STRUCTURAL ENGINEERING CALCULATIONS

PROJECT:

PROJECT LOCATION:

PSE PROJECT NUMBER:

DATE:

BY:

Table of Contents:

References:

1- Literature:

a. Based on International Building Code 2015 (IBC).

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

2- Software:

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

Design Criteria:

1- Location:	23403 GRAND CIRCLE DRIVE, KATY, TX 77449 (Lat: 29.787211 Long: -95.770752)	
2- Seismic:	RC	II
	SDC	A
	Site Class	D
	Sms	0.113
	Sm1	0.091
	Sds	0.075
	Sd1	0.061
	Ie	1.25
	R	1.25
3- Wind (Ultimate):	134 mph (3s gust)	
	Exposure	C
4- Roof Live Load:	20 psf	
5- Soil Bearing Capacity:	N/A	
6- Gravity Loads:	DL Roof	: 3 psf
7- Deflection Criteria:	Roof TL Deflection: L/180	

** Other criteria assumed as stated in design calculations.

2015 IBC SEISMIC DESIGN

EQUIVALENT LATERAL FORCE PROCEDURE

JOB NUMBER ETC 222-413

DESIGNER

Design Information

DATA	VALUE	SOURCE
Site Class	D	Site conditions, geotech report
S_s=	0.071	Seismic Design Parameters (Software)
S_1=	0.038	Seismic Design Parameters (Software)
S_{MS}=	0.113	Seismic Design Parameters (Calculated)
S_{M1}=	0.091	Seismic Design Parameters (Calculated)
I_E	1.0	ASCE 7-16 Table 1.5-2
Risk Category	2	ASCE 7-16 Table 1.5-1
R	1.5	ASCE 7-16 Table 15.4-2
h_n	9	Height per ASCE 7-16
C_t	0.02	ASCE 7-16 Table 12.8-2
Omega	2	ASCE 7-16 Table 15.4-2
W	3	As per page 1004 (psf)
T_L	12	Long-period Transition period (Software)

S_{MS}: Max considered spectral response acceleration for short periods
S_{M1}: Max considered spectral response acceleration for 1-second period
I_E : Seismic importance factor
R: Response modification factor

1) Design spectral response acceleration

S_{DS}: 5% Damped spectral response acceleration at short periods
S_{D1}: 5% Damped spectral response acceleration at 1 second period

S_{DS}=2/3(S_{ms}) S_{DS}= 2/3 X 0.113 S_{DS}= 0.075 [ASCE 7-16 Eq. 11.4-3]
S_{D1}=2/3(S_{m1}) S_{D1}= 2/3 X 0.0912 S_{D1}= 0.061 [ASCE 7-16 Eq. 11.4-4]

2) Seismic design category

From Table 11.6-1 ASCE 7-16 = A
From Table 11.6-2 ASCE 7-16 = A

Governing Design Category A

3) Determine design base shear (V)

A. ASCE 7-16, 11.4.8 Exception
Ts= 0.807079646

$T = T_a = C_t (h_n^x)$ [ASCE 7-16, 12.8.2.1, Eq. 12.8-7]

T_a : Approximate Fundamental Period

T= 0.020 X9$^{0.75}$ T= 0.104

For Site Class D/D-Default: T is < 1.5 Ts
For site class D/-default Cs shall be calculated per Eq. 12.8-2

Equivalent Force Procedure
[ASCE 7-16, 12.8.1]

$V= C_s \times W$

C_s : Seismic Response Coefficient
W : Total dead load and other applicable loads

B. [ASCE 7-16, 12.8.1.1, Eq. 12.8-2]

$C_S = \frac{S_{DS}}{R / I}$ $C_S = \frac{0.075}{1.5}$ 1.0 C_S= 0.050

C. Nor greater than

$C_S = \frac{S_{D1}}{T (R / I)}$ [ASCE 7-16, 12.8.1.1, Eq. 12.8-3] **OR** $C_S = \frac{S_{D1} * T_L}{T^2 (R / I)}$ [ASCE 7-16, 12.8.1.1, Eq. 12.8-4]

$C_S = \frac{0.061 \text{ X } 1}{0.104 \text{ X } 1.5}$ $C_S = \frac{0.061 \text{ X } 12 \text{ X1}}{0.011 \text{ X } 1.5}$

C_S= 0.390 C_S= 45.037

D. Nor less than [ASCE 7-16, 12.8.1.1, Eq. 12.8-5]

$C_S = 0.044 (S_{DS}) (I)$ C_S = 0.044 X 0.075 X1 C_S= 0.00331

Governing C_s = 0.050

V= Cs x W V = 0.05 X W Refer to sheet two for W and Calculated V

V= Cs x W V = 0.151 Psf As per ASCE 7-16 12.8.1

E_{mh} = Omega x V **V = 0.301 Psf** **As per ASCE 7-16 12.4.3.1**

WIND LOAD GOVERNS THE DESIGN AS PER PAGES 1001, 1002 & 1003

WALL SUPPORTED CANOPY 3 SECTION B
PAGE 1000-1099

MecaWind v2376

Calculations Prepared by:
Date: Mar 24, 2022

Basic Wind Parameters

Wind Load Standard	= ASCE 7-10	Exposure Category	= C
Wind Design Speed	= 134.0 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
NF	= Natural Frequency of Structure (Mode 1)	= 1.000 Hz
Alt	= Altitude (Ground Elevation) above Sea Level	= 0.000 ft
Bdist	= Base Elevation of Structure	= 0.000 ft
SDB	= Simple Diaphragm Building	= False
Reacs	= Show the Base Reactions in the output	= 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

RoofType: Building Roof Type	= Flat	RfHt : Roof Height	= 20.000 ft
W : Building Width	= 25.000 ft	L : Building Length	= 25.000 ft
Par : Is there a Parapet	= False		

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

Gust Factor Calculation:

Gust Factor Category I Rigid Structures - Simplified Method

G1	= For Rigid Structures (Nat. Freq.>1 Hz) use 0.85	= 0.85

Gust Factor Category II Rigid Structures - Complete Analysis

Zm	= 0.6 * Ht	= 15.000 ft
Izm	= Cc * (33 / Zm) ^ 0.167	= 0.228
Lzm	= L * (Zm / 33) ^ Epsilon	= 427.057
Q	= (1 / (1 + 0.63 * ((B + Ht) / Lzm)^0.63))^0.5	= 0.931
G2	= 0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm))	= 0.889

Gust Factor Used in Analysis

G	= Lessor Of G1 Or G2	= 0.850

Components and Cladding (C&C) Calculations per Ch 30 Part 1:

Zh	= Mean Roof Height for Kh: h + Base_Dist	= 20.000 ft
Kh	= Since 15 ft [4.572 m] < Zh < Zg --> 2.01 * (Zh/zg)^(2/Alpha)	= 0.902
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
LF	= Load Factor based upon STRENGTH Design	= 1.00
qh	= (0.00256 * Kh * Kzt * Kd * V^2) * LF	= 35.24 psf
LHD	= Least Horizontal Dimension: Min(B, L)	= 25.000 ft
a1	= Min(0.1 * LHD, 0.4 * h)	= 2.500 ft
a	= Max(a1, 0.04 * LHD, 3 ft [0.9 m])	= 3.000 ft
h/B	= Ratio of mean roof height to least hor dim: h / B	= 0.800

Wind Pressures for C&C Ch 30 Pt 1
All wind pressures include a load factor of 1.0

Description ft	Zone	Width ft	Span ft	Area sq ft	1/3 Rule	Ref Fig	GCp Max	GCp Min	p Max psf	p Min psf
	3	5.000	6.000	30.00	No	30.4-2A	0.252	-1.989	16.00	-76.43

Area = Span Length x Effective Width
1/3 Rule = Effective width need not be less than 1/3 of the span length
GCp = External Pressure Coefficients taken from Figures 30.4-1 through 30.4-7
p = Wind Pressure: qh*(GCp - GCpi) [Eqn 30.4-1]*
*Per Para 30.2.2 the Minimum Pressure for C&C is 16.00 psf [0.766 kPa] {Includes LF}
Since Roof Slope <= 10 Deg, the GCp value is reduced by 10%

DESIGN LOADS FOR CANOPY #3 SECTION B

Project Number	ETC 222- 413	Sheet			
Project Name		Designed by		Date	
Subject	DESIGN LOADS	Checked by		Date	

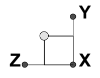
TRIB WIDTH = 3 feet

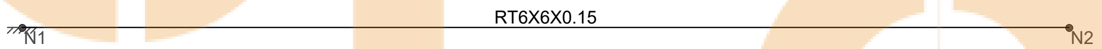
LOAD CALCULATION (DEAD & ROOF LIVE)

