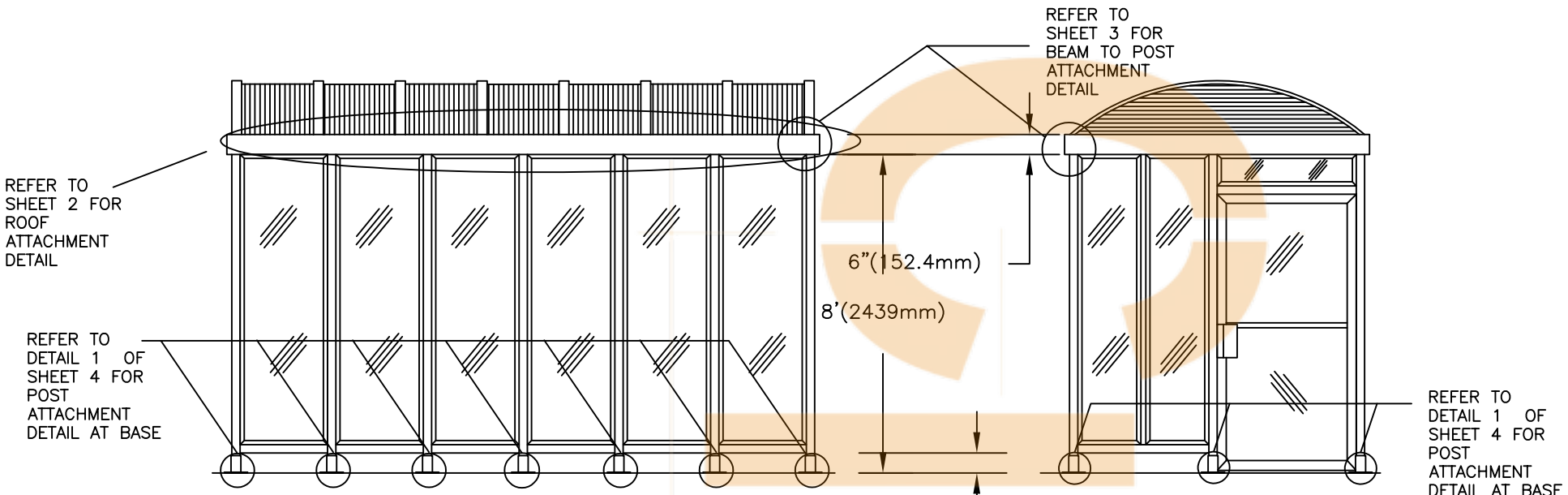
STRUCTURAL ENGINEERING CALCULATIONS FOR VELODOME SHELTER

PROJECT: VELODOME PEAPOD 8-10 SHELTER
CANADA

PROJECT LOCATION:

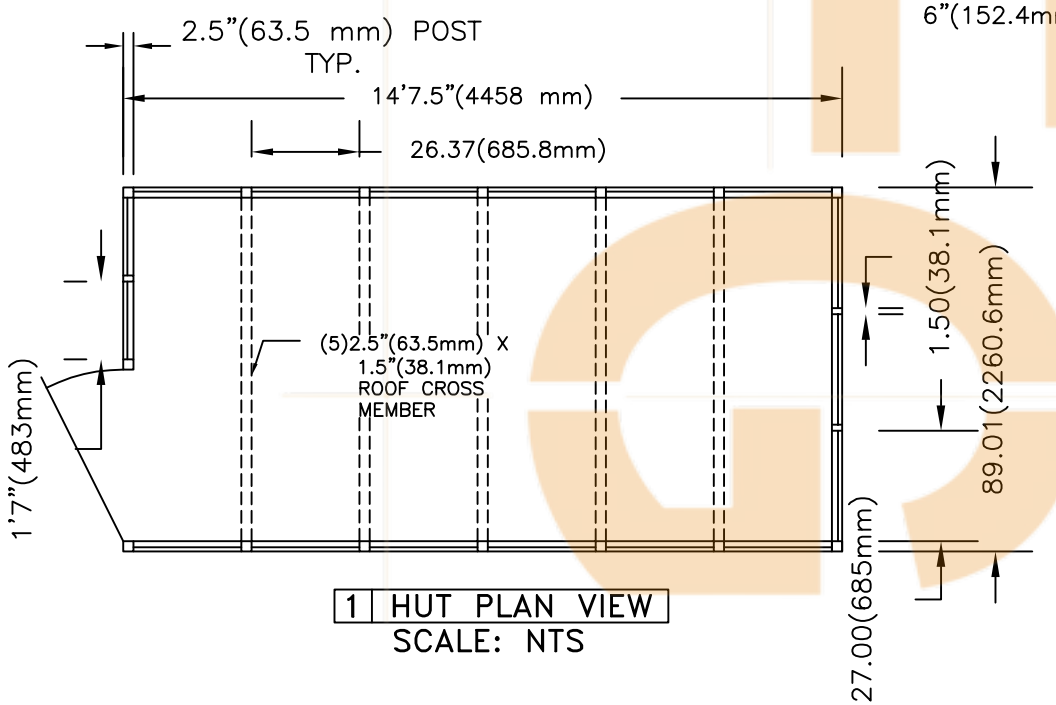
PSE PROJECT NUMBER:

DATE:



2 HUT SIDE ELEVATION
SCALE: NTS

3 HUT FRONT ELEVATION
SCALE: NTS



1 HUT PLAN VIEW
SCALE: NTS

42033–A CITY OF TERRACE
PEAPOD MINI 8–10

ALUMINUM: 6063–T52
WALL GLAZING: 1/4" CLEAR TEMPERED GLASS
ROOF PANELS: 1/4" TWIN WALL POLYCARBNATE

SHEET 1

RECOMMENDED PAD SIZE–16'–6" X 9'–6" X 6" THICK MINIMUM

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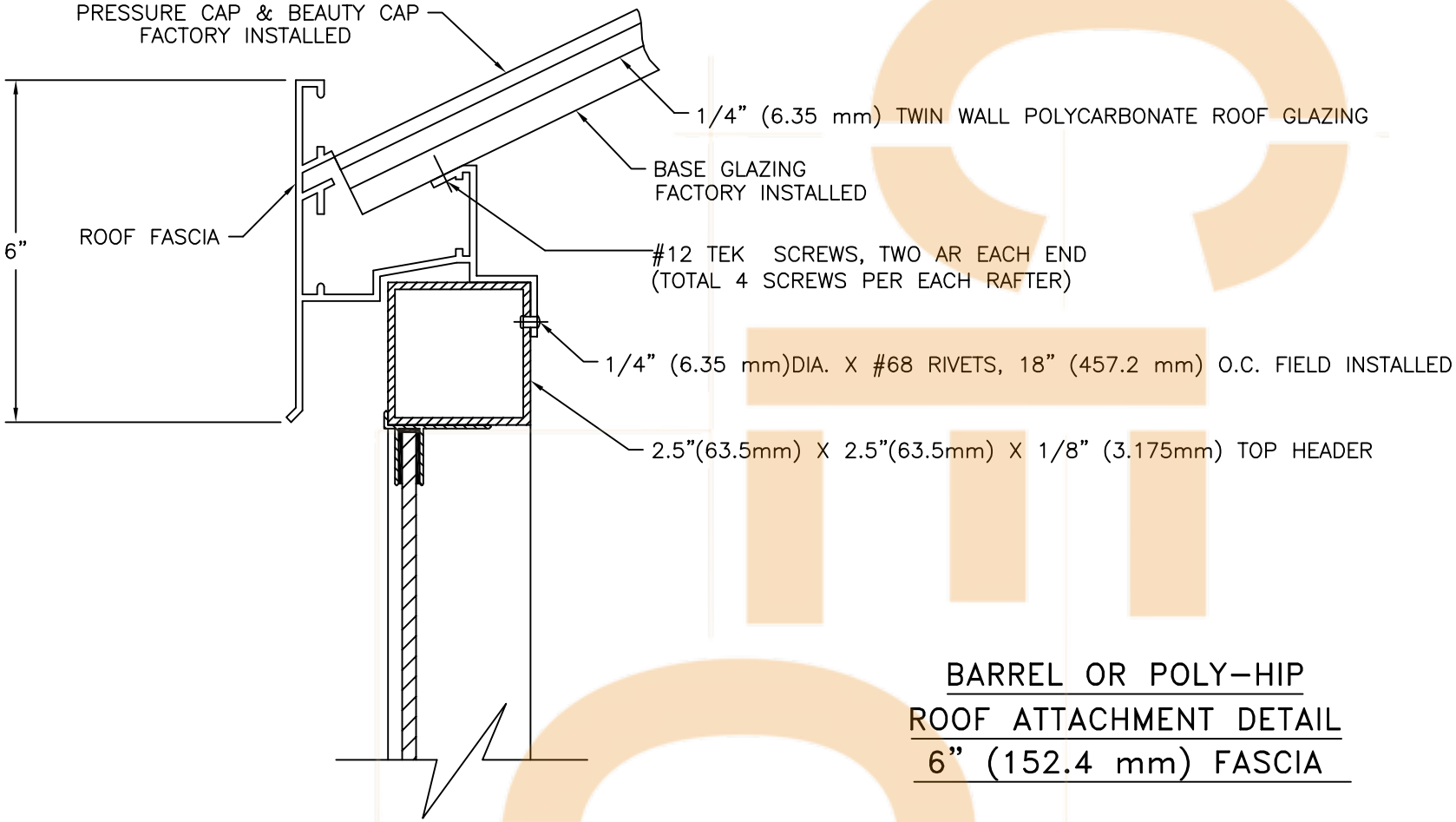
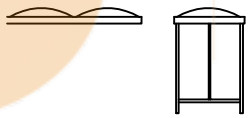


BARREL OR POLY-HIP
ROOF ATTACHMENT DETAIL
6" (152.4 mm) FASCIA



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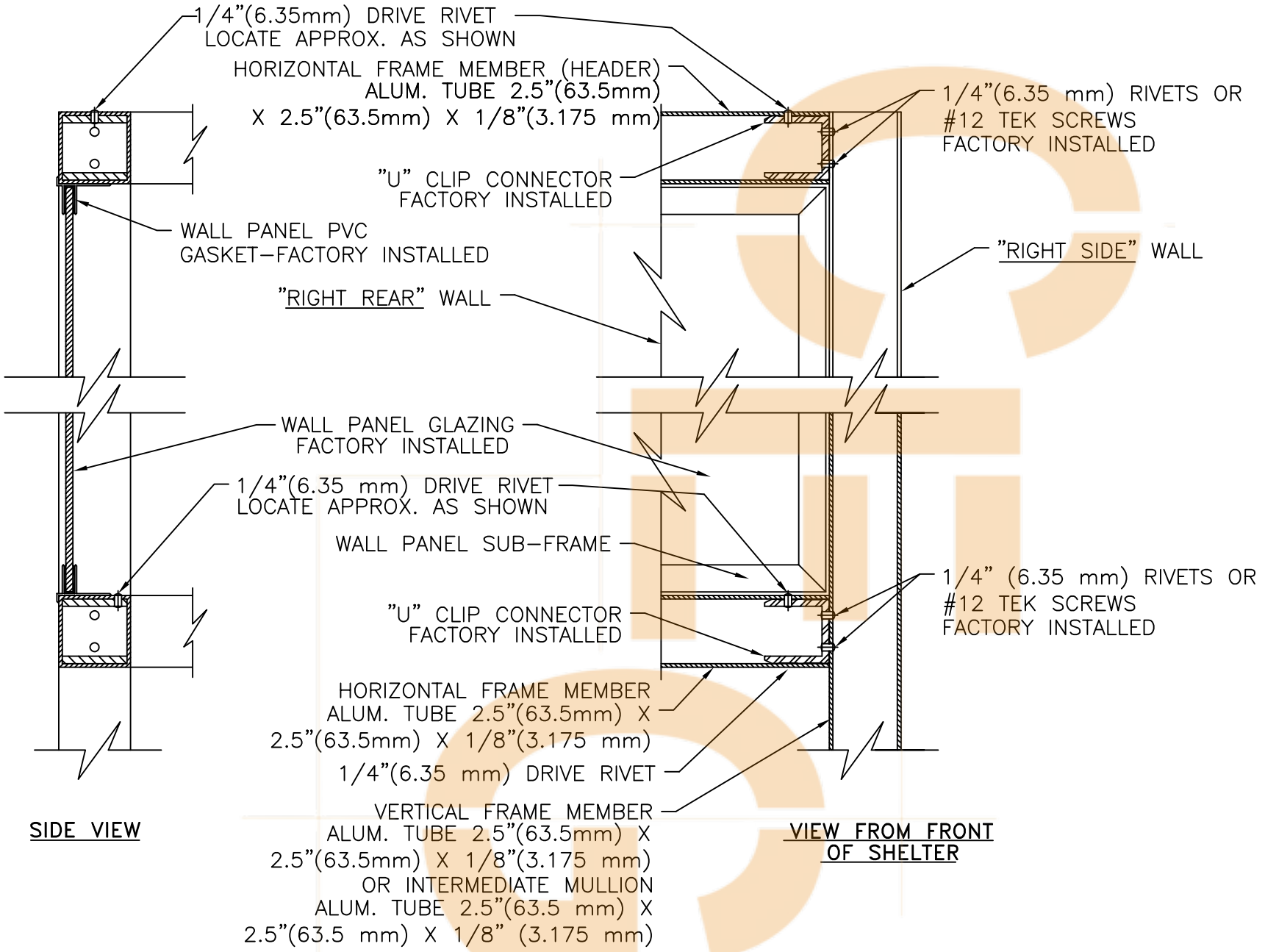
SHEET 2



SIDE VIEW

VIEW FROM FRONT
OF SHELTER

WALL PANEL CONNECTION DETAIL

TYPICAL FOR ALL
WALL PANEL CONNECTIONS

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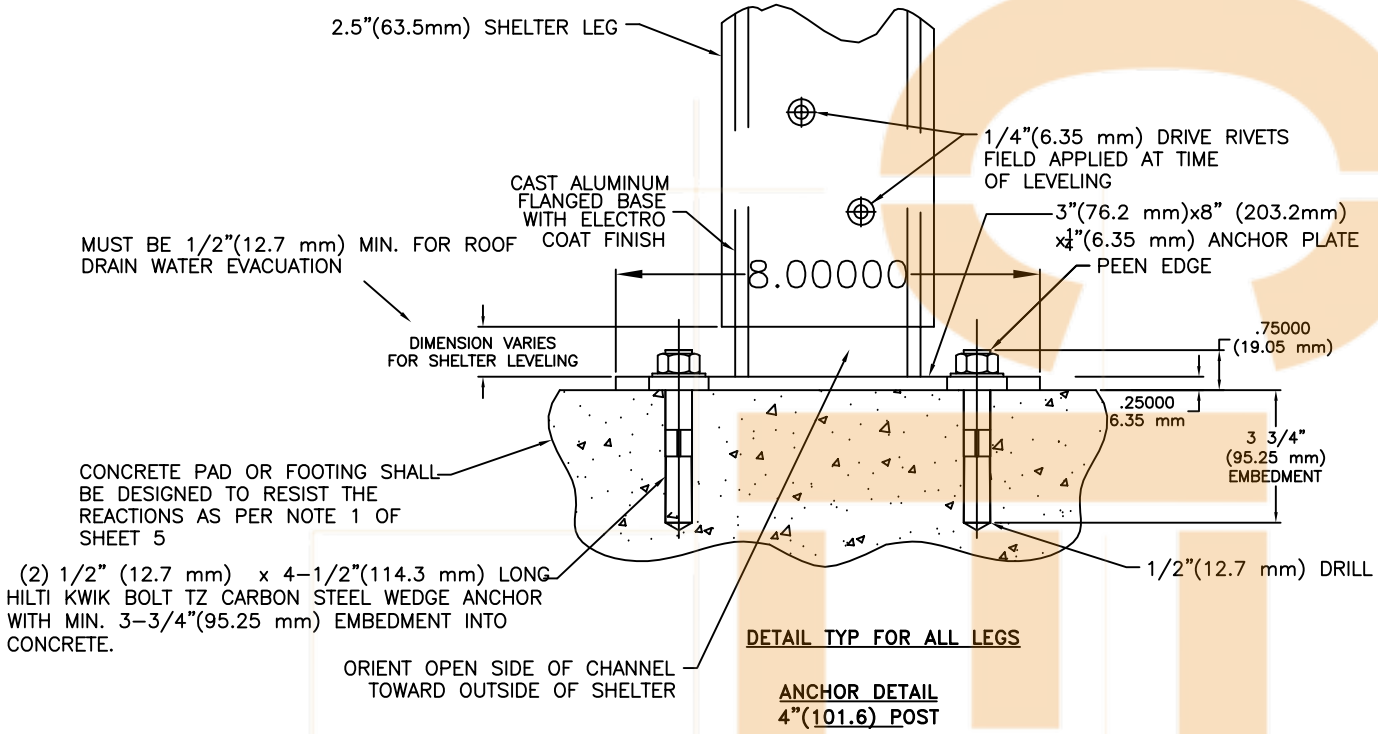
SHEET 3



GENERAL SHEET NOTES:

1. **Where Aluminum is in contact or fastened to dissimilar materials, direct contact between the aluminum and other material shall be prevented as specified in Aluminum Design Manual, 2015 Part 1: Specification for Aluminum structures - sections M7.1 through M7.3 or by placing a compatible, nonporus isolator between the aluminum and other material.**
2. **All carbon steel anchor bolts shall be Zinc plated as per above note 1.**

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1. FOOTING REACTIONS

The owner/user/builder should use the services of a local licensed engineer to design the concrete pad or footing to support the following loads:

- **Dead Load:**
  - **Vertical = 250 lbs (1.11 kN), (down);**
  - **Horizontal = 100 lbs (0.45 kN), Tension & Compression;**
- **Roof Live Load:**
  - **Vertical = 4000 lbs (17.8 kN), (down);**
  - **Horizontal = 650 lbs (2.9 kN), Tension & Compression;**
- **Wind Load (case 1):**
  - **Vertical = 650 lbs (2.9 kN), (up and down);**
  - **Horizontal = 650 lbs (2.9 kN), Tension & Compression;**
  - **Moment = 1000 lbs-FT (1.0 kN), (In all four perpendicular directions);**
- **Wind Load (case 2):**
  - **Vertical = 750 lbs (3.35 kN), (up & down);**
  - **Horizontal = 400 lbs (1.79 kN), Tension & Compression;**
  - **Moment = 1000 lbs-FT (1.0 kN), (In all four perpendicular directions);**
- **The above are the reactions due to the basic un-factored loads according to NBCC 2015**
- **All wind loads are at strength level**
- **Use 2018 British Columbia Building Code load combinations to to determine design loads**

Table of Contents:

References:

1- Literature:

a. Based on the 2018 British Columbia Building Code, based on the 2015 National Building code of Canada (NBC).

b. Aluminum Design Manual, ADMI – 15, Aluminum Association

2- Software:

a. RISA 3D Version 17.1,
RISA Technologies,
26212 Dimension Dr. Suite 200

b. HILTI PROFIS ANCHOR 3.0.73

Provinces and territories that have adopted regulations based on the 2015 editions of Codes Canada publications

Province/ Territory	NBC (National Building Code) 2015		NFC (National Fire Code) 2015		NPC (National Plumbing Code) 2015		NECB (National Energy Code for Buildings) 2015		NECB Energy Buildi
	Filed / Adopted	Enforced	Filed / Adopted	Enforced	Filed / Adopted	Enforced	Filed / Adopted	Enforced	Filed / Adopte
Y.T. (Yukon Territory)	2016-04-01	2017-04-01	2016-04	2017-04-01	2016-04	2017-04-01	-	-	-
N.W.T. (Northwest Territories)	2016-11-15	2016-11	2016-11-15	2016-11	-	-	-	-	-
Nun. (Nunavut)	2018-04-01	2018-09-01	2018-04-01	2018-09-01	2018-04-01	2018-09-01	-	-	-
B.C. (British Columbia)	2018-07-16	2018-12-10	2018-10-16	2018-12-10	2018-07-16	2018-12-10	2018-07-16	2018-12-10	-
Alta. (Alberta)	2019-02-14	2019-04-01	2019-02-14	2019-04-01	2016-03-31	2017-01-01	-	-	2019-02-14
Sask. (Saskatchewan)	2018-01-01	2018-01-01 (except Section 9.36.) Section 9.36. 2019-01-01	2018-01-01	2018-01-01	2017-06-09	2017-06-09	-	-	2018-01-01
Ont. (Ontario)	-	2020-01-01	-	2020-01-01	-	2020-01-01	-	-	-
P.E.I. (Prince Edward Island)	-	-	-	-	2016-06	2017-01	-	-	-
N.S. (Nova Scotia)	2017-03-01	2017-04-01	2017-05-01	2017-05-01	2017-03-01	2017-04-01	2017-03-01	2017-04-01	2019-11-06
N.L. (Newfoundland and Labrador)	2019-01-18	2019-02-28	2019-01-18	2019-02-28	-	-	-	-	-

Provinces and territories that have adopted regulations based on the 2010 and 2011 editions of Codes Canada publications

Province/ Territory	NBC 2010	NBC Revision 2012 (Section 9.36.)	NFC 2010	NPC 2010	NECB 2011

Design Criteria:

1- Location:	City Of Terrace, British Columbia (Lat: 54.51591 Long: -128.60321)	
2- Wind (Ultimate):	Ultimate Wind Speed : 53 miles per hour(Vfm) (23.6 m/Sec) Hourly Wind Pressure: 0.36 kPa (q50) Exposure : Open Terrain Iw : 1.0	
3- Snow Load:	Ss Sr S	= 5.4 kPa. = 0.6 kPa = 4.92kPa
4- Soil Bearing Capacity:	NA	
5- Gravity Loads:	DL Roof:	0.144 kPa
6- Deflection Criteria:	Roof TL Deflection: L/180	

** Other criteria assumed as stated in design calculations.

Roof Snow Load (NBC 2015)

version 1.0.1
February 10, 2022

Project:

Designer:

Climatic Data

Location

Province: British Columbia

Location:

Terrace

Importance factor

I_s: Normal

Factors

C_b: 0.8 Optional

C_w: 1.0

C_a: 1.0

Roof Geometry

Pitch: 4 /12

Slippery: No

Roof Plan dimensions (Only changes results if no C_b provided)

Longer dimension, l: 4.46 m

Shorter dimension, w: 2.26 m

Specified Snow Load

$S = I_s[S_s(C_bC_wC_sC_a)+S_r]$ *[4.1.6.2]*

Factors

Location: Terrace, British Columbia
Ss = 5.4 kPa / Sr = 0.6 kPa
Importance Factor, ULS: I_s = 1.0 / SLS: I_s = 0.9
C_w = 1
C_b = 0.8
Roof slope = 18.4 degrees
Slope Factor
For non-slippery roof:
Slope <= 30 degrees.
C_s = 1

ULS:

S = 1.0[5.4(0.8*1.0*1*1.0)+0.6] = 4.92kPa

S = 4.92 kPa

S = 102.8 psf

SLS:

S = 0.9[5.4(0.8*1.0*1*1.0)+0.6] = 4.43kPa

S = 4.43 kPa

S = 92.5 psf

WIND SPEED CONVERSION

VELODOME 222-403 Sheet
Designed by
Checked by

DESIGN LOADS

HOURLY WIND PRESSURE	=	0.36	kPa
GROUND SNOW LOAD	=	5.4	kPa
ASSOCIATED RAIN LOAD	=	0.4	kPa

CONVERSION OF PSF TO MPH

1 kpa = 20.89 psf	0.36	kPa	=	7.520	psf
Miles Per hour = Sqrt (psf/0.00256)			=	54.200	mph
		Use	Vfm =	55	mph

