
132			min	-99.849	1	-888.708	2	4.388	12	-.011	3	.003	12	-.51	3
133		10	max	-3.662	15	1079.792	2	-5.712	12	.012	1	.288	1	2.144	2
134			min	-99.849	1	-490.758	3	-170.31	1	-.011	3	.008	12	-.995	3
135		11	max	-3.662	15	888.708	2	-4.388	12	.011	3	.123	1	1.078	2
136			min	-99.849	1	-404.381	3	-133.89	1	-.012	1	.003	12	-.51	3
137		12	max	-3.662	15	697.624	2	-3.065	12	.011	3	0	10	.219	2
138			min	-99.849	1	-318.004	3	-97.47	1	-.012	1	-.002	1	-.119	3
139		13	max	-3.662	15	506.541	2	-1.741	12	.011	3	-.003	15	.179	3
140			min	-99.849	1	-231.628	3	-61.05	1	-.012	1	-.088	1	-.434	2



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### Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
141		14	max	-3.662	15	315.457	2	-.417	12	.011	3	-.005	15	.383	3
142			min	-99.849	1	-145.251	3	-24.63	1	-.012	1	-.135	1	-.879	2
143		15	max	-3.662	15	124.373	2	11.79	1	.011	3	-.005	12	.493	3
144			min	-99.849	1	-58.874	3	.439	15	-.012	1	-.142	1	-1.117	2
145		16	max	-3.662	15	27.503	3	48.21	1	.011	3	-.003	12	.51	3
146			min	-99.849	1	-66.71	2	1.763	15	-.012	1	-.109	1	-1.148	2
147		17	max	-3.662	15	113.88	3	84.63	1	.011	3	0	3	.434	3
148			min	-99.849	1	-257.794	2	3.087	15	-.012	1	-.037	1	-.973	2
149		18	max	-3.662	15	200.256	3	121.05	1	.011	3	.074	1	.264	3
150			min	-99.849	1	-448.878	2	4.411	15	-.012	1	.003	15	-.59	2
151		19	max	-3.662	15	286.633	3	157.47	1	.011	3	.225	1	0	2
152			min	-99.849	1	-639.961	2	5.735	15	-.012	1	.008	15	0	3
153	M2	1	max	1098.655	1	2.027	4	.878	1	0	3	0	3	0	1
154			min	-1299.396	3	.477	15	.032	15	0	1	0	1	0	1
155		2	max	1099.034	1	1.993	4	.878	1	0	3	0	1	0	15
156			min	-1299.112	3	.47	15	.032	15	0	1	0	15	0	4
157		3	max	1099.413	1	1.96	4	.878	1	0	3	0	1	0	15
158			min	-1298.827	3	.462	15	.032	15	0	1	0	15	-.001	4
159		4	max	1099.793	1	1.926	4	.878	1	0	3	0	1	0	15
160			min	-1298.543	3	.454	15	.032	15	0	1	0	15	-.002	4
161		5	max	1100.172	1	1.893	4	.878	1	0	3	0	1	0	15
162			min	-1298.258	3	.446	15	.032	15	0	1	0	15	-.002	4
163		6	max	1100.551	1	1.86	4	.878	1	0	3	.001	1	0	15
164			min	-1297.974	3	.438	15	.032	15	0	1	0	15	-.002	4
165		7	max	1100.93	1	1.826	4	.878	1	0	3	.001	1	0	15
166			min	-1297.69	3	.43	15	.032	15	0	1	0	15	-.003	4
167		8	max	1101.31	1	1.793	4	.878	1	0	3	.002	1	0	15
168			min	-1297.405	3	.422	15	.032	15	0	1	0	15	-.003	4
169		9	max	1101.689	1	1.759	4	.878	1	0	3	.002	1	0	15
170			min	-1297.121	3	.415	15	.032	15	0	1	0	15	-.004	4
171		10	max	1102.068	1	1.726	4	.878	1	0	3	.002	1	-.001	15
172			min	-1296.836	3	.407	15	.032	15	0	1	0	15	-.004	4
173		11	max	1102.447	1	1.693	4	.878	1	0	3	.002	1	-.001	15
174			min	-1296.552	3	.399	15	.032	15	0	1	0	15	-.005	4
175		12	max	1102.827	1	1.659	4	.878	1	0	3	.002	1	-.001	15
176			min	-1296.267	3	.391	15	.032	15	0	1	0	15	-.005	4
177		13	max	1103.206	1	1.626	4	.878	1	0	3	.003	1	-.001	15
178			min	-1295.983	3	.383	15	.032	15	0	1	0	15	-.006	4
179		14	max	1103.585	1	1.593	4	.878	1	0	3	.003	1	-.001	15
180			min	-1295.698	3	.375	15	.032	15	0	1	0	15	-.006	4
181		15	max	1103.964	1	1.559	4	.878	1	0	3	.003	1	-.002	15
182			min	-1295.414	3	.368	15	.032	15	0	1	0	15	-.006	4
183		16	max	1104.344	1	1.526	4	.878	1	0	3	.003	1	-.002	15
184			min	-1295.13	3	.36	15	.032	15	0	1	0	15	-.007	4
185		17	max	1104.723	1	1.492	4	.878	1	0	3	.004	1	-.002	15
186			min	-1294.845	3	.348	12	.032	15	0	1	0	15	-.007	4
187		18	max	1105.102	1	1.459	4	.878	1	0	3	.004	1	-.002	15
188			min	-1294.561	3	.335	12	.032	15	0	1	0	15	-.008	4
189		19	max	1105.482	1	1.426	4	.878	1	0	3	.004	1	-.002	15
190			min	-1294.276	3	.321	12	.032	15	0	1	0	15	-.008	4
191	M3	1	max	480.988	2	7.982	4	.077	1	0	3	0	1	.008	4
192			min	-616.776	3	1.877	15	.003	15	0	1	0	15	.002	15
193		2	max	480.817	2	7.212	4	.077	1	0	3	0	1	.005	2
194			min	-616.904	3	1.696	15	.003	15	0	1	0	15	0	12
195		3	max	480.647	2	6.442	4	.077	1	0	3	0	1	.003	2
196			min	-617.032	3	1.515	15	.003	15	0	1	0	15	0	3
197		4	max	480.477	2	5.672	4	.077	1	0	3	0	1	0	2





Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

Checked By: \_\_\_\_\_

### Envelope Member Section Forces (Continued)

Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
198		min	-617.16	3	1.334	15	.003	15	0	1	0	15	-.002	3
199	5	max	480.306	2	4.902	4	.077	1	0	3	0	1	0	15
200		min	-617.287	3	1.153	15	.003	15	0	1	0	15	-.003	3
201	6	max	480.136	2	4.132	4	.077	1	0	3	0	1	-.001	15
202		min	-617.415	3	.972	15	.003	15	0	1	0	15	-.005	4
203	7	max	479.966	2	3.362	4	.077	1	0	3	0	1	-.001	15
204		min	-617.543	3	.791	15	.003	15	0	1	0	15	-.006	4
205	8	max	479.795	2	2.592	4	.077	1	0	3	0	1	-.002	15
206		min	-617.671	3	.61	15	.003	15	0	1	0	15	-.008	4
207	9	max	479.625	2	1.822	4	.077	1	0	3	0	1	-.002	15
208		min	-617.798	3	.429	15	.003	15	0	1	0	15	-.009	4
209	10	max	479.454	2	1.052	4	.077	1	0	3	0	1	-.002	15
210		min	-617.926	3	.248	15	.003	15	0	1	0	15	-.009	4
211	11	max	479.284	2	.387	2	.077	1	0	3	0	1	-.002	15
212		min	-618.054	3	-.063	3	.003	15	0	1	0	15	-.009	4
213	12	max	479.114	2	-.114	15	.077	1	0	3	0	1	-.002	15
214		min	-618.182	3	-.513	3	.003	15	0	1	0	15	-.009	4
215	13	max	478.943	2	-.295	15	.077	1	0	3	0	1	-.002	15
216		min	-618.309	3	-1.258	4	.003	15	0	1	0	15	-.009	4
217	14	max	478.773	2	-.476	15	.077	1	0	3	0	1	-.002	15
218		min	-618.437	3	-2.028	4	.003	15	0	1	0	15	-.008	4
219	15	max	478.603	2	-.657	15	.077	1	0	3	0	1	-.002	15
220		min	-618.565	3	-2.798	4	.003	15	0	1	0	15	-.007	4
221	16	max	478.432	2	-.838	15	.077	1	0	3	0	1	-.001	15
222		min	-618.693	3	-3.568	4	.003	15	0	1	0	15	-.006	4
223	17	max	478.262	2	-1.019	15	.077	1	0	3	0	1	-.001	15
224		min	-618.82	3	-4.338	4	.003	15	0	1	0	15	-.004	4
225	18	max	478.092	2	-1.2	15	.077	1	0	3	0	1	0	15
226		min	-618.948	3	-5.108	4	.003	15	0	1	0	15	-.002	4
227	19	max	477.921	2	-1.381	15	.077	1	0	3	0	1	0	1
228		min	-619.076	3	-5.878	4	.003	15	0	1	0	15	0	1
229	M4	1	max	1222.189	1	0	1	-.337	15	0	1	0	1	0
230		min	-275.112	3	0	1	-9.239	1	0	1	0	15	0	1
231	2	max	1222.36	1	0	1	-.337	15	0	1	0	12	0	1
232		min	-274.985	3	0	1	-9.239	1	0	1	0	1	0	1
233	3	max	1222.53	1	0	1	-.337	15	0	1	0	15	0	1
234		min	-274.857	3	0	1	-9.239	1	0	1	-.002	1	0	1
235	4	max	1222.7	1	0	1	-.337	15	0	1	0	15	0	1
236		min	-274.729	3	0	1	-9.239	1	0	1	-.003	1	0	1
237	5	max	1222.871	1	0	1	-.337	15	0	1	0	15	0	1
238		min	-274.601	3	0	1	-9.239	1	0	1	-.004	1	0	1
239	6	max	1223.041	1	0	1	-.337	15	0	1	0	15	0	1
240		min	-274.474	3	0	1	-9.239	1	0	1	-.005	1	0	1
241	7	max	1223.211	1	0	1	-.337	15	0	1	0	15	0	1
242		min	-274.346	3	0	1	-9.239	1	0	1	-.006	1	0	1
243	8	max	1223.382	1	0	1	-.337	15	0	1	0	15	0	1
244		min	-274.218	3	0	1	-9.239	1	0	1	-.007	1	0	1
245	9	max	1223.552	1	0	1	-.337	15	0	1	0	15	0	1
246		min	-274.09	3	0	1	-9.239	1	0	1	-.008	1	0	1
247	10	max	1223.722	1	0	1	-.337	15	0	1	0	15	0	1
248		min	-273.963	3	0	1	-9.239	1	0	1	-.009	1	0	1
249	11	max	1223.893	1	0	1	-.337	15	0	1	0	15	0	1
250		min	-273.835	3	0	1	-9.239	1	0	1	-.01	1	0	1
251	12	max	1224.063	1	0	1	-.337	15	0	1	0	15	0	1
252		min	-273.707	3	0	1	-9.239	1	0	1	-.011	1	0	1
253	13	max	1224.233	1	0	1	-.337	15	0	1	0	15	0	1
254		min	-273.579	3	0	1	-9.239	1	0	1	-.012	1	0	1





Company : Schletter, Inc.  
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### Envelope Member Section Forces (Continued)

Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
255	14	max	1224.404	1	0	1	-.337	15	0	1	0	15	0	1
256		min	-273.452	3	0	1	-9.239	1	0	1	-.013	1	0	1
257	15	max	1224.574	1	0	1	-.337	15	0	1	0	15	0	1
258		min	-273.324	3	0	1	-9.239	1	0	1	-.014	1	0	1
259	16	max	1224.744	1	0	1	-.337	15	0	1	0	15	0	1
260		min	-273.196	3	0	1	-9.239	1	0	1	-.015	1	0	1
261	17	max	1224.915	1	0	1	-.337	15	0	1	0	15	0	1
262		min	-273.068	3	0	1	-9.239	1	0	1	-.016	1	0	1
263	18	max	1225.085	1	0	1	-.337	15	0	1	0	15	0	1
264		min	-272.941	3	0	1	-9.239	1	0	1	-.018	1	0	1
265	19	max	1225.255	1	0	1	-.337	15	0	1	0	15	0	1
266		min	-272.813	3	0	1	-9.239	1	0	1	-.019	1	0	1
267	M6	1	max	3528.033	1	2.571	2	0	1	0	0	1	0	1
268		min	-4243.946	3	-.019	3	0	1	0	1	0	1	0	1
269	2	max	3528.412	1	2.545	2	0	1	0	1	0	1	0	3
270		min	-4243.661	3	-.038	3	0	1	0	1	0	1	0	2
271	3	max	3528.791	1	2.519	2	0	1	0	1	0	1	0	3
272		min	-4243.377	3	-.058	3	0	1	0	1	0	1	-.001	2
273	4	max	3529.17	1	2.493	2	0	1	0	1	0	1	0	3
274		min	-4243.092	3	-.077	3	0	1	0	1	0	1	-.002	2
275	5	max	3529.55	1	2.467	2	0	1	0	1	0	1	0	3
276		min	-4242.808	3	-.097	3	0	1	0	1	0	1	-.003	2
277	6	max	3529.929	1	2.441	2	0	1	0	1	0	1	0	3
278		min	-4242.523	3	-.116	3	0	1	0	1	0	1	-.003	2
279	7	max	3530.308	1	2.415	2	0	1	0	1	0	1	0	3
280		min	-4242.239	3	-.136	3	0	1	0	1	0	1	-.004	2
281	8	max	3530.687	1	2.389	2	0	1	0	1	0	1	0	3
282		min	-4241.954	3	-.156	3	0	1	0	1	0	1	-.004	2
283	9	max	3531.067	1	2.363	2	0	1	0	1	0	1	0	3
284		min	-4241.67	3	-.175	3	0	1	0	1	0	1	-.005	2
285	10	max	3531.446	1	2.337	2	0	1	0	1	0	1	0	3
286		min	-4241.386	3	-.195	3	0	1	0	1	0	1	-.006	2
287	11	max	3531.825	1	2.311	2	0	1	0	1	0	1	0	3
288		min	-4241.101	3	-.214	3	0	1	0	1	0	1	-.006	2
289	12	max	3532.205	1	2.285	2	0	1	0	1	0	1	0	3
290		min	-4240.817	3	-.234	3	0	1	0	1	0	1	-.007	2
291	13	max	3532.584	1	2.259	2	0	1	0	1	0	1	0	3
292		min	-4240.532	3	-.253	3	0	1	0	1	0	1	-.007	2
293	14	max	3532.963	1	2.233	2	0	1	0	1	0	1	0	3
294		min	-4240.248	3	-.273	3	0	1	0	1	0	1	-.008	2
295	15	max	3533.342	1	2.207	2	0	1	0	1	0	1	0	3
296		min	-4239.963	3	-.292	3	0	1	0	1	0	1	-.009	2
297	16	max	3533.722	1	2.181	2	0	1	0	1	0	1	0	3
298		min	-4239.679	3	-.312	3	0	1	0	1	0	1	-.009	2
299	17	max	3534.101	1	2.155	2	0	1	0	1	0	1	0	3
300		min	-4239.394	3	-.331	3	0	1	0	1	0	1	-.01	2
301	18	max	3534.48	1	2.129	2	0	1	0	1	0	1	0	3
302		min	-4239.11	3	-.351	3	0	1	0	1	0	1	-.01	2
303	19	max	3534.859	1	2.103	2	0	1	0	1	0	1	0	3
304		min	-4238.826	3	-.37	3	0	1	0	1	0	1	-.011	2
305	M7	1	max	1831.017	2	8.019	4	0	1	0	1	0	.011	2
306		min	-1941.315	3	1.882	15	0	1	0	1	0	1	0	3
307	2	max	1830.847	2	7.249	4	0	1	0	1	0	1	.008	2
308		min	-1941.443	3	1.701	15	0	1	0	1	0	1	-.002	3
309	3	max	1830.676	2	6.479	4	0	1	0	1	0	1	.006	2
310		min	-1941.571	3	1.52	15	0	1	0	1	0	1	-.004	3
311	4	max	1830.506	2	5.709	4	0	1	0	1	0	1	.003	2