DEAD LOAD (W)	=	3 psf	x	3 ft	=	9 plf
ROOF LIVE LOAD	=	20 psf	x	3 ft	=	60 plf

WIND LOAD CASE A & CASE B

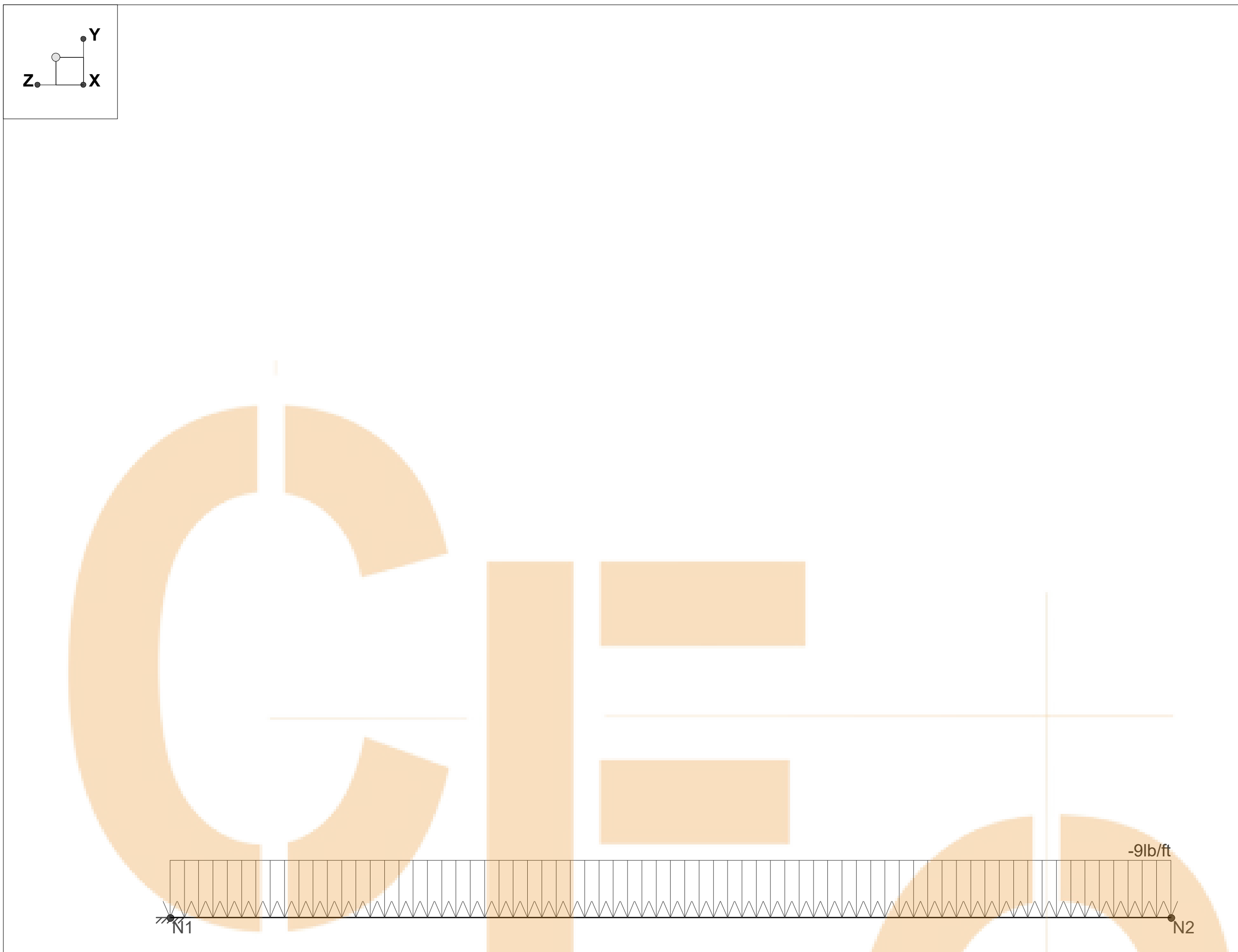
WIND LOAD A	=	16 psf	x	3 ft	=	48 plf
WIND LOAD B	=	-76.43 psf	x	3 ft	=	-229.29 plf





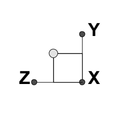
Envelope Only Solution

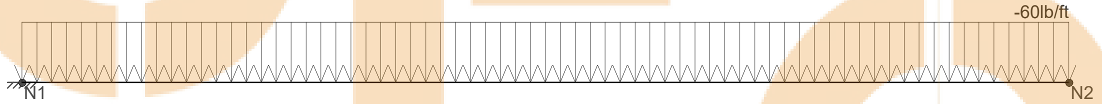
	CANOPY 3 SECTION B	SK - 3
EAST TEXAS 222-413		
		CANOPY 3 SECTION B.r3d



Loads: BLC 1, DL
Envelope Only Solution

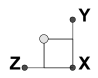
	CANOPY 3 SECTION B	SK - 2
EAST TEXAS 222-413		CANOPY 3 SECTION B.r3d

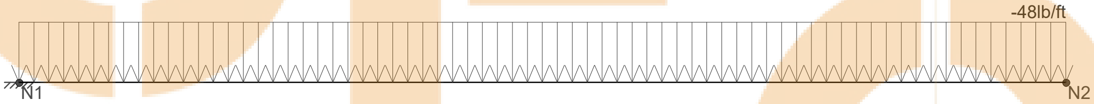




Loads: BLC 2, RLL
Envelope Only Solution

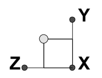
	CANOPY 3 SECTION B	SK - 4
EAST TEXAS 222-413		CANOPY 3 SECTION B.r3d

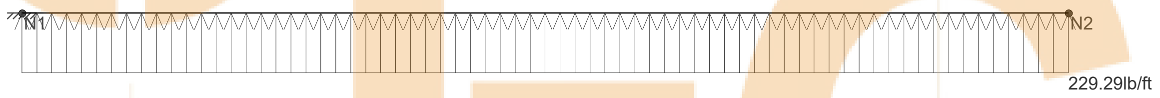




Loads: BLC 4, WLA
Envelope Only Solution

	CANOPY 3 SECTION B	SK - 5
EAST TEXAS 222-413		CANOPY 3 SECTION B.r3d





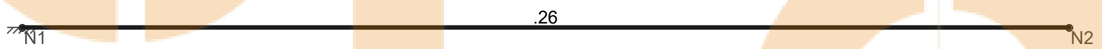
Loads: BLC 5, WLB
Envelope Only Solution

	CANOPY 3 SECTION B	SK - 6
EAST TEXAS 222-413		CANOPY 3 SECTION B.r3d

Y
Z X

Code Check
(Env)

No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

	CANOPY 3 SECTION B	SK - 7
EAST TEXAS 222-413		
		CANOPY 3 SECTION B.r3d

Aluminum Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (...	Density[...	Table B.4	kt	Ftu[ksi]	Fty[ksi]	Fcy[ksi]	Fsu[ksi]	Ct
1	3003-H14	10100	3787.5	.33	1.3	.173	Table B....	1	19	16	13	12	141
2	6061-T6	10100	3787.5	.33	1.3	.173	Table B....	1	38	35	35	24	141
3	6063-T5	10100	3787.5	.33	1.3	.173	Table B....	1	22	16	16	13	141
4	6063-T6	10100	3787.5	.33	1.3	.173	Table B....	1	30	25	25	19	141
5	5052-H34	10200	3787.5	.33	1.3	.173	Table B....	1	34	26	24	20	141
6	6061-T6 W	10100	3787.5	.33	1.3	.173	Table B....	1	24	15	15	15	141
7	6061-T6 haz	10100	3787.5	.33	1.3	.173	Table B....	1	29	23	23	18	141

Aluminum Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	B1	RT6X6X0.15	Beam	Rectangular Tubes	6061-T6 h...	Typical	3.51	20.033	20.033	30.03
2	Louvers	RT2X6X0.125	Beam	Rectangular Tubes	6061-T6	Typical	1.94	1.43	8.28	3.91

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N2	0	0	-5	0	
2	N1	0	0	0	0	

Aluminum Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	B1	5			Lbyy						Lateral

Member Area Loads

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
No Data to Print ...						