FOR SOFTWARE USAGE ASCE 7-10

V_{basic} =	(Vfm x 1.05) + 10.5 mph		=	68.25	mph
$V_{ultimate}$	(V_{basic} / (Sqrt 0.6)		=	88.11	mph
		Use	$V_{ultimate}$	90	mph

SHELTER DESIGN & ANALYSIS

Page 1,000 – 1,499

MecaWind v2403

Calculations Prepared by:
Date: Feb 08, 2022

Basic Wind Parameters

Wind Load Standard	= ASCE 7-10	Exposure Category	= C
Wind Design Speed	= 90.0 mph	Risk Category	= II
Structure Type	= Building	Building Type	= Enclosed

General Wind Settings

Incl_LF	= Include ASD Load Factor of 0.6 in Pressures	= False
DynType	= Dynamic Type of Structure	= Rigid
Alt	= Altitude (Ground Elevation) above Sea Level	= 0.000 ft
Bdist	= Base Elevation of Structure	= 0.000 ft
SDB	= Simple Diaphragm Building	= False
MWFRSType	= MWFRS Method Selected	= Ch 27 Pt 1

Topographic Factor per Fig 26.8-1

Topo	= Topographic Feature	= None
Kzt	= Topographic Factor	= 1.000

Building Inputs

Roof : Building Roof Type	= Arched	EHt : Eave Height	= 8.000 ft
W : Building Width	= 7.500 ft	L : Building Length	= 14.625 ft
Slope: Spring Line Slope	= 27.95 Deg		

Exposure Constants per Table 26.9-1:

Alpha: Const from Table 26.9-1	= 9.500	Zg: Const from Table 26.9-1	= 900.000 ft
At: Const from Table 26.9-1	= 0.105	Bt: Const from Table 26.9-1	= 1.000
Am: Const from Table 26.9-1	= 0.154	Bm: Const from Table 26.9-1	= 0.650
C: Const from Table 26.9-1	= 0.200	Eps: Const from Table 26.9-1	= 0.200

Overhang Inputs:

Std	= Overhangs on all sides are the same	= True
OHType	= Type of Roof Wall Intersections	=
OH	= Overhang of Roof Beyond Wall	= 0.000 ft

Main Wind Force Resisting System (MWFRS) Calculations per Ch 27 Part 1:

EHt	= Eave Height	= 8.000 ft
RHt	= Ridge Height	= 8.933 ft
h	= Mean Roof Height: 0.5*(EHt+RHt)	= 8.467 ft
Zh	= Mean Roof Height for Kh: h + Base_Dist	= 8.467 ft
Kh	= Since Zh<15 ft [4.572 m] --> 2.01 * (15/zg)^(2/Alpha)	= 0.849
Kzt	= Topographic Factor is 1 since no Topographic feature specified	= 1.000
Kd	= Wind Directionality Factor per Table 26.6-1	= 0.85
GCPi	= Ref Table 26.11-1 for Enclosed Building	= +/-0.18
RA	= Roof Area	= 114.15 sq ft
LF	= Load Factor based upon STRENGTH Design	= 1.00
qh	= (0.00256 * Kh * Kzt * Kd * V^2) * LF	= 14.96 psf
qin	= For Negative Internal Pressure of Enclosed Building use qh*LF	= 14.96 psf
qip	= For Positive Internal Pressure of Enclosed Building use qh*LF	= 14.96 psf

MWFRS Wind Normal to Ridge (Ref Fig 27.4-1}

h	= Mean Roof Height Of Building	= 8.467 ft
RHt	= Ridge Height Of Roof	= 8.933 ft
B	= Horizontal Dimension Of Building Normal To Wind Direction	= 14.625 ft
L	= Horizontal Dimension Of building Parallel To Wind Direction	= 7.500 ft
L/B	= Ratio Of L/B used For Cp determination	= 0.513
h/L	= Ratio Of h/L used For Cp determination	= 1.129
RHt	= Ridge Height Of Roof	= 8.933 ft
r	= Rise To Span Ratio (RHt-EHt)/W	= 0.124
Elev	= Is roof on Elevated Structure (Is EHt>0)	= True
OH_Top_CH	= Overhang Top End -X Center Half	= -0.824, -0.824
OH_Top_LQ	= Overhange Top Leeward Quarter +Y	= -0.5, -0.5
OH_Top_WQ	= Overhange Top Windward Quarter -Y	= -0.9, -0.9

```
Roof_CH   = Roof Coefficient  Center Half                                  = -0.824, -0.824
Roof_LQ   = Roof Coefficient  Leeward Quarter                              = -0.5, -0.5
Roof_WQ   = Roof Coefficient  Windward Quarter                             = -0.9, -0.9
Cp_WW     = Windward Wall Coefficient (All L/B Values)                     = 0.80
Cp_LW     = Leward Wall Coefficient Using L/B                              = -0.50
Cp_SW     = Side Wall Coefficient (All L/B values)                         = -0.70
GCpn_WW   = Parapet Combined Net Pressure Coefficient (Windward Parapet)   = 1.50
GCpn_LW   = Parapet Combined Net Pressure Coefficient (Leeward Parapet)    = -1.00
```

Gust Factor Calculation: Normal to Ridge

```
Gust factor (Flexible Or Dynamically sensitive Structure) :
B         = Avg Width of Struc Normal to Wind Direction                    = 14.625 ft
L         = Avg Length of Struc Parallel to Wind Direction                 = 7.500 ft
Vfps      = Wind Speed Converted to ft/sec                                 = 132.0 ft/s
VZm       = Bm * (Zm/33)^Am * Vfps                                         = 76.0 ft/s
N1        = f * Lzmean / VZmean                                            = 5.619 Hz
Rn        = 7.465 * N1 / (1 + 10.302 * N1)^(5/3)                           = 0.047
nh        = 4.6 * f * h / VZmean                                           = 0.512
Rh        = (1 / nh) - (1 / (2 * nh^2)) *(1 - Exp(-2*nh))                  = 0.731
nb        = 4.6 * f * b / VZmean                                           = 0.885
Rb        = (1 / nb) - (1 / (2 * nb^2)) * (1 - Exp(-2 * nb))               = 0.600
nl        = 15.4 * f * L / VZmean                                          = 1.520
Rl        = (1 / nl) - (1 / (2 * nl^2)) * (1 - Exp(-2 * nl))               = 0.452
R         = Sqrt((1 / Beta) * Rn * Rh * Rb * (.53 + .47 * Rl))             = 1.238
g         = (2 * Ln(3600 * NF1))^0.5 + 0.577 / (2 * Ln(3600 * NF1))^0.5    = 4.189
G         = .925*((1+1.7*Izm*(3.4^2 * Q^2 +g^2 * R^2)^.5)/(1+1.7*3.4*Izm))  = 1.348
```

Wall Wind Pressures based On Positive Internal Pressure (+GCPi) - Normal to Ridge
All wind pressures include a load factor of 1.0

Elev ft	Kz	Kzt	qz psf	GCPi	Windward Press psf	Leeward Press psf	Side Press psf	Total Press psf	Minimum Pressure* psf
8.00	0.849	1.000	14.96	0.18	13.44	-12.77	-16.81	26.21	16.00

Wall Wind Pressures based on Negative Internal Pressure (-GCPi) - Normal to Ridge
All wind pressures include a load factor of 1.0

Elev ft	Kz	Kzt	qz psf	GCPi	Windward Press psf	Leeward Press psf	Side Press psf	Total Press psf	Minimum Pressure* psf
8.00	0.849	1.000	14.96	-0.18	18.82	-7.39	-11.42	26.21	16.00

```
Notes Wall Pressures:
Kz       = Velocity Press Exp Coeff        Kzt      = Topographical Factor
qz       = 0.00256*Kz*Kzt*Kd*V^2           GCPi     = Internal Press Coefficient
Side     = qh * G * Cp_SW - qip * +GCPi    Windward = qz * G * Cp_WW - qip * +GCPi
Leeward  = qh * G * Cp_LW - qip * +GCPi    Total    = Windward Press - Leeward Press
* Minimum Pressure: Para 27.4.7 no less than 16.00 psf (Incl LF) applied to Walls
+ Pressures Acting TOWARD Surface          - Pressures Acting AWAY from Surface
```

Roof Wind Pressures for Positive & Negative Internal Pressure (+/- GCPi) - Normal to Ridge
All wind pressures include a load factor of 1.0

Roof Var	Start Dist ft	End Dist ft	Cp_min	Cp_max	GCPi	Pressure Pn_min* psf	Pressure Pp_min* psf	Pressure Pn_max psf	Pressure Pp_max psf
OH_Top_CH	N/A	N/A	-0.824	-0.824	0.180	-13.93	-19.32	-13.93	-19.32
OH_Top_LQ	N/A	N/A	-0.500	-0.500	0.180	-7.39	-12.77	-7.39	-12.77
OH_Top_WQ	N/A	N/A	-0.900	-0.900	0.180	-15.45	-20.84	-15.45	-20.84
Roof_CH	N/A	N/A	-0.824	-0.824	0.180	-13.93	-19.32	-13.93	-19.32
Roof_LQ	N/A	N/A	-0.500	-0.500	0.180	-7.39	-12.77	-7.39	-12.77
Roof_WQ	N/A	N/A	-0.900	-0.900	0.180	-15.45	-20.84	-15.45	-20.84

```
Notes Roof Pressures:
Start Dist = Start Dist from Windward Edge  End Dist = End Dist from Windward Edge
Cp_Max     = Largest Coefficient Magnitude  Cp_Min   = Smallest Coefficient Magnitude
```

```
Pp_max     = qh*G*Cp_max - qip*(+GCPi)      Pn_max    = qh*G*Cp_max - qin*(-GCpi)
Pp_min*    = qh*G*Cp_min - qip*(+GCPi)      Pn_min*   = qh*G*Cp_min - qin*(-GCPi)
OH = Overhang   X = Dir along Ridge   Y = Dir Perpendcular to Ridge  Z = Vertical
* The smaller uplift pressures due to Cp_Min can become critical when wind is combined
  with roof live load or snow load;  load combinations are given in ASCE 7
WQ = Windward Quarter    CH = Center Half      LQ = Leeward Quarter
+ Pressures Acting TOWARD Surface          - Pressures Acting AWAY from Surface
```

MWFRS Wind Parallel to Ridge (Ref Fig 27.4-1}

```
h         = Mean Roof Height Of Building                                    = 8.467 ft
RHt       = Ridge Height Of Roof                                            = 8.933 ft
B         = Horizontal Dimension Of Building Normal To Wind Direction       = 7.500 ft
L         = Horizontal Dimension Of building Parallel To Wind Direction     = 14.625 ft
L/B       = Ratio Of L/B used For Cp determination                          = 1.950
h/L       = Ratio Of h/L used For Cp determination                          = 0.579
RHt       = Ridge Height Of Roof                                            = 8.933 ft
r         = Rise To Span Ratio  (RHt-EHt)/W                                 = 0.124
Elev      = Is roof on Elevated Structure (Is EHt>0)                        = True
OH_Top    = **Overhang Top Coeff (0 to h/2) (0.000 ft to 0.000 ft)          = -0.18, -0.961
OH_Top_1  = Overhang Top Coeff (h to 2h) (14.625 ft to 14.625 ft)           = -0.18, -0.532
Roof      = **Roof Coeff (0 to h/2) (0.000 ft to 4.233 ft)                  = -0.18, -0.961
Roof_1    = Roof Coeff (h/2 to h) (4.233 ft to 8.467 ft)                    = -0.18, -0.868
Roof_2    = Roof Coeff (h to 2h) (8.467 ft to 14.625 ft)                    = -0.18, -0.532
**Includes Reduction Factor 0.99 For roof area, applied To Cp=-1.3 For h/L>=1 & (0 To h/2)
Cp_WW     = Windward Wall Coefficient (All L/B Values)                      = 0.80
Cp_LW     = Leward Wall Coefficient Using L/B                               = -0.31
Cp_SW     = Side Wall Coefficient (All L/B values)                          = -0.70
GCpn_WW   = Parapet Combined Net Pressure Coefficient (Windward Parapet)    = 1.50
GCpn_LW   = Parapet Combined Net Pressure Coefficient (Leeward Parapet)     = -1.00
```

Gust Factor Calculation: Parallel to Ridge

```
Gust factor (Flexible Or Dynamically sensitive Structure) :
B         = Avg Width of Struc Normal to Wind Direction                     = 7.500 ft
L         = Avg Length of Struc Parallel to Wind Direction                  = 14.625 ft
Vfps      = Wind Speed Converted to ft/sec                                  = 132.0 ft/s
VZm       = Bm * (Zm/33)^Am * Vfps                                          = 76.0 ft/s
N1        = f * Lzmean / VZmean                                             = 5.619 Hz
Rn        = 7.465 * N1 / (1 + 10.302 * N1)^(5/3)                            = 0.047
nh        = 4.6 * f * h / VZmean                                            = 0.512
Rh        = (1 / nh) - (1 / (2 * nh^2)) *(1 - Exp(-2*nh))                   = 0.731
nb        = 4.6 * f * b / VZmean                                            = 0.454
Rb        = (1 / nb) - (1 / (2 * nb^2)) * (1 - Exp(-2 * nb))                = 0.755
nl        = 15.4 * f * L / VZmean                                           = 2.964
Rl        = (1 / nl) - (1 / (2 * nl^2)) * (1 - Exp(-2 * nl))                = 0.281
R         = Sqrt((1 / Beta) * Rn * Rh * Rb * (.53 + .47 * Rl))              = 1.311
g         = (2 * Ln(3600 * NF1))^0.5 + 0.577 / (2 * Ln(3600 * NF1))^0.5     = 4.189
G         = .925*((1+1.7*Izm*(3.4^2 * Q^2 +g^2 * R^2)^.5)/(1+1.7*3.4*Izm))  = 1.388
```

Wall Wind Pressures based On Positive Internal Pressure (+GCPi) - Parallel to Ridge
All wind pressures include a load factor of 1.0

Elev ft	Kz	Kzt	qz psf	GCPi	Windward Press psf	Leeward Press psf	Side Press psf	Total Press psf	Minimum Pressure* psf
8.93	0.849	1.000	14.96	0.18	13.92	-9.13	-17.23	23.05	16.00
8.47	0.849	1.000	14.96	0.18	13.92	-9.13	-17.23	23.05	16.00
8.00	0.849	1.000	14.96	0.18	13.92	-9.13	-17.23	23.05	16.00

Wall Wind Pressures based on Negative Internal Pressure (-GCPi) - Parallel to Ridge
All wind pressures include a load factor of 1.0

Elev ft	Kz	Kzt	qz psf	GCPi	Windward Press psf	Leeward Press psf	Side Press psf	Total Press psf	Minimum Pressure* psf
8.93	0.849	1.000	14.96	-0.18	19.31	-3.75	-11.85	23.05	16.00
8.47	0.849	1.000	14.96	-0.18	19.31	-3.75	-11.85	23.05	16.00
8.00	0.849	1.000	14.96	-0.18	19.31	-3.75	-11.85	23.05	16.00

Notes Wall Pressures:

```
Kz       = Velocity Press Exp Coeff        Kzt      = Topographical Factor
qz       = 0.00256*Kz*Kzt*Kd*V^2           GCPi     = Internal Press Coefficient
Side     = qh * G * Cp_SW - qip * +GCPi    Windward = qz * G * Cp_WW - qip * +GCPi
Leeward  = qh * G * Cp_LW - qip * +GCPi    Total    = Windward Press - Leeward Press
* Minimum Pressure: Para 27.4.7 no less than 16.00 psf (Incl LF) applied to Walls
+ Pressures Acting TOWARD Surface          - Pressures Acting AWAY from Surface
```

Roof Wind Pressures for Positive & Negative Internal Pressure (+/- GCPi) - Parallel to Ridge

All wind pressures include a load factor of 1.0

Roof Var	Start Dist ft	End Dist ft	Cp_min	Cp_max	GCPi	Pressure Pn_min* psf	Pressure Pp_min* psf	Pressure Pn_max psf	Pressure Pp_max psf
OH_Top (-X)	0.000	0.000	-0.180	-0.961	0.180	-1.05	-6.43	-17.27	-22.66
OH_Top_1 (+X)	14.625	14.625	-0.180	-0.532	0.180	-1.05	-6.43	-8.35	-13.73
Roof	0.000	4.233	-0.180	-0.961	0.180	-1.05	-6.43	-17.27	-22.66
Roof_1	4.233	8.467	-0.180	-0.868	0.180	-1.05	-6.43	-15.34	-20.73
Roof_2	8.467	14.625	-0.180	-0.532	0.180	-1.05	-6.43	-8.35	-13.73

```
Notes Roof Pressures:
Start Dist = Start Dist from Windward Edge  End Dist = End Dist from Windward Edge
Cp_Max     = Largest Coefficient Magnitude  Cp_Min   = Smallest Coefficient Magnitude
Pp_max     = qh*G*Cp_max - qip*(+GCPi)      Pn_max   = qh*G*Cp_max - qin*(-GCpi)
Pp_min*    = qh*G*Cp_min - qip*(+GCPi)      Pn_min*  = qh*G*Cp_min - qin*(-GCPi)
OH = Overhang   X = Dir along Ridge   Y = Dir Perpendcular to Ridge  Z = Vertical
* The smaller uplift pressures due to Cp_Min can become critical when wind is combined
  with roof live load or snow load;  load combinations are given in ASCE 7
WQ = Windward Quarter    CH = Center Half      LQ = Leeward Quarter
+ Pressures Acting TOWARD Surface          - Pressures Acting AWAY from Surface
```

Job: VELODOME 222-403

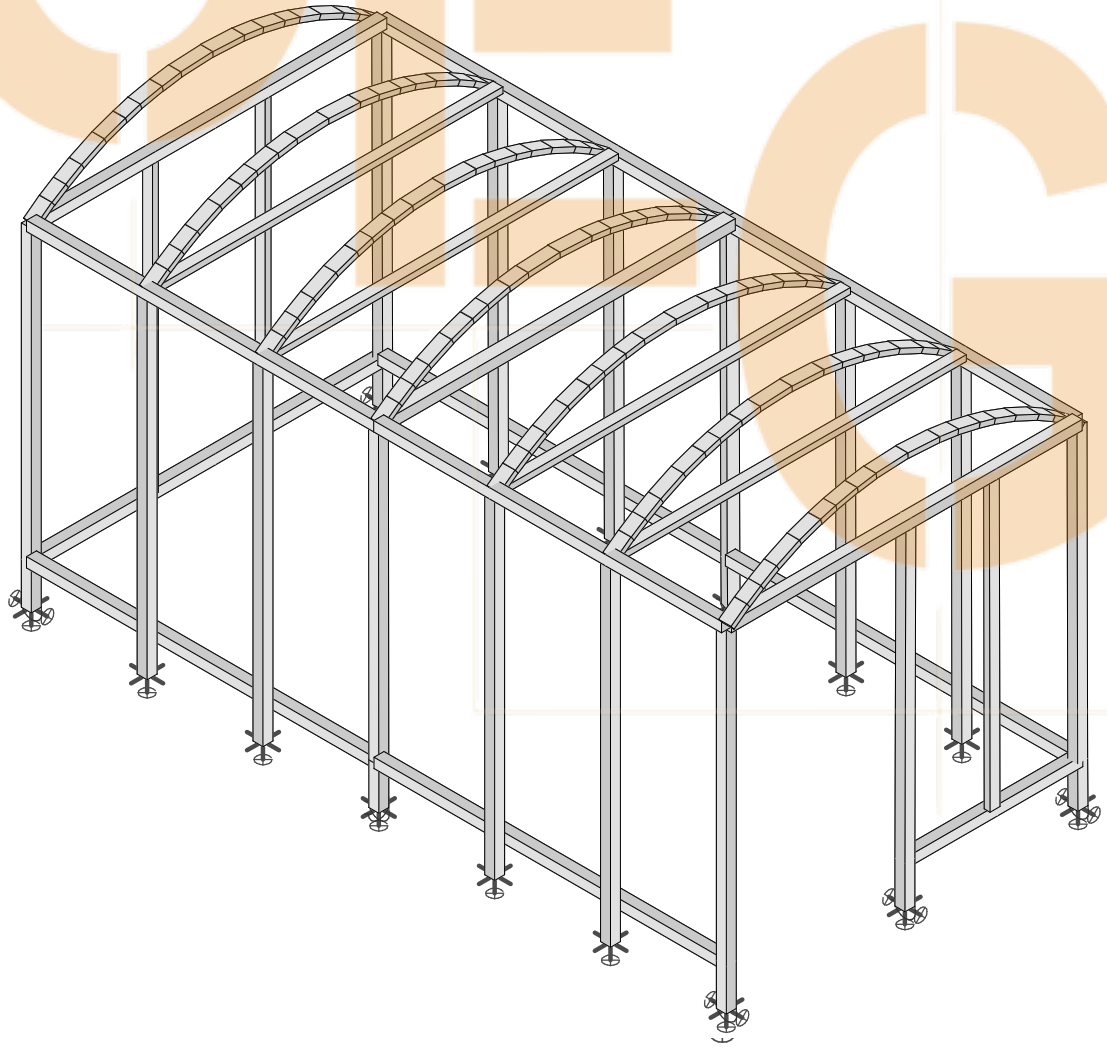
Page:
Designer:
Date:

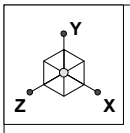
Shelter Design

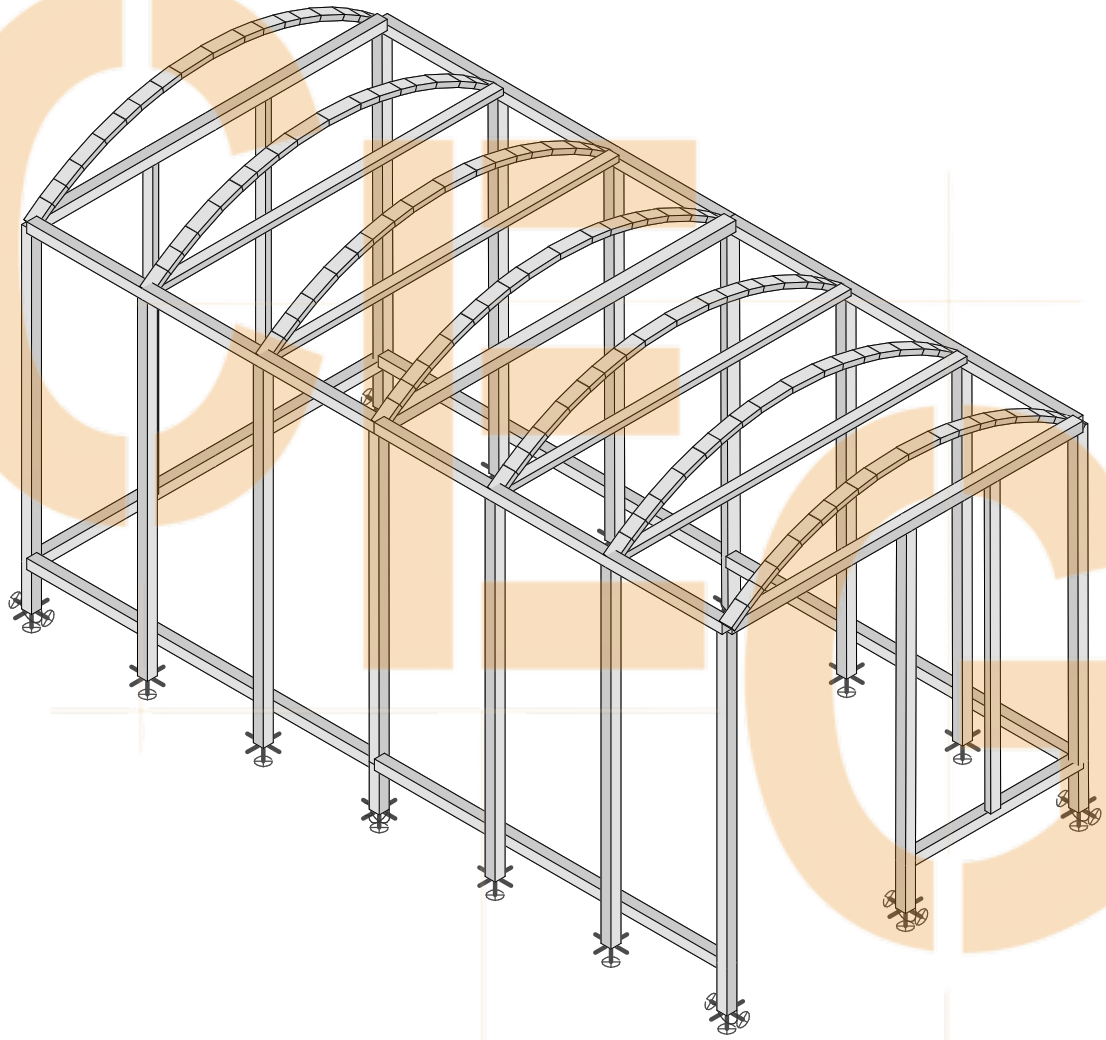
Dead Load (DL) = **0.144** kPa

Roof Snow Load **4.92** kPa

Wind Load (WL) = As per page 1,001, 1,002 & 1003

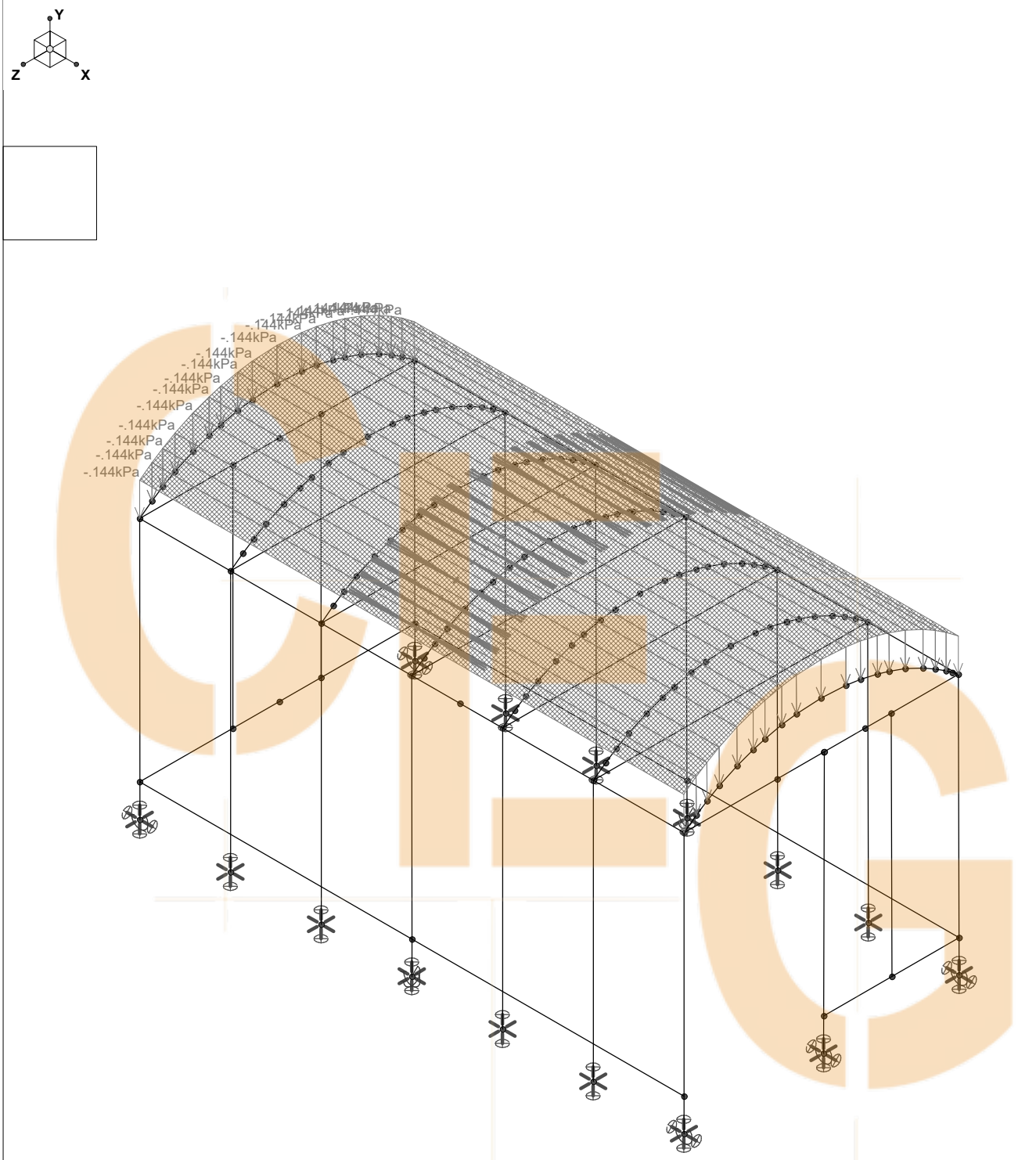






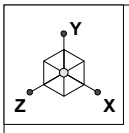
Envelope Only Solution

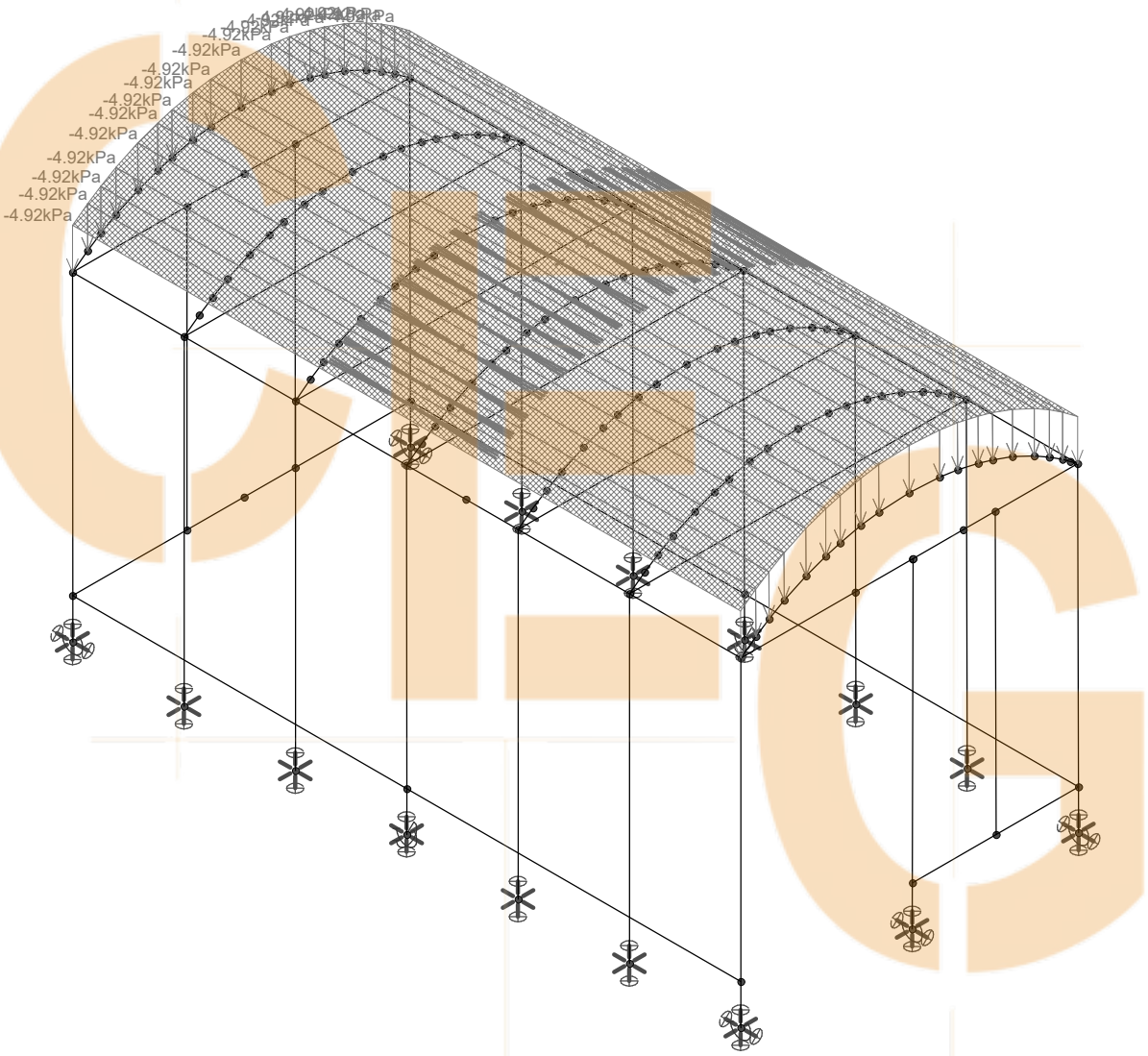
	PEAPOD MINI 8-10	SK - 1
VELODOME 222-403		PEAPOD MINI 8-10 (2).r3d



Loads: BLC 1, DL
Envelope Only Solution

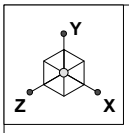
	PEAPOD MINI 8-10	SK - 2
VELODOME 222-403		PEAPOD MINI 8-10 (2).r3d

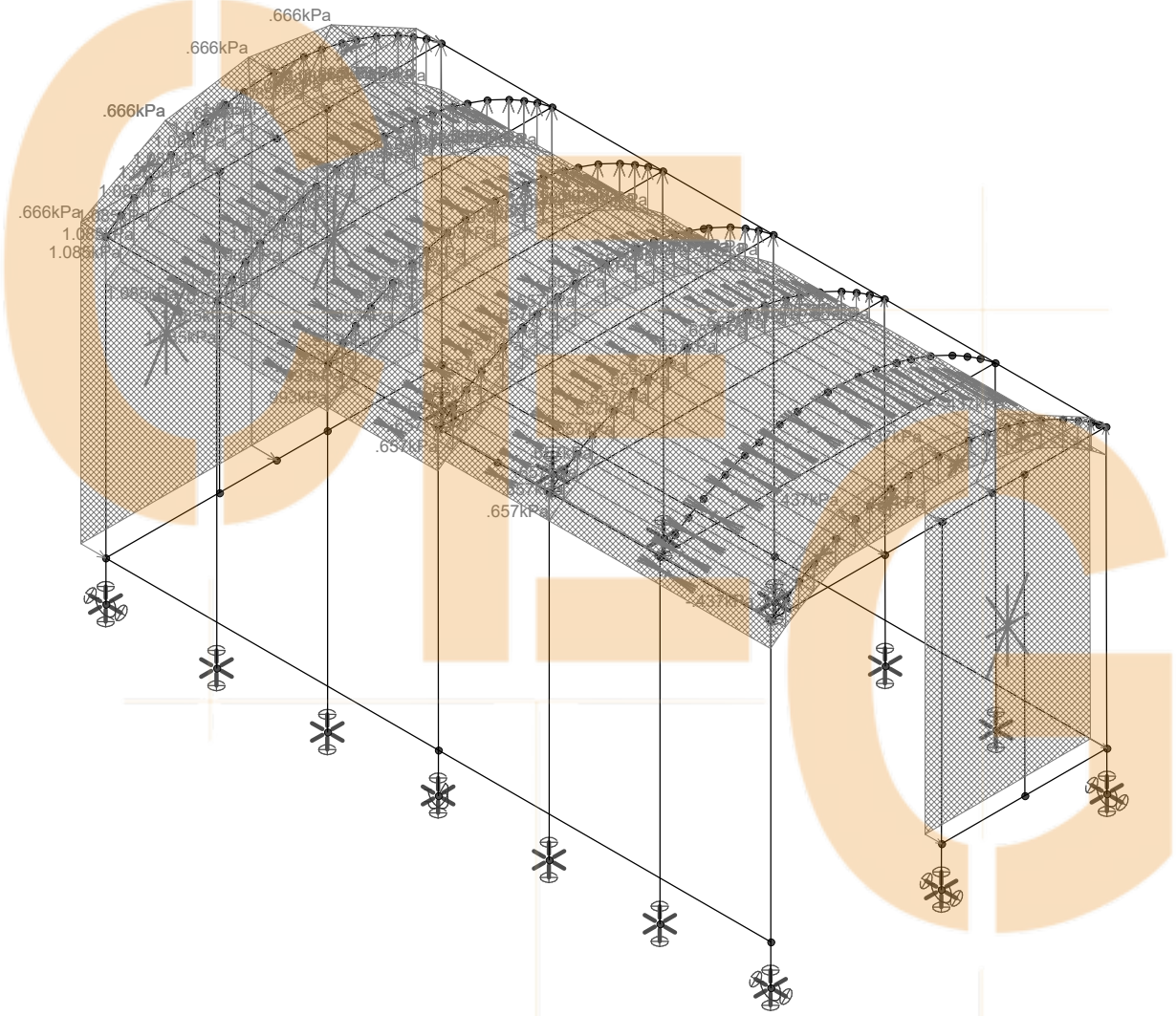




Loads: BLC 2, SL
Envelope Only Solution

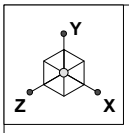
	PEAPOD MINI 8-10	SK - 3
VELODOME 222-403		PEAPOD MINI 8-10 (2).r3d

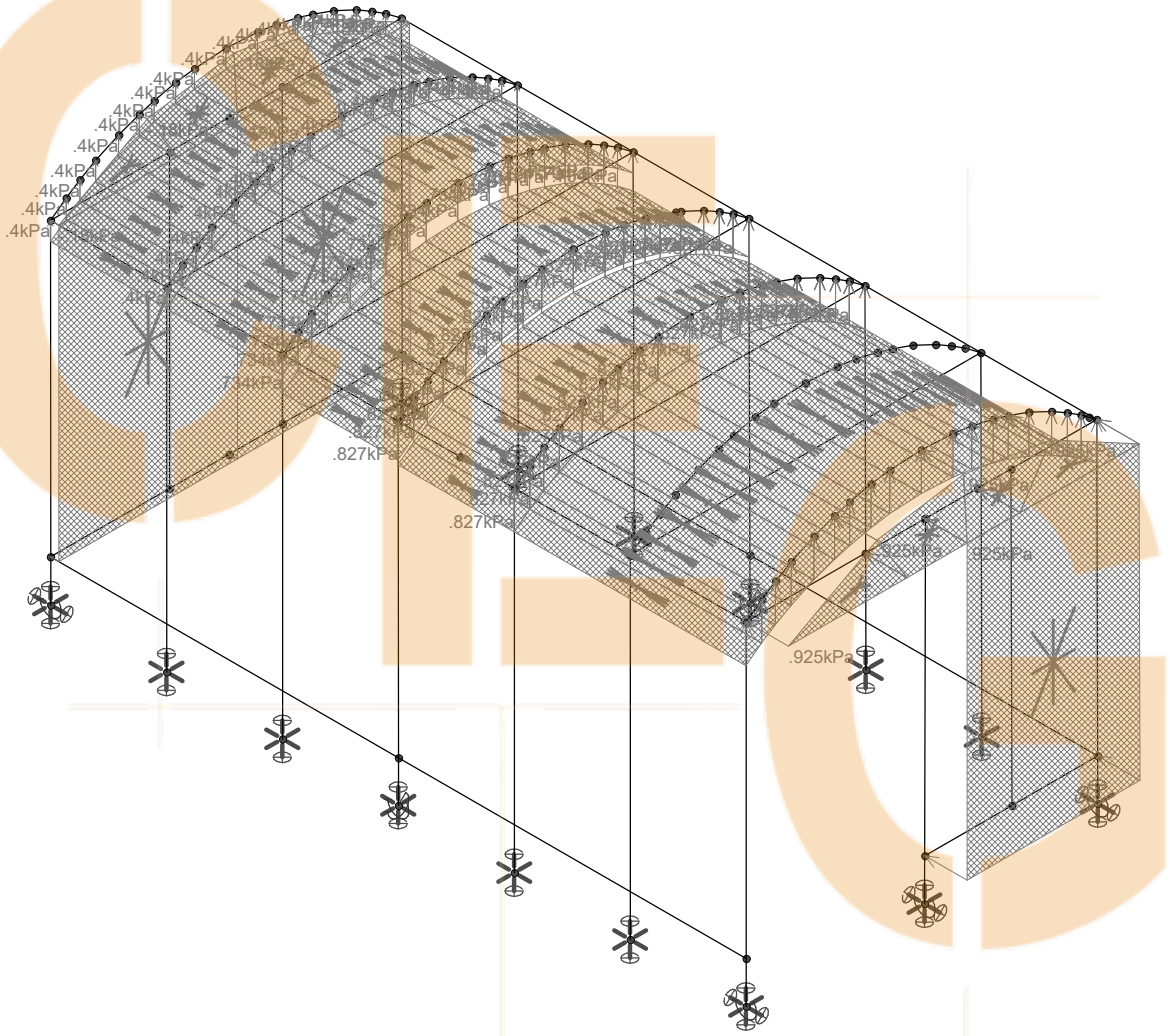




Loads: BLC 3, WL+X
Envelope Only Solution

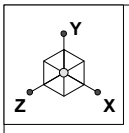
	PEAPOD MINI 8-10	SK - 4
VELODOME 222-403		PEAPOD MINI 8-10 (2).r3d