Company : Schletter, Inc.  
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### Envelope Member Section Forces (Continued)

Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
312		min	-1941.699	3	1.339	15	0	1	0	1	0	1	-.005	3
313	5	max	1830.336	2	4.939	4	0	1	0	1	0	1	.001	2
314		min	-1941.827	3	1.158	15	0	1	0	1	0	1	-.006	3
315	6	max	1830.165	2	4.169	4	0	1	0	1	0	1	0	2
316		min	-1941.954	3	.977	15	0	1	0	1	0	1	-.007	3
317	7	max	1829.995	2	3.399	4	0	1	0	1	0	1	-.001	15
318		min	-1942.082	3	.796	15	0	1	0	1	0	1	-.007	3
319	8	max	1829.825	2	2.629	4	0	1	0	1	0	1	-.002	15
320		min	-1942.21	3	.552	12	0	1	0	1	0	1	-.008	3
321	9	max	1829.654	2	2.024	2	0	1	0	1	0	1	-.002	15
322		min	-1942.338	3	.252	12	0	1	0	1	0	1	-.008	4
323	10	max	1829.484	2	1.424	2	0	1	0	1	0	1	-.002	15
324		min	-1942.465	3	-.119	3	0	1	0	1	0	1	-.009	4
325	11	max	1829.314	2	.824	2	0	1	0	1	0	1	-.002	15
326		min	-1942.593	3	-.569	3	0	1	0	1	0	1	-.009	4
327	12	max	1829.143	2	.224	2	0	1	0	1	0	1	-.002	15
328		min	-1942.721	3	-1.019	3	0	1	0	1	0	1	-.009	4
329	13	max	1828.973	2	-.29	15	0	1	0	1	0	1	-.002	15
330		min	-1942.849	3	-1.469	3	0	1	0	1	0	1	-.009	4
331	14	max	1828.803	2	-.471	15	0	1	0	1	0	1	-.002	15
332		min	-1942.976	3	-1.991	4	0	1	0	1	0	1	-.008	4
333	15	max	1828.632	2	-.652	15	0	1	0	1	0	1	-.002	15
334		min	-1943.104	3	-2.761	4	0	1	0	1	0	1	-.007	4
335	16	max	1828.462	2	-.833	15	0	1	0	1	0	1	-.001	15
336		min	-1943.232	3	-3.531	4	0	1	0	1	0	1	-.006	4
337	17	max	1828.292	2	-1.014	15	0	1	0	1	0	1	-.001	15
338		min	-1943.36	3	-4.301	4	0	1	0	1	0	1	-.004	4
339	18	max	1828.121	2	-1.195	15	0	1	0	1	0	1	0	15
340		min	-1943.487	3	-5.071	4	0	1	0	1	0	1	-.002	4
341	19	max	1827.951	2	-1.376	15	0	1	0	1	0	1	0	1
342		min	-1943.615	3	-5.841	4	0	1	0	1	0	1	0	1
343	M8	1	max	3475.038	1	0	1	0	1	0	1	0	1	1
344		min	-959.744	3	0	1	0	1	0	1	0	1	0	1
345	2	max	3475.208	1	0	1	0	1	0	1	0	1	0	1
346		min	-959.616	3	0	1	0	1	0	1	0	1	0	1
347	3	max	3475.378	1	0	1	0	1	0	1	0	1	0	1
348		min	-959.488	3	0	1	0	1	0	1	0	1	0	1
349	4	max	3475.549	1	0	1	0	1	0	1	0	1	0	1
350		min	-959.361	3	0	1	0	1	0	1	0	1	0	1
351	5	max	3475.719	1	0	1	0	1	0	1	0	1	0	1
352		min	-959.233	3	0	1	0	1	0	1	0	1	0	1
353	6	max	3475.889	1	0	1	0	1	0	1	0	1	0	1
354		min	-959.105	3	0	1	0	1	0	1	0	1	0	1
355	7	max	3476.06	1	0	1	0	1	0	1	0	1	0	1
356		min	-958.977	3	0	1	0	1	0	1	0	1	0	1
357	8	max	3476.23	1	0	1	0	1	0	1	0	1	0	1
358		min	-958.85	3	0	1	0	1	0	1	0	1	0	1
359	9	max	3476.4	1	0	1	0	1	0	1	0	1	0	1
360		min	-958.722	3	0	1	0	1	0	1	0	1	0	1
361	10	max	3476.571	1	0	1	0	1	0	1	0	1	0	1
362		min	-958.594	3	0	1	0	1	0	1	0	1	0	1
363	11	max	3476.741	1	0	1	0	1	0	1	0	1	0	1
364		min	-958.466	3	0	1	0	1	0	1	0	1	0	1
365	12	max	3476.911	1	0	1	0	1	0	1	0	1	0	1
366		min	-958.339	3	0	1	0	1	0	1	0	1	0	1
367	13	max	3477.082	1	0	1	0	1	0	1	0	1	0	1
368		min	-958.211	3	0	1	0	1	0	1	0	1	0	1



Company : Schletter, Inc.  
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Job Number :  
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### Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
369		14	max	3477.252	1	0	1	0	1	0	1	0	1	0	1
370			min	-958.083	3	0	1	0	1	0	1	0	1	0	1
371		15	max	3477.422	1	0	1	0	1	0	1	0	1	0	1
372			min	-957.955	3	0	1	0	1	0	1	0	1	0	1
373		16	max	3477.593	1	0	1	0	1	0	1	0	1	0	1
374			min	-957.828	3	0	1	0	1	0	1	0	1	0	1
375		17	max	3477.763	1	0	1	0	1	0	1	0	1	0	1
376			min	-957.7	3	0	1	0	1	0	1	0	1	0	1
377		18	max	3477.933	1	0	1	0	1	0	1	0	1	0	1
378			min	-957.572	3	0	1	0	1	0	1	0	1	0	1
379		19	max	3478.104	1	0	1	0	1	0	1	0	1	0	1
380			min	-957.444	3	0	1	0	1	0	1	0	1	0	1
381	M10	1	max	1098.655	1	2.027	4	-0.032	15	0	1	0	1	0	1
382			min	-1299.396	3	.477	15	-878	1	0	3	0	3	0	1
383		2	max	1099.034	1	1.993	4	-0.032	15	0	1	0	15	0	15
384			min	-1299.112	3	.47	15	-878	1	0	3	0	1	0	4
385		3	max	1099.413	1	1.96	4	-0.032	15	0	1	0	15	0	15
386			min	-1298.827	3	.462	15	-878	1	0	3	0	1	-.001	4
387		4	max	1099.793	1	1.926	4	-0.032	15	0	1	0	15	0	15
388			min	-1298.543	3	.454	15	-878	1	0	3	0	1	-.002	4
389		5	max	1100.172	1	1.893	4	-0.032	15	0	1	0	15	0	15
390			min	-1298.258	3	.446	15	-878	1	0	3	0	1	-.002	4
391		6	max	1100.551	1	1.86	4	-0.032	15	0	1	0	15	0	15
392			min	-1297.974	3	.438	15	-878	1	0	3	-.001	1	-.002	4
393		7	max	1100.93	1	1.826	4	-0.032	15	0	1	0	15	0	15
394			min	-1297.69	3	.43	15	-878	1	0	3	-.001	1	-.003	4
395		8	max	1101.31	1	1.793	4	-0.032	15	0	1	0	15	0	15
396			min	-1297.405	3	.422	15	-878	1	0	3	-.002	1	-.003	4
397		9	max	1101.689	1	1.759	4	-0.032	15	0	1	0	15	0	15
398			min	-1297.121	3	.415	15	-878	1	0	3	-.002	1	-.004	4
399		10	max	1102.068	1	1.726	4	-0.032	15	0	1	0	15	-.001	15
400			min	-1296.836	3	.407	15	-878	1	0	3	-.002	1	-.004	4
401		11	max	1102.447	1	1.693	4	-0.032	15	0	1	0	15	-.001	15
402			min	-1296.552	3	.399	15	-878	1	0	3	-.002	1	-.005	4
403		12	max	1102.827	1	1.659	4	-0.032	15	0	1	0	15	-.001	15
404			min	-1296.267	3	.391	15	-878	1	0	3	-.002	1	-.005	4
405		13	max	1103.206	1	1.626	4	-0.032	15	0	1	0	15	-.001	15
406			min	-1295.983	3	.383	15	-878	1	0	3	-.003	1	-.006	4
407		14	max	1103.585	1	1.593	4	-0.032	15	0	1	0	15	-.001	15
408			min	-1295.698	3	.375	15	-878	1	0	3	-.003	1	-.006	4
409		15	max	1103.964	1	1.559	4	-0.032	15	0	1	0	15	-.002	15
410			min	-1295.414	3	.368	15	-878	1	0	3	-.003	1	-.006	4
411		16	max	1104.344	1	1.526	4	-0.032	15	0	1	0	15	-.002	15
412			min	-1295.13	3	.36	15	-878	1	0	3	-.003	1	-.007	4
413		17	max	1104.723	1	1.492	4	-0.032	15	0	1	0	15	-.002	15
414			min	-1294.845	3	.348	12	-878	1	0	3	-.004	1	-.007	4
415		18	max	1105.102	1	1.459	4	-0.032	15	0	1	0	15	-.002	15
416			min	-1294.561	3	.335	12	-878	1	0	3	-.004	1	-.008	4
417		19	max	1105.482	1	1.426	4	-0.032	15	0	1	0	15	-.002	15
418			min	-1294.276	3	.321	12	-878	1	0	3	-.004	1	-.008	4
419	M11	1	max	480.988	2	7.982	4	-.003	15	0	1	0	15	.008	4
420			min	-616.776	3	1.877	15	-.077	1	0	3	0	1	.002	15
421		2	max	480.817	2	7.212	4	-.003	15	0	1	0	15	.005	2
422			min	-616.904	3	1.696	15	-.077	1	0	3	0	1	0	12
423		3	max	480.647	2	6.442	4	-.003	15	0	1	0	15	.003	2
424			min	-617.032	3	1.515	15	-.077	1	0	3	0	1	0	3
425		4	max	480.477	2	5.672	4	-.003	15	0	1	0	15	0	2



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

Checked By: \_\_\_\_\_

### Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
426			min	-617.16	3	1.334	15	-.077	1	0	3	0	1	-.002	3
427		5	max	480.306	2	4.902	4	-.003	15	0	1	0	15	0	15
428			min	-617.287	3	1.153	15	-.077	1	0	3	0	1	-.003	3
429		6	max	480.136	2	4.132	4	-.003	15	0	1	0	15	-.001	15
430			min	-617.415	3	.972	15	-.077	1	0	3	0	1	-.005	4
431		7	max	479.966	2	3.362	4	-.003	15	0	1	0	15	-.001	15
432			min	-617.543	3	.791	15	-.077	1	0	3	0	1	-.006	4
433		8	max	479.795	2	2.592	4	-.003	15	0	1	0	15	-.002	15
434			min	-617.671	3	.61	15	-.077	1	0	3	0	1	-.008	4
435		9	max	479.625	2	1.822	4	-.003	15	0	1	0	15	-.002	15
436			min	-617.798	3	.429	15	-.077	1	0	3	0	1	-.009	4
437		10	max	479.454	2	1.052	4	-.003	15	0	1	0	15	-.002	15
438			min	-617.926	3	.248	15	-.077	1	0	3	0	1	-.009	4
439		11	max	479.284	2	.387	2	-.003	15	0	1	0	15	-.002	15
440			min	-618.054	3	-.063	3	-.077	1	0	3	0	1	-.009	4
441		12	max	479.114	2	-.114	15	-.003	15	0	1	0	15	-.002	15
442			min	-618.182	3	-.513	3	-.077	1	0	3	0	1	-.009	4
443		13	max	478.943	2	-.295	15	-.003	15	0	1	0	15	-.002	15
444			min	-618.309	3	-1.258	4	-.077	1	0	3	0	1	-.009	4
445		14	max	478.773	2	-.476	15	-.003	15	0	1	0	15	-.002	15
446			min	-618.437	3	-2.028	4	-.077	1	0	3	0	1	-.008	4
447		15	max	478.603	2	-.657	15	-.003	15	0	1	0	15	-.002	15
448			min	-618.565	3	-2.798	4	-.077	1	0	3	0	1	-.007	4
449		16	max	478.432	2	-.838	15	-.003	15	0	1	0	15	-.001	15
450			min	-618.693	3	-3.568	4	-.077	1	0	3	0	1	-.006	4
451		17	max	478.262	2	-1.019	15	-.003	15	0	1	0	15	-.001	15
452			min	-618.82	3	-4.338	4	-.077	1	0	3	0	1	-.004	4
453		18	max	478.092	2	-1.2	15	-.003	15	0	1	0	15	0	15
454			min	-618.948	3	-5.108	4	-.077	1	0	3	0	1	-.002	4
455		19	max	477.921	2	-1.381	15	-.003	15	0	1	0	15	0	1
456			min	-619.076	3	-5.878	4	-.077	1	0	3	0	1	0	1
457	M12	1	max	1222.189	1	0	1	9.239	1	0	1	0	15	0	1
458			min	-275.112	3	0	1	.337	15	0	1	0	1	0	1
459		2	max	1222.36	1	0	1	9.239	1	0	1	0	1	0	1
460			min	-274.985	3	0	1	.337	15	0	1	0	12	0	1
461		3	max	1222.53	1	0	1	9.239	1	0	1	.002	1	0	1
462			min	-274.857	3	0	1	.337	15	0	1	0	15	0	1
463		4	max	1222.7	1	0	1	9.239	1	0	1	.003	1	0	1
464			min	-274.729	3	0	1	.337	15	0	1	0	15	0	1
465		5	max	1222.871	1	0	1	9.239	1	0	1	.004	1	0	1
466			min	-274.601	3	0	1	.337	15	0	1	0	15	0	1
467		6	max	1223.041	1	0	1	9.239	1	0	1	.005	1	0	1
468			min	-274.474	3	0	1	.337	15	0	1	0	15	0	1
469		7	max	1223.211	1	0	1	9.239	1	0	1	.006	1	0	1
470			min	-274.346	3	0	1	.337	15	0	1	0	15	0	1
471		8	max	1223.382	1	0	1	9.239	1	0	1	.007	1	0	1
472			min	-274.218	3	0	1	.337	15	0	1	0	15	0	1
473		9	max	1223.552	1	0	1	9.239	1	0	1	.008	1	0	1
474			min	-274.09	3	0	1	.337	15	0	1	0	15	0	1
475		10	max	1223.722	1	0	1	9.239	1	0	1	.009	1	0	1
476			min	-273.963	3	0	1	.337	15	0	1	0	15	0	1
477		11	max	1223.893	1	0	1	9.239	1	0	1	.01	1	0	1
478			min	-273.835	3	0	1	.337	15	0	1	0	15	0	1
479		12	max	1224.063	1	0	1	9.239	1	0	1	.011	1	0	1
480			min	-273.707	3	0	1	.337	15	0	1	0	15	0	1
481		13	max	1224.233	1	0	1	9.239	1	0	1	.012	1	0	1
482			min	-273.579	3	0	1	.337	15	0	1	0	15	0	1