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	IBC 16-8	Yes	Y		DL	1																		
2	IBC 16-10 (a)	Yes	Y		DL	1	RLL	1																
3	IBC 16-12 (a)	Yes	Y		DL	1	WL...	.6																
4	IBC 16-13 (a)	Yes	Y		DL	1	WL...	.45					R...	.75										
5	IBC 16-15	Yes	Y		DL	.6	WL...	.6																
6	IBC 16-12 (a)	Yes	Y		DL	1	WL-Y	.6																
7	IBC 16-13 (a)	Yes	Y		DL	1	WL-Y	.45					R...	.75										
8	IBC 16-15	Yes	Y		DL	.6	WL-Y	.6																
9	DL		Y		DL	1.25																		
10	RLL		Y		RLL	1.25																		
11	WL+Y		Y		WL+Y	1.25																		
12	WL-Y		Y		WL-Y	1.25																		

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [lb...	LC	MY [lb-ft]	LC	MZ [l...	LC
1	N1	m...	0	8	.399	4	0	8	997.65	4	0	8	0	8
2		min	0	1	-.648	8	0	1	-1620...	8	0	1	0	1
3	Totals:	m...	0	8	.399	4	0	8						
4		min	0	1	-.648	8	0	1						

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

	Member	Shape	Code C...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	Pnc/O...	Pnt/Om...	Mny/O...	Mnz/O...	Vny/O...	Vnz/O...	Cb	Eqn
1	M1	RT6X6X0...	.261	5	8	.047	5	y	8	39.223	48.927	6218.422	6218.422	13.925	13.925	2....	H.1-1

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear[k]	LC	Torque[...	LC	y-y Mo...	LC	z-z Moment[lb-ft]	LC
1	M1	1	max	0	8	0	8	0	8	0	8	0	8	0	8
2			min	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	0	8	.162	8	0	8	0	8	0	8	62.353	4
4			min	0	1	-.1	4	0	1	0	1	0	1	-101.287	8
5		3	max	0	8	.324	8	0	8	0	8	0	8	249.412	4
6			min	0	1	-.2	4	0	1	0	1	0	1	-405.146	8
7		4	max	0	8	.486	8	0	8	0	8	0	8	561.178	4
8			min	0	1	-.299	4	0	1	0	1	0	1	-911.579	8
9		5	max	0	8	.648	8	0	8	0	8	0	8	997.65	4
10			min	0	1	-.399	4	0	1	0	1	0	1	-1620.585	8

Envelope Member Section Deflections Service

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	8	.111	8	0	8	0	8	5286.528	1	NC	8
2			min	0	1	-.069	4	0	1	0	1	538.738	8	NC	1
3		2	max	0	8	.075	8	0	8	0	8	7886.115	1	NC	8
4			min	0	1	-.046	4	0	1	0	1	803.655	8	NC	1
5		3	max	0	8	.04	8	0	8	0	8	NC	1	NC	8
6			min	0	1	-.025	4	0	1	0	1	1503.107	8	NC	1
7		4	max	0	8	.012	8	0	8	0	8	NC	7	NC	8
8			min	0	1	-.008	4	0	1	0	1	4911.896	8	NC	1
9		5	max	0	8	0	8	0	8	0	8	NC	8	NC	8
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

ANCHOR DESIGN CANOPY 3 @ SECTION B

Project Number	ETC 222-413	Sheet			
Project Name		Designed by		Date	
Subject	CONNECTION	Checked by		Date	

CAPACITY OF 1/2" ø SS BOX BOLTS

CHECK FOR TENSILE CAPACITY OF ANCHORS

Moment acting on the member	=	1621.00	lbs.ft	
Moment arm (4.5"/12)	=	0.375	ft	
Tensile force acting on the member	=	4322.67	lbs	As per page 1,009
Allowable Tensile Capacity of Anchor	=	3280.00	lbs	
Number of Anchors provided	=	4.00	Nos	
Total allowable Tensile capacity of Anchor	=	13120.00	lbs	
Check for Tensile capacity of Anchors with force acting on the member	=	4322.67	<	13120.00 lbs
			SAFE	

USE [(4) 1/2" ø SS TYPE C BOX EXPANSION BOLTS FOR CONNECTING BEAM TO WALL FOR SECTION B

ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-3217

Reissued October 2021

This report is subject to renewal April 2023.

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DIVISION: 05 00 00—METALS
Section: 05 05 27—Metal Connectors

REPORT HOLDER:

LNA SOLUTIONS—A KEE SAFETY LOGISTIC LTD

EVALUATION SUBJECT:

BOXBOLT® TYPE C BLIND FASTENERS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015, 2012 and 2009 *International Building Code®* (IBC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Property evaluated:

Structural

2.0 USES

BoxBolt® Type C Blind Fasteners are designed for connecting structural steel to hollow structural section (HSS) steel members and other structural steel elements where access is difficult or is restricted to one side only. BoxBolt® Type C fasteners are intended for use with rectangular or square HSS members and are recognized for resisting static dominant tension and shear loads in bearing-type connections, and for resisting static dominant lateral loads in slip-critical connections, where static dominant loads include load combinations with gravity and wind loads for structures assigned to all Seismic Design Categories and load combinations with seismic loads for structures assigned to Seismic Design Category (SDC) A, B or C. The BoxBolt® Type C Blind Fasteners are alternatives to bolts described in Section J3 of AISC 360, which is referenced in Section 2205.1 of the IBC.

BoxBolt® Type C Blind Fasteners may also be used to resist load combinations with seismic loads for structures assigned to Seismic Design Categories (SDCs) D, E and F, based on cyclic test data in accordance with Sections 3.0 and 4.4 of the ICC-ES Acceptance Criteria for Expansion Bolts in Structural Steel Connections (AC437).

3.0 DESCRIPTION

3.1 General:

BoxBolt® Type C Blind Fasteners are assembled from four components, consisting of the core bolt (or set screw), the body (or shell), the shoulder (or collar), and the cone (or conical nut). The steel core bolt features a full-length threaded shank and a hexagonal head. The body is a steel segmented hollow cylinder, with four slits along the length of the cylinder, and are located at 90 degrees from each other. The collar is a steel flat hexagonal element with a circular hole at its center. The cone is a steel circular internally threaded nut with knurling on one end for interacting with the body. Nominal BoxBolt® diameters include $^{1}/_{2}$ inch (12.0 mm), $^{5}/_{8}$ inch (16.0 mm), and $^{3}/_{4}$ inch (20.0 mm), with each diameter of bolt available in three lengths. Figure 1 provides a picture of the BoxBolt®. Table 1 provides part codes, dimensions and installation information. Table 2 provides BoxBolt® Type C fastener strength information.

3.2 Materials:

3.2.1 Core Bolt: The core bolt is manufactured from steel complying with ISO 4017, Class 8.8 in accordance with ISO 898-1, having a specified tensile strength, F_u, of 116,030 psi (800 MP_a) for the M12 and M16 bolts, and 120,380 psi (830 MP_a) for the M20 bolts.

3.2.2 Body, Collar and Cone: The body, collar, and cone are manufactured from steel complying with BS EN 10083 Grade C22E (1.1151).

3.2.3 Finish: All components are hot dip galvanized in accordance with BS EN ISO 1461 with a mean coating thickness of 2.2 mil (55 μm), as described in the report holder's quality documentation.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The BoxBolt® Type C Blind Fasteners are alternatives to bolts described in Section J3 of AISC 360, which is referenced in Section 2205.1 of the IBC, for bearing-type connections and for slip-critical connections.

The design of the BoxBolt® Type C Blind Fasteners must comply with this report, Section J3 of AISC 360 and the information for the BoxBolt® provided in Tables 1 and 2 of this report.

For BoxBolt® Type C Blind Fasteners used in structures assigned to Seismic Design Categories (SDCs) D, E and F, the fasteners are intended to be used as force-controlled components and are not expected to undergo inelastic deformations. The construction documents (including structural calculations and engineering plans) specifying the BoxBolt® Type C Blind Fasteners, must consider this requirement for a force-controlled behavior, and additional requirements in AISC 341, as applicable.

The load-carrying capacity of a connection utilizing BoxBolt® Type C Blind Fasteners depends on the fasteners' capacities as shown in Table 2, the affected elements of members and connecting elements, and the interaction between the fasteners and the connected elements. All applicable limit states of a connection must be checked to determine the load-carrying capacity of the connection. The available strength of a connection is limited by the governing limit state (or the limit state with the least available strength), which occurs in the weakest component in the connection, typically the steel section itself in the case of thin steel sections, or the BoxBolt® in the case of thick wall steel sections, or a combination of the two.

Connections subjected to combined static tension loading and static shear-bearing loading must comply with the following:

$$\left(\frac{Tension\ Demand}{Tension\ Capacity}\right)^2 + \left(\frac{Shear\ Demand}{Shear\ Capacity}\right)^2 \leq 1.0$$

4.2 Installation:

The BoxBolt® Type C Blind Fasteners must be installed in accordance with the details noted in this section, the manufacturer's installation instructions and the approved plans. In case of a conflict between this report and the report holder's installation instructions, the most restrictive requirement governs.

1. Holes must be drilled into the sections to be connected, ensuring that the resulting holes have the correct diameter, spacing and edge distance according to the report holder's published specifications, this evaluation report and the correct design requirements for the connection, as indicated in the approved plans. Holes must be standard diameter holes conforming to AISC 360, where the bolt hole diameters must be no greater than the bolt shell diameter plus $^1/_{16}$ inch (1.6 mm).
2. Burrs in the holes must be removed before insertion of the BoxBolt® Type C Blind Fasteners.
3. The structural steel elements to be fastened adjacent to each other must be positioned to ensure:
   a. That the two sections are lined up and rest one against the other without any gap. Clamps must be used as necessary to hold the two sections together and prevent formation of gaps.
   b. That the holes are aligned, using a mandrel if necessary.
4. The core bolts must be positioned in the holes. The collar must rest flat against the section with no gap.
5. The collar must be held in position using a suitable open-ended wrench, and then the core bolt must be tightened to the specified torque, as noted in Table 1 of this report.
6. The tightening tool must then be removed and the tightening torque on the bolt must be verified. If necessary, the tightening torque must be corrected.