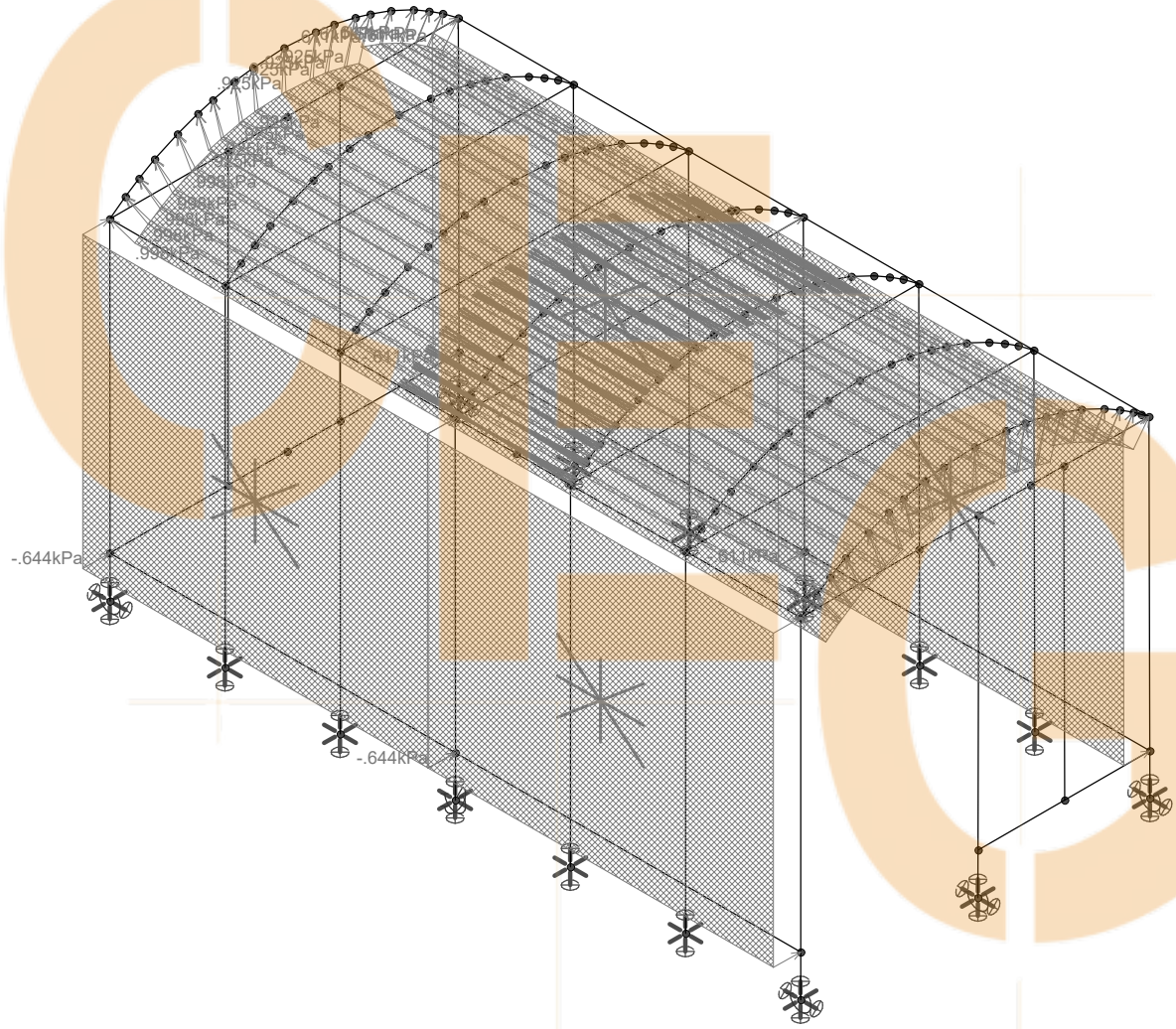




Loads: BLC 4, WL-X
Envelope Only Solution

	PEAPOD MINI 8-10	SK - 5
VELODOME 222-403		PEAPOD MINI 8-10 (2).r3d





Loads: BLC 5, WL+Z
Envelope Only Solution

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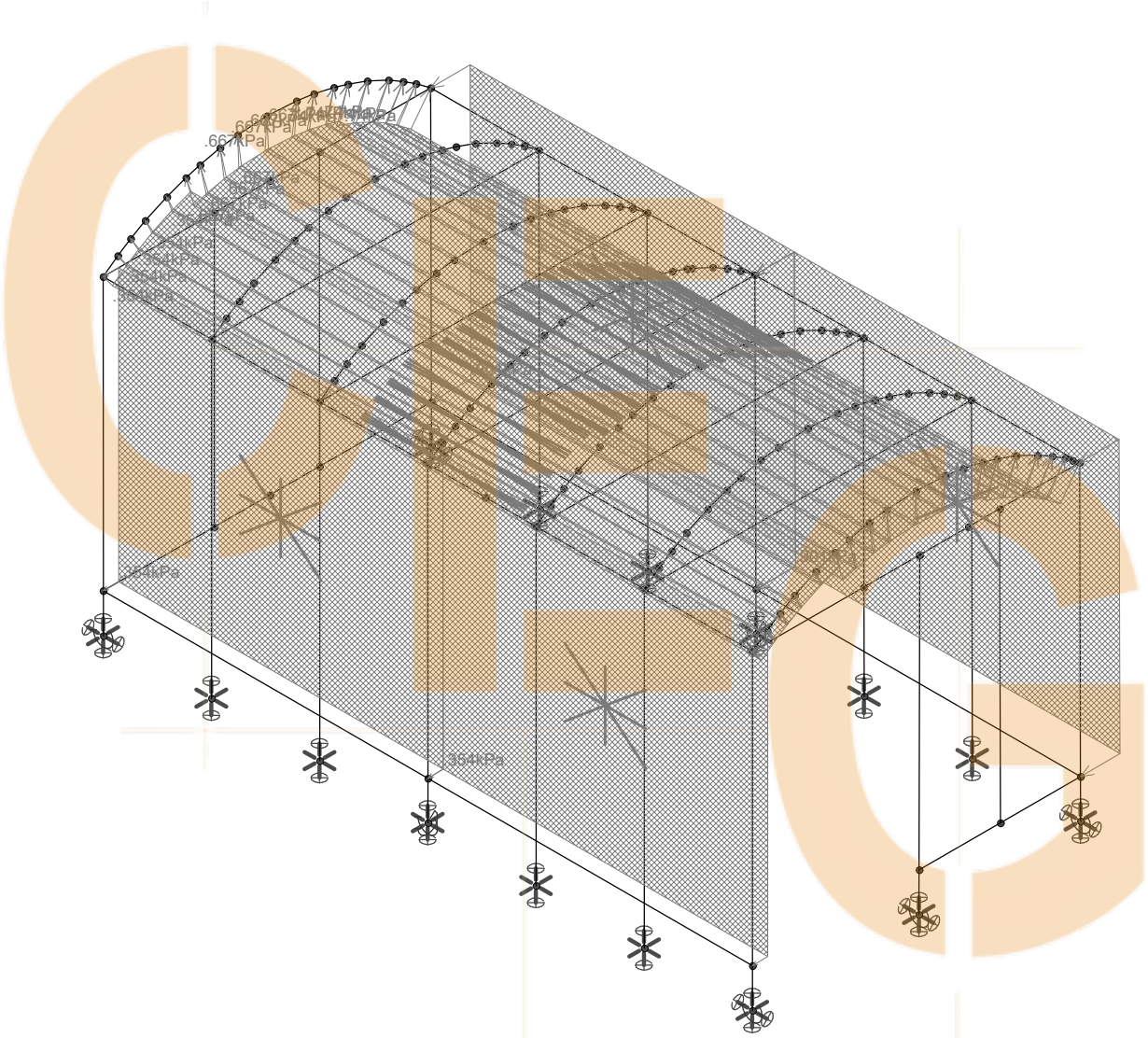
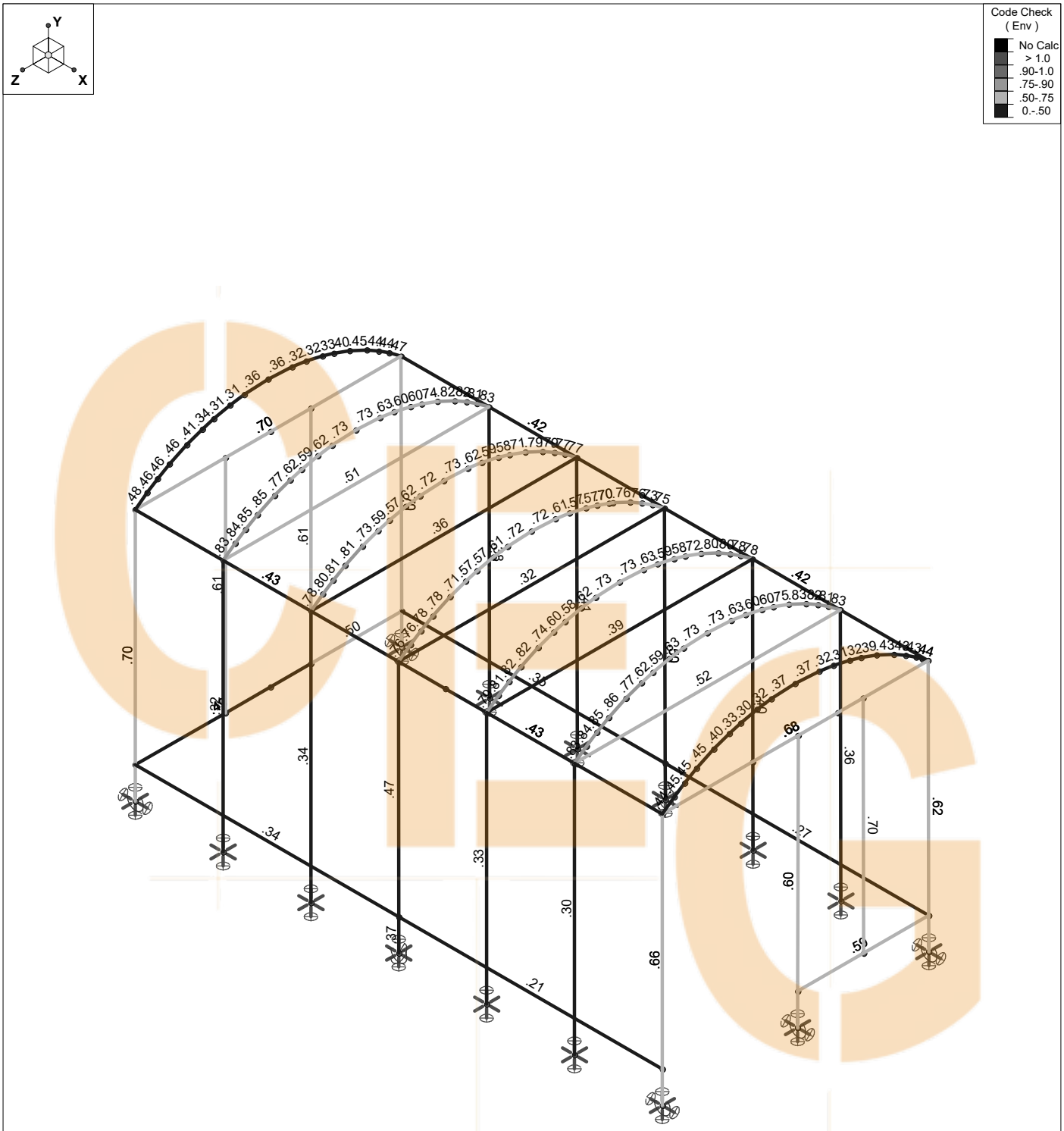
VELODOME 222-403		PEAPOD MINI 8-10 (2).r3d



Loads: BLC 6, WL-Z
Envelope Only Solution

	PEAPOD MINI 8-10	SK - 7
VELODOME 222-403		PEAPOD MINI 8-10 (2).r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

	PEAPOD MINI 8-10	SK - 8
VELODOME 222-403		PEAPOD MINI 8-10 (2).r3d

Aluminum Properties

	Label	E [kPa]	G [kPa]	Nu	Therm (...	Density[...	Table B.4	kt	Ftu[kPa]	Fty[kPa]	Fcy[kPa]	Fsu[kPa]	Ct
1	3003-H14	6.964e+7	2.611e+7	.33	1.3	2767.973	Table B....	1	1.31e+5	1.103e+5	89631.1..	82736.4...	141
2	6061-T6	6.964e+7	2.611e+7	.33	1.3	2767.973	Table B....	1	2.62e+5	2.413e+5	2.413e+5	1.655e+5	141
3	6063-T5	6.964e+7	2.611e+7	.33	1.3	2767.973	Table B....	1	1.517e+5	1.103e+5	1.103e+5	89631.1..	141
4	6063-T6	6.964e+7	2.611e+7	.33	1.3	2767.973	Table B....	1	2.068e+5	1.724e+5	1.724e+5	1.31e+5	141
5	5052-H34	7.033e+7	2.611e+7	.33	1.3	2767.973	Table B....	1	2.344e+5	1.793e+5	1.655e+5	1.379e+5	141
6	6061-T6 W	6.964e+7	2.611e+7	.33	1.3	2767.973	Table B....	1	1.655e+5	1.034e+5	1.034e+5	1.034e+5	141

Aluminum Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [mm2]	Iyy [mm4]	Izz [mm4]	J [mm4]
1	Header Be...	RT2.5X2.5X0....	Beam	Rectangular Tubes	6063-T5	Typical	767.743	4.662e+5	4.662e+5	6.951e+5
2	Column	RT2.5X2.5X0....	Column	Rectangular Tubes	6063-T5	Typical	767.743	4.662e+5	4.662e+5	6.951e+5
3	Mullion Co...	RT1.5X2.5X0....	Column	Rectangular Tubes	6063-T5	Typical	605.163	1.403e+5	3.193e+5	2.959e+5
4	Roof Rafter	ROOF 1.23 x...	Beam	Rectangular Tubes	6063-T5	Typical	338.71	60770.274	2.651e+5	1.561e+5
5	middle be...	RT2.5x3x0.125	Beam	Rectangular Tubes	6063-T5	Typical	846.776	5.394e+5	7.182e+5	9.241e+5
6	CROSS B...	1.5 x2.5x .125	Beam	Rectangular Tubes	6063-T5	Typical	605.163	3.193e+5	1.403e+5	2.959e+5

Joint Coordinates and Temperatures

	Label	X [m]	Y [m]	Z [m]	Temp [F]	Detach From Diaphragm
1	N1	2.061589	1.686408	5.068902	0	
2	N2	6.519298	1.686408	5.068902	0	
3	N3	2.061589	1.761295	4.066047	0	
4	N4	2.061589	1.818329	4.154448	0	
5	N5	2.061589	1.875981	4.254924	0	
6	N6	2.061589	1.944402	4.401239	0	
7	N7	2.061589	1.99188	4.533547	0	
8	N8	2.061589	2.02005	4.629724	0	
9	N9	2.061589	2.05154	4.767504	0	
10	N10	2.061589	2.068981	4.887378	0	
11	N11	2.061589	1.761295	6.1136	0	
12	N12	2.061589	1.818329	6.025199	0	
13	N13	2.061589	1.875981	5.924724	0	
14	N14	2.061589	1.944402	5.778409	0	
15	N15	2.061589	1.99188	5.6461	0	
16	N16	2.061589	2.02005	5.549924	0	
17	N17	2.061589	2.05154	5.412143	0	
18	N18	2.061589	2.068981	5.292269	0	
19	N19	2.061589	2.08021	5.089824	0	
20	N20	2.804891	1.761295	4.066047	0	
21	N21	2.804891	1.818329	4.154448	0	
22	N22	2.804891	1.875981	4.254924	0	
23	N23	2.804891	1.944402	4.401239	0	
24	N24	2.804891	1.99188	4.533547	0	
25	N25	2.804891	2.02005	4.629724	0	
26	N26	2.804891	2.05154	4.767504	0	
27	N27	2.804891	2.068981	4.887378	0	
28	N28	2.804891	1.686408	6.213736	0	
29	N29	2.804891	1.761295	6.1136	0	
30	N30	2.804891	1.818329	6.025199	0	
31	N31	2.804891	1.875981	5.924724	0	
32	N32	2.804891	1.944402	5.778409	0	
33	N33	2.804891	1.99188	5.6461	0	
34	N34	2.804891	2.02005	5.549924	0	
35	N35	2.804891	2.05154	5.412143	0	
36	N36	2.804891	2.068981	5.292269	0	
37	N37	2.804891	2.08021	5.089824	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [m]	Y [m]	Z [m]	Temp [F]	Detach From Diaphragm
38	N38	3.547493	1.761295	4.066047	0	
39	N39	3.547493	1.818329	4.154448	0	
40	N40	3.547493	1.875981	4.254924	0	
41	N41	3.547493	1.944402	4.401239	0	
42	N42	3.547493	1.99188	4.533547	0	
43	N43	3.547493	2.02005	4.629724	0	
44	N44	3.547493	2.05154	4.767504	0	
45	N45	3.547493	2.068981	4.887378	0	
46	N46	3.547493	1.686408	6.213736	0	
47	N47	3.547493	1.761295	6.1136	0	
48	N48	3.547493	1.818329	6.025199	0	
49	N49	3.547493	1.875981	5.924724	0	
50	N50	3.547493	1.944402	5.778409	0	
51	N51	3.547493	1.99188	5.6461	0	
52	N52	3.547493	2.02005	5.549924	0	
53	N53	3.547493	2.05154	5.412143	0	
54	N54	3.547493	2.068981	5.292269	0	
55	N55	3.547493	2.08021	5.089824	0	
56	N56	4.288544	1.761295	4.066047	0	
57	N57	4.288544	1.818329	4.154448	0	
58	N58	4.288544	1.875981	4.254924	0	
59	N59	4.288544	1.944402	4.401239	0	
60	N60	4.288544	1.99188	4.533547	0	
61	N61	4.288544	2.02005	4.629724	0	
62	N62	4.288544	2.05154	4.767504	0	
63	N63	4.288544	2.068981	4.887378	0	
64	N64	4.288544	1.686408	6.213736	0	
65	N65	4.288544	1.761295	6.1136	0	
66	N66	4.288544	1.818329	6.025199	0	
67	N67	4.288544	1.875981	5.924724	0	
68	N68	4.288544	1.944402	5.778409	0	
69	N69	4.288544	1.99188	5.6461	0	
70	N70	4.288544	2.02005	5.549924	0	
71	N71	4.288544	2.05154	5.412143	0	
72	N72	4.288544	2.068981	5.292269	0	
73	N73	4.288544	2.08021	5.089824	0	
74	N74	5.033395	1.761295	4.066047	0	
75	N75	5.033395	1.818329	4.154448	0	
76	N76	5.033395	1.875981	4.254924	0	
77	N77	5.033395	1.944402	4.401239	0	
78	N78	5.033395	1.99188	4.533547	0	
79	N79	5.033395	2.02005	4.629724	0	
80	N80	5.033395	2.05154	4.767504	0	
81	N81	5.033395	2.068981	4.887378	0	
82	N82	5.033395	1.686408	6.213736	0	
83	N83	5.033395	1.761295	6.1136	0	
84	N84	5.033395	1.818329	6.025199	0	
85	N85	5.033395	1.875981	5.924724	0	
86	N86	5.033395	1.944402	5.778409	0	
87	N87	5.033395	1.99188	5.6461	0	
88	N88	5.033395	2.02005	5.549924	0	
89	N89	5.033395	2.05154	5.412143	0	
90	N90	5.033395	2.068981	5.292269	0	
91	N91	5.033395	2.08021	5.089824	0	
92	N92	6.519298	1.761295	4.066047	0	
93	N93	6.519298	1.818329	4.154448	0	
94	N94	6.519298	1.875981	4.254924	0	
95	N95	6.519298	1.944402	4.401239	0	
96	N96	6.519298	1.99188	4.533547	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [m]	Y [m]	Z [m]	Temp [F]	Detach From Diaphragm
97	N97	6.519298	2.02005	4.629724	0	
98	N98	6.519298	2.05154	4.767504	0	
99	N99	6.519298	2.068981	4.887378	0	
100	N100	6.519298	1.761295	6.1136	0	
101	N101	6.519298	1.818329	6.025199	0	
102	N102	6.519298	1.875981	5.924724	0	
103	N103	6.519298	1.944402	5.778409	0	
104	N104	6.519298	1.99188	5.6461	0	
105	N105	6.519298	2.02005	5.549924	0	
106	N106	6.519298	2.05154	5.412143	0	
107	N107	6.519298	2.068981	5.292269	0	
108	N108	6.519298	2.08021	5.089824	0	
109	N109	2.061589	1.686408	6.213736	0	
110	N110	2.061589	-0.448739	6.213736	0	
111	N111	6.519298	-0.448739	6.213736	0	
112	N112	6.519298	1.686408	6.213736	0	
113	N113	2.804891	1.686408	3.965911	0	
114	N114	3.547493	1.686408	3.965911	0	
115	N115	4.288544	1.686408	3.965911	0	
116	N116	5.033395	1.686408	3.965911	0	
117	N117	6.519298	1.723851	4.015979	0	
118	N118	2.061589	1.686408	3.965911	0	
119	N119	2.061589	-0.448739	3.959597	0	
120	N123	4.290443	-0.448739	3.959597	0	
121	N125	5.776346	1.686408	3.965911	0	
122	N126	6.519298	1.686408	3.965911	0	
123	N127	6.519298	-0.448739	3.959597	0	
124	N128	2.80454	-0.448739	3.96038	0	
125	N129	3.547492	-0.448739	3.96038	0	
126	N130	4.290443	-0.183983	3.96038	0	
127	N131	5.033395	-0.448739	3.96038	0	
128	N132	5.776346	-0.448739	3.96038	0	
129	N133	2.061589	-0.183983	3.96038	0	
130	N134	2.061589	-0.183983	4.728709	0	
131	N135	2.061589	-0.183983	5.068902	0	
132	N136	2.061589	-0.181768	6.213736	0	
133	N137	6.519298	-0.183983	3.96038	0	
134	N138	6.519298	-0.183983	5.068902	0	
135	N139	6.519298	-0.181768	6.213736	0	
136	N140	6.519298	1.686408	4.728709	0	
137	N141	6.519298	1.686408	5.45091	0	
138	N142	2.061589	1.686408	4.728709	0	
139	N143	2.061589	-0.183983	5.45091	0	
140	N144	2.061589	1.686408	5.45091	0	
141	N145	4.684404	1.686408	6.213736	0	
142	N147	4.288544	1.956271	4.434316	0	
143	N148	4.290443	-0.446525	6.213736	0	
144	N149	2.804541	-0.448739	6.213736	0	
145	N150	3.547492	-0.448739	6.213736	0	
146	N151	4.290443	-0.181768	6.213736	0	
147	N152	5.033395	-0.448739	6.213736	0	
148	N153	5.776346	-0.448739	6.213736	0	
149	N154	6.519298	-0.450954	5.069692	0	
150	N155	6.519298	1.686408	5.063371	0	
151	N159	5.776346	1.686408	6.213736	0	
152	N160	6.519298	-0.183983	4.51038	0	
153	N161	6.519298	1.686408	4.515911	0	
154	N163A	5.776346	1.761295	4.066047	0	
155	N164	5.776346	1.818329	4.154448	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [m]	Y [m]	Z [m]	Temp [F]	Detach From Diaphragm
156	N165	5.776346	1.875981	4.254924	0	
157	N166	5.776346	1.944402	4.401239	0	
158	N167	5.776346	1.99188	4.533547	0	
159	N168	5.776346	2.02005	4.629724	0	
160	N169	5.776346	2.05154	4.767504	0	
161	N170	5.776346	2.068981	4.887378	0	
162	N172	5.776346	1.761295	6.1136	0	
163	N173	5.776346	1.818329	6.025199	0	
164	N174	5.776346	1.875981	5.924724	0	
165	N175	5.776346	1.944402	5.778409	0	
166	N176	5.776346	1.99188	5.6461	0	
167	N177	5.776346	2.02005	5.549924	0	
168	N178	5.776346	2.05154	5.412143	0	
169	N179	5.776346	2.068981	5.292269	0	
170	N180	5.776346	2.08021	5.089824	0	

Aluminum Design Parameters

	Label	Shape	Length[m]	Lbyy[m]	Lbzz[m]	Lcomp top[m]	Lcomp bot[m]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Column	1.87			Lbyy						Lateral
2	M2	Column	1.87			Lbyy						Lateral
3	M3	Header Bea...	2.248			.305						Lateral
4	M4	Roof Rafter	.125	1.219	2.134	.305						Lateral
5	M5	Roof Rafter	.105	1.219	2.134	.305						Lateral
6	M6	Roof Rafter	.116	1.219	2.134	.305						Lateral
7	M7	Roof Rafter	.162	1.219	2.134	.305						Lateral
8	M8	Roof Rafter	.141	1.219	2.134	.305						Lateral
9	M9	Roof Rafter	.1	1.219	2.134	.305						Lateral
10	M10	Roof Rafter	.141	1.219	2.134	.305						Lateral
11	M11	Roof Rafter	.121	1.219	2.134	.305						Lateral
12	M12	Roof Rafter	.203	1.219	2.134	.305						Lateral
13	M13	Roof Rafter	.125	1.219	2.134	.305						Lateral
14	M14	Roof Rafter	.105	1.219	2.134	.305						Lateral
15	M15	Roof Rafter	.116	1.219	2.134	.305						Lateral
16	M16	Roof Rafter	.162	1.219	2.134	.305						Lateral
17	M17	Roof Rafter	.141	1.219	2.134	.305						Lateral
18	M18	Roof Rafter	.1	1.219	2.134	.305						Lateral
19	M19	Roof Rafter	.141	1.219	2.134	.305						Lateral
20	M20	Roof Rafter	.121	1.219	2.134	.305						Lateral
21	M21	Roof Rafter	.203	1.219	2.134	.305						Lateral
22	M22	Roof Rafter	.125	1.219	2.134	.305						Lateral
23	M23	Roof Rafter	.105	1.219	2.134	.305						Lateral
24	M24	Roof Rafter	.116	1.219	2.134	.305						Lateral
25	M25	Roof Rafter	.162	1.219	2.134	.305						Lateral
26	M26	Roof Rafter	.141	1.219	2.134	.305						Lateral
27	M27	Roof Rafter	.1	1.219	2.134	.305						Lateral
28	M28	Roof Rafter	.141	1.219	2.134	.305						Lateral
29	M29	Roof Rafter	.121	1.219	2.134	.305						Lateral
30	M30	Roof Rafter	.203	1.219	2.134	.305						Lateral
31	M31	Roof Rafter	.125	1.219	2.134	.305						Lateral
32	M32	Roof Rafter	.105	1.219	2.134	.305						Lateral
33	M33	Roof Rafter	.116	1.219	2.134	.305						Lateral
34	M34	Roof Rafter	.162	1.219	2.134	.305						Lateral
35	M35	Roof Rafter	.141	1.219	2.134	.305						Lateral
36	M36	Roof Rafter	.1	1.219	2.134	.305						Lateral
37	M37	Roof Rafter	.141	1.219	2.134	.305						Lateral
38	M38	Roof Rafter	.121	1.219	2.134	.305						Lateral
39	M39	Roof Rafter	.203	1.219	2.134	.305						Lateral

Aluminum Design Parameters (Continued)

	Label	Shape	Length[m]	Lbyy[m]	Lbzz[m]	Lcomp top[m]	Lcomp bot[m]	L-torqu...	Kyy	Kzz	Cb	Function
40	M40	Roof Rafter	.125	1.219	2.134	.305						Lateral
41	M41	Roof Rafter	.105	1.219	2.134	.305						Lateral
42	M42	Roof Rafter	.116	1.219	2.134	.305						Lateral
43	M43	Roof Rafter	.162	1.219	2.134	.305						Lateral
44	M44	Roof Rafter	.141	1.219	2.134	.305						Lateral
45	M45	Roof Rafter	.1	1.219	2.134	.305						Lateral
46	M46	Roof Rafter	.141	1.219	2.134	.305						Lateral
47	M47	Roof Rafter	.121	1.219	2.134	.305						Lateral
48	M48	Roof Rafter	.203	1.219	2.134	.305						Lateral
49	M49	Roof Rafter	.125	1.219	2.134	.305						Lateral
50	M50	Roof Rafter	.105	1.219	2.134	.305						Lateral
51	M51	Roof Rafter	.116	1.219	2.134	.305						Lateral
52	M52	Roof Rafter	.162	1.219	2.134	.305						Lateral
53	M53	Roof Rafter	.141	1.219	2.134	.305						Lateral
54	M54	Roof Rafter	.1	1.219	2.134	.305						Lateral
55	M55	Roof Rafter	.141	1.219	2.134	.305						Lateral
56	M56	Roof Rafter	.121	1.219	2.134	.305						Lateral
57	M57	Roof Rafter	.203	1.219	2.134	.305						Lateral
58	M58	Roof Rafter	.125	1.219	2.134	.305						Lateral
59	M59	Roof Rafter	.105	1.219	2.134	.305						Lateral
60	M60	Roof Rafter	.116	1.219	2.134	.305						Lateral
61	M61	Roof Rafter	.162	1.219	2.134	.305						Lateral
62	M62	Roof Rafter	.141	1.219	2.134	.305						Lateral
63	M63	Roof Rafter	.1	1.219	2.134	.305						Lateral
64	M64	Roof Rafter	.141	1.219	2.134	.305						Lateral
65	M65	Roof Rafter	.121	1.219	2.134	.305						Lateral
66	M66	Roof Rafter	.203	1.219	2.134	.305						Lateral
67	M67	Roof Rafter	.125	1.219	2.134	.305						Lateral
68	M68	Roof Rafter	.105	1.219	2.134	.305						Lateral
69	M69	Roof Rafter	.116	1.219	2.134	.305						Lateral
70	M70	Roof Rafter	.162	1.219	2.134	.305						Lateral
71	M71	Roof Rafter	.141	1.219	2.134	.305						Lateral
72	M72	Roof Rafter	.1	1.219	2.134	.305						Lateral
73	M73	Roof Rafter	.141	1.219	2.134	.305						Lateral
74	M74	Roof Rafter	.121	1.219	2.134	.305						Lateral
75	M75	Roof Rafter	.203	1.219	2.134	.305						Lateral
76	M76	Roof Rafter	.125	1.219	2.134	.305						Lateral
77	M77	Roof Rafter	.105	1.219	2.134	.305						Lateral
78	M78	Roof Rafter	.116	1.219	2.134	.305						Lateral
79	M79	Roof Rafter	.162	1.219	2.134	.305						Lateral
80	M80	Roof Rafter	.141	1.219	2.134	.305						Lateral
81	M81	Roof Rafter	.1	1.219	2.134	.305						Lateral
82	M82	Roof Rafter	.141	1.219	2.134	.305						Lateral
83	M83	Roof Rafter	.121	1.219	2.134	.305						Lateral
84	M84	Roof Rafter	.203	1.219	2.134	.305						Lateral
85	M85	Roof Rafter	.125	1.219	2.134	.305						Lateral
86	M86	Roof Rafter	.105	1.219	2.134	.305						Lateral
87	M87	Roof Rafter	.116	1.219	2.134	.305						Lateral
88	M88	Roof Rafter	.162	1.219	2.134	.305						Lateral
89	M89	Roof Rafter	.141	1.219	2.134	.305						Lateral
90	M90	Roof Rafter	.1	1.219	2.134	.305						Lateral
91	M91	Roof Rafter	.141	1.219	2.134	.305						Lateral
92	M92	Roof Rafter	.121	1.219	2.134	.305						Lateral
93	M93	Roof Rafter	.203	1.219	2.134	.305						Lateral
94	M94	Header Bea...	2.248			.305						Lateral
95	M95	Roof Rafter	.125	1.219	2.134	.305						Lateral
96	M96	Roof Rafter	.105	1.219	2.134	.305						Lateral
97	M97	Roof Rafter	.116	1.219	2.134	.305						Lateral
98	M98	Roof Rafter	.162	1.219	2.134	.305						Lateral