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

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### Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
483		14	max	1224.404	1	0	1	9.239	1	0	1	.013	1	0	1
484			min	-273.452	3	0	1	.337	15	0	1	0	15	0	1
485		15	max	1224.574	1	0	1	9.239	1	0	1	.014	1	0	1
486			min	-273.324	3	0	1	.337	15	0	1	0	15	0	1
487		16	max	1224.744	1	0	1	9.239	1	0	1	.015	1	0	1
488			min	-273.196	3	0	1	.337	15	0	1	0	15	0	1
489		17	max	1224.915	1	0	1	9.239	1	0	1	.016	1	0	1
490			min	-273.068	3	0	1	.337	15	0	1	0	15	0	1
491		18	max	1225.085	1	0	1	9.239	1	0	1	.018	1	0	1
492			min	-272.941	3	0	1	.337	15	0	1	0	15	0	1
493		19	max	1225.255	1	0	1	9.239	1	0	1	.019	1	0	1
494			min	-272.813	3	0	1	.337	15	0	1	0	15	0	1
495	M1	1	max	157.243	1	725.472	3	-3.443	15	0	1	.224	1	0	3
496			min	5.729	15	-493.202	1	-93.859	1	0	3	.008	15	-.014	2
497		2	max	157.732	1	724.462	3	-3.443	15	0	1	.174	1	.247	1
498			min	5.877	15	-494.548	1	-93.859	1	0	3	.006	15	-.382	3
499		3	max	370.72	3	557.292	1	-3.411	15	0	3	.125	1	.496	1
500			min	-222.256	2	-527.282	3	-93.196	1	0	1	.005	15	-.749	3
501		4	max	371.088	3	555.946	1	-3.411	15	0	3	.076	1	.202	1
502			min	-221.766	2	-528.292	3	-93.196	1	0	1	.003	15	-.471	3
503		5	max	371.455	3	554.6	1	-3.411	15	0	3	.026	1	-.004	15
504			min	-221.276	2	-529.301	3	-93.196	1	0	1	0	15	-.192	3
505		6	max	371.823	3	553.254	1	-3.411	15	0	3	0	15	.088	3
506			min	-220.786	2	-530.311	3	-93.196	1	0	1	-.023	1	-.394	2
507		7	max	372.19	3	551.908	1	-3.411	15	0	3	-.003	15	.368	3
508			min	-220.296	2	-531.32	3	-93.196	1	0	1	-.072	1	-.675	2
509		8	max	372.557	3	550.562	1	-3.411	15	0	3	-.004	15	.649	3
510			min	-219.806	2	-532.33	3	-93.196	1	0	1	-.121	1	-.966	1
511		9	max	382.797	3	46.816	2	-5.039	15	0	9	.072	1	.758	3
512			min	-155.79	2	.409	15	-137.604	1	0	3	.003	15	-1.101	1
513		10	max	383.165	3	45.47	2	-5.039	15	0	9	0	15	.738	3
514			min	-155.3	2	.003	15	-137.604	1	0	3	0	1	-1.118	2
515		11	max	383.532	3	44.124	2	-5.039	15	0	9	-.003	15	.719	3
516			min	-154.81	2	-1.658	4	-137.604	1	0	3	-.073	1	-1.141	2
517		12	max	393.695	3	347.131	3	-3.328	15	0	2	.12	1	.626	3
518			min	-97.661	10	-626.782	2	-91.074	1	0	3	.004	15	-1.011	2
519		13	max	394.062	3	346.122	3	-3.328	15	0	2	.072	1	.443	3
520			min	-97.253	10	-628.128	2	-91.074	1	0	3	.003	15	-.68	2
521		14	max	394.429	3	345.112	3	-3.328	15	0	2	.024	1	.261	3
522			min	-96.845	10	-629.474	2	-91.074	1	0	3	0	15	-.36	1
523		15	max	394.797	3	344.102	3	-3.328	15	0	2	0	15	.079	3
524			min	-96.436	10	-630.82	2	-91.074	1	0	3	-.025	1	-.042	1
525		16	max	395.164	3	343.093	3	-3.328	15	0	2	-.003	15	.317	2
526			min	-96.028	10	-632.166	2	-91.074	1	0	3	-.073	1	-.102	3
527		17	max	395.532	3	342.083	3	-3.328	15	0	2	-.004	15	.651	2
528			min	-95.62	10	-633.512	2	-91.074	1	0	3	-.121	1	-.283	3
529		18	max	-5.883	15	641.793	2	-3.663	15	0	3	-.006	15	.327	2
530			min	-157.956	1	-285.678	3	-99.948	1	0	2	-.172	1	-.14	3
531		19	max	-5.735	15	640.447	2	-3.663	15	0	3	-.008	15	.011	3
532			min	-157.467	1	-286.687	3	-99.948	1	0	2	-.225	1	-.012	1
533	M5	1	max	341.075	1	2417.915	3	0	1	0	1	0	1	.029	2
534			min	11.096	12	-1671.889	1	0	1	0	1	0	1	0	3
535		2	max	341.565	1	2416.905	3	0	1	0	1	0	1	.91	1
536			min	11.341	12	-1673.235	1	0	1	0	1	0	1	-1.276	3
537		3	max	1190.294	3	1690.536	1	0	1	0	1	0	1	1.753	1
538			min	-780.29	2	-1684.113	3	0	1	0	1	0	1	-2.502	3
539		4	max	1190.662	3	1689.19	1	0	1	0	1	0	1	.861	1





Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

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### Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
540			min	-779.8	2	-1685.122	3	0	1	0	1	0	1	-1.613	3
541		5	max	1191.029	3	1687.844	1	0	1	0	1	0	1	.012	9
542			min	-779.31	2	-1686.132	3	0	1	0	1	0	1	-.724	3
543		6	max	1191.397	3	1686.498	1	0	1	0	1	0	1	.166	3
544			min	-778.821	2	-1687.141	3	0	1	0	1	0	1	-.948	2
545		7	max	1191.764	3	1685.152	1	0	1	0	1	0	1	1.057	3
546			min	-778.331	2	-1688.151	3	0	1	0	1	0	1	-1.81	1
547		8	max	1192.132	3	1683.806	1	0	1	0	1	0	1	1.948	3
548			min	-777.841	2	-1689.16	3	0	1	0	1	0	1	-2.699	1
549		9	max	1208.494	3	156.429	2	0	1	0	1	0	1	2.242	3
550			min	-645.234	2	.407	15	0	1	0	1	0	1	-3.056	1
551		10	max	1208.861	3	155.082	2	0	1	0	1	0	1	2.171	3
552			min	-644.744	2	0	15	0	1	0	1	0	1	-3.102	2
553		11	max	1209.229	3	153.736	2	0	1	0	1	0	1	2.101	3
554			min	-644.254	2	-1.534	4	0	1	0	1	0	1	-3.184	2
555		12	max	1225.746	3	1092.64	3	0	1	0	1	0	1	1.844	3
556			min	-511.695	2	-1931.704	2	0	1	0	1	0	1	-2.85	2
557		13	max	1226.113	3	1091.63	3	0	1	0	1	0	1	1.268	3
558			min	-511.205	2	-1933.05	2	0	1	0	1	0	1	-1.83	2
559		14	max	1226.48	3	1090.621	3	0	1	0	1	0	1	.692	3
560			min	-510.715	2	-1934.396	2	0	1	0	1	0	1	-.849	1
561		15	max	1226.848	3	1089.611	3	0	1	0	1	0	1	.211	2
562			min	-510.225	2	-1935.742	2	0	1	0	1	0	1	-.004	13
563		16	max	1227.215	3	1088.602	3	0	1	0	1	0	1	1.233	2
564			min	-509.735	2	-1937.088	2	0	1	0	1	0	1	-.458	3
565		17	max	1227.583	3	1087.592	3	0	1	0	1	0	1	2.256	2
566			min	-509.245	2	-1938.434	2	0	1	0	1	0	1	-1.032	3
567		18	max	-11.668	12	2163.635	2	0	1	0	1	0	1	1.163	2
568			min	-341.117	1	-980.809	3	0	1	0	1	0	1	-.54	3
569		19	max	-11.423	12	2162.289	2	0	1	0	1	0	1	.024	1
570			min	-340.627	1	-981.818	3	0	1	0	1	0	1	-.022	3
571	M9	1	max	157.243	1	725.472	3	93.859	1	0	3	-.008	15	0	3
572			min	5.729	15	-493.202	1	3.443	15	0	1	-.224	1	-.014	2
573		2	max	157.732	1	724.462	3	93.859	1	0	3	-.006	15	.247	1
574			min	5.877	15	-494.548	1	3.443	15	0	1	-.174	1	-.382	3
575		3	max	370.72	3	557.292	1	93.196	1	0	1	-.005	15	.496	1
576			min	-222.256	2	-527.282	3	3.411	15	0	3	-.125	1	-.749	3
577		4	max	371.088	3	555.946	1	93.196	1	0	1	-.003	15	.202	1
578			min	-221.766	2	-528.292	3	3.411	15	0	3	-.076	1	-.471	3
579		5	max	371.455	3	554.6	1	93.196	1	0	1	0	15	-.004	15
580			min	-221.276	2	-529.301	3	3.411	15	0	3	-.026	1	-.192	3
581		6	max	371.823	3	553.254	1	93.196	1	0	1	.023	1	.088	3
582			min	-220.786	2	-530.311	3	3.411	15	0	3	0	15	-.394	2
583		7	max	372.19	3	551.908	1	93.196	1	0	1	.072	1	.368	3
584			min	-220.296	2	-531.32	3	3.411	15	0	3	.003	15	-.675	2
585		8	max	372.557	3	550.562	1	93.196	1	0	1	.121	1	.649	3
586			min	-219.806	2	-532.33	3	3.411	15	0	3	.004	15	-.966	1
587		9	max	382.797	3	46.816	2	137.604	1	0	3	-.003	15	.758	3
588			min	-155.79	2	.409	15	5.039	15	0	9	-.072	1	-1.101	1
589		10	max	383.165	3	45.47	2	137.604	1	0	3	0	1	.738	3
590			min	-155.3	2	.003	15	5.039	15	0	9	0	15	-1.118	2
591		11	max	383.532	3	44.124	2	137.604	1	0	3	.073	1	.719	3
592			min	-154.81	2	-1.658	4	5.039	15	0	9	.003	15	-1.141	2
593		12	max	393.695	3	347.131	3	91.074	1	0	3	-.004	15	.626	3
594			min	-97.661	10	-626.782	2	3.328	15	0	2	-.12	1	-1.011	2
595		13	max	394.062	3	346.122	3	91.074	1	0	3	-.003	15	.443	3
596			min	-97.253	10	-628.128	2	3.328	15	0	2	-.072	1	-.68	2



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

Checked By: \_\_\_\_\_

### Envelope Member Section Forces (Continued)

Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
597	14	max	394.429	3	345.112	3	91.074	1	0	3	0	15	.261	3
598		min	-96.845	10	-629.474	2	3.328	15	0	2	-.024	1	-.36	1
599	15	max	394.797	3	344.102	3	91.074	1	0	3	.025	1	.079	3
600		min	-96.436	10	-630.82	2	3.328	15	0	2	0	15	-.042	1
601	16	max	395.164	3	343.093	3	91.074	1	0	3	.073	1	.317	2
602		min	-96.028	10	-632.166	2	3.328	15	0	2	.003	15	-.102	3
603	17	max	395.532	3	342.083	3	91.074	1	0	3	.121	1	.651	2
604		min	-95.62	10	-633.512	2	3.328	15	0	2	.004	15	-.283	3
605	18	max	-5.883	15	641.793	2	99.948	1	0	2	.172	1	.327	2
606		min	-157.956	1	-285.678	3	3.663	15	0	3	.006	15	-.14	3
607	19	max	-5.735	15	640.447	2	99.948	1	0	2	.225	1	.011	3
608		min	-157.467	1	-286.687	3	3.663	15	0	3	.008	15	-.012	1

### Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M13	1	max	0	1	.116	2	.007	3	9.392e-3	2	NC	1	NC	1
2			min	0	15	-.021	3	-.003	2	-1.705e-3	3	NC	1	NC	1
3		2	max	0	1	.297	3	.034	1	1.077e-2	2	NC	5	NC	2
4			min	0	15	-.083	1	0	10	-1.748e-3	3	736.68	3	7122.526	1
5		3	max	0	1	.554	3	.081	1	1.216e-2	2	NC	5	NC	3
6			min	0	15	-.237	1	.003	15	-1.791e-3	3	407.143	3	2924.091	1
7		4	max	0	1	.71	3	.122	1	1.354e-2	2	NC	5	NC	3
8			min	0	15	-.322	1	.005	15	-1.835e-3	3	320.276	3	1938.485	1
9		5	max	0	1	.746	3	.143	1	1.492e-2	2	NC	5	NC	3
10			min	0	15	-.326	1	.005	15	-1.878e-3	3	305.361	3	1653.718	1
11		6	max	0	1	.664	3	.138	1	1.63e-2	2	NC	5	NC	3
12			min	0	15	-.252	1	.005	15	-1.921e-3	3	341.854	3	1716.174	1
13		7	max	0	1	.489	3	.108	1	1.769e-2	2	NC	5	NC	3
14			min	0	15	-.116	1	.004	10	-1.964e-3	3	459.184	3	2194.861	1
15		8	max	0	1	.267	3	.062	1	1.907e-2	2	NC	4	NC	2
16			min	0	15	.001	15	-.002	10	-2.007e-3	3	813.423	3	3834.819	1
17		9	max	0	1	.21	2	.022	3	2.045e-2	2	NC	4	NC	1
18			min	0	15	.005	15	-.007	10	-2.05e-3	3	2481.496	2	NC	1
19		10	max	0	1	.27	2	.021	3	2.183e-2	2	NC	3	NC	1
20		min	0	1	-.025	3	-.014	2	-2.093e-3	3	1513.721	2	NC	1	
21	11	max	0	15	.21	2	.022	3	2.045e-2	2	NC	4	NC	1	
22		min	0	1	.005	15	-.007	10	-2.05e-3	3	2481.496	2	NC	1	
23	12	max	0	15	.267	3	.062	1	1.907e-2	2	NC	4	NC	2	
24		min	0	1	.001	15	-.002	10	-2.007e-3	3	813.423	3	3834.819	1	
25	13	max	0	15	.489	3	.108	1	1.769e-2	2	NC	5	NC	3	
26		min	0	1	-.116	1	.004	10	-1.964e-3	3	459.184	3	2194.861	1	
27	14	max	0	15	.664	3	.138	1	1.63e-2	2	NC	5	NC	3	
28		min	0	1	-.252	1	.005	15	-1.921e-3	3	341.854	3	1716.174	1	
29	15	max	0	15	.746	3	.143	1	1.492e-2	2	NC	5	NC	3	
30		min	0	1	-.326	1	.005	15	-1.878e-3	3	305.361	3	1653.718	1	
31	16	max	0	15	.71	3	.122	1	1.354e-2	2	NC	5	NC	3	
32		min	0	1	-.322	1	.005	15	-1.835e-3	3	320.276	3	1938.485	1	
33	17	max	0	15	.554	3	.081	1	1.216e-2	2	NC	5	NC	3	
34		min	0	1	-.237	1	.003	15	-1.791e-3	3	407.143	3	2924.091	1	
35	18	max	0	15	.297	3	.034	1	1.077e-2	2	NC	5	NC	2	
36		min	0	1	-.083	1	0	10	-1.748e-3	3	736.68	3	7122.526	1	
37	19	max	0	15	.116	2	.007	3	9.392e-3	2	NC	1	NC	1	
38		min	0	1	-.021	3	-.003	2	-1.705e-3	3	NC	1	NC	1	
39	M14	1	max	0	1	.225	3	.006	3	5.561e-3	1	NC	1	NC	1
40			min	0	15	-.364	2	-.003	2	-4.036e-3	3	NC	1	NC	1



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

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### Envelope Member Section Deflections (Continued)

Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
41	2	max	0	1	.537	3	.024	1	6.659e-3	1	NC	5	NC	1
42		min	0	15	-.685	1	0	10	-4.905e-3	3	725.038	1	NC	1
43	3	max	0	1	.802	3	.065	1	7.757e-3	1	NC	5	NC	3
44		min	0	15	-.964	1	.002	15	-5.775e-3	3	389.254	1	3665.7	1
45	4	max	0	1	.986	3	.104	1	8.855e-3	1	NC	15	NC	3
46		min	0	15	-1.167	1	.004	15	-6.644e-3	3	290.827	1	2272.759	1
47	5	max	0	1	1.074	3	.127	1	9.954e-3	1	NC	15	NC	3
48		min	0	15	-1.28	1	.005	15	-7.513e-3	3	255.058	1	1869.16	1
49	6	max	0	1	1.065	3	.125	1	1.105e-2	1	NC	15	NC	3
50		min	0	15	-1.301	1	.005	15	-8.382e-3	3	249.213	1	1894.949	1
51	7	max	0	1	.976	3	.1	1	1.215e-2	1	NC	15	NC	3
52		min	0	15	-1.246	1	.004	10	-9.252e-3	3	264.883	1	2383.199	1
53	8	max	0	1	.841	3	.058	1	1.325e-2	1	NC	15	NC	2
54		min	0	15	-1.142	1	-.001	10	-1.012e-2	3	299.991	1	4104.035	1
55	9	max	0	1	.71	3	.019	3	1.435e-2	1	NC	15	NC	1
56		min	0	15	-1.035	1	-.006	10	-1.099e-2	3	347.71	1	NC	1
57	10	max	0	1	.648	3	.019	3	1.544e-2	1	NC	5	NC	1
58		min	0	1	-.985	2	-.013	2	-1.186e-2	3	376.571	1	NC	1
59	11	max	0	15	.71	3	.019	3	1.435e-2	1	NC	15	NC	1
60		min	0	1	-1.035	1	-.006	10	-1.099e-2	3	347.71	1	NC	1
61	12	max	0	15	.841	3	.058	1	1.325e-2	1	NC	15	NC	2
62		min	0	1	-1.142	1	-.001	10	-1.012e-2	3	299.991	1	4104.035	1
63	13	max	0	15	.976	3	.1	1	1.215e-2	1	NC	15	NC	3
64		min	0	1	-1.246	1	.004	10	-9.252e-3	3	264.883	1	2383.199	1
65	14	max	0	15	1.065	3	.125	1	1.105e-2	1	NC	15	NC	3
66		min	0	1	-1.301	1	.005	15	-8.382e-3	3	249.213	1	1894.949	1
67	15	max	0	15	1.074	3	.127	1	9.954e-3	1	NC	15	NC	3
68		min	0	1	-1.28	1	.005	15	-7.513e-3	3	255.058	1	1869.16	1
69	16	max	0	15	.986	3	.104	1	8.855e-3	1	NC	15	NC	3
70		min	0	1	-1.167	1	.004	15	-6.644e-3	3	290.827	1	2272.759	1
71	17	max	0	15	.802	3	.065	1	7.757e-3	1	NC	5	NC	3
72		min	0	1	-.964	1	.002	15	-5.775e-3	3	389.254	1	3665.7	1
73	18	max	0	15	.537	3	.024	1	6.659e-3	1	NC	5	NC	1
74		min	0	1	-.685	1	0	10	-4.905e-3	3	725.038	1	NC	1
75	19	max	0	15	.225	3	.006	3	5.561e-3	1	NC	1	NC	1
76		min	0	1	-.364	2	-.003	2	-4.036e-3	3	NC	1	NC	1
77	M15	1	max	0	15	.23	.006	3	3.419e-3	3	NC	1	NC	1
78		min	0	1	-.364	2	-.003	2	-5.74e-3	2	NC	1	NC	1
79	2	max	0	15	.43	3	.024	1	4.158e-3	3	NC	5	NC	1
80		min	0	1	-.75	2	0	10	-6.875e-3	2	606.257	2	NC	1
81	3	max	0	15	.603	3	.065	1	4.897e-3	3	NC	5	NC	3
82		min	0	1	-1.079	2	.002	15	-8.009e-3	2	327.018	2	3654.639	1
83	4	max	0	15	.732	3	.105	1	5.637e-3	3	NC	15	NC	3
84		min	0	1	-1.314	2	.004	15	-9.143e-3	2	246.308	2	2267.167	1
85	5	max	0	15	.808	3	.127	1	6.376e-3	3	NC	15	NC	3
86		min	0	1	-1.433	2	.005	15	-1.028e-2	2	218.702	2	1864.758	1
87	6	max	0	15	.829	3	.125	1	7.115e-3	3	NC	15	NC	3
88		min	0	1	-1.439	2	.005	15	-1.141e-2	2	217.644	2	1890.028	1
89	7	max	0	15	.804	3	.1	1	7.854e-3	3	NC	15	NC	3
90		min	0	1	-1.348	2	.004	15	-1.255e-2	2	237.623	2	2375.083	1
91	8	max	0	15	.75	3	.059	1	8.594e-3	3	NC	15	NC	2
92		min	0	1	-1.201	2	0	10	-1.368e-2	2	279.518	2	4079.629	1
93	9	max	0	15	.691	3	.018	3	9.333e-3	3	NC	15	NC	1
94		min	0	1	-1.054	2	-.006	10	-1.481e-2	2	339.117	2	NC	1
95	10	max	0	1	.662	3	.017	3	1.007e-2	3	NC	5	NC	1
96		min	0	1	-.984	2	-.012	2	-1.595e-2	2	377.209	1	NC	1
97	11	max	0	1	.691	3	.018	3	9.333e-3	3	NC	15	NC	1





Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

Checked By: \_\_\_\_\_

### Envelope Member Section Deflections (Continued)

Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
98		min	0	15	-1.054	2	-.006	10	-1.481e-2	2	339.117	2	NC	1
99		max	0	1	.75	3	.059	1	8.594e-3	3	NC	15	NC	2
100		min	0	15	-1.201	2	0	10	-1.368e-2	2	279.518	2	4079.629	1
101		max	0	1	.804	3	.1	1	7.854e-3	3	NC	15	NC	3
102		min	0	15	-1.348	2	.004	15	-1.255e-2	2	237.623	2	2375.083	1
103		max	0	1	.829	3	.125	1	7.115e-3	3	NC	15	NC	3
104		min	0	15	-1.439	2	.005	15	-1.141e-2	2	217.644	2	1890.028	1
105		max	0	1	.808	3	.127	1	6.376e-3	3	NC	15	NC	3
106		min	0	15	-1.433	2	.005	15	-1.028e-2	2	218.702	2	1864.758	1
107		max	0	1	.732	3	.105	1	5.637e-3	3	NC	15	NC	3
108		min	0	15	-1.314	2	.004	15	-9.143e-3	2	246.308	2	2267.167	1
109		max	0	1	.603	3	.065	1	4.897e-3	3	NC	5	NC	3
110		min	0	15	-1.079	2	.002	15	-8.009e-3	2	327.018	2	3654.639	1
111		max	0	1	.43	3	.024	1	4.158e-3	3	NC	5	NC	1
112		min	0	15	-.75	2	0	10	-6.875e-3	2	606.257	2	NC	1
113		max	0	1	.23	3	.006	3	3.419e-3	3	NC	1	NC	1
114		min	0	15	-.364	2	-.003	2	-5.74e-3	2	NC	1	NC	1
115	M16	max	0	15	.108	1	.005	3	6.061e-3	3	NC	1	NC	1
116		min	0	1	-.076	3	-.003	2	-8.297e-3	1	NC	1	NC	1
117		max	0	15	.031	3	.034	1	7.111e-3	3	NC	5	NC	2
118		min	0	1	-.16	2	.001	10	-9.431e-3	1	893.069	2	7163.79	1
119		max	0	15	.115	3	.081	1	8.162e-3	3	NC	5	NC	3
120		min	0	1	-.368	2	.003	15	-1.057e-2	1	497.115	2	2930.67	1
121		max	0	15	.159	3	.122	1	9.212e-3	3	NC	5	NC	3
122		min	0	1	-.488	2	.005	15	-1.17e-2	1	396.312	2	1938.78	1
123		max	0	15	.157	3	.143	1	1.026e-2	3	NC	5	NC	3
124		min	0	1	-.502	2	.005	15	-1.283e-2	1	386.884	2	1650.83	1
125		max	0	15	.109	3	.138	1	1.131e-2	3	NC	5	NC	3
126		min	0	1	-.414	2	.005	15	-1.397e-2	1	452.793	2	1709.02	1
127		max	0	15	.026	3	.109	1	1.236e-2	3	NC	5	NC	3
128		min	0	1	-.246	2	.004	15	-1.51e-2	1	671.434	2	2176.397	1
129		max	0	15	.015	9	.063	1	1.341e-2	3	NC	3	NC	2
130		min	0	1	-.073	3	0	10	-1.624e-2	1	1654.313	2	3760.78	1
131		max	0	15	.169	1	.018	1	1.447e-2	3	NC	4	NC	1
132		min	0	1	-.16	3	-.005	10	-1.737e-2	1	2797.08	3	NC	1
133		max	0	1	.246	1	.015	3	1.552e-2	3	NC	5	NC	1
134		min	0	1	-.199	3	-.011	2	-1.851e-2	1	1690.004	1	NC	1
135		max	0	1	.169	1	.018	1	1.447e-2	3	NC	4	NC	1
136		min	0	15	-.16	3	-.005	10	-1.737e-2	1	2797.08	3	NC	1
137		max	0	1	.015	9	.063	1	1.341e-2	3	NC	3	NC	2
138		min	0	15	-.073	3	0	10	-1.624e-2	1	1654.313	2	3760.78	1
139		max	0	1	.026	3	.109	1	1.236e-2	3	NC	5	NC	3
140		min	0	15	-.246	2	.004	15	-1.51e-2	1	671.434	2	2176.397	1
141		max	0	1	.109	3	.138	1	1.131e-2	3	NC	5	NC	3
142		min	0	15	-.414	2	.005	15	-1.397e-2	1	452.793	2	1709.02	1
143		max	0	1	.157	3	.143	1	1.026e-2	3	NC	5	NC	3
144		min	0	15	-.502	2	.005	15	-1.283e-2	1	386.884	2	1650.83	1
145		max	0	1	.159	3	.122	1	9.212e-3	3	NC	5	NC	3
146		min	0	15	-.488	2	.005	15	-1.17e-2	1	396.312	2	1938.78	1
147		max	0	1	.115	3	.081	1	8.162e-3	3	NC	5	NC	3
148		min	0	15	-.368	2	.003	15	-1.057e-2	1	497.115	2	2930.67	1
149		max	0	1	.031	3	.034	1	7.111e-3	3	NC	5	NC	2
150		min	0	15	-.16	2	.001	10	-9.431e-3	1	893.069	2	7163.79	1
151		max	0	1	.108	1	.005	3	6.061e-3	3	NC	1	NC	1
152		min	0	15	-.076	3	-.003	2	-8.297e-3	1	NC	1	NC	1
153	M2	max	.006	1	.005	2	.007	1	-7.029e-6	15	NC	1	NC	2
154		min	-.007	3	-.009	3	0	15	-1.921e-4	1	NC	1	7634.179	1



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

Checked By: \_\_\_\_\_

### Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
155		2	max	.006	1	.004	2	.007	1	-6.558e-6	15	NC	1	NC	2
156			min	-.007	3	-.009	3	0	15	-1.793e-4	1	NC	1	8327.462	1
157		3	max	.005	1	.004	2	.006	1	-6.088e-6	15	NC	1	NC	2
158			min	-.006	3	-.008	3	0	15	-1.664e-4	1	NC	1	9153.929	1
159		4	max	.005	1	.003	2	.005	1	-5.617e-6	15	NC	1	NC	1
160			min	-.006	3	-.008	3	0	15	-1.535e-4	1	NC	1	NC	1
161		5	max	.005	1	.002	2	.005	1	-5.147e-6	15	NC	1	NC	1
162			min	-.005	3	-.008	3	0	15	-1.406e-4	1	NC	1	NC	1
163		6	max	.004	1	.002	2	.004	1	-4.676e-6	15	NC	1	NC	1
164			min	-.005	3	-.007	3	0	15	-1.278e-4	1	NC	1	NC	1
165		7	max	.004	1	.001	2	.004	1	-4.206e-6	15	NC	1	NC	1
166			min	-.005	3	-.007	3	0	15	-1.149e-4	1	NC	1	NC	1
167		8	max	.004	1	0	2	.003	1	-3.735e-6	15	NC	1	NC	1
168			min	-.004	3	-.006	3	0	15	-1.02e-4	1	NC	1	NC	1
169		9	max	.003	1	0	2	.003	1	-3.265e-6	15	NC	1	NC	1
170			min	-.004	3	-.006	3	0	15	-8.914e-5	1	NC	1	NC	1
171		10	max	.003	1	0	2	.002	1	-2.794e-6	15	NC	1	NC	1
172			min	-.003	3	-.006	3	0	15	-7.626e-5	1	NC	1	NC	1
173		11	max	.003	1	0	2	.002	1	-2.323e-6	15	NC	1	NC	1
174			min	-.003	3	-.005	3	0	15	-6.338e-5	1	NC	1	NC	1
175		12	max	.002	1	0	15	.001	1	-1.853e-6	15	NC	1	NC	1
176			min	-.003	3	-.005	3	0	15	-5.051e-5	1	NC	1	NC	1
177		13	max	.002	1	0	15	.001	1	-1.382e-6	15	NC	1	NC	1
178			min	-.002	3	-.004	3	0	15	-3.763e-5	1	NC	1	NC	1
179		14	max	.002	1	0	15	0	1	-9.119e-7	15	NC	1	NC	1
180			min	-.002	3	-.003	3	0	15	-2.476e-5	1	NC	1	NC	1
181		15	max	.001	1	0	15	0	1	-4.413e-7	15	NC	1	NC	1
182			min	-.002	3	-.003	3	0	15	-1.188e-5	1	NC	1	NC	1
183		16	max	0	1	0	15	0	1	9.964e-7	1	NC	1	NC	1
184			min	-.001	3	-.002	3	0	15	-4.649e-7	3	NC	1	NC	1
185		17	max	0	1	0	15	0	1	1.387e-5	1	NC	1	NC	1
186			min	0	3	-.002	3	0	15	3.627e-7	12	NC	1	NC	1
187		18	max	0	1	0	15	0	1	2.675e-5	1	NC	1	NC	1
188			min	0	3	0	4	0	15	9.703e-7	15	NC	1	NC	1
189		19	max	0	1	0	1	0	1	3.962e-5	1	NC	1	NC	1
190			min	0	1	0	1	0	1	1.441e-6	15	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-4.554e-7	15	NC	1	NC	1
192			min	0	1	0	1	0	1	-1.251e-5	1	NC	1	NC	1
193		2	max	0	3	0	15	0	1	9.533e-6	1	NC	1	NC	1
194			min	0	2	-.002	4	0	15	3.488e-7	15	NC	1	NC	1
195		3	max	0	3	0	15	0	1	3.158e-5	1	NC	1	NC	1
196			min	0	2	-.003	4	0	15	1.153e-6	15	NC	1	NC	1
197		4	max	0	3	-.001	15	0	1	5.363e-5	1	NC	1	NC	1
198			min	0	2	-.005	4	0	15	1.957e-6	15	NC	1	NC	1
199		5	max	.001	3	-.002	15	0	1	7.567e-5	1	NC	1	NC	1
200			min	0	2	-.007	4	0	15	2.761e-6	15	NC	1	NC	1
201		6	max	.001	3	-.002	15	.001	1	9.772e-5	1	NC	1	NC	1
202			min	-.001	2	-.009	4	0	15	3.565e-6	15	NC	1	NC	1
203		7	max	.002	3	-.002	15	.001	1	1.198e-4	1	NC	1	NC	1
204			min	-.001	2	-.01	4	0	15	4.37e-6	15	8927.257	4	NC	1
205		8	max	.002	3	-.003	15	.002	1	1.418e-4	1	NC	1	NC	1
206			min	-.002	2	-.012	4	0	15	5.174e-6	15	7987.34	4	NC	1
207		9	max	.002	3	-.003	15	.002	1	1.639e-4	1	NC	1	NC	1
208			min	-.002	2	-.013	4	0	15	5.978e-6	15	7428.512	4	NC	1
209		10	max	.003	3	-.003	15	.002	1	1.859e-4	1	NC	2	NC	1
210			min	-.002	2	-.013	4	0	15	6.782e-6	15	7152.552	4	NC	1
211		11	max	.003	3	-.003	15	.003	1	2.08e-4	1	NC	2	NC	1