4.3 Special Inspection:

Special inspection is required in accordance with 2015 and 2012 IBC Sections 1704.3, 1705.1.1 and 1705.2 (2009 IBC Sections 1704.3, 1704.15 and 1705), as applicable). The report holder must submit inspection procedures to verify proper installation of the BoxBolts® Type C Blind Fasteners. Where BoxBolts® Type C Blind Fasteners are used for seismic or wind load resistance, special inspection must comply with 2015 IBC Sections 1705.11, 1705.12 and 1705.13 (2012 IBC Sections 1705.10, 1705.11 and 1705.12; 2009 IBC Sections 1706, 1707 and 1708; as applicable).

4.4 Packaging:

Each package of the BoxBolt® Type C Blind Fasteners must include the following information: installation and safety instructions, minimum and maximum fixing ranges (or the total thickness of elements to be connected), installation torque, design loads and special inspection requirements.

5.0 CONDITIONS OF USE

The BoxBolt® Type C Blind Fasteners described in this report comply with, or are suitable alternatives to what is specified in, the codes noted in Section 1.0 of this report, subject to the following conditions:

5.1 Steel structures utilizing BoxBolt® Type C Blind Fasteners must be designed in accordance with the IBC including its referenced standards (such as AISC 360 and AISC 341) and this evaluation report; and must be installed in accordance with this evaluation report and the report holder's installation instructions. In case of a conflict between this evaluation report and the report holder's installation instructions, the most restrictive requirement governs.

5.2 Calculations and details, justifying the use of the BoxBolt® Type C Blind Fasteners is in compliance with the applicable code and this evaluation report, including showing that the BoxBolt® fasteners, the affected elements of members and connecting elements are adequate to resist the applied loads, must be submitted to the code official for approval. The calculations and details must be signed and sealed by a registered design professional, when required by the statutes of the jurisdiction in which the project is to be constructed.

5.3 **Fire-resistive Construction:** Where not otherwise prohibited in the code, BoxBolt® Type C Fasteners are permitted for use with fire-resistance-rated construction provided that at least one of the following conditions is fulfilled:

- The BoxBolt® fasteners are used to resist wind or seismic forces only.
- BoxBolt® fasteners that support a fire-resistance-rated envelope or a fire-resistance-rated membrane, are protected by approved fire-resistance-rated materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
- The BoxBolt® fasteners are used to support nonstructural elements.

5.4 Special inspection must be provided as specified in Section 4.3 of this report.

5.5 For BoxBolt® Type C Blind Fasteners used in structures assigned to Seismic Design Categories (SDCs) D, E and F, the fasteners are intended to be used as force-controlled components and are not expected to undergo inelastic deformations, and the design professional must consider this force-controlled behavior in his design.

5.6 The BoxBolt® Type C Fasteners addressed in this evaluation report are manufactured under a quality program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Expansion Bolts in Structural Steel Connections (AC437), dated October 2014 (editorially revised December 2016).

7.0 IDENTIFICATION

7.1 The BoxBolt® Type C fastener package is labeled with the product part number, quantity, batch number, image of the product, report holder's name (LNA Solutions—A Kee Safety Logistic Ltd.), and the evaluation report number (ESR-3217).The fastener is identified by a nine-character alphanumeric part number (BQXGALXXC). The first three characters (BQX) indicate the length of the fastener (Size 1, 2, or 3). The second three characters (GAL) indicate the fasteners are coated with a hot dip galvanized coating. The last three characters (XXC) indicate the diameter and type of fastener, where XX is the numeric diameter in millimeters (12, 16 or 20), and C identifies the fastener as a Type C fastener. Each core bolt is stamped with a head marking of "ATBX". Each collar is stamped with "BOXBOLT" and part number.

7.2 The report holder's contact information is the following:

LNA SOLUTIONS—A KEE SAFETY LOGISTIC LTD
3924A VARSITY DRIVE
ANN ARBOR, MICHIGAN 48108
(888) 724-2323
www.LNASolutions.com

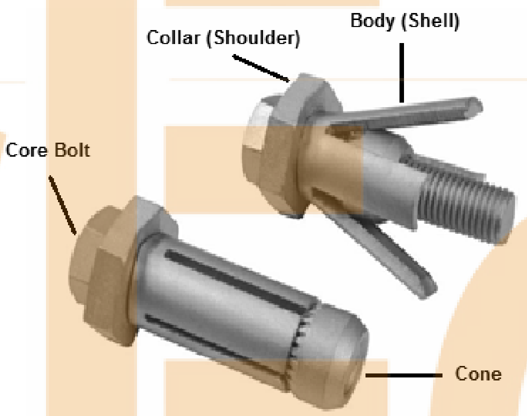


FIGURE 1—TYPICAL BOX BOLT® TYPE C BLIND FASTENER

TABLE 1—BOXBOLT® TYPE C BLIND FASTENER DIMENSIONAL AND INSTALLATION INFORMATION[1]

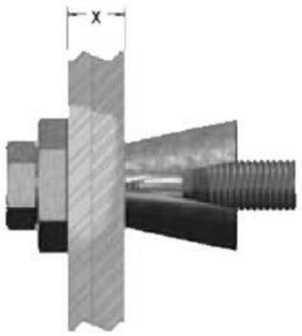
PART NUMBER AND DESCRIPTION			DIMENSIONAL INFORMATION[3]							INSTALLATION INFORMATION[3]	
BoxBolt® (Part Code)	BoxBolt® (Core Bolt Diameter)	Description[2]	Core Bolt Length	Clamping Range (dim x) Min	Clamping Range (dim x) Max	Across Flats of Shoulder	Collar Thickness	Dim A	Dim B	Dim C Drill Dia	Torque (ft-lb)
BQ1GAL12C	1/2" (12 mm)	1/2" BoxBolt® Size 1	2 3/16" (55 mm)	1/2"	15/16"	1" (26 mm)	5/16" (8.4 mm)	2 1/16" (52 mm)	1 1/8"	13/16"	60
BQ2GAL12C	1/2" (12 mm)	1/2" BoxBolt® Size 2	3 1/8" (80 mm)	3/4"	1 7/8"	1" (26 mm)	5/16" (8.4 mm)	2 1/16" (52 mm)	1 1/8"	13/16"	60
BQ3GAL12C	1/2" (12 mm)	1/2" BoxBolt® Size 3	4" (100 mm)	1 1/2"	2 11/16"	1" (26 mm)	5/16" (8.4 mm)	2 1/16" (52 mm)	1 1/8"	13/16"	60
BQ1GAL16C	5/8" (16 mm)	5/8" BoxBolt® Size 1	3" (75 mm)	5/8"	1 3/8"	1 7/16" (36 mm)	3/8" (9.4 mm)	2 11/16" (68 mm)	1 3/8"	1 1/16"	140
BQ2GAL16C	5/8" (16 mm)	5/8" BoxBolt® Size 2	4" (100 mm)	1"	2 5/16"	1 7/16" (36 mm)	3/8" (9.4 mm)	2 11/16" (68 mm)	1 3/8"	1 1/16"	140
BQ3GAL16C	5/8" (16 mm)	5/8" BoxBolt® Size 3	4 3/4" (120 mm)	2"	3 1/16"	1 7/16" (36 mm)	3/8" (9.4 mm)	2 11/16" (68 mm)	1 3/8"	1 1/16"	140
BQ1GAL20C	3/4" (20 mm)	3/4" BoxBolt® Size 1	4" (100 mm)	3/4"	1 13/16"	1 13/16" (46 mm)	7/16" (11.4 mm)	3 7/16" (87 mm)	1 3/4"	1 3/8"	220
BQ2GAL20C	3/4" (20 mm)	3/4" BoxBolt® Size 2	5 1/8" (130 mm)	1 5/16"	3"	1 13/16" (46 mm)	7/16" (11.4 mm)	3 7/16" (87 mm)	1 3/4"	1 3/8"	220
BQ3GAL20C	3/4" (20 mm)	3/4" BoxBolt® Size 3	6" (150 mm)	2 9/16"	4"	1 13/16" (46 mm)	7/16" (11.4 mm)	3 7/16" (87 mm)	1 3/4"	1 3/8"	220

For **SI:** 1 inch = 25.4mm; 1 lbf = 4.448N; 1 ft-lb = 1.356 N-m.

[1]When dimensions are expressed in both US Customary and SI units; BoxBolt® dimensions in US Customary units are converted from the corresponding SI units.

[2]BoxBolt® size is determined by core bolt length.

[3]Dimension "X" is the total thickness of the connected steel elements (or the grip); "A" is the minimum spacing between fasteners; "B" is the minimum edge distance for the fasteners; and "C" is the standard hole diameters for the fasteners.