Aluminum Design Parameters (Continued)

	Label	Shape	Length[m]	Lbyy[m]	Lbzz[m]	Lcomp top[m]	Lcomp bot[m]	L-torqu...	Kyy	Kzz	Cb	Function
99	M99	Roof Rafter	.141	1.219	2.134	.305						Lateral
100	M100	Roof Rafter	.1	1.219	2.134	.305						Lateral
101	M101	Roof Rafter	.141	1.219	2.134	.305						Lateral
102	M102	Roof Rafter	.121	1.219	2.134	.305						Lateral
103	M103	Roof Rafter	.203	1.219	2.134	.305						Lateral
104	M104	Roof Rafter	.125	1.219	2.134	.305						Lateral
105	M105	Roof Rafter	.105	1.219	2.134	.305						Lateral
106	M106	Roof Rafter	.116	1.219	2.134	.305						Lateral
107	M107	Roof Rafter	.162	1.219	2.134	.305						Lateral
108	M108	Roof Rafter	.141	1.219	2.134	.305						Lateral
109	M109	Roof Rafter	.1	1.219	2.134	.305						Lateral
110	M110	Roof Rafter	.141	1.219	2.134	.305						Lateral
111	M111	Roof Rafter	.121	1.219	2.134	.305						Lateral
112	M112	Roof Rafter	.203	1.219	2.134	.305						Lateral
113	M113	Column	2.135			.305						Lateral
114	M114	Column	2.135			.305						Lateral
115	M115	Column	2.135			.305						Lateral
116	M116	Header Bea...	2.227			.305						Lateral
117	M117	Column	2.135			.305						Lateral
118	M118	Column	2.135			.305						Lateral
119	M119	Column	2.135			.305						Lateral
120	M120	Column	2.135	.305		.305						Lateral
121	M121	Column	2.135			.305						Lateral
122	M122	Column	2.135			.305						Lateral
123	M123	Header Bea...	2.229			.305						Lateral
124	M124	Header Bea...	2.229			.305						Lateral
125	M125	Header Bea...	.768			.305						Lateral
126	M126	Header Bea...	1.485			.305						Lateral
127	M127	Header Bea...	1.109			.305						Lateral
128	M129	Mullion Col...	1.87			.305						Lateral
129	M130	middle beam	2.248			.305						Lateral
130	M131	Header Bea...	2.229			.305						Lateral
131	M132	Header Bea...	2.229			.305						Lateral
132	M133	Column	2.137			.305						Lateral
133	M134	Column	2.135			.305						Lateral
134	M135	Column	2.135			.305						Lateral
135	M136	Column	2.135			.305						Lateral
136	M137	Column	2.135			.305						Lateral
137	M138	Column	.265			.305						Lateral
138	M139	Column	1.868			.305						Lateral
139	M140	CROSS BE...	2.248			Lbyy						Lateral
140	M141	CROSS BE...	2.248			Lbyy						Lateral
141	M142	Header Bea...	2.227			Lbyy						Lateral
142	M143	Header Bea...	2.231			Lbyy						Lateral
143	M144	Header Bea...	2.231			Lbyy						Lateral
144	M145	Mullion Col...	1.87			.305						Lateral
145	M145A	Mullion Col...	1.87			.305						Lateral
146	M146	CROSS BE...	2.248			Lbyy						Lateral
147	M147	CROSS BE...	2.248			Lbyy						Lateral
148	M148	Roof Rafter	.125	1.219	2.134	.305						Lateral
149	M149	Roof Rafter	.105	1.219	2.134	.305						Lateral
150	M150	Roof Rafter	.116	1.219	2.134	.305						Lateral
151	M151	Roof Rafter	.162	1.219	2.134	.305						Lateral
152	M152	Roof Rafter	.141	1.219	2.134	.305						Lateral
153	M153	Roof Rafter	.1	1.219	2.134	.305						Lateral
154	M154	Roof Rafter	.141	1.219	2.134	.305						Lateral
155	M155	Roof Rafter	.121	1.219	2.134	.305						Lateral
156	M156	Roof Rafter	.203	1.219	2.134	.305						Lateral
157	M157	Roof Rafter	.125	1.219	2.134	.305						Lateral

Aluminum Design Parameters (Continued)

	Label	Shape	Length[m]	Lbyy[m]	Lbzz[m]	Lcomp top[m]	Lcomp bot[m]	L-torqu...	Kyy	Kzz	Cb	Function
158	M158	Roof Rafter	.105	1.219	2.134	.305						Lateral
159	M159	Roof Rafter	.116	1.219	2.134	.305						Lateral
160	M160	Roof Rafter	.162	1.219	2.134	.305						Lateral
161	M161	Roof Rafter	.141	1.219	2.134	.305						Lateral
162	M162	Roof Rafter	.1	1.219	2.134	.305						Lateral
163	M163	Roof Rafter	.141	1.219	2.134	.305						Lateral
164	M164	Roof Rafter	.121	1.219	2.134	.305						Lateral
165	M165	Roof Rafter	.203	1.219	2.134	.305						Lateral

Member Area Loads (BLC 1 : DL)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
1	N109	N11	N100	N112	Y	Two Way	-.144
2	N11	N12	N101	N100	Y	Two Way	-.144
3	N12	N13	N102	N101	Y	Two Way	-.144
4	N13	N14	N103	N102	Y	Two Way	-.144
5	N14	N15	N104	N103	Y	Two Way	-.144
6	N15	N16	N105	N104	Y	Two Way	-.144
7	N16	N17	N106	N105	Y	Two Way	-.144
8	N17	N18	N107	N106	Y	Two Way	-.144
9	N18	N19	N108	N107	Y	Two Way	-.144
10	N19	N10	N99	N108	Y	Two Way	-.144
11	N10	N9	N98	N99	Y	Two Way	-.144
12	N9	N8	N97	N98	Y	Two Way	-.144
13	N8	N7	N96	N97	Y	Two Way	-.144
14	N7	N6	N95	N96	Y	Two Way	-.144
15	N6	N5	N94	N95	Y	Two Way	-.144
16	N5	N4	N93	N94	Y	Two Way	-.144
17	N4	N3	N92	N93	Y	Two Way	-.144
18	N3	N118	N126	N92	Y	Two Way	-.144

Member Area Loads (BLC 2 : SL)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
1	N109	N11	N100	N112	Y	Two Way	-4.92
2	N11	N12	N101	N100	Y	Two Way	-4.92
3	N12	N13	N102	N101	Y	Two Way	-4.92
4	N13	N14	N103	N102	Y	Two Way	-4.92
5	N14	N15	N104	N103	Y	Two Way	-4.92
6	N15	N16	N105	N104	Y	Two Way	-4.92
7	N16	N17	N106	N105	Y	Two Way	-4.92
8	N17	N18	N107	N106	Y	Two Way	-4.92
9	N18	N19	N108	N107	Y	Two Way	-4.92
10	N19	N10	N99	N108	Y	Two Way	-4.92
11	N10	N9	N98	N99	Y	Two Way	-4.92
12	N9	N8	N97	N98	Y	Two Way	-4.92
13	N8	N7	N96	N97	Y	Two Way	-4.92
14	N7	N6	N95	N96	Y	Two Way	-4.92
15	N6	N5	N94	N95	Y	Two Way	-4.92
16	N5	N4	N93	N94	Y	Two Way	-4.92
17	N4	N3	N92	N93	Y	Two Way	-4.92
18	N3	N118	N126	N92	Y	Two Way	-4.92

Member Area Loads (BLC 3 : WL+X)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
1	N2	N126	N137	N138	Perp	Two Way	-.437
2	N112	N104	N141		Perp	Two Way	-.437
3	N104	N108	N2	N141	Perp	Two Way	-.437

Member Area Loads (BLC 3 : WL+X) (Continued)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
4	N96	N126	N140		Perp	Two Way	-.437
5	N108	N96	N140	N2	Perp	Two Way	-.437
6	N109	N136	N135	N1	Perp	Two Way	.666
7	N1	N135	N133	N118	Perp	Two Way	.666
8	N15	N109	N144		Perp	Two Way	.666
9	N15	N144	N1	N19	Perp	Two Way	.666
10	N19	N1	N142	N7	Perp	Two Way	.666
11	N7	N142	N118		Perp	Two Way	.666
12	N109	N28	N29	N11	Y	Two Way	1.085
13	N11	N29	N30	N12	Y	Two Way	1.085
14	N12	N30	N31	N13	Y	Two Way	1.085
15	N13	N31	N32	N14	Y	Two Way	1.085
16	N14	N32	N33	N15	Y	Two Way	1.085
17	N15	N33	N34	N16	Y	Two Way	1.085
18	N16	N34	N35	N17	Y	Two Way	1.085
19	N17	N35	N36	N18	Y	Two Way	1.085
20	N18	N36	N37	N19	Y	Two Way	1.085
21	N19	N37	N27	N10	Y	Two Way	1.085
22	N10	N27	N26	N9	Y	Two Way	1.085
23	N9	N26	N25	N8	Y	Two Way	1.085
24	N8	N25	N24	N7	Y	Two Way	1.085
25	N7	N24	N23	N6	Y	Two Way	1.085
26	N6	N23	N22	N5	Y	Two Way	1.085
27	N5	N22	N21	N4	Y	Two Way	1.085
28	N4	N21	N20	N3	Y	Two Way	1.085
29	N3	N20	N113	N118	Y	Two Way	1.085
30	N28	N46	N47	N29	Y	Two Way	1.085
31	N29	N47	N48	N30	Y	Two Way	1.085
32	N30	N48	N49	N31	Y	Two Way	1.085
33	N31	N49	N50	N32	Y	Two Way	1.085
34	N32	N50	N51	N33	Y	Two Way	1.085
35	N33	N51	N52	N34	Y	Two Way	1.085
36	N34	N52	N53	N35	Y	Two Way	1.085
37	N35	N53	N54	N36	Y	Two Way	1.085
38	N36	N54	N55	N37	Y	Two Way	1.085
39	N37	N55	N45	N27	Y	Two Way	1.085
40	N27	N45	N44	N26	Y	Two Way	1.085
41	N26	N44	N43	N25	Y	Two Way	1.085
42	N25	N43	N42	N24	Y	Two Way	1.085
43	N24	N42	N41	N23	Y	Two Way	1.085
44	N23	N41	N40	N22	Y	Two Way	1.085
45	N22	N40	N39	N21	Y	Two Way	1.085
46	N21	N39	N38	N20	Y	Two Way	1.085
47	N20	N38	N114	N113	Y	Two Way	1.085
48	N46	N64	N65	N47	Y	Two Way	.993
49	N47	N65	N66	N48	Y	Two Way	.993
50	N48	N66	N67	N49	Y	Two Way	.993
51	N49	N67	N68	N50	Y	Two Way	.993
52	N50	N68	N69	N51	Y	Two Way	.993
53	N51	N69	N70	N52	Y	Two Way	.993
54	N52	N70	N71	N53	Y	Two Way	.993
55	N53	N71	N72	N54	Y	Two Way	.993
56	N54	N72	N73	N55	Y	Two Way	.993
57	N55	N73	N63	N45	Y	Two Way	.993
58	N45	N63	N62	N44	Y	Two Way	.993
59	N44	N62	N61	N43	Y	Two Way	.993
60	N43	N61	N60	N42	Y	Two Way	.993
61	N42	N60	N59	N41	Y	Two Way	.993
62	N41	N59	N58	N40	Y	Two Way	.993

Member Area Loads (BLC 3 : WL+X) (Continued)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
63	N40	N58	N57	N39	Y	Two Way	.993
64	N39	N57	N56	N38	Y	Two Way	.993
65	N38	N56	N115	N114	Y	Two Way	.993
66	N64	N82	N83	N65	Y	Two Way	.657
67	N65	N83	N84	N66	Y	Two Way	.657
68	N66	N84	N85	N67	Y	Two Way	.657
69	N67	N85	N86	N68	Y	Two Way	.657
70	N68	N86	N87	N69	Y	Two Way	.657
71	N69	N87	N88	N70	Y	Two Way	.657
72	N70	N88	N89	N71	Y	Two Way	.657
73	N71	N89	N90	N72	Y	Two Way	.657
74	N72	N90	N91	N73	Y	Two Way	.657
75	N73	N91	N81	N63	Y	Two Way	.657
76	N63	N81	N80	N62	Y	Two Way	.657
77	N62	N80	N79	N61	Y	Two Way	.657
78	N61	N79	N78	N60	Y	Two Way	.657
79	N60	N78	N77	N59	Y	Two Way	.657
80	N59	N77	N76	N58	Y	Two Way	.657
81	N58	N76	N75	N57	Y	Two Way	.657
82	N57	N75	N74	N56	Y	Two Way	.657
83	N56	N74	N116	N115	Y	Two Way	.657
84	N82	N112	N100	N83	Y	Two Way	.657
85	N83	N100	N101	N84	Y	Two Way	.657
86	N84	N101	N102	N85	Y	Two Way	.657
87	N85	N102	N103	N86	Y	Two Way	.657
88	N86	N103	N104	N87	Y	Two Way	.657
89	N87	N104	N105	N88	Y	Two Way	.657
90	N88	N105	N106	N89	Y	Two Way	.657
91	N89	N106	N107	N90	Y	Two Way	.657
92	N90	N107	N108	N91	Y	Two Way	.657
93	N91	N108	N99	N81	Y	Two Way	.657
94	N81	N99	N98	N80	Y	Two Way	.657
95	N80	N98	N97	N79	Y	Two Way	.657
96	N79	N97	N96	N78	Y	Two Way	.657
97	N78	N96	N95	N77	Y	Two Way	.657
98	N77	N95	N94	N76	Y	Two Way	.657
99	N76	N94	N93	N75	Y	Two Way	.657
100	N75	N93	N92	N74	Y	Two Way	.657
101	N74	N92	N126	N116	Y	Two Way	.657

Member Area Loads (BLC 4 : WL-X)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
1	N2	N126	N137	N138	Perp	Two Way	.925
2	N112	N104	N141		Perp	Two Way	.925
3	N104	N108	N2	N141	Perp	Two Way	.925
4	N96	N126	N140		Perp	Two Way	.925
5	N108	N96	N140	N2	Perp	Two Way	.925
6	N109	N136	N135	N1	Perp	Two Way	-.18
7	N1	N135	N133	N118	Perp	Two Way	-.18
8	N15	N109	N144		Perp	Two Way	-.18
9	N15	N144	N1	N19	Perp	Two Way	-.18
10	N19	N1	N142	N7	Perp	Two Way	-.18
11	N7	N142	N118		Perp	Two Way	-.18
12	N109	N28	N29	N11	Y	Two Way	.4
13	N11	N29	N30	N12	Y	Two Way	.4
14	N12	N30	N31	N13	Y	Two Way	.4
15	N13	N31	N32	N14	Y	Two Way	.4
16	N14	N32	N33	N15	Y	Two Way	.4

Member Area Loads (BLC 4 : WL-X) (Continued)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
17	N15	N33	N34	N16	Y	Two Way	.4
18	N16	N34	N35	N17	Y	Two Way	.4
19	N17	N35	N36	N18	Y	Two Way	.4
20	N18	N36	N37	N19	Y	Two Way	.4
21	N19	N37	N27	N10	Y	Two Way	.4
22	N10	N27	N26	N9	Y	Two Way	.4
23	N9	N26	N25	N8	Y	Two Way	.4
24	N8	N25	N24	N7	Y	Two Way	.4
25	N7	N24	N23	N6	Y	Two Way	.4
26	N6	N23	N22	N5	Y	Two Way	.4
27	N5	N22	N21	N4	Y	Two Way	.4
28	N4	N21	N20	N3	Y	Two Way	.4
29	N3	N20	N113	N118	Y	Two Way	.4
30	N28	N46	N47	N29	Y	Two Way	.4
31	N29	N47	N48	N30	Y	Two Way	.4
32	N30	N48	N49	N31	Y	Two Way	.4
33	N31	N49	N50	N32	Y	Two Way	.4
34	N32	N50	N51	N33	Y	Two Way	.4
35	N33	N51	N52	N34	Y	Two Way	.4
36	N34	N52	N53	N35	Y	Two Way	.4
37	N35	N53	N54	N36	Y	Two Way	.4
38	N36	N54	N55	N37	Y	Two Way	.4
39	N37	N55	N45	N27	Y	Two Way	.4
40	N27	N45	N44	N26	Y	Two Way	.4
41	N26	N44	N43	N25	Y	Two Way	.4
42	N25	N43	N42	N24	Y	Two Way	.4
43	N24	N42	N41	N23	Y	Two Way	.4
44	N23	N41	N40	N22	Y	Two Way	.4
45	N22	N40	N39	N21	Y	Two Way	.4
46	N21	N39	N38	N20	Y	Two Way	.4
47	N20	N38	N114	N113	Y	Two Way	.4
48	N46	N64	N65	N47	Y	Two Way	.734
49	N47	N65	N66	N48	Y	Two Way	.734
50	N48	N66	N67	N49	Y	Two Way	.734
51	N49	N67	N68	N50	Y	Two Way	.734
52	N50	N68	N69	N51	Y	Two Way	.734
53	N51	N69	N70	N52	Y	Two Way	.734
54	N52	N70	N71	N53	Y	Two Way	.734
55	N53	N71	N72	N54	Y	Two Way	.734
56	N54	N72	N73	N55	Y	Two Way	.734
57	N55	N73	N63	N45	Y	Two Way	.734
58	N45	N63	N62	N44	Y	Two Way	.734
59	N44	N62	N61	N43	Y	Two Way	.734
60	N43	N61	N60	N42	Y	Two Way	.734
61	N42	N60	N59	N41	Y	Two Way	.734
62	N41	N59	N58	N40	Y	Two Way	.734
63	N40	N58	N57	N39	Y	Two Way	.734
64	N39	N57	N56	N38	Y	Two Way	.734
65	N38	N56	N115	N114	Y	Two Way	.734
66	N64	N82	N83	N65	Y	Two Way	.827
67	N65	N83	N84	N66	Y	Two Way	.827
68	N66	N84	N85	N67	Y	Two Way	.827
69	N67	N85	N86	N68	Y	Two Way	.827
70	N68	N86	N87	N69	Y	Two Way	.827
71	N69	N87	N88	N70	Y	Two Way	.827
72	N70	N88	N89	N71	Y	Two Way	.827
73	N71	N89	N90	N72	Y	Two Way	.827
74	N72	N90	N91	N73	Y	Two Way	.827
75	N73	N91	N81	N63	Y	Two Way	.827

Member Area Loads (BLC 4 : WL-X) (Continued)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
76	N63	N81	N80	N62	Y	Two Way	.827
77	N62	N80	N79	N61	Y	Two Way	.827
78	N61	N79	N78	N60	Y	Two Way	.827
79	N60	N78	N77	N59	Y	Two Way	.827
80	N59	N77	N76	N58	Y	Two Way	.827
81	N58	N76	N75	N57	Y	Two Way	.827
82	N57	N75	N74	N56	Y	Two Way	.827
83	N56	N74	N116	N115	Y	Two Way	.827
84	N82	N112	N100	N83	Y	Two Way	.827
85	N83	N100	N101	N84	Y	Two Way	.827
86	N84	N101	N102	N85	Y	Two Way	.827
87	N85	N102	N103	N86	Y	Two Way	.827
88	N86	N103	N104	N87	Y	Two Way	.827
89	N87	N104	N105	N88	Y	Two Way	.827
90	N88	N105	N106	N89	Y	Two Way	.827
91	N89	N106	N107	N90	Y	Two Way	.827
92	N90	N107	N108	N91	Y	Two Way	.827
93	N91	N108	N99	N81	Y	Two Way	.827
94	N81	N99	N98	N80	Y	Two Way	.827
95	N80	N98	N97	N79	Y	Two Way	.827
96	N79	N97	N96	N78	Y	Two Way	.827
97	N78	N96	N95	N77	Y	Two Way	.827
98	N77	N95	N94	N76	Y	Two Way	.827
99	N76	N94	N93	N75	Y	Two Way	.827
100	N75	N93	N92	N74	Y	Two Way	.827
101	N74	N92	N126	N116	Y	Two Way	.827

Member Area Loads (BLC 5 : WL+Z)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
1	N7	N96	N95	N6	Perp	Two Way	.611
2	N6	N95	N94	N5	Perp	Two Way	.611
3	N5	N94	N93	N4	Perp	Two Way	.611
4	N4	N93	N92	N3	Perp	Two Way	.611
5	N3	N92	N126	N118	Perp	Two Way	.611
6	N15	N104	N105	N16	Perp	Two Way	.925
7	N16	N105	N106	N17	Perp	Two Way	.925
8	N17	N106	N107	N18	Perp	Two Way	.925
9	N18	N107	N108	N19	Perp	Two Way	.925
10	N19	N108	N99	N10	Perp	Two Way	.925
11	N10	N99	N98	N9	Perp	Two Way	.925
12	N9	N98	N97	N8	Perp	Two Way	.925
13	N8	N97	N96	N7	Perp	Two Way	.925
14	N109	N112	N100	N11	Perp	Two Way	.998
15	N11	N100	N101	N12	Perp	Two Way	.998
16	N12	N101	N102	N13	Perp	Two Way	.998
17	N13	N102	N103	N14	Perp	Two Way	.998
18	N14	N103	N104	N15	Perp	Two Way	.998
19	N136	N109	N64	N151	Z	Two Way	-.644
20	N151	N64	N112	N139	Z	Two Way	-.644
21	N133	N118	N115	N130	Z	Two Way	-.611
22	N130	N115	N126	N137	Z	Two Way	-.611