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

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### Envelope Member Section Deflections (Continued)

Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
212		min	-.002	2	-.013	4	0	15	7.586e-6	15	7118.493	4	NC	1
213		max	.003	3	-.003	15	.003	1	2.3e-4	1	NC	2	NC	1
214		min	-.003	2	-.013	4	0	15	8.391e-6	15	7326.874	4	NC	1
215		max	.004	3	-.003	15	.004	1	2.521e-4	1	NC	1	NC	1
216		min	-.003	2	-.012	4	0	15	9.195e-6	15	7821.922	4	NC	1
217		max	.004	3	-.003	15	.004	1	2.741e-4	1	NC	1	NC	1
218		min	-.003	2	-.011	4	0	15	9.999e-6	15	8714.789	4	NC	1
219		max	.004	3	-.002	15	.005	1	2.961e-4	1	NC	1	NC	1
220		min	-.003	2	-.009	4	0	15	1.08e-5	15	NC	1	NC	1
221		max	.004	3	-.002	15	.005	1	3.182e-4	1	NC	1	NC	1
222		min	-.003	2	-.008	4	0	15	1.161e-5	15	NC	1	NC	1
223		max	.005	3	-.001	15	.006	1	3.402e-4	1	NC	1	NC	1
224		min	-.004	2	-.006	1	0	15	1.241e-5	15	NC	1	NC	1
225		max	.005	3	0	15	.006	1	3.623e-4	1	NC	1	NC	1
226		min	-.004	2	-.005	1	0	15	1.322e-5	15	NC	1	NC	1
227		max	.005	3	0	15	.007	1	3.843e-4	1	NC	1	NC	1
228		min	-.004	2	-.003	1	0	15	1.402e-5	15	NC	1	NC	1
229	M4	max	.003	1	.004	2	0	15	2.057e-5	1	NC	1	NC	3
230		min	0	3	-.005	3	-.007	1	7.61e-7	15	NC	1	3581.549	1
231		max	.003	1	.003	2	0	15	2.057e-5	1	NC	1	NC	2
232		min	0	3	-.005	3	-.006	1	7.61e-7	15	NC	1	3897.944	1
233		max	.003	1	.003	2	0	15	2.057e-5	1	NC	1	NC	2
234		min	0	3	-.005	3	-.006	1	7.61e-7	15	NC	1	4274.319	1
235		max	.002	1	.003	2	0	15	2.057e-5	1	NC	1	NC	2
236		min	0	3	-.005	3	-.005	1	7.61e-7	15	NC	1	4726.286	1
237		max	.002	1	.003	2	0	15	2.057e-5	1	NC	1	NC	2
238		min	0	3	-.004	3	-.005	1	7.61e-7	15	NC	1	5275.066	1
239		max	.002	1	.003	2	0	15	2.057e-5	1	NC	1	NC	2
240		min	0	3	-.004	3	-.004	1	7.61e-7	15	NC	1	5950.083	1
241		max	.002	1	.002	2	0	15	2.057e-5	1	NC	1	NC	2
242		min	0	3	-.004	3	-.004	1	7.61e-7	15	NC	1	6793.108	1
243		max	.002	1	.002	2	0	15	2.057e-5	1	NC	1	NC	2
244		min	0	3	-.003	3	-.003	1	7.61e-7	15	NC	1	7865.065	1
245		max	.002	1	.002	2	0	15	2.057e-5	1	NC	1	NC	2
246		min	0	3	-.003	3	-.003	1	7.61e-7	15	NC	1	9257.679	1
247		max	.001	1	.002	2	0	15	2.057e-5	1	NC	1	NC	1
248		min	0	3	-.003	3	-.002	1	7.61e-7	15	NC	1	NC	1
249		max	.001	1	.002	2	0	15	2.057e-5	1	NC	1	NC	1
250		min	0	3	-.002	3	-.002	1	7.61e-7	15	NC	1	NC	1
251		max	.001	1	.001	2	0	15	2.057e-5	1	NC	1	NC	1
252		min	0	3	-.002	3	-.001	1	7.61e-7	15	NC	1	NC	1
253		max	0	1	.001	2	0	15	2.057e-5	1	NC	1	NC	1
254		min	0	3	-.002	3	-.001	1	7.61e-7	15	NC	1	NC	1
255		max	0	1	.001	2	0	15	2.057e-5	1	NC	1	NC	1
256		min	0	3	-.002	3	0	1	7.61e-7	15	NC	1	NC	1
257		max	0	1	0	2	0	15	2.057e-5	1	NC	1	NC	1
258		min	0	3	-.001	3	0	1	7.61e-7	15	NC	1	NC	1
259		max	0	1	0	2	0	15	2.057e-5	1	NC	1	NC	1
260		min	0	3	0	3	0	1	7.61e-7	15	NC	1	NC	1
261		max	0	1	0	2	0	15	2.057e-5	1	NC	1	NC	1
262		min	0	3	0	3	0	1	7.61e-7	15	NC	1	NC	1
263		max	0	1	0	2	0	15	2.057e-5	1	NC	1	NC	1
264		min	0	3	0	3	0	1	7.61e-7	15	NC	1	NC	1
265		max	0	1	0	1	0	1	2.057e-5	1	NC	1	NC	1
266		min	0	1	0	1	0	1	7.61e-7	15	NC	1	NC	1
267	M6	max	.019	1	.02	2	0	1	0	1	NC	4	NC	1
268		min	-.023	3	-.028	3	0	1	0	1	1962.926	3	NC	1



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
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### Envelope Member Section Deflections (Continued)

Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
269	2	max	.018	1	.018	2	0	1	0	1	NC	4	NC	1
270		min	-.021	3	-.027	3	0	1	0	1	2080.325	3	NC	1
271	3	max	.017	1	.016	2	0	1	0	1	NC	4	NC	1
272		min	-.02	3	-.025	3	0	1	0	1	2212.65	3	NC	1
273	4	max	.016	1	.015	2	0	1	0	1	NC	4	NC	1
274		min	-.019	3	-.023	3	0	1	0	1	2362.917	3	NC	1
275	5	max	.015	1	.013	2	0	1	0	1	NC	4	NC	1
276		min	-.018	3	-.022	3	0	1	0	1	2535.009	3	NC	1
277	6	max	.014	1	.012	2	0	1	0	1	NC	1	NC	1
278		min	-.016	3	-.02	3	0	1	0	1	2734.001	3	NC	1
279	7	max	.013	1	.01	2	0	1	0	1	NC	1	NC	1
280		min	-.015	3	-.019	3	0	1	0	1	2966.664	3	NC	1
281	8	max	.011	1	.009	2	0	1	0	1	NC	1	NC	1
282		min	-.014	3	-.017	3	0	1	0	1	3242.227	3	NC	1
283	9	max	.01	1	.007	2	0	1	0	1	NC	1	NC	1
284		min	-.013	3	-.015	3	0	1	0	1	3573.618	3	NC	1
285	10	max	.009	1	.006	2	0	1	0	1	NC	1	NC	1
286		min	-.011	3	-.014	3	0	1	0	1	3979.509	3	NC	1
287	11	max	.008	1	.005	2	0	1	0	1	NC	1	NC	1
288		min	-.01	3	-.012	3	0	1	0	1	4487.911	3	NC	1
289	12	max	.007	1	.004	2	0	1	0	1	NC	1	NC	1
290		min	-.009	3	-.011	3	0	1	0	1	5142.844	3	NC	1
291	13	max	.006	1	.003	2	0	1	0	1	NC	1	NC	1
292		min	-.008	3	-.009	3	0	1	0	1	6017.68	3	NC	1
293	14	max	.005	1	.002	2	0	1	0	1	NC	1	NC	1
294		min	-.006	3	-.008	3	0	1	0	1	7244.494	3	NC	1
295	15	max	.004	1	.001	2	0	1	0	1	NC	1	NC	1
296		min	-.005	3	-.006	3	0	1	0	1	9087.44	3	NC	1
297	16	max	.003	1	0	2	0	1	0	1	NC	1	NC	1
298		min	-.004	3	-.005	3	0	1	0	1	NC	1	NC	1
299	17	max	.002	1	0	2	0	1	0	1	NC	1	NC	1
300		min	-.003	3	-.003	3	0	1	0	1	NC	1	NC	1
301	18	max	.001	1	0	2	0	1	0	1	NC	1	NC	1
302		min	-.001	3	-.002	3	0	1	0	1	NC	1	NC	1
303	19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
304		min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	1	NC	1	NC	1
306		min	0	1	0	1	0	1	0	1	NC	1	NC	1
307	2	max	0	3	0	2	0	1	0	1	NC	1	NC	1
308		min	0	2	-.002	3	0	1	0	1	NC	1	NC	1
309	3	max	.002	3	0	15	0	1	0	1	NC	1	NC	1
310		min	-.002	2	-.005	3	0	1	0	1	NC	1	NC	1
311	4	max	.003	3	-.001	15	0	1	0	1	NC	1	NC	1
312		min	-.003	2	-.007	3	0	1	0	1	NC	1	NC	1
313	5	max	.004	3	-.002	15	0	1	0	1	NC	1	NC	1
314		min	-.004	2	-.009	3	0	1	0	1	NC	1	NC	1
315	6	max	.005	3	-.002	15	0	1	0	1	NC	1	NC	1
316		min	-.004	2	-.01	3	0	1	0	1	9311.279	3	NC	1
317	7	max	.006	3	-.002	15	0	1	0	1	NC	1	NC	1
318		min	-.005	2	-.012	3	0	1	0	1	8289.133	3	NC	1
319	8	max	.007	3	-.003	15	0	1	0	1	NC	1	NC	1
320		min	-.006	2	-.013	3	0	1	0	1	7680.009	3	NC	1
321	9	max	.008	3	-.003	15	0	1	0	1	NC	1	NC	1
322		min	-.007	2	-.013	3	0	1	0	1	7358.828	3	NC	1
323	10	max	.008	3	-.003	15	0	1	0	1	NC	1	NC	1
324		min	-.008	2	-.014	3	0	1	0	1	7268.885	3	NC	1
325	11	max	.009	3	-.003	15	0	1	0	1	NC	1	NC	1



Company : Schletter, Inc.  
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### Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
326			min	-.009	2	-.014	3	0	1	0	1	7257.607	4	NC	1
327		12	max	.01	3	-.003	15	0	1	0	1	NC	1	NC	1
328			min	-.01	2	-.013	3	0	1	0	1	7463.143	4	NC	1
329		13	max	.011	3	-.003	15	0	1	0	1	NC	1	NC	1
330			min	-.011	2	-.012	3	0	1	0	1	7961.226	4	NC	1
331		14	max	.012	3	-.003	15	0	1	0	1	NC	1	NC	1
332			min	-.012	2	-.011	4	0	1	0	1	8864.298	4	NC	1
333		15	max	.013	3	-.002	15	0	1	0	1	NC	1	NC	1
334			min	-.012	2	-.01	1	0	1	0	1	NC	1	NC	1
335		16	max	.014	3	-.002	15	0	1	0	1	NC	1	NC	1
336			min	-.013	2	-.009	1	0	1	0	1	NC	1	NC	1
337		17	max	.015	3	-.001	15	0	1	0	1	NC	1	NC	1
338			min	-.014	2	-.008	1	0	1	0	1	NC	1	NC	1
339		18	max	.016	3	0	15	0	1	0	1	NC	1	NC	1
340			min	-.015	2	-.007	1	0	1	0	1	NC	1	NC	1
341		19	max	.017	3	0	15	0	1	0	1	NC	1	NC	1
342			min	-.016	2	-.006	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.008	1	.014	2	0	1	0	1	NC	1	NC	1
344			min	-.002	3	-.017	3	0	1	0	1	NC	1	NC	1
345		2	max	.008	1	.014	2	0	1	0	1	NC	1	NC	1
346			min	-.002	3	-.016	3	0	1	0	1	NC	1	NC	1
347		3	max	.007	1	.013	2	0	1	0	1	NC	1	NC	1
348			min	-.002	3	-.015	3	0	1	0	1	NC	1	NC	1
349		4	max	.007	1	.012	2	0	1	0	1	NC	1	NC	1
350			min	-.002	3	-.014	3	0	1	0	1	NC	1	NC	1
351		5	max	.006	1	.011	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.013	3	0	1	0	1	NC	1	NC	1
353		6	max	.006	1	.01	2	0	1	0	1	NC	1	NC	1
354			min	-.002	3	-.012	3	0	1	0	1	NC	1	NC	1
355		7	max	.006	1	.01	2	0	1	0	1	NC	1	NC	1
356			min	-.002	3	-.011	3	0	1	0	1	NC	1	NC	1
357		8	max	.005	1	.009	2	0	1	0	1	NC	1	NC	1
358			min	-.001	3	-.01	3	0	1	0	1	NC	1	NC	1
359		9	max	.005	1	.008	2	0	1	0	1	NC	1	NC	1
360			min	-.001	3	-.009	3	0	1	0	1	NC	1	NC	1
361		10	max	.004	1	.007	2	0	1	0	1	NC	1	NC	1
362			min	-.001	3	-.008	3	0	1	0	1	NC	1	NC	1
363		11	max	.004	1	.006	2	0	1	0	1	NC	1	NC	1
364			min	-.001	3	-.008	3	0	1	0	1	NC	1	NC	1
365		12	max	.003	1	.006	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.007	3	0	1	0	1	NC	1	NC	1
367		13	max	.003	1	.005	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.006	3	0	1	0	1	NC	1	NC	1
369		14	max	.002	1	.004	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.005	3	0	1	0	1	NC	1	NC	1
371		15	max	.002	1	.003	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.004	3	0	1	0	1	NC	1	NC	1
373		16	max	.001	1	.002	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.003	3	0	1	0	1	NC	1	NC	1
375		17	max	0	1	.002	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.002	3	0	1	0	1	NC	1	NC	1
377		18	max	0	1	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	0	3	0	1	0	1	NC	1	NC	1
379		19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
380			min	0	1	0	1	0	1	0	1	NC	1	NC	1
381	M10	1	max	.006	1	.005	2	0	15	1.921e-4	1	NC	1	NC	2
382			min	-.007	3	-.009	3	-.007	1	7.029e-6	15	NC	1	7634.179	1