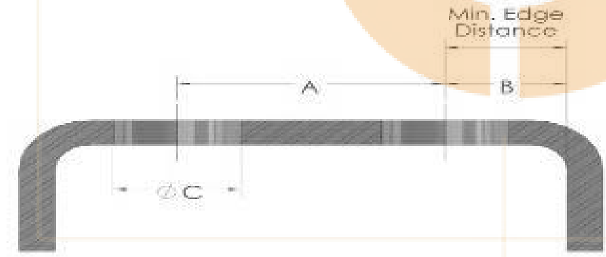


TABLE 2—BOXBOLT® TYPE C BLIND FASTENER STRENGTH INFORMATION

PART CODE	LRFD STRENGTHS[1] (lbf)						ASD STRENGTHS[2] (lbf)					
	Static Dominant Loads[3]			Seismic SDC D, E or F[4]			Static Dominant Loads[3]			Seismic SDC D, E or F[4]		
	Shear-bearing	Shear-slip resistance	Tension	Shear-bearing	Shear-slip resistance	Tension	Shear-bearing	Shear-slip resistance	Tension	Shear-bearing	Shear-slip resistance	Tension
BQ1GAL12C	7680	150	5250	6900	150	4730	4800	90	3280	4320	100	2960
BQ2GAL12C	7680	150	5250	6900	150	4730	4800	90	3280	4230	100	2960
BQ3GAL12C	7680	150	5250	6900	150	4730	4800	90	3280	4320	100	2960
BQ1GAL16C	12200	170	13100	11000	170	11400	7650	110	8230	6870	110	7120
BQ2GAL16C	12200	170	13100	11000	170	11400	7650	110	8230	6870	110	7120
BQ3GAL16C	12200	170	13100	11000	170	11400	7650	110	8230	6870	110	7120
BQ1GAL20C	17600	790	15000	11800	790	13500	11000	490	9400	7380	500	8470
BQ2GAL20C	17600	790	15000	11800	790	13500	11000	490	9400	7380	500	8470
BQ3GAL20C	17600	790	15000	11800	790	13500	11000	490	9400	7380	500	8470

For **SI:** 1 lbf = 4.448N.

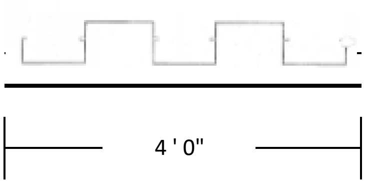
[1]Load and Resistance Factor Design (LRFD) strengths are derived in accordance AC437, Sections 3.4, 3.5, 3.7 and 3.8, based on test data per AC437 Section 4.0.
[2]Allowable Strength Design (ASD) strengths are derived in accordance AC437, Sections 3.4, 3.5, 3.9 and 3.10, based on test data per AC437 Section 4.0.
[3]Static dominant loads include load combinations with gravity and wind loads for structures assigned to all Seismic Design Categories and load combinations with seismic loads for structures assigned to Seismic Design Category (SDC) A, B or C.
[4]Seismic SDC D, E or F refer to load combinations with seismic loads for structures assigned to Seismic Design Category (SDC) D, E or F.

DECK DESIGN - CANOPY #3 SECTION B

Project Number	ETC 222-413	Sheet			
Project Name		Designed by		Date	
Subject	DECK DESIGN	Checked by		Date	

Deck Design

Max Span on Deck = 4 ft



WL on Deck = 45.858 psf
RLL on Deck = 20 psf

For 8 ft Span

Allowable Wind Load =	**114.0**	**>**	**45.9**	psf
Allowable Live Load =	**118.0**	**>**	**20.0**	psf

USE 2-3/4" X 6" X 0.078" ALUMINIUM DECKING as per page 1,018

Deck Fastner Design

Uplift on Deck = 45.858 psf X $\frac{6"}{12"/ft}$ X $\frac{4.00\ ft}{2}$ = **45.9 Lbs**

Pull out strength of Steel Binder Heavy guage #12 screws = 996 lbs as per page 1,019

Allowable Pull Out = 996 lbs/4 (factor of Safety) = **249.0 Lbs** > **45.9 Lbs**

SAFE

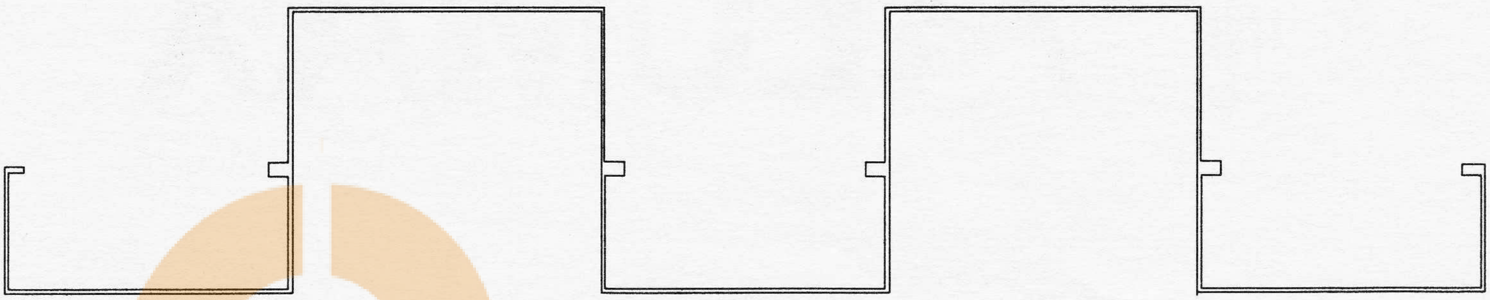
USE [2 #12 screws @6" o.c.]

WALKWAY COVER DECKS

SAFETY FACTOR OF 1.95 FROM ULTIMATE STRESS
CHARTS SHOW TOTAL ALLOWABLE LOAD PER BENT.
ALL PROFILES ARE 6063–T6 IN ACCORDANCE WITH ASTM STDS. WELD STRESS IN ACCORDANCE WITH ALUMINUM ASSOCIATION STANDARDS. ALL DESIGN STRESS AND FACTORS OF SAFETY.

1502

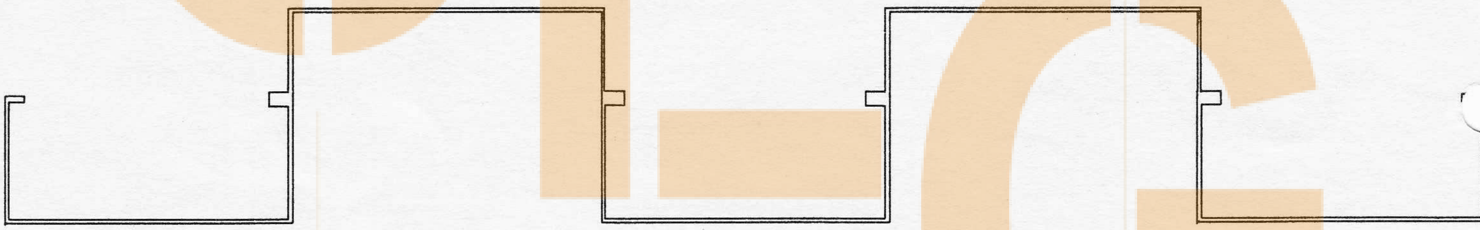
1018



6″ DECK

Span (FT.)	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Gravity *	57	51	46	41	38	34	31	29	26	24	23	21	20	18	17	16	15	14
Wind *	68	61	54	49	45	41	37	34	31	29	27	25	23	22	20	19	18	17
L/180 *	69	58	49	42	36	32	28	24	22	19	17	15	14	12	11	10	9	9

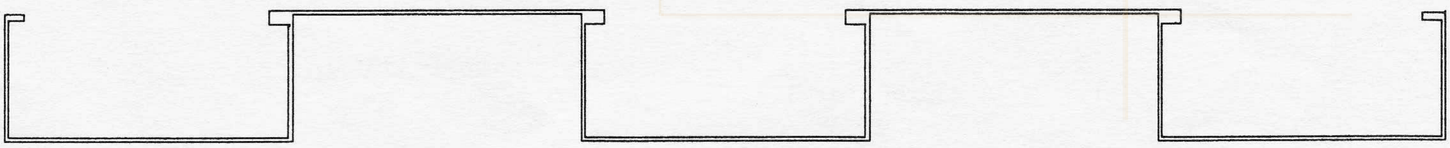
* (PFS)



4-1/2″ DECK

Span (FT.)	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Gravity *	75	64	55	48	42	38	33	30	27	25	22	21	19	17	16	15	14	13
Wind *	89	76	65	57	50	44	39	35	32	29	26	24	22	20	19	18	16	15
L/180 *	95	75	60	49	40	34	28	24	21	18	15	14	12	11	9	8	8	7

* (PSF)