Member Area Loads (BLC 6 : WL-Z)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
1	N7	N96	N95	N6	Perp	Two Way	.74
2	N6	N95	N94	N5	Perp	Two Way	.74
3	N5	N94	N93	N4	Perp	Two Way	.74
4	N4	N93	N92	N3	Perp	Two Way	.74

Member Area Loads (BLC 6 : WL-Z) (Continued)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[kPa]
5	N3	N92	N126	N118	Perp	Two Way	.74
6	N15	N104	N105	N16	Perp	Two Way	.667
7	N16	N105	N106	N17	Perp	Two Way	.667
8	N17	N106	N107	N18	Perp	Two Way	.667
9	N18	N107	N108	N19	Perp	Two Way	.667
10	N19	N108	N99	N10	Perp	Two Way	.667
11	N10	N99	N98	N9	Perp	Two Way	.667
12	N9	N98	N97	N8	Perp	Two Way	.667
13	N8	N97	N96	N7	Perp	Two Way	.667
14	N109	N112	N100	N11	Perp	Two Way	.354
15	N11	N100	N101	N12	Perp	Two Way	.354
16	N12	N101	N102	N13	Perp	Two Way	.354
17	N13	N102	N103	N14	Perp	Two Way	.354
18	N14	N103	N104	N15	Perp	Two Way	.354
19	N136	N109	N64	N151	Z	Two Way	.354
20	N151	N64	N112	N139	Z	Two Way	.354
21	N133	N118	N115	N130	Z	Two Way	.901
22	N130	N115	N126	N137	Z	Two Way	.901

Load Combinations

	Description	Solve	PDe...	S...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	Deflection 1	Yes	Y		DL	1																		
2	NBCC 1	Yes	Y		DL	1.4																		
3	NBCC 3 (a)	Yes	Y		DL	1.25	SL	1.5																
4	NBCC 3 (d)	Yes	Y		DL	.9	SL	1.5																
5	NBCC 3 (c) (a)	Yes	Y		DL	1.25	SL	1.5	W...	.4														
6	NBCC 3 (c) (b)	Yes	Y		DL	1.25	SL	1.5	W...	.4														
7	NBCC 3 (f) (a)	Yes	Y		DL	.9	SL	1.5	W...	.4														
8	NBCC 3 (f) (b)	Yes	Y		DL	.9	SL	1.5	W...	.4														
9	NBCC 4 (a) (a)	Yes	Y		DL	1.25	WL...	1.4																
10	NBCC 4 (a) (b)	Yes	Y		DL	1.25	WL+Z	1.4																
11	NBCC 4 (c) (a)	Yes	Y		DL	1.25	WL...	1.4	SL	.5														
12	NBCC 4 (c) (b)	Yes	Y		DL	1.25	WL+Z	1.4	SL	.5														
13	NBCC 4 (d) (a)	Yes	Y		DL	.9	WL...	1.4																
14	NBCC 4 (d) (b)	Yes	Y		DL	.9	WL+Z	1.4																
15	NBCC 4 (f) (a)	Yes	Y		DL	.9	WL...	1.4	SL	.5														
16	NBCC 4 (f) (b)	Yes	Y		DL	.9	WL+Z	1.4	SL	.5														
17	NBCC 3 (c) (a)	Yes	Y		DL	1.25	SL	1.5	W...	.4														
18	NBCC 3 (c) (b)	Yes	Y		DL	1.25	SL	1.5	W...	.4														
19	NBCC 3 (f) (a)	Yes	Y		DL	.9	SL	1.5	W...	.4														
20	NBCC 3 (f) (b)	Yes	Y		DL	.9	SL	1.5	W...	.4														
21	NBCC 4 (a) (a)	Yes	Y		DL	1.25	WL-X	1.4																
22	NBCC 4 (a) (b)	Yes	Y		DL	1.25	WL-Z	1.4																
23	NBCC 4 (c) (a)	Yes	Y		DL	1.25	WL-X	1.4	SL	.5														
24	NBCC 4 (c) (b)	Yes	Y		DL	1.25	WL-Z	1.4	SL	.5														
25	NBCC 4 (d) (a)	Yes	Y		DL	.9	WL-X	1.4																
26	NBCC 4 (d) (b)	Yes	Y		DL	.9	WL-Z	1.4																
27	NBCC 4 (f) (a)	Yes	Y		DL	.9	WL-X	1.4	SL	.5														
28	NBCC 4 (f) (b)	Yes	Y		DL	.9	WL-Z	1.4	SL	.5														
29	DL		Y		DL	1.25																		
30	RSL		Y		SL	1.25																		
31	WL+X		Y		5	1.25																		
32	WL-X		Y		6	1.25																		
33	WL+Z		Y		3	1.25																		
34	WL-Z		Y		4	1.25																		

Envelope Joint Reactions

	Joint		X [kN]	LC	Y [kN]	LC	Z [kN]	LC	MX [kN-m]	LC	MY [kN-m]	LC	MZ [kN-m]	LC
1	N110	max	.063	21	4.178	18	1.806	16	.897	12	.185	11	.19	11
2		min	-.01	8	-2.136	14	-2.036	24	-.915	24	-.101	12	-.119	23
3	N111	max	.29	27	3.773	5	1.118	12	.947	12	.172	12	.186	11
4		min	-.68	9	-1.223	14	-.872	24	-.863	24	-.136	24	-.118	23
5	N119	max	.547	21	4.074	6	2.006	12	.919	12	.133	24	.22	11
6		min	-.239	15	-1.993	26	-1.809	28	-.924	24	-.182	11	-.182	23
7	N123	max	1.562	23	6.968	3	1.314	10	.49	12	.03	11	.234	11
8		min	-1.858	11	-.887	26	-1.741	26	-.553	24	-.02	23	-.197	23
9	N127	max	.069	28	4.557	6	1.174	12	.555	12	.112	12	.216	11
10		min	-.523	9	-3.686	26	-1.23	28	-.59	24	-.136	24	-.183	23
11	N148	max	.81	23	6.986	3	1.389	14	.505	12	.007	23	.202	11
12		min	-1.493	11	-1.172	14	-.956	22	-.453	24	-.025	15	-.127	23
13	N154	max	.678	23	2.868	24	1.746	16	.577	12	.033	24	.28	11
14		min	-.416	11	-2.693	16	-1.98	24	-.621	24	-.027	12	-.334	23
15	N149	max	.085	25	6.93	3	.456	14	0	28	.049	24	0	28
16		min	-.116	13	-1.123	14	-.317	26	0	1	-.048	12	0	1
17	N150	max	.08	25	6.945	3	.482	14	0	28	.018	24	0	28
18		min	-.118	13	-1.37	13	-.341	26	0	1	-.018	12	0	1
19	N152	max	.083	25	6.962	3	.471	14	0	28	.047	12	0	28
20		min	-.11	13	-1.069	25	-.33	26	0	1	-.048	24	0	1
21	N153	max	.085	25	6.932	3	.433	14	0	28	.077	12	0	28
22		min	-.122	13	-1.202	13	-.298	26	0	1	-.079	24	0	1
23	N132	max	.103	25	6.923	3	.417	14	0	28	.077	12	0	28
24		min	-.129	13	-1.119	13	-.548	26	0	1	-.078	24	0	1
25	N131	max	.104	25	6.953	3	.452	14	0	28	.047	12	0	28
26		min	-.118	13	-1.047	25	-.587	26	0	1	-.048	24	0	1
27	N129	max	.099	25	6.936	3	.463	14	0	28	.019	24	0	28
28		min	-.126	13	-1.377	13	-.598	26	0	1	-.018	12	0	1
29	N128	max	.106	25	6.917	3	.436	14	0	28	.048	24	0	28
30		min	-.124	13	-.821	13	-.57	26	0	1	-.048	12	0	1
31	Totals:	max	4.604	27	83.857	3	13.903	16						
32		min	-6.061	9	-10.077	13	-13.908	22						

Envelope AA ADM1-15: LRFD - Building Aluminum Code Checks

	Member	Shape	Code C...	Loc[m]	LC	Shear ...	Loc[m]	Dir	LC	phi*Pnc...	phi*Pnt[...	phi*Mn...	phi*Mn...	phi*Vny...	phi*Vnz...	Cb	Eqn
1	M160	ROOF 1....	.855	0	18	.128	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
2	M159	ROOF 1....	.854	.116	18	.139	0	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
3	M34	ROOF 1....	.853	0	18	.124	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
4	M33	ROOF 1....	.852	.116	18	.126	0	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
5	M158	ROOF 1....	.842	.105	18	.165	0	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
6	M32	ROOF 1....	.839	.105	18	.149	0	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
7	M157	ROOF 1....	.830	0	6	.217	.125	z	12	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
8	M148	ROOF 1....	.829	0	18	.214	.125	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
9	M31	ROOF 1....	.826	0	6	.196	.125	z	12	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
10	M151	ROOF 1....	.825	0	6	.122	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
11	M22	ROOF 1....	.825	0	18	.193	.125	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
12	M150	ROOF 1....	.824	.116	6	.128	.116	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
13	M25	ROOF 1....	.824	0	6	.119	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
14	M88	ROOF 1....	.823	0	18	.115	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
15	M87	ROOF 1....	.823	.116	18	.102	.116	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
16	M24	ROOF 1....	.823	.116	6	.115	.116	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
17	M52	ROOF 1....	.815	0	18	.111	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
18	M51	ROOF 1....	.814	.116	18	.098	.116	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
19	M86	ROOF 1....	.809	.105	18	.111	.105	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
20	M149	ROOF 1....	.808	.105	6	.158	.105	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
21	M23	ROOF 1....	.806	.105	6	.142	.105	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1

Envelope AA ADM1-15: LRFD - Building Aluminum Code Checks (Continued)

	Member	Shape	Code C...	Loc[m]	LC	Shear ...	Loc[m]	Dir	LC	phi*Pnc...	phi*Pnt[...	phi*Mn...	phi*Mn...	phi*Vny...	phi*Vnz...	Cb	Eqn
22	M50	ROOF 1....	.799	.105	18	.106	.105	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
23	M79	ROOF 1....	.796	0	6	.110	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
24	M78	ROOF 1....	.795	.116	6	.103	.116	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
25	M85	ROOF 1....	.789	0	6	.174	.125	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
26	M43	ROOF 1....	.788	0	6	.107	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
27	M42	ROOF 1....	.787	.116	6	.098	.116	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
28	M76	ROOF 1....	.783	0	18	.176	.125	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
29	M69	ROOF 1....	.780	.116	18	.085	.116	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
30	M70	ROOF 1....	.780	0	18	.102	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
31	M49	ROOF 1....	.778	0	6	.167	.125	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
32	M77	ROOF 1....	.777	.105	6	.112	.105	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
33	M40	ROOF 1....	.771	0	18	.168	.125	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
34	M41	ROOF 1....	.768	.105	6	.106	.105	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
35	M161	ROOF 1....	.768	0	18	.140	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
36	M35	ROOF 1....	.768	0	18	.139	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
37	M67	ROOF 1....	.758	0	6	.146	.125	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
38	M68	ROOF 1....	.758	.105	18	.089	.105	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
39	M60	ROOF 1....	.757	.116	6	.085	.116	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
40	M61	ROOF 1....	.757	0	6	.099	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
41	M58	ROOF 1....	.750	0	18	.146	.125	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
42	M152	ROOF 1....	.745	0	6	.135	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
43	M26	ROOF 1....	.745	0	6	.134	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
44	M89	ROOF 1....	.740	0	18	.133	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
45	M53	ROOF 1....	.733	0	18	.131	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
46	M59	ROOF 1....	.732	.105	6	.089	.105	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
47	M84	ROOF 1....	.727	.112	3	.129	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
48	M93	ROOF 1....	.726	.114	3	.132	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
49	M165	ROOF 1....	.726	.112	3	.135	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
50	M156	ROOF 1....	.726	.114	3	.133	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
51	M39	ROOF 1....	.726	.114	3	.135	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
52	M30	ROOF 1....	.725	.114	3	.132	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
53	M48	ROOF 1....	.725	.112	3	.128	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
54	M57	ROOF 1....	.724	.114	3	.131	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
55	M80	ROOF 1....	.719	0	6	.130	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
56	M66	ROOF 1....	.717	.112	3	.128	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
57	M75	ROOF 1....	.716	.114	3	.129	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
58	M44	ROOF 1....	.713	0	6	.128	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
59	M71	ROOF 1....	.708	0	18	.127	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
60	M3	RT2.5X2....	.702	2.248	24	.055	1.475	y	24	44.434	76.224	1.458	1.458	20.417	20.417	3....	H.1-1
61	M145	RT1.5X2....	.701	1.87	24	.062	1.87	z	25	21.081	60.083	.731	.998	20.417	10.809	2....	H.1-1
62	M117	RT2.5X2....	.700	2.135	12	.202	2.135	y	28	46.241	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
63	M113	RT2.5X2....	.699	2.135	24	.175	1.868	z	16	46.242	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
64	M62	ROOF 1....	.697	0	3	.125	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
65	M94	RT2.5X2....	.678	0	12	.088	0	z	12	44.434	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
66	M114	RT2.5X2....	.657	2.135	12	.202	1.868	z	12	46.242	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
67	M155	ROOF 1....	.630	.081	18	.103	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
68	M29	ROOF 1....	.630	.081	18	.102	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
69	M83	ROOF 1....	.626	.083	18	.101	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
70	M164	ROOF 1....	.625	.083	18	.104	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
71	M47	ROOF 1....	.622	.083	18	.101	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
72	M36	ROOF 1....	.621	0	18	.101	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
73	M38	ROOF 1....	.621	.087	3	.105	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
74	M162	ROOF 1....	.621	0	18	.102	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
75	M92	ROOF 1....	.620	.088	3	.104	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
76	M56	ROOF 1....	.619	.088	3	.103	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
77	M115	RT2.5X2....	.617	1.868	12	.176	2.135	y	28	46.241	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
78	M129	RT1.5X2....	.614	1.87	24	.057	0	z	24	21.081	60.083	.731	.998	20.417	10.809	2....	H.1-1
79	M65	ROOF 1....	.613	.087	3	.100	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
80	M74	ROOF 1....	.611	.087	3	.100	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1

Envelope AA ADM1-15: LRFD - Building Aluminum Code Checks (Continued)

	Member	Shape	Code C...	Loc[m]	LC	Shear ...	Loc[m]	Dir	LC	phi*Pnc...	phi*Pnt[...	phi*Mn...	phi*Mn...	phi*Vny...	phi*Vnz...	Cb	Eqn
81	M145A	RT1.5X2....	.607	1.87	24	.058	0	z	24	21.081	60.083	.731	.998	20.417	10.809	2....	H.1-1
82	M27	ROOF 1....	.605	0	6	.098	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
83	M153	ROOF 1....	.604	0	6	.098	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
84	M28	ROOF 1....	.601	.085	18	.106	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
85	M154	ROOF 1....	.601	.085	18	.106	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
86	M133	RT2.5X2....	.597	0	24	.125	1.892	y	24	46.206	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
87	M90	ROOF 1....	.596	0	18	.098	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
88	M127	RT2.5X2....	.593	0	28	.150	0	z	27	63.943	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
89	M163	ROOF 1....	.591	.087	18	.106	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
90	M54	ROOF 1....	.591	0	18	.098	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
91	M82	ROOF 1....	.591	.088	18	.106	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
92	M46	ROOF 1....	.586	.088	18	.105	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
93	M37	ROOF 1....	.585	.085	6	.106	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
94	M81	ROOF 1....	.582	0	6	.098	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
95	M45	ROOF 1....	.576	0	6	.098	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
96	M91	ROOF 1....	.576	.087	6	.106	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
97	M72	ROOF 1....	.574	0	18	.096	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
98	M55	ROOF 1....	.572	.088	6	.106	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
99	M64	ROOF 1....	.569	.09	3	.104	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
100	M63	ROOF 1....	.568	0	3	.096	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
101	M73	ROOF 1....	.566	.091	3	.104	0	z	3	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
102	M147	1.5 x2.5x ...	.524	0	26	.017	0	z	24	14.596	60.083	1.664	.439	20.417	10.809	2....	H.1-1
103	M146	1.5 x2.5x ...	.510	0	26	.021	0	z	24	14.596	60.083	1.664	.439	20.417	10.809	2....	H.1-1
104	M125	RT2.5X2....	.505	0	12	.151	0	z	15	70.299	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
105	M120	RT2.5X2....	.495	2.135	24	.113	1.891	z	11	46.241	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
106	M126	RT2.5X2....	.494	1.485	24	.159	1.346	z	15	57.193	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
107	M13	ROOF 1....	.479	0	12	.129	.125	z	12	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
108	M139	RT2.5X2....	.475	1.868	24	.057	0	z	12	50.631	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
109	M4	ROOF 1....	.470	0	24	.130	.125	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
110	M16	ROOF 1....	.461	0	18	.068	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
111	M15	ROOF 1....	.461	0	18	.082	0	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
112	M14	ROOF 1....	.460	.105	18	.098	.105	z	12	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
113	M107	ROOF 1....	.447	0	18	.071	0	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
114	M106	ROOF 1....	.447	0	18	.089	0	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
115	M105	ROOF 1....	.446	.105	18	.106	0	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
116	M7	ROOF 1....	.445	0	6	.065	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
117	M6	ROOF 1....	.444	.116	6	.081	.116	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
118	M95	ROOF 1....	.442	0	18	.137	.125	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
119	M104	ROOF 1....	.442	0	6	.138	.125	z	12	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
120	M5	ROOF 1....	.442	.105	6	.099	.105	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
121	M142	RT2.5X2....	.432	0	11	.112	0	z	12	44.767	76.224	1.458	1.458	20.417	20.417	3....	H.1-1
122	M143	RT2.5X2....	.430	2.231	24	.083	2.231	z	16	44.706	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
123	M98	ROOF 1....	.430	0	6	.067	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
124	M97	ROOF 1....	.429	.116	6	.085	.116	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
125	M96	ROOF 1....	.426	.105	6	.104	.105	z	24	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
126	M116	RT2.5X2....	.425	0	11	.135	0	z	24	44.767	76.224	1.458	1.458	20.417	20.417	3....	H.1-1
127	M144	RT2.5X2....	.424	2.231	24	.104	2.231	z	28	44.706	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
128	M17	ROOF 1....	.414	0	18	.073	0	z	5	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
129	M119	RT2.5X2....	.410	.912	24	.045	2.135	y	24	46.242	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
130	M8	ROOF 1....	.401	0	6	.072	0	z	5	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
131	M108	ROOF 1....	.400	0	18	.073	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
132	M121	RT2.5X2....	.398	.934	24	.070	2.135	y	24	46.242	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
133	M141	1.5 x2.5x ...	.388	0	26	.019	0	z	24	14.596	60.083	1.664	.439	20.417	10.809	2....	H.1-1
134	M99	ROOF 1....	.387	0	6	.076	0	z	17	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
135	M118	RT2.5X2....	.385	.934	24	.071	0	y	24	46.242	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
136	M138	RT2.5X2....	.369	0	12	.095	0	y	11	76.224	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
137	M103	ROOF 1....	.368	.112	17	.066	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
138	M112	ROOF 1....	.367	.114	17	.067	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
139	M122	RT2.5X2....	.364	.979	24	.097	0	y	24	46.242	76.224	1.458	1.458	20.417	20.417	1....	H.1-1

Envelope AA ADM1-15: LRFD - Building Aluminum Code Checks (Continued)

	Member	Shape	Code C...	Loc[m]	LC	Shear ...	Loc[m]	Dir	LC	phi*Pnc...	phi*Pnt[...	phi*Mn...	phi*Mn...	phi*Vny...	phi*Vnz...	Cb	Eqn
140	M12	ROOF 1....	.359	.112	5	.069	0	z	6	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
141	M21	ROOF 1....	.359	.112	5	.071	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
142	M140	1.5 x2.5x ...	.358	0	26	.020	0	z	24	14.596	60.083	1.664	.439	20.417	10.809	2....	H.1-1
143	M123	RT2.5X2....	.353	0	15	.141	0	z	24	44.737	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
144	M135	RT2.5X2....	.341	1.312	12	.039	0	y	12	46.242	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
145	M18	ROOF 1....	.339	0	18	.057	0	z	5	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
146	M131	RT2.5X2....	.338	0	15	.124	0	z	16	44.737	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
147	M136	RT2.5X2....	.329	1.29	12	.063	0	y	12	46.242	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
148	M9	ROOF 1....	.328	0	6	.056	0	z	5	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
149	M109	ROOF 1....	.325	0	18	.057	0	z	17	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
150	M130	RT2.5x3x...	.320	0	24	.022	0	z	24	49.946	84.071	1.687	1.872	25.221	20.417	2....	H.1-1
151	M102	ROOF 1....	.318	.086	17	.055	0	z	17	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
152	M11	ROOF 1....	.318	.071	18	.053	0	z	5	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
153	M134	RT2.5X2....	.317	1.268	12	.063	0	y	12	46.242	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
154	M100	ROOF 1....	.316	0	6	.059	0	z	17	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
155	M111	ROOF 1....	.316	.087	17	.054	0	z	17	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
156	M10	ROOF 1....	.316	.075	18	.058	0	z	5	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
157	M20	ROOF 1....	.310	.072	6	.053	0	z	18	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
158	M101	ROOF 1....	.307	.078	18	.061	0	z	17	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
159	M19	ROOF 1....	.306	.075	6	.058	0	z	5	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
160	M110	ROOF 1....	.298	.078	6	.059	0	z	17	19.638	33.628	.311	.663	13.653	4.975	1....	H.1-1
161	M137	RT2.5X2....	.297	1.223	12	.087	0	y	12	46.242	76.224	1.458	1.458	20.417	20.417	1....	H.1-1
162	M124	RT2.5X2....	.273	2.229	27	.159	2.229	z	24	44.737	76.224	1.458	1.458	20.417	20.417	2....	H.1-1
163	M132	RT2.5X2....	.215	2.229	11	.113	2.229	z	12	44.737	76.224	1.458	1.458	20.417	20.417	2....	H.1-1

CONNECTION DESIGN - HEADER BEAM TO POST CONNECTION IN TENSION

Project Number	222-403	Sheet			
Project Name	VELODOME	Designed by		Date	
Subject		Checked by		Date	

CAPACITY OF 1/4" ø POP RIVETS

CONVERTING MOMENT INTO FORCE TO CHECK FOR TENSION

Maximum Moment acting on the header beai	=	0.541 kips.ft	0.734 kN-m	As per page 1,032
Lever arm (3" /12)	=	0.25 ft	0.0762 m	(Size of the frame 4")
Force acting due to moment	=	2.164 kips	9.6325 kN	
Total Force acting on the beam	=	2164 lbs	9632.5 N	
Using 1/4" POP Rivets in design	=	1240 lbs	5515.8 N	As per Page 1,038
Strength Reduction Factor (Factor of Safety)	=	1.8	1.8	
Allowable Pullout value of the Rivet	=	688.9	3064.3	
Number of Rivets provided	=	4 Nos		

Total Tension capacity of 1/4" Rivets	=	12257	N	>	9632.546	N
		2756	Lbs	>	2164	Lbs
		SAFE				

USE [(4) 1/4" ø DOME HEAD BLIND RIVETS ARE USED TO COUNTER ACT THE SHEAR]

CONNECTION DESIGN - HEADER BEAM TO U CLIP IN SHEAR

Project Number	222-403	Sheet			
Project Name	VELODOME	Designed by		Date	
Subject		Checked by		Date	