Company : Schletter, Inc.  
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### Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
383		2	max	.006	1	.004	2	0	15	1.793e-4	1	NC	1	NC	2
384			min	-.007	3	-.009	3	-.007	1	6.558e-6	15	NC	1	8327.462	1
385		3	max	.005	1	.004	2	0	15	1.664e-4	1	NC	1	NC	2
386			min	-.006	3	-.008	3	-.006	1	6.088e-6	15	NC	1	9153.929	1
387		4	max	.005	1	.003	2	0	15	1.535e-4	1	NC	1	NC	1
388			min	-.006	3	-.008	3	-.005	1	5.617e-6	15	NC	1	NC	1
389		5	max	.005	1	.002	2	0	15	1.406e-4	1	NC	1	NC	1
390			min	-.005	3	-.008	3	-.005	1	5.147e-6	15	NC	1	NC	1
391		6	max	.004	1	.002	2	0	15	1.278e-4	1	NC	1	NC	1
392			min	-.005	3	-.007	3	-.004	1	4.676e-6	15	NC	1	NC	1
393		7	max	.004	1	.001	2	0	15	1.149e-4	1	NC	1	NC	1
394			min	-.005	3	-.007	3	-.004	1	4.206e-6	15	NC	1	NC	1
395		8	max	.004	1	0	2	0	15	1.02e-4	1	NC	1	NC	1
396			min	-.004	3	-.006	3	-.003	1	3.735e-6	15	NC	1	NC	1
397		9	max	.003	1	0	2	0	15	8.914e-5	1	NC	1	NC	1
398			min	-.004	3	-.006	3	-.003	1	3.265e-6	15	NC	1	NC	1
399		10	max	.003	1	0	2	0	15	7.626e-5	1	NC	1	NC	1
400			min	-.003	3	-.006	3	-.002	1	2.794e-6	15	NC	1	NC	1
401		11	max	.003	1	0	2	0	15	6.338e-5	1	NC	1	NC	1
402			min	-.003	3	-.005	3	-.002	1	2.323e-6	15	NC	1	NC	1
403		12	max	.002	1	0	15	0	15	5.051e-5	1	NC	1	NC	1
404			min	-.003	3	-.005	3	-.001	1	1.853e-6	15	NC	1	NC	1
405		13	max	.002	1	0	15	0	15	3.763e-5	1	NC	1	NC	1
406			min	-.002	3	-.004	3	-.001	1	1.382e-6	15	NC	1	NC	1
407		14	max	.002	1	0	15	0	15	2.476e-5	1	NC	1	NC	1
408			min	-.002	3	-.003	3	0	1	9.119e-7	15	NC	1	NC	1
409		15	max	.001	1	0	15	0	15	1.188e-5	1	NC	1	NC	1
410			min	-.002	3	-.003	3	0	1	4.413e-7	15	NC	1	NC	1
411		16	max	0	1	0	15	0	15	4.649e-7	3	NC	1	NC	1
412			min	-.001	3	-.002	3	0	1	-9.964e-7	1	NC	1	NC	1
413		17	max	0	1	0	15	0	15	-3.627e-7	12	NC	1	NC	1
414			min	0	3	-.002	3	0	1	-1.387e-5	1	NC	1	NC	1
415		18	max	0	1	0	15	0	15	-9.703e-7	15	NC	1	NC	1
416			min	0	3	0	4	0	1	-2.675e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	-1.441e-6	15	NC	1	NC	1
418			min	0	1	0	1	0	1	-3.962e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.251e-5	1	NC	1	NC	1
420			min	0	1	0	1	0	1	4.554e-7	15	NC	1	NC	1
421		2	max	0	3	0	15	0	15	-3.488e-7	15	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-9.533e-6	1	NC	1	NC	1
423		3	max	0	3	0	15	0	15	-1.153e-6	15	NC	1	NC	1
424			min	0	2	-.003	4	0	1	-3.158e-5	1	NC	1	NC	1
425		4	max	0	3	-.001	15	0	15	-1.957e-6	15	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-5.363e-5	1	NC	1	NC	1
427		5	max	.001	3	-.002	15	0	15	-2.761e-6	15	NC	1	NC	1
428			min	0	2	-.007	4	0	1	-7.567e-5	1	NC	1	NC	1
429		6	max	.001	3	-.002	15	0	15	-3.565e-6	15	NC	1	NC	1
430			min	-.001	2	-.009	4	-.001	1	-9.772e-5	1	NC	1	NC	1
431		7	max	.002	3	-.002	15	0	15	-4.37e-6	15	NC	1	NC	1
432			min	-.001	2	-.01	4	-.001	1	-1.198e-4	1	8927.257	4	NC	1
433		8	max	.002	3	-.003	15	0	15	-5.174e-6	15	NC	1	NC	1
434			min	-.002	2	-.012	4	-.002	1	-1.418e-4	1	7987.34	4	NC	1
435		9	max	.002	3	-.003	15	0	15	-5.978e-6	15	NC	1	NC	1
436			min	-.002	2	-.013	4	-.002	1	-1.639e-4	1	7428.512	4	NC	1
437		10	max	.003	3	-.003	15	0	15	-6.782e-6	15	NC	2	NC	1
438			min	-.002	2	-.013	4	-.002	1	-1.859e-4	1	7152.552	4	NC	1
439		11	max	.003	3	-.003	15	0	15	-7.586e-6	15	NC	2	NC	1





Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

Checked By: \_\_\_\_\_

### Envelope Member Section Deflections (Continued)

Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
440		min	-.002	2	-.013	4	-.003	1	-2.08e-4	1	7118.493	4	NC	1
441		max	.003	3	-.003	15	0	15	-8.391e-6	15	NC	2	NC	1
442		min	-.003	2	-.013	4	-.003	1	-2.3e-4	1	7326.874	4	NC	1
443		max	.004	3	-.003	15	0	15	-9.195e-6	15	NC	1	NC	1
444		min	-.003	2	-.012	4	-.004	1	-2.521e-4	1	7821.922	4	NC	1
445		max	.004	3	-.003	15	0	15	-9.999e-6	15	NC	1	NC	1
446		min	-.003	2	-.011	4	-.004	1	-2.741e-4	1	8714.789	4	NC	1
447		max	.004	3	-.002	15	0	15	-1.08e-5	15	NC	1	NC	1
448		min	-.003	2	-.009	4	-.005	1	-2.961e-4	1	NC	1	NC	1
449		max	.004	3	-.002	15	0	15	-1.161e-5	15	NC	1	NC	1
450		min	-.003	2	-.008	4	-.005	1	-3.182e-4	1	NC	1	NC	1
451		max	.005	3	-.001	15	0	15	-1.241e-5	15	NC	1	NC	1
452		min	-.004	2	-.006	1	-.006	1	-3.402e-4	1	NC	1	NC	1
453		max	.005	3	0	15	0	15	-1.322e-5	15	NC	1	NC	1
454		min	-.004	2	-.005	1	-.006	1	-3.623e-4	1	NC	1	NC	1
455		max	.005	3	0	15	0	15	-1.402e-5	15	NC	1	NC	1
456		min	-.004	2	-.003	1	-.007	1	-3.843e-4	1	NC	1	NC	1
457	M12	max	.003	1	.004	2	.007	1	-7.61e-7	15	NC	1	NC	3
458		min	0	3	-.005	3	0	15	-2.057e-5	1	NC	1	3581.549	1
459	2	max	.003	1	.003	2	.006	1	-7.61e-7	15	NC	1	NC	2
460		min	0	3	-.005	3	0	15	-2.057e-5	1	NC	1	3897.944	1
461	3	max	.003	1	.003	2	.006	1	-7.61e-7	15	NC	1	NC	2
462		min	0	3	-.005	3	0	15	-2.057e-5	1	NC	1	4274.319	1
463	4	max	.002	1	.003	2	.005	1	-7.61e-7	15	NC	1	NC	2
464		min	0	3	-.005	3	0	15	-2.057e-5	1	NC	1	4726.286	1
465	5	max	.002	1	.003	2	.005	1	-7.61e-7	15	NC	1	NC	2
466		min	0	3	-.004	3	0	15	-2.057e-5	1	NC	1	5275.066	1
467	6	max	.002	1	.003	2	.004	1	-7.61e-7	15	NC	1	NC	2
468		min	0	3	-.004	3	0	15	-2.057e-5	1	NC	1	5950.083	1
469	7	max	.002	1	.002	2	.004	1	-7.61e-7	15	NC	1	NC	2
470		min	0	3	-.004	3	0	15	-2.057e-5	1	NC	1	6793.108	1
471	8	max	.002	1	.002	2	.003	1	-7.61e-7	15	NC	1	NC	2
472		min	0	3	-.003	3	0	15	-2.057e-5	1	NC	1	7865.065	1
473	9	max	.002	1	.002	2	.003	1	-7.61e-7	15	NC	1	NC	2
474		min	0	3	-.003	3	0	15	-2.057e-5	1	NC	1	9257.679	1
475	10	max	.001	1	.002	2	.002	1	-7.61e-7	15	NC	1	NC	1
476		min	0	3	-.003	3	0	15	-2.057e-5	1	NC	1	NC	1
477	11	max	.001	1	.002	2	.002	1	-7.61e-7	15	NC	1	NC	1
478		min	0	3	-.002	3	0	15	-2.057e-5	1	NC	1	NC	1
479	12	max	.001	1	.001	2	.001	1	-7.61e-7	15	NC	1	NC	1
480		min	0	3	-.002	3	0	15	-2.057e-5	1	NC	1	NC	1
481	13	max	0	1	.001	2	.001	1	-7.61e-7	15	NC	1	NC	1
482		min	0	3	-.002	3	0	15	-2.057e-5	1	NC	1	NC	1
483	14	max	0	1	.001	2	0	1	-7.61e-7	15	NC	1	NC	1
484		min	0	3	-.002	3	0	15	-2.057e-5	1	NC	1	NC	1
485	15	max	0	1	0	2	0	1	-7.61e-7	15	NC	1	NC	1
486		min	0	3	-.001	3	0	15	-2.057e-5	1	NC	1	NC	1
487	16	max	0	1	0	2	0	1	-7.61e-7	15	NC	1	NC	1
488		min	0	3	0	3	0	15	-2.057e-5	1	NC	1	NC	1
489	17	max	0	1	0	2	0	1	-7.61e-7	15	NC	1	NC	1
490		min	0	3	0	3	0	15	-2.057e-5	1	NC	1	NC	1
491	18	max	0	1	0	2	0	1	-7.61e-7	15	NC	1	NC	1
492		min	0	3	0	3	0	15	-2.057e-5	1	NC	1	NC	1
493	19	max	0	1	0	1	0	1	-7.61e-7	15	NC	1	NC	1
494		min	0	1	0	1	0	1	-2.057e-5	1	NC	1	NC	1
495	M1	max	.007	3	.116	2	0	1	1.564e-2	1	NC	1	NC	1
496		min	-.003	2	-.021	3	0	15	-2.535e-2	3	NC	1	NC	1



Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

Checked By: \_\_\_\_\_

### Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
497		2	max	.007	3	.056	2	0	15	7.606e-3	1	NC	4	NC	1
498			min	-.003	2	-.009	3	-.005	1	-1.254e-2	3	1932.477	2	NC	1
499		3	max	.007	3	.01	3	0	15	3.125e-5	10	NC	5	NC	1
500			min	-.003	2	-.008	2	-.007	1	-1.336e-4	1	930.669	2	NC	1
501		4	max	.007	3	.043	3	0	15	4.612e-3	1	NC	5	NC	1
502			min	-.003	2	-.081	2	-.007	1	-4.686e-3	3	586.865	2	NC	1
503		5	max	.006	3	.085	3	0	15	9.358e-3	1	NC	15	NC	1
504			min	-.003	2	-.157	2	-.005	1	-9.248e-3	3	423.164	2	NC	1
505		6	max	.006	3	.132	3	0	15	1.41e-2	1	NC	15	NC	1
506			min	-.003	2	-.23	2	-.002	1	-1.381e-2	3	333.05	2	NC	1
507		7	max	.006	3	.176	3	0	1	1.885e-2	1	NC	15	NC	1
508			min	-.003	2	-.296	2	0	12	-1.837e-2	3	279.89	2	NC	1
509		8	max	.006	3	.213	3	0	1	2.36e-2	1	8986.294	15	NC	1
510			min	-.003	2	-.348	2	0	15	-2.294e-2	3	248.461	2	NC	1
511		9	max	.006	3	.237	3	0	15	2.61e-2	1	8399.704	15	NC	1
512			min	-.003	2	-.381	2	0	1	-2.307e-2	3	232.106	2	NC	1
513		10	max	.006	3	.246	3	0	1	2.728e-2	2	8220.998	15	NC	1
514			min	-.003	2	-.392	2	0	15	-2.025e-2	3	227.301	2	NC	1
515		11	max	.006	3	.24	3	0	1	2.931e-2	2	8399.471	15	NC	1
516			min	-.003	2	-.381	2	0	15	-1.744e-2	3	232.848	2	NC	1
517		12	max	.006	3	.22	3	0	15	2.83e-2	2	8985.802	15	NC	1
518			min	-.003	2	-.347	2	0	1	-1.459e-2	3	250.453	1	NC	1
519		13	max	.005	3	.187	3	0	15	2.27e-2	2	NC	15	NC	1
520			min	-.003	2	-.293	2	0	1	-1.168e-2	3	284.28	1	NC	1
521		14	max	.005	3	.145	3	.002	1	1.709e-2	2	NC	15	NC	1
522			min	-.003	2	-.224	2	0	15	-8.768e-3	3	342.031	1	NC	1
523		15	max	.005	3	.099	3	.004	1	1.149e-2	2	NC	15	NC	1
524			min	-.003	2	-.15	1	0	15	-5.859e-3	3	441.19	1	NC	1
525		16	max	.005	3	.05	3	.006	1	5.882e-3	2	NC	5	NC	1
526			min	-.003	2	-.074	1	0	15	-2.949e-3	3	624.175	1	NC	1
527		17	max	.005	3	.003	3	.007	1	5.071e-4	1	NC	5	NC	1
528			min	-.003	2	-.005	2	0	15	-3.957e-5	3	1013.947	1	NC	1
529		18	max	.005	3	.055	1	.005	1	1.044e-2	2	NC	4	NC	1
530			min	-.003	2	-.038	3	0	15	-4.259e-3	3	2142.43	1	NC	1
531		19	max	.005	3	.108	1	0	15	2.097e-2	2	NC	1	NC	1
532			min	-.003	2	-.076	3	0	1	-8.644e-3	3	NC	1	NC	1
533	M5	1	max	.021	3	.27	2	0	1	0	1	NC	1	NC	1
534			min	-.014	2	-.025	3	0	1	0	1	NC	1	NC	1
535		2	max	.021	3	.13	2	0	1	0	1	NC	5	NC	1
536			min	-.014	2	-.01	3	0	1	0	1	828.37	2	NC	1
537		3	max	.021	3	.031	3	0	1	0	1	NC	5	NC	1
538			min	-.014	2	-.026	2	0	1	0	1	390.245	2	NC	1
539		4	max	.02	3	.119	3	0	1	0	1	9895.607	15	NC	1
540			min	-.014	2	-.213	2	0	1	0	1	239.27	2	NC	1
541		5	max	.02	3	.239	3	0	1	0	1	6923.428	15	NC	1
542			min	-.013	2	-.415	2	0	1	0	1	168.642	2	NC	1
543		6	max	.02	3	.373	3	0	1	0	1	5329.617	15	NC	1
544			min	-.013	2	-.615	2	0	1	0	1	130.487	2	NC	1
545		7	max	.019	3	.504	3	0	1	0	1	4409.345	15	NC	1
546			min	-.013	2	-.796	2	0	1	0	1	108.326	2	NC	1
547		8	max	.019	3	.614	3	0	1	0	1	3874.322	15	NC	1
548			min	-.013	2	-.941	2	0	1	0	1	95.387	2	NC	1
549		9	max	.018	3	.685	3	0	1	0	1	3599.974	15	NC	1
550			min	-.012	2	-1.033	2	0	1	0	1	88.65	1	NC	1
551		10	max	.018	3	.711	3	0	1	0	1	3517.319	15	NC	1
552			min	-.012	2	-1.064	2	0	1	0	1	86.636	1	NC	1
553		11	max	.018	3	.693	3	0	1	0	1	3600.06	15	NC	1





Company : Schletter, Inc.  
Designer : HCV  
Job Number :  
Model Name : Standard PVMax Racking System