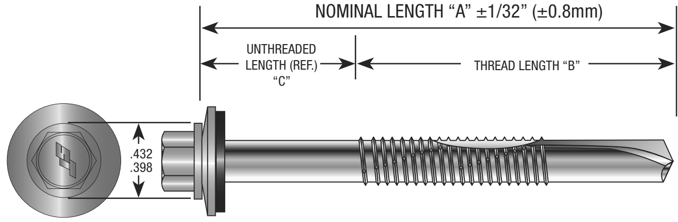


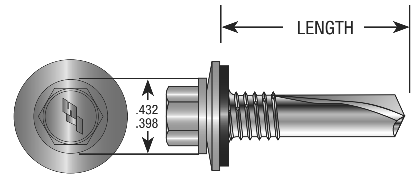
2-3/4″ DECK

Span (FT.)	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Gravity *	118	93	75	62	52	45	38	34	29	26	23	21	19	17	16
Wind *	114	90	73	61	51	43	37	33	29	25	23	20	18	17	15
L/180 *	123	86	63	47	36	29	23	19	15	13	11	9	8	7	6

* (PSF)

Steelbinder® Heavy Gauge





SPECIFICATIONS SUMMARY

#12-24 Dimensions:

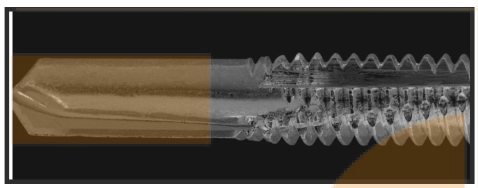
Drill Point: #4/#5
Major Diameter: .215"/.209"
Minor Diameter: .164" REF
Hex Across Flats: .311/.305

SIZE	HEAD STYLE	CARTON QTY.	WEIGHT/M
12-24 x 7/8"	HWH	2500	12.0
12-24 x 1-1/4"	HWH	2500	12.6
12-24 x 1-1/2"	HWH	2000	16.2
12-24 x 2"	HWH	1500	22.1

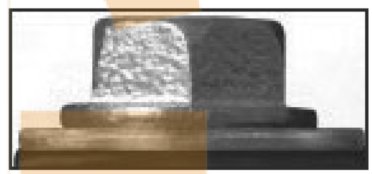
PERFORMANCE DATA

PULL OUT STRENGTH VALUE (LBS. ULT.)		MATERIAL			
		HRS Primed Only		HRS PLATE	
	NOM. GAUGE	14	12	3/16"	1/4"
	THICKNESS	.070	.106	.187	.250
#12-24 HEAVY GAUGE		924	1627	2556	3298

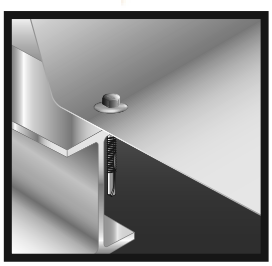
PULL OVER STRENGTH VALUE (LBS. ULT.)	DESIGNATION	MATERIAL		
		AZ55 GALVALUME		
	NOM. GAUGE	26	24	22
	THICKNESS	.019	.024	.032
BONDED WASHER (14mm O.D.)		801	996	1258
(.398/.432 HWH DIA.)		775	956	1078

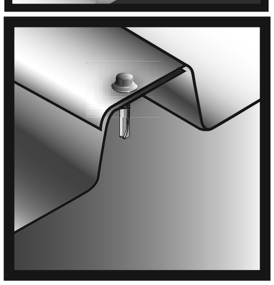


Long Drill point assures proper clearance of heavy gauge metal before any thread engagement begins



HWH with EPDM bonded washer provides a secure seal to prevent leaks.





- Fastener lengths over 1-1/4"are designed to penetrate steel thickness up to .500". 12-24 x 7/8" is designed to drill up to .250".
- Thread to point ratio engineered to provide maximum pull out strength in heavy gauge steel.
- EPDM rubber is vulcanized to steel washer. Moisture has no place to penetrate. The washer provides a secure seal even when driven at an angle.
- Applications include metal deck to structural steel or bar joists, & retrofit clips to structural steel.
- Fastener is also available without a bonded sealing washer.

NOTES: *1. HRS (Hot Rolled Steel)*
2. All strength values shown are ultimate values, expressed in LBS. Apply an appropriate safety factor to obtain design limits.

SEALTITE BUILDING FASTENERS
www.sealtite.com

6357 Reynolds Road
P.O. Box 4515, Tyler, Texas 75712
800-352-4864 • 800-352-3940 Fax
903-592-2826 • 903-592-1583 Fax

9950 Princeton Glendale Rd.
Cincinnati, OH 45246
800-944-8920 • 800-944-4183 Fax
513-874-5905 • 513-874-5903 Fax

WALL SUPPORTED CANOPY 5 SECTION C
PAGE 1100-1199

MecaWind v2376

Calculations Prepared by:
Date: Mar 24, 2022

Basic Wind Parameters

Wind Load Standard = ASCE 7-10
Wind Design Speed = 134.0 mph
Structure Type = Building
Exposure Category = C
Risk Category = II
Building Type = Enclosed

General Wind Settings

Incl_LF = Include ASD Load Factor of 0.6 in Pressures = False
DynType = Dynamic Type of Structure = Rigid
NF = Natural Frequency of Structure (Mode 1) = 1.000 Hz
Alt = Altitude (Ground Elevation) above Sea Level = 0.000 ft
Bdist = Base Elevation of Structure = 0.000 ft
SDB = Simple Diaphragm Building = False
Reacs = Show the Base Reactions in the output = 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

RoofType: Building Roof Type = Flat
W : Building Width = 25.000 ft
Par : Is there a Parapet = False
RfHt : Roof Height = 20.000 ft
L : Building Length = 25.000 ft

Exposure Constants per Table 26.9-1:

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

Gust Factor Calculation:

Gust Factor Category I Rigid Structures - Simplified Method
G1 = For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85
Gust Factor Category II Rigid Structures - Complete Analysis
Zm = 0.6 * Ht = 15.000 ft
Izm = Cc * (33 / Zm) ^ 0.167 = 0.228
Lzm = L * (Zm / 33) ^ Epsilon = 427.057
Q = (1 / (1 + 0.63 * ((B + Ht) / Lzm)^0.63))^0.5 = 0.931
G2 = 0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm)) = 0.889
Gust Factor Used in Analysis
G = Lessor Of G1 Or G2 = 0.850

Components and Cladding (C&C) Calculations per Ch 30 Part 1:

Zh = Mean Roof Height for Kh: h + Base_Dist = 20.000 ft
Kh = Since 15 ft [4.572 m] < Zh < Zg --> 2.01 * (Zh/zg)^(2/Alpha) = 0.902
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
LF = Load Factor based upon STRENGTH Design = 1.00
qh = (0.00256 * Kh * Kzt * Kd * V^2) * LF = 35.24 psf
LHD = Least Horizontal Dimension: Min(B, L) = 25.000 ft
a1 = Min(0.1 * LHD, 0.4 * h) = 2.500 ft
a = Max(a1, 0.04 * LHD, 3 ft [0.9 m]) = 3.000 ft
h/B = Ratio of mean roof height to least hor dim: h / B = 0.800

Wind Pressures for C&C Ch 30 Pt 1
All wind pressures include a load factor of 1.0

Description ft	Zone	Width ft	Span ft	Area sq ft	1/3 Rule	Ref Fig	GCp Max	GCp Min	p Max psf	p Min psf
	3	5.000	6.000	30.00	No	30.4-2A	0.252	-1.989	16.00	-76.43

Area = Span Length x Effective Width
1/3 Rule = Effective width need not be less than 1/3 of the span length
GCp = External Pressure Coefficients taken from Figures 30.4-1 through 30.4-7
p = Wind Pressure: qh*(GCp - GCpi) [Eqn 30.4-1]*
*Per Para 30.2.2 the Minimum Pressure for C&C is 16.00 psf [0.766 kPa] {Includes LF}
Since Roof Slope <= 10 Deg, the GCp value is reduced by 10%

DESIGN LOADS FOR CANOPY #5 SECTION C

Project Number	ETC 222- 413	Sheet			
Project Name		Designed by		Date	
Subject	DESIGN LOADS	Checked by		Date	

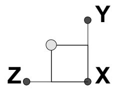
TRIB WIDTH = 11.75 feet

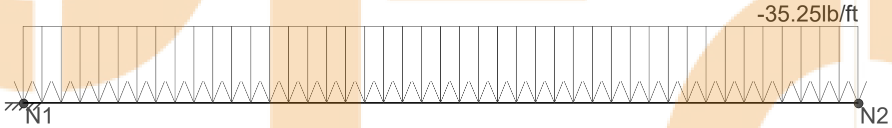
LOAD CALCULATION (DEAD & ROOF LIVE)

DEAD LOAD (W)	=	3	psf	x	11.75	ft	=	35.25	plf
ROOF LIVE LOAD	=	20	psf	x	11.75	ft	=	235	plf

WIND LOAD CASE A & CASE B

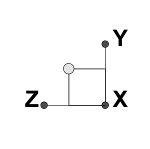
WIND LOAD A	=	16	psf	x	11.75	ft	=	188	plf
WIND LOAD B	=	-76.43	psf	x	11.75	ft	=	-898.05	plf