CAPACITY OF 1/4" ø POP RIVETS

CONVERTING MOMENT INTO FORCE

Maximum Moment acting on the header beam	=	0.541 kips.ft	0.734 kN-m	As per page 1,032
Lever arm (3" /12)	=	0.25 ft	0.076 m	(Size of Frame 4")
Force acting due to moment	=	2.164 kips	9.633 kN	
Total Force acting on the beam	=	2164 lbs	9633 N	
Using 1/4" POP Rivets in design	=	1000 lbs	4448 N	As per Page 1,038
Strength Reduction Factor (Factor of Safety)	=	1.8	1.8	
Allowable Pullout value of the Rivet	=	555.6	2471	
Number of Rivets provided	=	4 Nos		
Total Tension capacity of 1/4" Rivets	=	9885 N	>	9632.546 N
		2222 Lbs	>	2164 Lbs
		SAFE		

USE [(4) 1/4" ø DOME HEAD BLIND RIVETS ARE USED TO COUNTER ACT THE SHEAR]

Envelope Member Section Forces

	Member	Sec		Axial[kN]	LC	y Shear...	LC	z Shear[kN]	LC	Torque[...	LC	y-y Mo...	LC	z-z Moment[kN-m]	LC
1	M117	1	max	3.663	6	.671	12	.045	11	.015	24	.282	23	.734	12
2			min	-1.188	26	-.591	28	-.219	23	-.02	12	-.267	11	-.719	28
3		2	max	3.677	6	.741	12	.166	11	.015	24	.158	23	.369	12
4			min	-1.178	26	-.695	28	-.251	23	-.02	12	-.217	11	-.392	28
5		3	max	3.691	6	.911	12	.41	11	.015	24	.008	25	.046	24
6			min	-1.169	26	-.946	28	-.317	23	-.02	12	-.069	9	-.073	12
7		4	max	3.705	6	1.067	12	.616	11	.015	24	.214	11	.617	24
8			min	-1.16	26	-1.176	28	-.373	23	-.02	12	-.179	23	-.604	12
9		5	max	4.076	6	2.009	12	.238	15	.133	24	.221	11	.924	24
10			min	-1.998	26	-1.802	28	-.55	21	-.181	11	-.183	23	-.919	12
11	M133	1	max	.888	24	.872	24	.009	26	.008	24	.102	11	.84	24
12			min	-.889	16	-.862	12	-.175	25	-.014	23	-.083	23	-.828	12
13		2	max	.902	24	.872	24	.009	26	.008	24	.086	11	.374	24
14			min	-.879	16	-.862	12	-.066	11	-.014	23	-.141	21	-.367	12
15		3	max	.916	24	.872	24	.156	23	.008	24	.029	13	.093	12
16			min	-.869	16	-.862	12	-.154	11	-.014	23	-.111	25	-.092	24
17		4	max	.93	24	.872	24	.327	23	.008	24	.024	23	.554	12
18			min	-.859	16	-.862	12	-.235	11	-.014	23	-.077	11	-.558	24
19		5	max	2.874	24	1.979	24	.678	23	.033	24	.334	23	.577	12
20			min	-2.698	16	-1.732	16	-.418	11	-.027	12	-.28	11	-.621	24
21	M127	1	max	.383	22	1.836	12	.232	11	.091	11	.139	24	.683	12
22			min	-.165	14	-1.885	28	-.459	23	-.149	27	-.113	12	-.717	28
23		2	max	.383	22	1.829	12	.22	11	.091	11	.098	24	.175	16
24			min	-.165	14	-1.89	28	-.433	23	-.149	27	-.08	12	-.194	24
25		3	max	1.117	24	1.857	16	.195	21	.036	23	.065	11	.357	16
26			min	-.872	16	-1.913	24	-.154	24	-.026	15	-.125	23	-.366	24
27		4	max	1.117	24	1.852	16	.24	21	.036	23	.032	11	.165	28
28			min	-.872	16	-1.92	24	-.154	24	-.026	15	-.065	23	-.157	12
29		5	max	1.117	24	1.846	16	.285	21	.036	23	.019	12	.698	24
30			min	-.872	16	-1.927	24	-.154	24	-.026	15	-.025	24	-.669	16
31	M145	1	max	.022	20	.73	12	.491	25	.005	25	.02	13	.679	12
32			min	-.071	12	-.739	24	-.203	13	-.003	24	-.098	25	-.686	24
33		2	max	.029	20	.73	12	.254	25	.005	25	.08	23	.337	12
34			min	-.061	12	-.739	24	-.091	13	-.003	24	-.053	11	-.34	24
35		3	max	.038	18	.73	12	.053	11	.005	25	.13	21	.005	26
36			min	-.053	16	-.739	24	-.045	23	-.003	24	-.062	15	-.004	12
37		4	max	.048	18	.73	12	.195	11	.005	25	.038	21	.351	24
38			min	-.046	16	-.739	24	-.346	23	-.003	24	-.005	13	-.346	12
39		5	max	.057	18	.73	12	.309	11	.005	25	.117	11	.696	24
40			min	-.039	16	-.739	24	-.586	23	-.003	24	-.185	23	-.687	12
41	M115	1	max	3.877	6	.567	12	.18	11	.047	12	.197	23	.642	12
42			min	-1.932	26	-.486	24	-.023	26	-.044	24	-.309	11	-.627	24
43		2	max	3.891	6	.637	12	.268	11	.047	12	.194	23	.332	12
44			min	-1.922	26	-.591	24	-.114	23	-.044	24	-.193	11	-.356	24
45		3	max	3.905	6	.807	12	.379	11	.047	12	.074	21	.026	24
46			min	-1.913	26	-.841	24	-.349	23	-.044	24	-.022	13	-.054	12
47		4	max	3.919	6	.963	12	.489	11	.047	12	.211	11	.541	24
48			min	-1.903	26	-1.071	24	-.582	23	-.044	24	-.179	27	-.53	12
49		5	max	4.559	6	1.172	12	.526	9	.112	12	.217	11	.59	24
50			min	-3.689	26	-1.214	28	-.068	28	-.137	24	-.183	23	-.555	12
51	M125	1	max	.588	12	.965	12	.74	11	.135	15	.1	12	.623	12
52			min	-.111	28	-.934	28	-.236	23	-.057	23	-.295	11	-.623	28
53		2	max	.588	12	.96	12	.74	11	.135	15	.085	12	.438	12
54			min	-.111	28	-.938	28	-.236	23	-.057	23	-.152	11	-.443	28
55		3	max	.588	12	.955	12	.699	11	.135	15	.07	12	.255	12
56			min	-.111	28	-.942	28	-.224	23	-.057	23	-.082	24	-.263	28
57		4	max	.588	12	.95	12	.643	11	.135	15	.116	11	.073	16
58			min	-.111	28	-.945	28	-.209	23	-.057	23	-.067	24	-.083	24

CONNECTION DESIGN - ROOF MEMBERS
CONNECTION TO FASCIA

Project Number	222-403	Sheet			
Project Name	VELODOME	Designed by		Date	
Subject		Checked by		Date	

CAPACITY OF 1/4" ø POP RIVETS

CHECK FOR TENSION

Axial tensile force on The Roof Rafter	=	458 lbs	2034 N	As per page 1,035	
Using 1/4" POP Rivets in design (Tension)	=	1240 lbs	5516 N	As per page 1,038	
Strength Reduction Factor (Factor of Safety)	=	1.8	1.8		
Allowable Pullout value of the Rivet	=	688.89	3064		
Number of Rivets provided	=	1 Nos			
Total Tension capacity of 1/4" Rivets	=	3064.3 N	>	2034	N
		688.89 Lbs	>	458	Lbs
		SAFE			

CHECK FOR SHEAR

Shear force on The Roof Rafter	=	145 lbs	643 N	As per page 1,036	
Using 1/4" POP Rivets in design (Shear)	=	1000 lbs	4448 N	As per page 1,038	
Strength Reduction Factor (Factor of Safety)	=	1.8	1.8		
Allowable Shear value of the Rivet	=	555.56	2471		
Number of Rivets provided	=	1 Nos	1 Nos		
Total Shear capacity of 1/4" Rivets	=	2471.2 N	>	643	N
		555.56 Lbs	>	145	Lbs
		SAFE			

USE (4) 1/4" POP RIVETS ON EACH END OF THE RAFTERS

CONNECTION DESIGN - FASCIA IS CONNECTED TO BELOW HEADER BEAM

Project Number	222-403	Sheet			
Project Name	VELODOME	Designed by		Date	
Subject		Checked by		Date	

CAPACITY OF 1/4" ø POP RIVETS

CHECK FOR TENSION

Axial tensile force on The Header Beam	=	458 lbs	2034 N	As per page 1,035
Using 1/4" POP Rivets in design (Tension)	=	1240 lbs	5516 N	As per page 1,038
Strength Reduction Factor (Factor of Safety)	=	1.8	1.8	
Allowable Pullout value of the Rivet	=	688.89	3064.4	
Number of Rivets provided	=	1 Nos		

Total Tension capacity of 1/4" Rivets	=	3064.4 N	>	2034 N
Total Tension capacity of 1/4" Rivets	=	688.89 Lbs	>	458 Lbs
		SAFE		

CHECK FOR SHEAR

Shear force on The Header Beam	=	145 lbs	643 N	As per page 1,036
Using 1/4" POP Rivets in design (Shear)	=	1000 lbs	4448 N	As per page 1,038
Strength Reduction Factor (Factor of Safety)	=	1.8	1.8	
Allowable Shear value of the Rivet	=	555.56	2471.1	
Number of Rivets provided	=	1 Nos		

Total Shear capacity of 1/4" Rivets	=	2471.1 N		643 N
Total Shear capacity of 1/4" Rivets	=	555.56 Lbs	>	145 Lbs
		SAFE		

EACH RAFTER IS SPACED AT 2' 6" C/C, RIVETS ARE INSTALLED AT EVERY 18" O.C

AS PER THE ABOVE RIVETS CAPACITY AND FORCES , CONNECTION IS SAFE IN RESISTING THE FORCES WITH RIVETS @ 18" O.C ALONG THE FASCIA

Envelope Member Section Forces

	Member	Sec		Axial[kN]	LC	y Shear...	LC	z Shear[kN]	LC	Torque[...	LC	y-y Mo...	LC	z-z Moment[kN-m]	LC
1	M31	1	max	11.277	3	.162	26	.579	3	.053	12	.078	26	.193	24
2			min	-2.034	13	-.164	14	-.201	26	-.054	24	-.064	12	-.19	12
3		2	max	11.251	3	.162	26	.614	3	.053	12	.071	26	.188	24
4			min	-2.029	13	-.164	14	-.203	26	-.054	24	-.056	12	-.185	12
5		3	max	11.224	3	.162	26	.65	3	.053	12	.066	28	.183	24
6			min	-2.024	13	-.164	14	-.205	26	-.054	24	-.048	12	-.18	12
7		4	max	11.198	3	.162	26	.685	3	.053	12	.066	28	.178	24
8			min	-2.02	13	-.164	14	-.208	26	-.054	24	-.045	10	-.176	12
9		5	max	11.171	3	.162	26	.721	3	.053	12	.067	28	.174	24
10			min	-2.015	13	-.164	14	-.21	26	-.054	24	-.043	10	-.171	12
11	M22	1	max	11.276	3	.163	26	.577	3	.053	12	.054	14	.192	24
12			min	-2.033	13	-.164	14	-.163	14	-.054	24	-.054	18	-.19	12
13		2	max	11.25	3	.163	26	.613	3	.053	12	.049	14	.187	24
14			min	-2.029	13	-.164	14	-.167	14	-.054	24	-.036	18	-.186	12
15		3	max	11.223	3	.163	26	.648	3	.053	12	.045	16	.183	24
16			min	-2.024	13	-.164	14	-.171	14	-.054	24	-.028	24	-.181	12
17		4	max	11.197	3	.163	26	.684	3	.053	12	.046	16	.178	24
18			min	-2.019	13	-.164	14	-.175	14	-.054	24	-.025	22	-.176	12
19		5	max	11.17	3	.163	26	.719	3	.053	12	.047	16	.173	24
20			min	-2.015	13	-.164	14	-.179	14	-.054	24	-.024	22	-.171	12
21	M32	1	max	11.193	3	.161	22	.15	14	.041	12	.067	28	.177	24
22			min	-2.018	13	-.162	14	-.169	28	-.042	24	-.043	10	-.174	12
23		2	max	11.113	3	.161	22	.126	10	.041	12	.063	28	.173	24
24			min	-2.004	13	-.162	14	-.146	26	-.042	24	-.039	10	-.17	12
25		3	max	11.032	3	.161	22	.198	6	.041	12	.06	28	.169	24
26			min	-1.989	13	-.162	14	-.153	26	-.042	24	-.036	10	-.166	12
27		4	max	10.952	3	.161	22	.315	6	.041	12	.059	18	.164	24
28			min	-1.974	13	-.162	14	-.16	26	-.042	24	-.034	10	-.162	12
29		5	max	10.872	3	.161	22	.433	3	.041	12	.068	18	.16	24
30			min	-1.96	13	-.162	14	-.168	26	-.042	24	-.032	10	-.158	12
31	M23	1	max	11.192	3	.161	26	.09	22	.041	12	.047	16	.176	24
32			min	-2.018	13	-.162	14	-.114	16	-.042	24	-.024	22	-.174	12
33		2	max	11.112	3	.161	26	.073	22	.041	12	.045	8	.172	24
34			min	-2.003	13	-.162	14	-.094	14	-.042	24	-.022	22	-.17	12
35		3	max	11.032	3	.161	26	.188	18	.041	12	.048	8	.168	24
36			min	-1.988	13	-.162	14	-.108	14	-.042	24	-.02	22	-.166	12
37		4	max	10.952	3	.161	26	.308	3	.041	12	.053	8	.164	24
38			min	-1.974	13	-.162	14	-.123	14	-.042	24	-.019	22	-.162	12
39		5	max	10.871	3	.161	26	.433	3	.041	12	.062	6	.16	24
40			min	-1.959	13	-.162	14	-.137	14	-.042	24	-.018	22	-.158	12
41	M33	1	max	10.879	3	.16	24	.125	14	.033	12	.068	18	.162	24
42			min	-1.96	13	-.161	10	-.18	20	-.034	24	-.032	10	-.159	12
43		2	max	10.798	3	.16	24	.098	10	.033	12	.065	18	.158	24
44			min	-1.946	13	-.161	10	-.134	28	-.034	24	-.029	10	-.155	12
45		3	max	10.717	3	.16	24	.143	6	.033	12	.066	18	.153	24
46			min	-1.931	13	-.161	10	-.13	26	-.034	24	-.026	10	-.15	12
47		4	max	10.636	3	.16	24	.276	6	.033	12	.07	18	.148	24
48			min	-1.916	13	-.161	10	-.138	26	-.034	24	-.025	14	-.146	12
49		5	max	10.555	3	.16	24	.415	3	.033	12	.079	18	.144	24
50			min	-1.901	13	-.161	10	-.146	26	-.034	24	-.024	14	-.141	12
51	M24	1	max	10.879	3	.161	24	.073	26	.033	12	.062	6	.162	24
52			min	-1.96	13	-.161	10	-.167	8	-.033	24	-.018	22	-.16	12
53		2	max	10.798	3	.161	24	.054	22	.033	12	.059	6	.157	24
54			min	-1.945	13	-.161	10	-.091	16	-.033	24	-.016	22	-.155	12
55		3	max	10.717	3	.161	24	.134	18	.033	12	.06	6	.152	24
56			min	-1.93	13	-.161	10	-.093	14	-.033	24	-.015	22	-.151	12
57		4	max	10.636	3	.161	24	.273	3	.033	12	.065	6	.148	24
58			min	-1.916	13	-.161	10	-.109	14	-.033	24	-.014	26	-.146	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[kN]	LC	y Shear...	LC	z Shear[kN]	LC	Torque[...	LC	y-y Mo...	LC	z-z Moment[kN-m]	LC
531	M69	1	max	10.887	3	.012	23	.129	14	.002	24	.068	18	.012	23
532			min	-1.471	14	-.006	11	-.175	24	-.002	25	-.037	10	-.006	24
533		2	max	10.806	3	.012	23	.102	10	.002	24	.065	18	.012	23
534			min	-1.472	14	-.006	11	-.137	28	-.002	25	-.034	10	-.006	24
535		3	max	10.725	3	.012	23	.15	6	.002	24	.066	18	.011	23
536			min	-1.474	14	-.006	11	-.137	26	-.002	25	-.032	10	-.005	24
537		4	max	10.644	3	.012	23	.282	6	.002	24	.071	18	.011	23
538			min	-1.475	14	-.006	11	-.145	26	-.002	25	-.03	14	-.005	24
539		5	max	10.563	3	.012	23	.422	3	.002	24	.08	18	.011	23
540			min	-1.477	14	-.006	11	-.153	26	-.002	25	-.029	14	-.005	24
541	M75	1	max	9.425	3	.012	23	.107	14	0	23	.005	13	.003	25
542			min	-1.474	14	-.006	24	-.64	3	0	11	-.038	6	-.001	13
543		2	max	9.409	3	.012	23	.063	14	0	23	.008	13	.002	25
544			min	-1.475	14	-.006	24	-.357	18	0	11	-.063	3	-.001	13
545		3	max	9.394	3	.012	23	.02	14	0	23	.009	13	.002	25
546			min	-1.475	14	-.006	24	-.082	18	0	11	-.073	3	0	13
547		4	max	9.378	3	.012	23	.216	6	0	23	.009	13	0	25
548			min	-1.475	14	-.006	24	-.045	26	0	11	-.07	3	0	13
549		5	max	9.362	3	.012	23	.499	3	0	23	.006	13	0	5
550			min	-1.476	14	-.006	24	-.075	26	0	11	-.052	18	0	17
551	M92	1	max	9.541	3	.106	12	.071	14	.003	12	.002	25	.035	12
552			min	-1.474	14	-.108	24	-.503	3	-.003	24	-.022	6	-.035	24
553		2	max	9.516	3	.106	12	.045	14	.003	12	.004	25	.032	12
554			min	-1.474	14	-.108	24	-.334	3	-.003	24	-.034	6	-.032	24
555		3	max	9.492	3	.106	12	.019	14	.003	12	.005	25	.029	12
556			min	-1.475	14	-.108	24	-.171	18	-.003	24	-.041	6	-.029	24
557		4	max	9.467	3	.106	12	.01	6	.003	12	.005	25	.026	12
558			min	-1.475	14	-.108	24	-.025	26	-.003	24	-.043	6	-.026	24
559		5	max	9.443	3	.106	12	.173	3	.003	12	.005	25	.022	12
560			min	-1.475	14	-.108	24	-.043	26	-.003	24	-.04	3	-.022	24
561	M91	1	max	9.724	3	.105	12	.075	14	0	25	.003	24	.05	12
562			min	-1.471	14	-.107	24	-.524	3	0	18	-.005	12	-.051	24
563		2	max	9.68	3	.105	12	.044	14	0	25	.003	26	.047	12
564			min	-1.472	14	-.107	24	-.331	18	0	18	-.018	6	-.047	24
565		3	max	9.636	3	.105	12	.015	25	0	25	.003	25	.043	12
566			min	-1.473	14	-.107	24	-.144	18	0	18	-.026	6	-.043	24
567		4	max	9.591	3	.105	12	.061	6	0	25	.003	25	.039	12
568			min	-1.474	14	-.107	24	-.037	26	0	18	-.027	6	-.039	24
569		5	max	9.547	3	.105	12	.252	3	0	25	.002	25	.035	12
570			min	-1.475	14	-.107	24	-.058	26	0	18	-.022	6	-.036	24
571	M66	1	max	9.425	3	.012	23	.084	13	0	23	.006	14	.003	23
572			min	-1.473	14	-.006	24	-.638	3	0	13	-.041	18	-.001	24
573		2	max	9.409	3	.012	23	.046	26	0	23	.009	14	.002	23
574			min	-1.473	14	-.006	24	-.353	3	0	13	-.064	18	0	24
575		3	max	9.394	3	.012	23	.016	26	0	23	.009	14	.001	23
576			min	-1.473	14	-.006	24	-.078	6	0	13	-.074	18	0	5
577		4	max	9.378	3	.012	23	.22	18	0	23	.009	13	0	23
578			min	-1.473	14	-.006	24	-.054	14	0	13	-.07	18	0	5
579		5	max	9.362	3	.012	23	.502	3	0	23	.006	13	0	17
580			min	-1.474	14	-.006	24	-.097	14	0	13	-.052	18	0	5
581	M93	1	max	9.425	3	.106	12	.099	14	.005	12	.005	25	.022	12
582			min	-1.472	14	-.108	24	-.643	3	-.005	24	-.04	3	-.022	24
583		2	max	9.409	3	.106	12	.055	14	.005	12	.008	25	.017	12
584			min	-1.473	14	-.108	24	-.357	3	-.005	24	-.065	3	-.017	24
585		3	max	9.393	3	.106	12	.012	14	.005	12	.009	25	.011	12
586			min	-1.473	14	-.108	24	-.079	18	-.005	24	-.076	3	-.011	24
587		4	max	9.377	3	.106	12	.213	3	.005	12	.009	25	.006	12
588			min	-1.473	14	-.108	24	-.037	26	-.005	24	-.073	3	-.006	24
589		5	max	9.361	3	.106	12	.498	3	.005	12	.006	25	.002	5

CONNECTION DESIGN - FLANGE BASE CONNECTION

Project Number	222-403	Sheet			
Project Name	VELODOME	Designed by		Date	
Subject		Checked by		Date	

CAPACITY OF 1/4" ø POP RIVETS

CHECK FOR TENSION

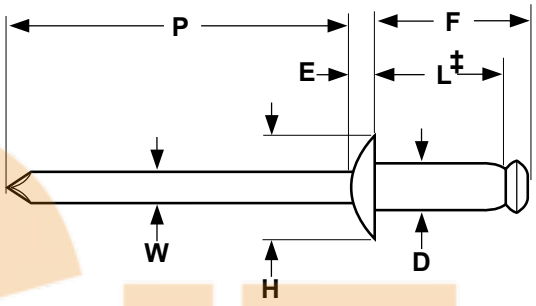
Maximum Moment acting on the header beam	=	0.682 kips.ft	0.924 kN-m	As per page 1,011
Lever arm (5" /12) (Bolt to Bolt Distance)	=	0.5 ft	0.127 m	
Force acting due to moment	=	1.364 kips	7.2756 kN	
Total Force acting on the beam	=	1364 lbs	7275.6 N	
Using 1/4" POP Rivets in design (Tension)	=	1240 lbs	5515.8 N	As per page 1,336
Strength Reduction Factor (Factor of Safety)	=	1.8	1.8	
Allowable Pullout value of the Rivet	=	688.89	3064.3	
Number of Rivets provided	=	3 Nos		
Total Tension capacity of 1/4" Rivets	=	9193 N	>	7275.591 N
		2066.7 Lbs	>	1364 Lbs
		SAFE		

USE (4) 1/4" DRIVE RIVETS FOR FLANGE BASE CONNECTION

Rivets

Steel Rivet/ Steel Mandrel

Dome Head Blind Rivet



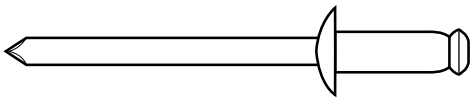
STEEL BODY/STEEL MANDREL DOME HEAD BREAK-STEM BLIND RIVETS — SAE J-1200

Nominal Rivet Diameter	D		H		E	W	P	F	Ultimate Shear Load	Ultimate Tensile Load	Mandrel Break Load	
	Rivet Shank Diameter		Head Diameter		Head Height	Mandrel Diameter	Mandrel Protrusion	Blind Side Protrusion				
	Max	Min	Max	Min	Max	Nom	Min	Max	Min, lb.	Min, lb.	Max	Min
3/32	0.096	0.090	0.198	0.178	0.032	0.057	1.00	L + 0.100	130	170	360	260
1/8	0.128	0.122	0.262	0.238	0.040	0.076	1.00	L + 0.120	260	310	800	600
5/32	0.159	0.153	0.328	0.296	0.050	0.095	1.06	L + 0.140	370	470	1000	750
3/16	0.191	0.183	0.394	0.356	0.060	0.114	1.06	L + 0.160	540	680	1450	1150
1/4	0.255	0.246	0.525	0.475	0.080	0.151	1.25	L + 0.180	1000	1240	2350	1950

Description	A carbon steel blind fastener which has a self-contained carbon steel mandrel which permits the formation of an upset on the blind end of the rivet and expansion of the rivet shank during rivet setting to join the component parts of an assembly. The steel mandrel is pulled into or against the rivet body, breaking at or near the junction of the mandrel shank and its upset end. The head of the body is slightly rounded and twice as wide as the body diameter.
Applications/ Advantages	Dome head is the most commonly specified head style because of its low profile and neat, finished appearance. The all steel design gives this style rivet greater tensile and shear values than all varieties of aluminum rivets. They should be used when fastening materials similar to carbon steel.
Material	*Rivet:* Low carbon steel, plated zinc. *Mandrel:* Carbon steel 1006 or equivalent. May be furnished plain or with a protective coating, at the option of the manufacturer.
Shear Strength	Rivets shall have ultimate shear loads not less than the minimum ultimate shear loads specified for the applicable size given in the above table.
Tensile Strength	Rivets shall have ultimate tensile loads not less than the minimum ultimate tensile loads specified for the applicable size given in the above table.
Mandrel Break Load	While the rivet is being set, the axially applied load necessary to break the mandrel shall be within the limits specified for the applicable rivet size given in the above table.