Oct 26, 2015

Checked By: \_\_\_\_\_

### Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
554			min	-.012	2	-1.033	2	0	1	0	1	88.798	1	NC	1
555		12	max	.017	3	.633	3	0	1	0	1	3874.525	15	NC	1
556			min	-.012	2	-.938	2	0	1	0	1	95.92	1	NC	1
557		13	max	.017	3	.536	3	0	1	0	1	4409.762	15	NC	1
558			min	-.012	2	-.786	1	0	1	0	1	109.932	1	NC	1
559		14	max	.016	3	.414	3	0	1	0	1	5330.433	15	NC	1
560			min	-.011	2	-.599	1	0	1	0	1	134.268	1	NC	1
561		15	max	.016	3	.278	3	0	1	0	1	6925.042	15	NC	1
562			min	-.011	2	-.395	1	0	1	0	1	176.983	1	NC	1
563		16	max	.016	3	.14	3	0	1	0	1	9898.987	15	NC	1
564			min	-.011	2	-.193	1	0	1	0	1	258.05	1	NC	1
565		17	max	.015	3	.011	3	0	1	0	1	NC	5	NC	1
566			min	-.011	2	-.016	2	0	1	0	1	435.876	1	NC	1
567		18	max	.015	3	.127	1	0	1	0	1	NC	5	NC	1
568			min	-.011	2	-.099	3	0	1	0	1	950.304	1	NC	1
569		19	max	.015	3	.246	1	0	1	0	1	NC	1	NC	1
570			min	-.011	2	-.199	3	0	1	0	1	NC	1	NC	1
571	M9	1	max	.007	3	.116	2	0	15	2.535e-2	3	NC	1	NC	1
572			min	-.003	2	-.021	3	0	1	-1.564e-2	1	NC	1	NC	1
573		2	max	.007	3	.056	2	.005	1	1.254e-2	3	NC	4	NC	1
574			min	-.003	2	-.009	3	0	15	-7.606e-3	1	1932.477	2	NC	1
575		3	max	.007	3	.01	3	.007	1	1.336e-4	1	NC	5	NC	1
576			min	-.003	2	-.008	2	0	15	-3.125e-5	10	930.669	2	NC	1
577		4	max	.007	3	.043	3	.007	1	4.686e-3	3	NC	5	NC	1
578			min	-.003	2	-.081	2	0	15	-4.612e-3	1	586.865	2	NC	1
579		5	max	.006	3	.085	3	.005	1	9.248e-3	3	NC	15	NC	1
580			min	-.003	2	-.157	2	0	15	-9.358e-3	1	423.164	2	NC	1
581		6	max	.006	3	.132	3	.002	1	1.381e-2	3	NC	15	NC	1
582			min	-.003	2	-.23	2	0	15	-1.41e-2	1	333.05	2	NC	1
583		7	max	.006	3	.176	3	0	12	1.837e-2	3	NC	15	NC	1
584			min	-.003	2	-.296	2	0	1	-1.885e-2	1	279.89	2	NC	1
585		8	max	.006	3	.213	3	0	15	2.294e-2	3	8986.294	15	NC	1
586			min	-.003	2	-.348	2	0	1	-2.36e-2	1	248.461	2	NC	1
587		9	max	.006	3	.237	3	0	1	2.307e-2	3	8399.704	15	NC	1
588			min	-.003	2	-.381	2	0	15	-2.61e-2	1	232.106	2	NC	1
589		10	max	.006	3	.246	3	0	15	2.025e-2	3	8220.998	15	NC	1
590			min	-.003	2	-.392	2	0	1	-2.728e-2	2	227.301	2	NC	1
591		11	max	.006	3	.24	3	0	15	1.744e-2	3	8399.471	15	NC	1
592			min	-.003	2	-.381	2	0	1	-2.931e-2	2	232.848	2	NC	1
593		12	max	.006	3	.22	3	0	1	1.459e-2	3	8985.802	15	NC	1
594			min	-.003	2	-.347	2	0	15	-2.83e-2	2	250.453	1	NC	1
595		13	max	.005	3	.187	3	0	1	1.168e-2	3	NC	15	NC	1
596			min	-.003	2	-.293	2	0	15	-2.27e-2	2	284.28	1	NC	1
597		14	max	.005	3	.145	3	0	15	8.768e-3	3	NC	15	NC	1
598			min	-.003	2	-.224	2	-.002	1	-1.709e-2	2	342.031	1	NC	1
599		15	max	.005	3	.099	3	0	15	5.859e-3	3	NC	15	NC	1
600			min	-.003	2	-.15	1	-.004	1	-1.149e-2	2	441.19	1	NC	1
601		16	max	.005	3	.05	3	0	15	2.949e-3	3	NC	5	NC	1
602			min	-.003	2	-.074	1	-.006	1	-5.882e-3	2	624.175	1	NC	1
603		17	max	.005	3	.003	3	0	15	3.957e-5	3	NC	5	NC	1
604			min	-.003	2	-.005	2	-.007	1	-5.071e-4	1	1013.947	1	NC	1
605		18	max	.005	3	.055	1	0	15	4.259e-3	3	NC	4	NC	1
606			min	-.003	2	-.038	3	-.005	1	-1.044e-2	2	2142.43	1	NC	1
607		19	max	.005	3	.108	1	0	1	8.644e-3	3	NC	1	NC	1
608			min	-.003	2	-.076	3	0	15	-2.097e-2	2	NC	1	NC	1



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Address:			
Phone:			
E-mail:			

### 1. Project information

Customer company:  
Customer contact name:  
Customer e-mail:  
Comment:

Project description:  
Location:  
Fastening description:

### 2. Input Data & Anchor Parameters

#### General

Design method: ACI 318-05  
Units: Imperial units

#### Anchor Information:

Anchor type: Bonded anchor  
Material: A193 Grade B8/B8M (304/316SS)  
Diameter (inch): 0.500  
Effective Embedment depth,  $h_{ef}$  (inch): 6.000  
Code report: IAPMO UES ER-263  
Anchor category: -  
Anchor ductility: Yes  
 $h_{min}$  (inch): 8.50  
 $C_{ac}$  (inch): 9.67  
 $C_{min}$  (inch): 1.75  
 $S_{min}$  (inch): 3.00

#### Load and Geometry

Load factor source: ACI 318 Section 9.2  
Load combination: not set  
Seismic design: No  
Anchors subjected to sustained tension: No  
Apply entire shear load at front row: No  
Anchors only resisting wind and/or seismic loads: No

#### Base Material

Concrete: Normal-weight  
Concrete thickness,  $h$  (inch): 18.00  
State: Cracked  
Compressive strength,  $f'_c$  (psi): 2500  
 $\Psi_{c,v}$ : 1.0  
Reinforcement condition: B tension, B shear  
Supplemental reinforcement: Not applicable  
Reinforcement provided at corners: No  
Do not evaluate concrete breakout in tension: No  
Do not evaluate concrete breakout in shear: No  
Hole condition: Dry concrete  
Inspection: Periodic  
Temperature range, Short/Long: 110/75°F  
Ignore 6do requirement: Not applicable  
Build-up grout pad: No

#### Base Plate

Length x Width x Thickness (inch): 4.00 x 4.00 x 0.28

<Figure 1>



Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

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<Figure 2>



**Recommended Anchor**

Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)  
Code Report: IAPMO UES ER-263





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## 3. Resulting Anchor Forces

Anchor	Tension load, $N_{ua}$ (lb)	Shear load x, $V_{uax}$ (lb)	Shear load y, $V_{uay}$ (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	1723.0	23.0	593.0	593.4
Sum	1723.0	23.0	593.0	593.4

Maximum concrete compression strain (%): 0.00  
Maximum concrete compression stress (psi): 0  
Resultant tension force (lb): 1723  
Resultant compression force (lb): 0  
Eccentricity of resultant tension forces in x-axis,  $e'_{Nx}$  (inch): 0.00  
Eccentricity of resultant tension forces in y-axis,  $e'_{Ny}$  (inch): 0.00  
Eccentricity of resultant shear forces in x-axis,  $e'_{Vx}$  (inch): 0.00  
Eccentricity of resultant shear forces in y-axis,  $e'_{Vy}$  (inch): 0.00

<Figure 3>



## 4. Steel Strength of Anchor in Tension (Sec. D.5.1)

$N_{sa}$ (lb)	$\phi$	$\phi N_{sa}$ (lb)
8095	0.75	6071

## 5. Concrete Breakout Strength of Anchor in Tension (Sec. D.5.2)

$$N_b = k_c \lambda \sqrt{f_c} h_{ef}^{1.5} \text{ (Eq. D-7)}$$

$k_c$	$\lambda$	$f_c$ (psi)	$h_{ef}$ (in)	$N_b$ (lb)
17.0	1.00	2500	5.247	10215

$$\phi N_{cb} = \phi (A_{Nc} / A_{Nco}) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \text{ (Sec. D.4.1 & Eq. D-4)}$$

$A_{Nc}$ (in <sup>2</sup> )	$A_{Nco}$ (in <sup>2</sup> )	$\psi_{ed,N}$	$\psi_{c,N}$	$\psi_{cp,N}$	$N_b$ (lb)	$\phi$	$\phi N_{cb}$ (lb)
220.36	247.75	0.967	1.00	1.000	10215	0.65	5710

## 6. Adhesive Strength of Anchor in Tension (AC308 Sec. 3.3)

$$\tau_{k,cr} = \tau_{k,cr} f_{short-term} K_{sat}$$

$\tau_{k,cr}$ (psi)	$f_{short-term}$	$K_{sat}$	$\tau_{k,cr}$ (psi)
1035	1.00	1.00	1035

$$N_{a0} = \tau_{k,cr} \pi d_a h_{ef} \text{ (Eq. D-16f)}$$

$\tau_{k,cr}$ (psi)	$d_a$ (in)	$h_{ef}$ (in)	$N_{a0}$ (lb)
1035	0.50	6.000	9755

$$\phi N_a = \phi (A_{Na} / A_{Na0}) \psi_{ed,Na} \psi_{p,Na} N_{a0} \text{ (Sec. D.4.1 & Eq. D-16a)}$$

$A_{Na}$ (in <sup>2</sup> )	$A_{Na0}$ (in <sup>2</sup> )	$\psi_{ed,Na}$	$\psi_{p,Na}$	$N_{a0}$ (lb)	$\phi$	$\phi N_a$ (lb)
109.66	109.66	1.000	1.000	9755	0.55	5365

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

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### 8. Steel Strength of Anchor in Shear (Sec. D.6.1)

$V_{sa}$ (lb)	$\phi_{grout}$	$\phi$	$\phi_{grout}\phi V_{sa}$ (lb)
4855	1.0	0.65	3156

### 9. Concrete Breakout Strength of Anchor in Shear (Sec. D.6.2)

**Shear perpendicular to edge in y-direction:**

$$V_{by} = 7(l_e / d_a)^{0.2} \sqrt{d_a \lambda} \sqrt{f'_c c_{a1}}^{1.5} \text{ (Eq. D-24)}$$

$l_e$ (in)	$d_a$ (in)	$\lambda$	$f'_c$ (psi)	$c_{a1}$ (in)	$V_{by}$ (lb)
4.00	0.50	1.00	2500	7.00	6947

$$\phi V_{cbx} = \phi (A_{Vc} / A_{Vco}) \psi_{ed,V} \psi_{c,V} \psi_{h,V} V_{by} \text{ (Sec. D.4.1 & Eq. D-21)}$$

$A_{Vc}$ (in <sup>2</sup> )	$A_{Vco}$ (in <sup>2</sup> )	$\psi_{ed,V}$	$\psi_{c,V}$	$\psi_{h,V}$	$V_{by}$ (lb)	$\phi$	$\phi V_{cbx}$ (lb)
192.89	220.50	0.925	1.000	1.000	6947	0.70	3934

**Shear perpendicular to edge in x-direction:**

$$V_{bx} = 7(l_e / d_a)^{0.2} \sqrt{d_a \lambda} \sqrt{f'_c c_{a1}}^{1.5} \text{ (Eq. D-24)}$$

$l_e$ (in)	$d_a$ (in)	$\lambda$	$f'_c$ (psi)	$c_{a1}$ (in)	$V_{bx}$ (lb)
4.00	0.50	1.00	2500	7.87	8282

$$\phi V_{cbx} = \phi (A_{Vc} / A_{Vco}) \psi_{ed,V} \psi_{c,V} \psi_{h,V} V_{bx} \text{ (Sec. D.4.1 & Eq. D-21)}$$

$A_{Vc}$ (in <sup>2</sup> )	$A_{Vco}$ (in <sup>2</sup> )	$\psi_{ed,V}$	$\psi_{c,V}$	$\psi_{h,V}$	$V_{bx}$ (lb)	$\phi$	$\phi V_{cbx}$ (lb)
165.27	278.72	0.878	1.000	1.000	8282	0.70	3018

**Shear parallel to edge in x-direction:**

$$V_{by} = 7(l_e / d_a)^{0.2} \sqrt{d_a \lambda} \sqrt{f'_c c_{a1}}^{1.5} \text{ (Eq. D-24)}$$

$l_e$ (in)	$d_a$ (in)	$\lambda$	$f'_c$ (psi)	$c_{a1}$ (in)	$V_{by}$ (lb)
4.00	0.50	1.00	2500	7.00	6947

$$\phi V_{cbx} = \phi (2)(A_{Vc} / A_{Vco}) \psi_{ed,V} \psi_{c,V} \psi_{h,V} V_{by} \text{ (Sec. D.4.1, D.6.2.1(c) & Eq. D-21)}$$

$A_{Vc}$ (in <sup>2</sup> )	$A_{Vco}$ (in <sup>2</sup> )	$\psi_{ed,V}$	$\psi_{c,V}$	$\psi_{h,V}$	$V_{by}$ (lb)	$\phi$	$\phi V_{cbx}$ (lb)
192.89	220.50	1.000	1.000	1.000	6947	0.70	8508

**Shear parallel to edge in y-direction:**

$$V_{bx} = 7(l_e / d_a)^{0.2} \sqrt{d_a \lambda} \sqrt{f'_c c_{a1}}^{1.5} \text{ (Eq. D-24)}$$

$l_e$ (in)	$d_a$ (in)	$\lambda$	$f'_c$ (psi)	$c_{a1}$ (in)	$V_{bx}$ (lb)
4.00	0.50	1.00	2500	7.87	8282

$$\phi V_{cbx} = \phi (2)(A_{Vc} / A_{Vco}) \psi_{ed,V} \psi_{c,V} \psi_{h,V} V_{bx} \text{ (Sec. D.4.1, D.6.2.1(c) & Eq. D-21)}$$

$A_{Vc}$ (in <sup>2</sup> )	$A_{Vco}$ (in <sup>2</sup> )	$\psi_{ed,V}$	$\psi_{c,V}$	$\psi_{h,V}$	$V_{bx}$ (lb)	$\phi$	$\phi V_{cbx}$ (lb)
165.27	278.72	1.000	1.000	1.000	8282	0.70	6875

### 10. Concrete Pryout Strength of Anchor in Shear (Sec. D.6.3)

$$\phi V_{cp} = \phi \min[k_{cp} N_a; k_{cp} N_{cb}] = \phi \min[k_{cp}(A_{Na} / A_{Na0}) \psi_{ed,Na} \psi_{p,Na} N_{a0}; k_{cp}(A_{Nc} / A_{Nco}) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b] \text{ (Eq. D-30a)}$$

$k_{cp}$	$A_{Na}$ (in <sup>2</sup> )	$A_{Na0}$ (in <sup>2</sup> )	$\psi_{ed,Na}$	$\psi_{p,Na}$	$N_{a0}$ (lb)	$N_a$ (lb)
2.0	109.66	109.66	1.000	1.000	9755	9755

$A_{Nc}$ (in <sup>2</sup> )	$A_{Nco}$ (in <sup>2</sup> )	$\psi_{ed,N}$	$\psi_{c,N}$	$\psi_{cp,N}$	$N_b$ (lb)	$N_{cb}$ (lb)	$\phi$	$\phi V_{cp}$ (lb)
220.36	247.75	0.967	1.000	1.000	10215	8785	0.70	12298

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

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Address:			
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## 11. Results

### Interaction of Tensile and Shear Forces (Sec. D.7)

Tension	Factored Load, $N_{ua}$ (lb)	Design Strength, $\phi N_n$ (lb)	Ratio	Status	
Steel	1723	6071	0.28	Pass	
Concrete breakout	1723	5710	0.30	Pass	
<b>Adhesive</b>	<b>1723</b>	<b>5365</b>	<b>0.32</b>	<b>Pass (Governs)</b>	
Shear	Factored Load, $V_{ua}$ (lb)	Design Strength, $\phi V_n$ (lb)	Ratio	Status	
<b>Steel</b>	<b>593</b>	<b>3156</b>	<b>0.19</b>	<b>Pass (Governs)</b>	
T Concrete breakout y+	593	3934	0.15	Pass	
T Concrete breakout x+	23	3018	0.01	Pass	
Concrete breakout y+	23	8508	0.00	Pass	
Concrete breakout x+	593	6875	0.09	Pass	
Concrete breakout, combined	-	-	0.15	Pass	
Pryout	593	12298	0.05	Pass	
Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.1	0.32	0.00	32.1 %	1.0	Pass

**AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS) with hef = 6.000 inch meets the selected design criteria.**

## 12. Warnings

- This temperature range is currently outside the scope of ACI 318-11 and ACI 355.4, and is provided for historical purposes.
- Designer must exercise own judgement to determine if this design is suitable.
- Refer to manufacturer's product literature for hole cleaning and installation instructions.