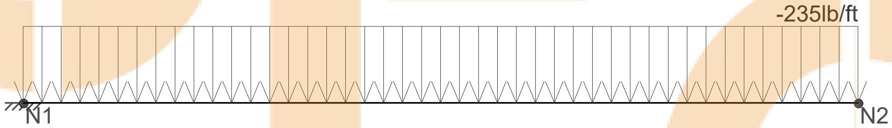




Loads: BLC 1, DL
Envelope Only Solution

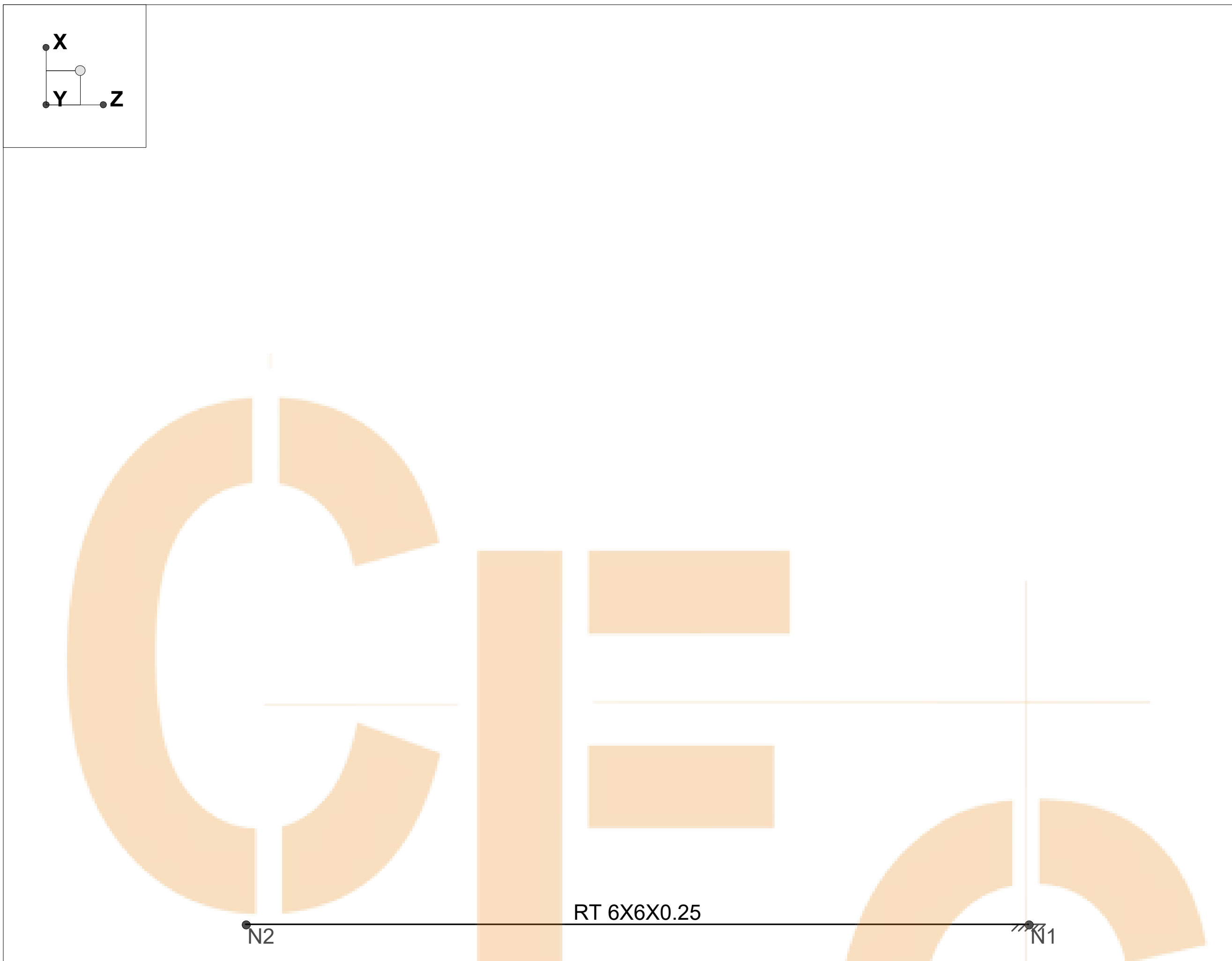
	CANOPY 5 SECTION C	SK - 2
EAST TEXAS 222-403		SUNSHADE LAYOUT #3.r3d





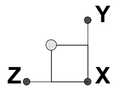
Loads: BLC 2, RLL
Envelope Only Solution

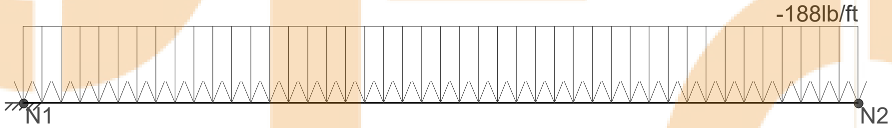
	CANOPY 5 SECTION C	SK - 3
EAST TEXAS 222-403		SUNSHADE LAYOUT #3.r3d



Envelope Only Solution

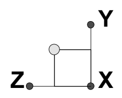
	CANOPY 5 SECTION C	SK - 1
EAST TEXAS 222-405		SUNSHADE LAYOUT #3.r3d

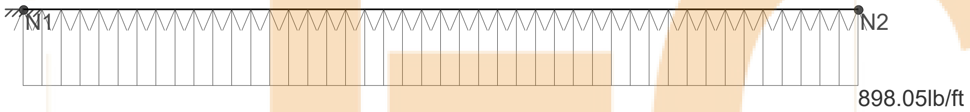




Loads: BLC 4, WLA
Envelope Only Solution

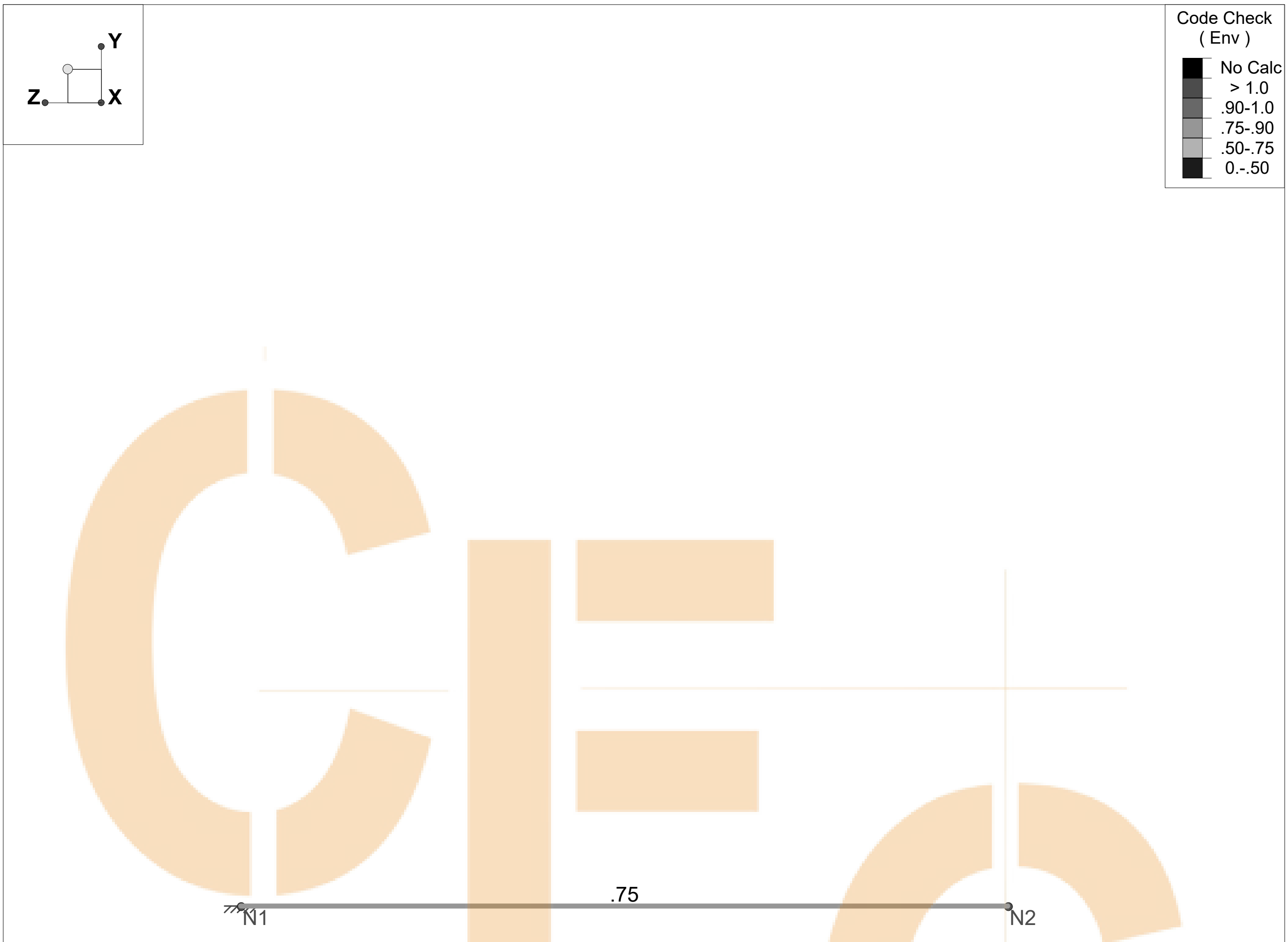
	CANOPY 5 SECTION C	SK - 4
EAST TEXAS 222-405		SUNSHADE LAYOUT #3.r3d