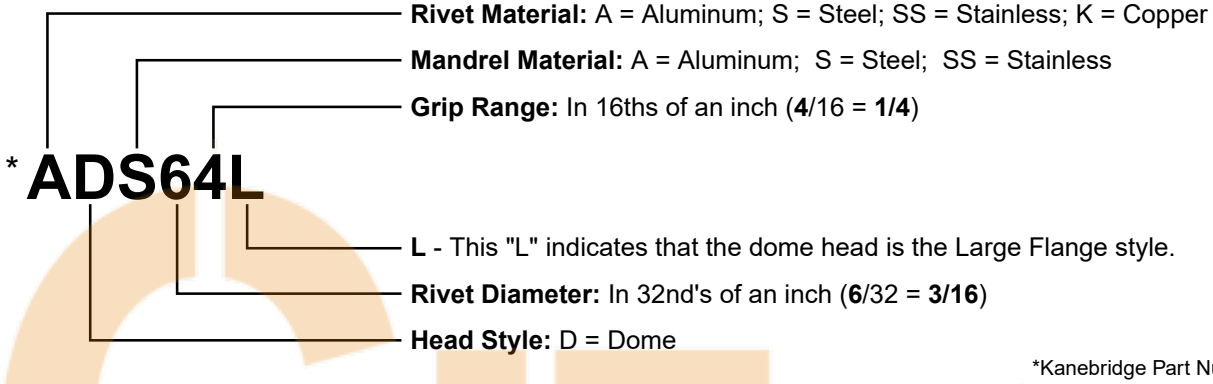
Dome Head Blind Rivet

Steel Rivet/ Steel Mandrel



Part Number Comparison - Dome Head Steel Rivet/Steel Mandrel							
Kanebridge	**Huck-Automatic**	**Pop®**	**Marson/ Creative**	**Star**	**Celus®**	**Cherry**	**Gesipa®**
SDS41	SBS41	SD41BS	SB4-1	4-1SSD	S/S 41D	SSP-41	GSMD41S
SDS42	SBS42	SD42BS	SB4-2	4-2SSD	S/S 42D	SSP-42	GSMD42S
SDS43	SBS43	SD43BS	SB4-3	4-3SSD	S/S 43D	SSP-43	GSMD43S
SDS44	SBS44	SD44BS	SB4-4	4-4SSD	S/S 44D	SSP-44	GSMD44S
SDS45	SBS45	SD45BS	SB4-5	4-5SSD	S/S 45D	SSP-45	GSMD45S
SDS46	SBS46	SD46BS	SB4-6	4-6SSD	S/S 46D	SSP-46	GSMD46S
SDS48	SBS48	SD48BS	SB4-8	4-8SSD	S/S 48D	SSP-48	GSMD48S
SDS52	SBS52	SD52BS	SB5-2	5-2SSD	S/S 52D	SSP-52	GSMD52S
SDS53	SBS53	SD53BS	SB5-3	5-3SSD	S/S 53D	-	GSMD53
SDS54	SBS54	SD54BS	SB5-4	5-4SSD	S/S 54D	SSP-54	GSMD54
SDS56	SBS56	SD56BS	SB5-6	5-6SSD	S/S 56D	SSP-56	GSMD56
SDS58	SBS58	-	SB5-8	5-8SSD	S/S 58D	SSP-58	GSMD58
SDS62	SBS62	SD62BS	SB6-2	6-2SSD	S/S 62D	SSP-62	GSMD62
SDS64	SBS64	SD64BS	SB6-4	6-4SSD	S/S 64D	SSP-64	GSMD64
SDS66	SBS66	SD66BS	SB6-6	6-6SSD	S/S 66D	SSP-66	GSMD66
SDS68	SBS68	SD68BS	SB6-8	6-8SSD	S/S 68D	SSP-68	GSMD68
SDS610	SBS610	SD610BS	SB6-10	6-10SSD	S/S610D	SSP-610	GSMD610
SDS84	SBS84	SD84BS	SB8-4	-	S/S 84D	SSP-84	GSMD84
SDS86	SBS86	SD86BS	SB8-6	-	S/S 86D	SSP-86	GSMD86
SDS88	SBS88	SD88BS	SB8-8	-	S/S 88D	SSP-88	GSMD88
SDS810	SBS810	SD810BS	-	-	S/S810D	SSP-810	GSMD810
SDS812	SBS812	SD812BS	SB8-12	-	S/S812D	SSP-812	GSMD812
SDS816	-	SD816BS	-	-	S/S816D	SSP-816	GSMD816

Part Number Key



*Kanebridge Part Number

Notes on Rivet Selection

Strength- The tensile and shear strengths required for an application must be determined and a rivet selected that meets those requirements.

Materials- Choose a rivet that is made of a metal with similar mechanical and physical properties as the materials being joined. This is especially critical in assemblies where higher temperatures and/or corrosive elements are present. Metal compatability helps reduce the risks of galvanic corrosion and material fatigue.

Grip Range- Measure the total thickness of the materials being fastened. This is known as the "rivet grip". The grip ranges of the most commonly available rivets are listed in the table below. Sufficient rivet length is necessary for proper formation of the secondary head on the blind side of the assembly. Multi-grip rivets have wider grip ranges than standard break-stem blind rivets.

Application Data for Standard Break-Stem Blind Rivets

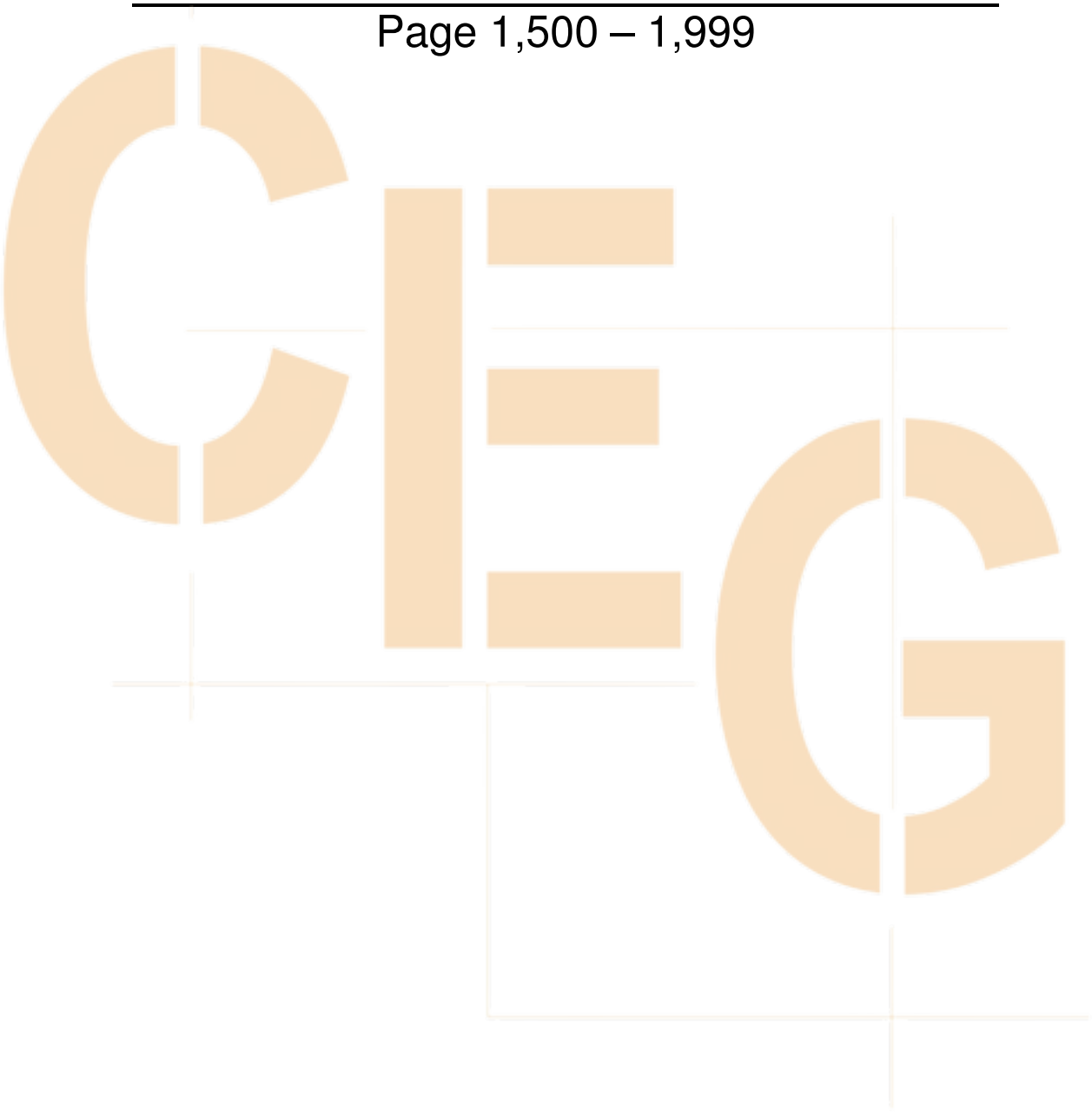
SAE J-1200

Rivet Number	Grip Range	Barrel Length	Recommended Hole Size		Drill Size
		Max	Max	Min	
31	.020-.062	.187	0.100	0.097	#41
32	.020-.125	.250			
33	.087-.187	.312			
34	.126-.250	.375			
41	.020-.062	.212	0.133	0.129	#30
42	.063-.125	.275			
43	.126-.187	.337			
44	.188-.250	.400			
45	.251-.312	.462			
46	.313-.375	.525			
48	.376-.500	.650			
52	.020-.125	.300	0.164	0.160	#20
53	.125-.187	.362			
54	.188-.250	.425			
56	.251-.375	.550			
58	.376-.500	.675			
510	.501-.625	.800			
512	.626-.750	.925			
516	.876-1.000	1.175			

Rivet Number	Grip Range	Barrel Length	Recommended Hole Size		Drill Size
		Max	Max	Min	
62	.020-.125	.325	0.196	0.192	#11
63	.126-.187	.387			
64	.188-.250	.450			
66	.251-.375	.575			
68	.376-.500	.700			
610	.510-.625	.825			
612	.626-.750	.950			
614	.751-.875	1.075			
616	.876-1.000	1.200			
618	1.001-1.125	1.325			
620	1.126-1.250	1.450			
622	1.251-1.375	1.575			
84	.126-.250	.500	0.261	0.257	F
86	.251-.375	.625			
88	.376-.500	.750			
810	.501-.625	.875			
812	.626-.750	.990			
816	.751-1.000	1.240			

SHELTER TYPICAL ANCHORAGE DESIGN

Page 1,500 – 1,999



ANCHORAGE DESIGN

Project Number	VELODOME 222-403	Sheet	1,500		
Project Name		Designed by		Date	
Subject		Checked by		Date	

ANCHORS @ CORNER & MIDDLE

Horizontal	=	-1.858	kN	As per page 1,026
Vertical	=	-3.686	kN	
Moment	=	-0.925	kN-m	

USE [(2) 1/2" ø Hilti Kwik Bolt TZ Carbon Steel Anchors , min 3 3/4" (95.25mm) embedment, as per pages 1501 to 1510]

Hilti PROFIS Engineering 3.0.75

www.hilti.com

Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Copy- Velodome 222-403	Date:	3/2/2022
Fastening point:			

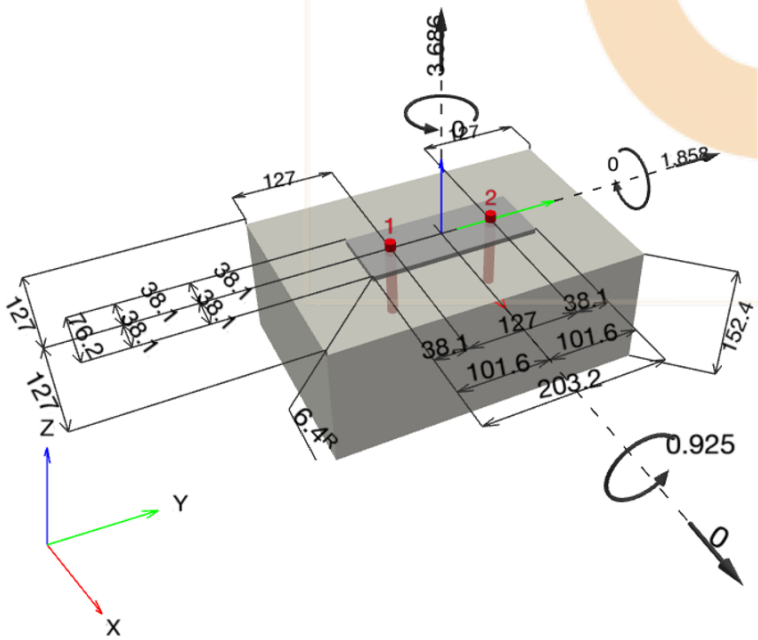
Specifier's comments:

1 Input data

Anchor type and diameter:	**Kwik Bolt 1 - CS 1/2 (3 1/4) hnom2**
Item number:	2231459 KB1 1/2x4 1/2
Effective embedment depth:	$h_{ef,act}$ = 82.5 mm, h_{nom} = 92.1 mm
Material:	Carbon Steel
Evaluation Service Report:	ER-678
Issued I Valid:	11/15/2021 | 11/30/2022
Proof:	Design Method ACI 318-14 / Mech
Stand-off installation:	e_b = 0.0 mm (no stand-off); t = 6.3 mm
Anchor plate[R]:	l_x x l_y x t = 76.2 mm x 203.2 mm x 6.3 mm; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	cracked concrete, 3000, f_c' = 3,000 psi; h = 152.4 mm
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [mm] & Loading [kN, kNm]



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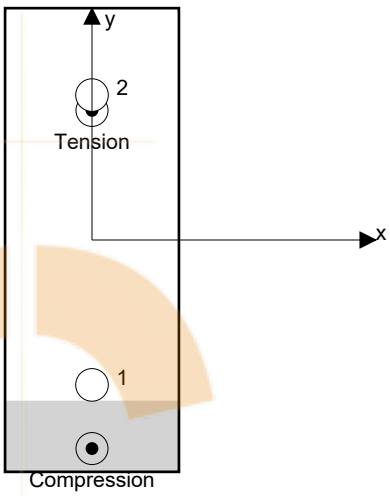
1.1 Design results

Case	Description	Forces [kN] / Moments [kNm]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 3.686; V_x = 0.000; V_y = 1.858; M_x = 0.925; M_y = 0.000; M_z = 0.000;	no	53

2 Load case/Resulting anchor forces



Anchor reactions [kN]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	0.450	0.929	0.000	0.929
2	8.066	0.929	0.000	0.929

max. concrete compressive strain: 0.14 [‰]
max. concrete compressive stress: 4.14 [N/mm^2]
resulting tension force in (x/y)=(0.0/56.8): 8.515 [kN]
resulting compression force in (x/y)=(0.0/-91.4): 4.829 [kN]

Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N_{ua} [kN]	Capacity ϕ N_n [kN]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	8.066	36.245	23	OK
Pullout Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	8.515	16.359	53	OK

* highest loaded anchor **anchor group (anchors in tension)

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3.1 Steel Strength

N_{sa} = ESR value refer to ICC-ES ER-678
$\phi\ N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [mm²]	f_{uta} [N/mm²]
66	730.45

Calculations

N_{sa} [kN]
48.327

Results

N_{sa} [kN]	ϕ_{steel}	$\phi\ N_{sa}$ [kN]	N_{ua} [kN]
48.327	0.750	36.245	8.066

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3.2 Concrete Breakout Failure

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N}\ \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b$ — ACI 318-14 Eq. (17.4.2.1b)

$\phi\ N_{cbg} \geq N_{ua}$ — ACI 318-14 Table 17.3.1.1

A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ — ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\ e'_N}{3\ h_{ef}}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.4.2.4)

$\psi_{ed,N} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.4.2.5b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.4.2.7b)

$N_b = k_c\ \lambda_a\ \sqrt{f'_c}\ h_{ef}^{1.5}$ — ACI 318-14 Eq. (17.4.2.2a)

Variables

h_{ef} [mm]	$e_{c1,N}$ [mm]	$e_{c2,N}$ [mm]	$c_{a,min}$ [mm]	$\psi_{c,N}$
82.5	0.0	56.8	127.0	1.000

c_{ac} [mm]	k_c	λ_a	f'_c [psi]
254.0	17	1.000	3,000

Calculations

A_{Nc} [mm²]	A_{Nc0} [mm²]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kN]
92,782	61,331	1.000	0.686	1.000	1.000	24.267

Results

N_{cbg} [kN]	$\phi_{concrete}$	$\phi\ N_{cbg}$ [kN]	N_{ua} [kN]
25.168	0.650	16.359	8.515

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4 Shear load

	Load V_{ua} [kN]	Capacity ϕ V_n [kN]	Utilization $\beta_V = V_{ua}/\phi$ V_n	Status
Steel Strength*	0.929	15.099	7	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	1.858	51.397	4	OK
Concrete edge failure in direction y+**	1.858	7.774	24	OK

* highest loaded anchor **anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} = ESR value refer to ICC-ES ER-678
ϕ $V_{steel} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,V}$ [mm²]	f_{uta} [N/mm²]
66	730.45

Calculations

V_{sa} [kN]
23.229

Results

V_{sa} [kN]	ϕ_{steel}	ϕ V_{sa} [kN]	V_{ua} [kN]
23.229	0.650	15.099	0.929

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4.2 Pryout Strength

$V_{cpg} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \right]$ ACI 318-14 Eq. (17.5.3.1b)

$\phi V_{cpg} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nc0} = 9 h_{ef}^2$ ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2 e'_N}{3 h_{ef}}} \right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.4)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.5b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.7b)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ ACI 318-14 Eq. (17.4.2.2a)

Variables

k_{cp}	h_{ef} [mm]	$e_{c1,N}$ [mm]	$e_{c2,N}$ [mm]	$c_{a,min}$ [mm]
2	82.5	0.0	0.0	127.0

$\psi_{c,N}$	c_{ac} [mm]	k_c	λ_a	f'_c [psi]
1.000	254.0	17	1.000	3,000

Calculations

A_{Nc} [mm²]	A_{Nc0} [mm²]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kN]
92,782	61,331	1.000	1.000	1.000	1.000	24.267

Results

V_{cpg} [kN]	$\phi_{concrete}$	ϕV_{cpg} [kN]	V_{ua} [kN]
73.424	0.700	51.397	1.858

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4.3 Concrete edge failure in direction y+

$V_{cb} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ed,V} \psi_{c,V} \psi_{h,V} \psi_{parallel,V} V_b$ — ACI 318-14 Eq. (17.5.2.1a)

$\phi V_{cb} \geq V_{ua}$ — ACI 318-14 Table 17.3.1.1

A_{Vc} see ACI 318-14, Section 17.5.2.1, Fig. R 17.5.2.1(b)

$A_{Vc0} = 4.5 c_{a1}^2$ — ACI 318-14 Eq. (17.5.2.1c)

$\psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.5.2.6b)

$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ — ACI 318-14 Eq. (17.5.2.8)

$V_b = \left(7\left(\frac{l_e}{d_a}\right)^{0.2}\sqrt{d_a}\right) \lambda_a \sqrt{f_c'} c_{a1}^{1.5}$ — ACI 318-14 Eq. (17.5.2.2a)

Variables

c_{a1} [mm]	c_{a2} [mm]	$\psi_{c,V}$	h_a [mm]	l_e [mm]
101.6	127.0	1.000	152.4	82.5

λ_a	d_a [mm]	f_c' [psi]	$\psi_{parallel,V}$
1.000	12.7	3,000	1.000

Calculations

A_{Vc} [mm²]	A_{Vc0} [mm²]	$\psi_{ed,V}$	$\psi_{h,V}$	V_b [kN]
38,710	46,452	0.950	1.000	14.028

Results

V_{cb} [kN]	$\phi_{concrete}$	ϕV_{cb} [kN]	V_{ua} [kN]
11.106	0.700	7.774	1.858

5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.521	0.239	5/3	43	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

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6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- Hilti post-installed anchors shall be installed in accordance with the Hilti Manufacturer's Printed Installation Instructions (MPII). Reference ACI 318-14, Section 17.8.1.

Fastening meets the design criteria!

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7 Installation data

Anchor type and diameter: Kwik Bolt 1 - CS 1/2 (3 1/4) hnom2

Profile: no profile

Item number: 2231459 KB1 1/2x4 1/2

Hole diameter in the fixture: d_f = 14.3 mm

Maximum installation torque: 0.054 kNm

Plate thickness (input): 6.3 mm

Hole diameter in the base material: 12.7 mm

Recommended plate thickness: not calculated

Hole depth in the base material: 108.0 mm

Drilling method: Hammer drilled

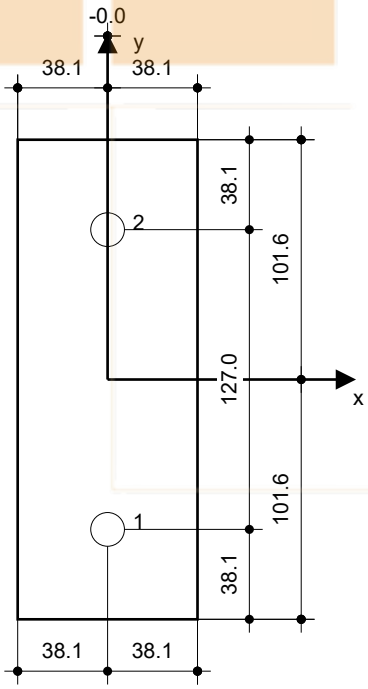
Minimum thickness of the base material: 152.4 mm

Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Hilti KB1 stud anchor with 92.075 mm embedment, 1/2 (3 1/4) hnom2, Carbon steel, installation per ER-678

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Manual blow-out pump	• Hilti SIW 6AT-A22 + SI AT-A22 • Torque wrench • Hammer



Coordinates Anchor [mm]

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0.0	-63.5	127.0	127.0	127.0	254.0
2	0.0	63.5	127.0	127.0	254.0	127.0

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8 Remarks; Your Cooperation Duties

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Project Conclusion:

The Project is Twin wall polycarbonate roof Glazing with Glass wall panels. The Shelter is Adequate for assigned loading condition and the member sizes as shown in the drawings.