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Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 34-35 Inch Width		
Address:			
Phone:			
E-mail:			

### 1. Project information

Customer company:  
Customer contact name:  
Customer e-mail:  
Comment:

Project description:  
Location:  
Fastening description:

### 2. Input Data & Anchor Parameters

#### General

Design method: ACI 318-05  
Units: Imperial units

#### Anchor Information:

Anchor type: Bonded anchor  
Material: A193 Grade B8/B8M (304/316SS)  
Diameter (inch): 0.500  
Effective Embedment depth,  $h_{ef}$  (inch): 6.000  
Code report: IAPMO UES ER-263  
Anchor category: -  
Anchor ductility: Yes  
 $h_{min}$  (inch): 8.50  
 $C_{ac}$  (inch): 9.67  
 $C_{min}$  (inch): 1.75  
 $S_{min}$  (inch): 3.00

#### Load and Geometry

Load factor source: ACI 318 Section 9.2  
Load combination: not set  
Seismic design: No  
Anchors subjected to sustained tension: No  
Apply entire shear load at front row: No  
Anchors only resisting wind and/or seismic loads: No

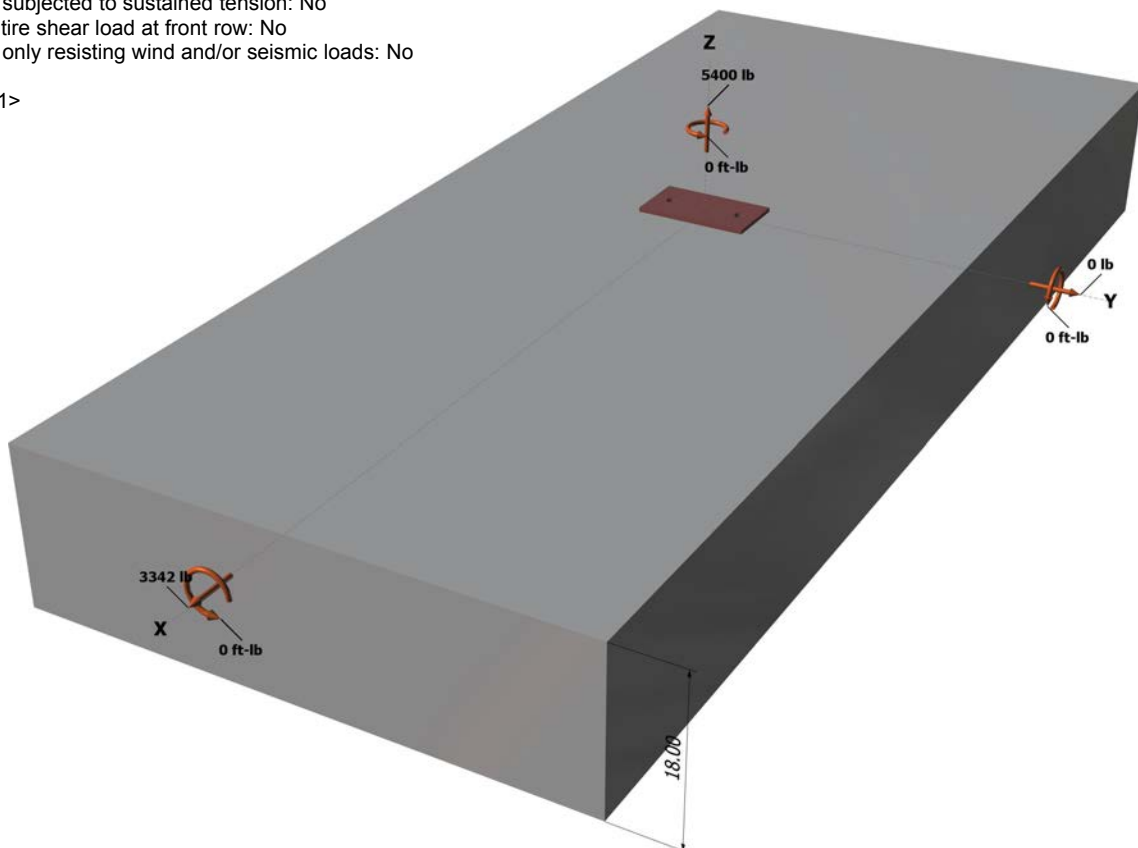
#### Base Material

Concrete: Normal-weight  
Concrete thickness,  $h$  (inch): 18.00  
State: Cracked  
Compressive strength,  $f'_c$  (psi): 2500  
 $\Psi_{c,v}$ : 1.0  
Reinforcement condition: B tension, B shear  
Supplemental reinforcement: Not applicable  
Reinforcement provided at corners: No  
Do not evaluate concrete breakout in tension: No  
Do not evaluate concrete breakout in shear: No  
Hole condition: Dry concrete  
Inspection: Periodic  
Temperature range, Short/Long: 110/75°F  
Ignore 6do requirement: Not applicable  
Build-up grout pad: No

#### Base Plate

Length x Width x Thickness (inch): 4.00 x 7.00 x 0.28

<Figure 1>



Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

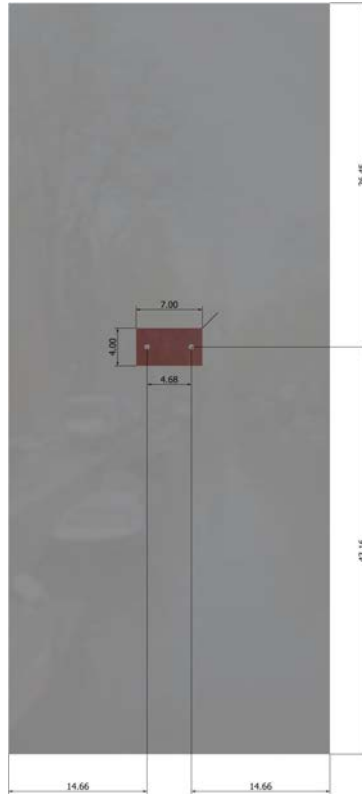
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<Figure 2>



**Recommended Anchor**

Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)  
Code Report: IAPMO UES ER-263







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## 3. Resulting Anchor Forces

Anchor	Tension load, $N_{ua}$ (lb)	Shear load x, $V_{uax}$ (lb)	Shear load y, $V_{uay}$ (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	2700.0	1671.0	0.0	1671.0
2	2700.0	1671.0	0.0	1671.0
Sum	5400.0	3342.0	0.0	3342.0

Maximum concrete compression strain (‰): 0.00  
Maximum concrete compression stress (psi): 0  
Resultant tension force (lb): 5400  
Resultant compression force (lb): 0  
Eccentricity of resultant tension forces in x-axis,  $e'_{Nx}$  (inch): 0.00  
Eccentricity of resultant tension forces in y-axis,  $e'_{Ny}$  (inch): 0.00  
Eccentricity of resultant shear forces in x-axis,  $e'_{Vx}$  (inch): 0.00  
Eccentricity of resultant shear forces in y-axis,  $e'_{Vy}$  (inch): 0.00

<Figure 3>



## 4. Steel Strength of Anchor in Tension (Sec. D.5.1)

$N_{sa}$ (lb)	$\phi$	$\phi N_{sa}$ (lb)
8095	0.75	6071

## 5. Concrete Breakout Strength of Anchor in Tension (Sec. D.5.2)

$$N_b = k_c \lambda \sqrt{f'_c} h_{ef}^{1.5} \text{ (Eq. D-7)}$$

$k_c$	$\lambda$	$f'_c$ (psi)	$h_{ef}$ (in)	$N_b$ (lb)
17.0	1.00	2500	6.000	12492

$$\phi N_{cbg} = \phi (A_{Nc} / A_{Nco}) \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b \text{ (Sec. D.4.1 \& Eq. D-5)}$$

$A_{Nc}$ (in <sup>2</sup> )	$A_{Nco}$ (in <sup>2</sup> )	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	$N_b$ (lb)	$\phi$	$\phi N_{cbg}$ (lb)
408.24	324.00	1.000	1.000	1.00	1.000	12492	0.65	10231

## 6. Adhesive Strength of Anchor in Tension (AC308 Sec. 3.3)

$$\tau_{k,cr} = \tau_{k,cr} f_{short-term} K_{sat}$$

$\tau_{k,cr}$ (psi)	$f_{short-term}$	$K_{sat}$	$\tau_{k,cr}$ (psi)
1035	1.00	1.00	1035

$$N_{a0} = \tau_{k,cr} \pi d_a h_{ef} \text{ (Eq. D-16f)}$$

$\tau_{k,cr}$ (psi)	$d_a$ (in)	$h_{ef}$ (in)	$N_{a0}$ (lb)
1035	0.50	6.000	9755

$$\phi N_{ag} = \phi (A_{Na} / A_{Na0}) \Psi_{ed,Na} \Psi_{g,Na} \Psi_{ec,Na} \Psi_{p,Na} N_{a0} \text{ (Sec. D.4.1 \& Eq. D-16b)}$$

$A_{Na}$ (in <sup>2</sup> )	$A_{Na0}$ (in <sup>2</sup> )	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	$N_{a0}$ (lb)	$\phi$	$\phi N_{ag}$ (lb)
158.66	109.66	1.000	1.043	1.000	1.000	9755	0.55	8093

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

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### 8. Steel Strength of Anchor in Shear (Sec. D.6.1)

$V_{sa}$ (lb)	$\phi_{grout}$	$\phi$	$\phi_{grout}\phi V_{sa}$ (lb)
4855	1.0	0.65	3156

### 9. Concrete Breakout Strength of Anchor in Shear (Sec. D.6.2)

**Shear perpendicular to edge in x-direction:**

$$V_{bx} = 7(l_e / d_a)^{0.2} \sqrt{d_a \lambda} \sqrt{f'_c c_{a1}}^{1.5} \text{ (Eq. D-24)}$$

$l_e$ (in)	$d_a$ (in)	$\lambda$	$f'_c$ (psi)	$c_{a1}$ (in)	$V_{bx}$ (lb)
4.00	0.50	1.00	2500	12.00	15593

$$\phi V_{cbgx} = \phi (A_{vc} / A_{vco}) \psi_{ec,v} \psi_{ed,v} \psi_{c,v} \psi_{h,v} V_{bx} \text{ (Sec. D.4.1 & Eq. D-22)}$$

$A_{vc}$ (in <sup>2</sup> )	$A_{vco}$ (in <sup>2</sup> )	$\psi_{ec,v}$	$\psi_{ed,v}$	$\psi_{c,v}$	$\psi_{h,v}$	$V_{bx}$ (lb)	$\phi$	$\phi V_{cbgx}$ (lb)
612.00	648.00	1.000	0.944	1.000	1.000	15593	0.70	9735

**Shear parallel to edge in x-direction:**

$$V_{by} = 7(l_e / d_a)^{0.2} \sqrt{d_a \lambda} \sqrt{f'_c c_{a1}}^{1.5} \text{ (Eq. D-24)}$$

$l_e$ (in)	$d_a$ (in)	$\lambda$	$f'_c$ (psi)	$c_{a1}$ (in)	$V_{by}$ (lb)
4.00	0.50	1.00	2500	14.66	21056

$$\phi V_{cbx} = \phi (2)(A_{vc} / A_{vco}) \psi_{ed,v} \psi_{c,v} \psi_{h,v} V_{by} \text{ (Sec. D.4.1, D.6.2.1(c) & Eq. D-21)}$$

$A_{vc}$ (in <sup>2</sup> )	$A_{vco}$ (in <sup>2</sup> )	$\psi_{ed,v}$	$\psi_{c,v}$	$\psi_{h,v}$	$V_{by}$ (lb)	$\phi$	$\phi V_{cbx}$ (lb)
791.64	967.12	1.000	1.000	1.000	21056	0.70	24129

### 10. Concrete Pryout Strength of Anchor in Shear (Sec. D.6.3)

$$\phi V_{cpq} = \phi \min[k_{cp} N_{ag}; k_{cp} N_{cbg}] = \phi \min[k_{cp}(A_{Na} / A_{Na0}) \psi_{ed,Na} \psi_{g,Na} \psi_{ec,Na} \psi_{p,Na} N_{a0}; k_{cp}(A_{Nc} / A_{Nco}) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b] \text{ (Eq. D-30b)}$$

$k_{cp}$	$A_{Na}$ (in <sup>2</sup> )	$A_{Na0}$ (in <sup>2</sup> )	$\psi_{ed,Na}$	$\psi_{g,Na}$	$\psi_{ec,Na}$	$\psi_{p,Na}$	$N_{a0}$ (lb)	$N_a$ (lb)
2.0	158.66	109.66	1.000	1.043	1.000	1.000	9755	14715

$A_{Nc}$ (in <sup>2</sup> )	$A_{Nco}$ (in <sup>2</sup> )	$\psi_{ec,N}$	$\psi_{ed,N}$	$\psi_{c,N}$	$\psi_{cp,N}$	$N_b$ (lb)	$N_{cb}$ (lb)	$\phi$
408.24	324.00	1.000	1.000	1.000	1.000	12492	15740	0.70

$$\phi V_{cpq} \text{ (lb)}$$

20601

## 11. Results

### Interaction of Tensile and Shear Forces (Sec. D.7)

Tension	Factored Load, $N_{ua}$ (lb)	Design Strength, $\phi N_n$ (lb)	Ratio	Status	
Steel	2700	6071	0.44	Pass	
Concrete breakout	5400	10231	0.53	Pass	
<b>Adhesive</b>	<b>5400</b>	<b>8093</b>	<b>0.67</b>	<b>Pass (Governs)</b>	
Shear	Factored Load, $V_{ua}$ (lb)	Design Strength, $\phi V_n$ (lb)	Ratio	Status	
<b>Steel</b>	<b>1671</b>	<b>3156</b>	<b>0.53</b>	<b>Pass (Governs)</b>	
T Concrete breakout x+	3342	9735	0.34	Pass	
Concrete breakout y-	1671	24129	0.07	Pass	
Pryout	3342	20601	0.16	Pass	
Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

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Anchor Designer™  
Software  
Version 2.4.5673.0

Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	5/5
Project:	Standard PVMax - Worst Case, 34-35 Inch Width		
Address:			
Phone:			
E-mail:			

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Sec. D.7.3	0.67	0.53	119.7 %	1.2	Pass
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**AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS) with hef = 6.000 inch meets the selected design criteria.**

#### **12. Warnings**

- This temperature range is currently outside the scope of ACI 318-11 and ACI 355.4, and is provided for historical purposes.
- Designer must exercise own judgement to determine if this design is suitable.
- Refer to manufacturer's product literature for hole cleaning and installation instructions.