Loads: BLC 5, WLB
Envelope Only Solution

	CANOPY 5 SECTION C	SK - 5
EAST TEXAS 222-403		SUNSHADE LAYOUT #3.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

	CANOPY 5 SECTION C	SK - 6
EAST TEXAS 222-415		SUNSHADE LAYOUT #3.r3d

Aluminum Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (...	Density[...	Table B.4	kt	Ftu[ksi]	Fty[ksi]	Fcy[ksi]	Fsu[ksi]	Ct
1	3003-H14	10100	3787.5	.33	1.3	.173	Table B....	1	19	16	13	12	141
2	6061-T6	10100	3787.5	.33	1.3	.173	Table B....	1	38	35	35	24	141
3	6063-T5	10100	3787.5	.33	1.3	.173	Table B....	1	22	16	16	13	141
4	6063-T6	10100	3787.5	.33	1.3	.173	Table B....	1	30	25	25	19	141
5	5052-H34	10200	3787.5	.33	1.3	.173	Table B....	1	34	26	24	20	141
6	6061-T6 W	10100	3787.5	.33	1.3	.173	Table B....	1	24	15	15	15	141
7	6061-T6 haz	10100	3787.5	.33	1.3	.173	Table B....	1	29	23	23	18	141

Aluminum Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	B1	RT 6X6X0.25	Beam	Rectangular Tubes	6061-T6 h...	Typical	5.75	31.745	31.745	47.527
2	Louvers	RT2X6X0.125	Beam	Rectangular Tubes	6061-T6	Typical	1.94	1.43	8.28	3.91

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N2	0	0	-6	0	
2	N1	0	0	0	0	

Aluminum Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	B1	6			Lbyy						Lateral

Member Area Loads

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
No Data to Print ...						

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	IBC 16-8	Yes	Y		DL	1																		
2	IBC 16-10 (a)	Yes	Y		DL	1	RLL	1																
3	IBC 16-12 (a)	Yes	Y		DL	1	WL...	.6																
4	IBC 16-13 (a)	Yes	Y		DL	1	WL...	.45					R...	.75										
5	IBC 16-15	Yes	Y		DL	.6	WL...	.6																
6	IBC 16-12 (a)	Yes	Y		DL	1	WL-Y	.6																
7	IBC 16-13 (a)	Yes	Y		DL	1	WL-Y	.45					R...	.75										
8	IBC 16-15	Yes	Y		DL	.6	WL-Y	.6																
9	DL		Y		DL	1.25																		
10	RLL		Y		RLL	1.25																		
11	WL+Y		Y		WL+Y	1.25																		
12	WL-Y		Y		WL-Y	1.25																		

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [lb...	LC	MY [lb-ft]	LC	MZ [l...	LC
1	N1	m...	0	8	1.818	4	0	8	5454	4	0	8	0	8
2		min	0	1	-3.081	8	0	1	-9243...	8	0	1	0	1
3	Totals:	m...	0	8	1.818	4	0	8						
4		min	0	1	-3.081	8	0	1						

RISA A NEMETSCHEK COMPANY

Company :
Designer :
Job Number : EAST TEXAS 222-403
Model Name : CANOPY 5 SECTION C

8:19 PM
Checked By:

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

	Member	Shape	Code C...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	Pnc/O...	Pnt/Om...	Mny/O...	Mnz/O...	Vny/O...	Vnz/O...	Cb	Eqn
1	M1	RT 6X6X...	.752	6	8	.140	6	y	8	73.301	80.152	12291....	12291....	21.955	21.955	2....	H.1-1

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear[k]	LC	Torque[...	LC	y-y Mo...	LC	z-z Moment[lb-ft]	LC
1	M1	1	max	0	8	0	8	0	8	0	8	0	8	0	8
2			min	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	0	8	.77	8	0	8	0	8	0	8	340.875	4
4			min	0	1	-.454	4	0	1	0	1	0	1	-577.732	8
5		3	max	0	8	1.541	8	0	8	0	8	0	8	1363.5	4
6			min	0	1	-.909	4	0	1	0	1	0	1	-2310.93	8
7		4	max	0	8	2.311	8	0	8	0	8	0	8	3067.875	4
8			min	0	1	-1.363	4	0	1	0	1	0	1	-5199.592	8
9		5	max	0	8	3.081	8	0	8	0	8	0	8	5454	4
10			min	0	1	-1.818	4	0	1	0	1	0	1	-9243.72	8

Envelope Member Section Deflections Service

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	8	.572	8	0	8	0	8	1534.93	1	NC	8
2			min	0	1	-.337	4	0	1	0	1	125.983	8	NC	1
3		2	max	0	8	.383	8	0	8	0	8	2292.469	1	NC	8
4			min	0	1	-.226	4	0	1	0	1	188.16	8	NC	1
5		3	max	0	8	.204	8	0	8	0	8	4299.72	1	NC	8
6			min	0	1	-.12	4	0	1	0	1	352.91	8	NC	1
7		4	max	0	8	.062	8	0	8	0	8	NC	1	NC	8
8			min	0	1	-.037	4	0	1	0	1	1163.7	8	NC	1
9		5	max	0	8	0	8	0	8	0	8	NC	8	NC	8
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

ANCHOR DESIGN @ SECTION D

Project Number	ETC 222-413	Sheet			
Project Name		Designed by		Date	
Subject	CONNECTION	Checked by		Date	

CAPACITY OF 5/8" ø SS BOX BOLTS

CHECK FOR TENSILE CAPACITY OF ANCHORS

Moment acting on the member	=	9244.00	lbs.ft			
Moment arm (4.5"/12)	=	0.375	ft			
Tensile force acting on the member	=	24650.67	lbs	As per page 1,111		
Allowable Tensile Capacity of Anchor	=	8230.00	lbs			
Number of Anchors provided	=	4.00	Nos			
Total allowable Tensile capacity of Anchor	=	32920.00	lbs			
Check for Tensile capacity of Anchors with force acting on the member	=	24650.67	<		32920.00	lbs
			SAFE			

USE [(4) 5/8" ø SS TYPE C BOX EXPANSION BOLTS FOR CONNECTING BEAM TO WALL FOR SECTION D]

ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-3217

Reissued October 2021

This report is subject to renewal April 2023.

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DIVISION: 05 00 00—METALS
Section: 05 05 27—Metal Connectors

REPORT HOLDER:

LNA SOLUTIONS—A KEE SAFETY LOGISTIC LTD

EVALUATION SUBJECT:

BOXBOLT® TYPE C BLIND FASTENERS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015, 2012 and 2009 *International Building Code®* (IBC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Property evaluated:

Structural

2.0 USES

BoxBolt® Type C Blind Fasteners are designed for connecting structural steel to hollow structural section (HSS) steel members and other structural steel elements where access is difficult or is restricted to one side only. BoxBolt® Type C fasteners are intended for use with rectangular or square HSS members and are recognized for resisting static dominant tension and shear loads in bearing-type connections, and for resisting static dominant lateral loads in slip-critical connections, where static dominant loads include load combinations with gravity and wind loads for structures assigned to all Seismic Design Categories and load combinations with seismic loads for structures assigned to Seismic Design Category (SDC) A, B or C. The BoxBolt® Type C Blind Fasteners are alternatives to bolts described in Section J3 of AISC 360, which is referenced in Section 2205.1 of the IBC.

BoxBolt® Type C Blind Fasteners may also be used to resist load combinations with seismic loads for structures assigned to Seismic Design Categories (SDCs) D, E and F, based on cyclic test data in accordance with Sections 3.0 and 4.4 of the ICC-ES Acceptance Criteria for Expansion Bolts in Structural Steel Connections (AC437).

3.0 DESCRIPTION

3.1 General:

BoxBolt® Type C Blind Fasteners are assembled from four components, consisting of the core bolt (or set screw), the body (or shell), the shoulder (or collar), and the cone (or conical nut). The steel core bolt features a full-length threaded shank and a hexagonal head. The body is a steel segmented hollow cylinder, with four slits along the length of the cylinder, and are located at 90 degrees from each other. The collar is a steel flat hexagonal element with a circular hole at its center. The cone is a steel circular internally threaded nut with knurling on one end for interacting with the body. Nominal BoxBolt® diameters include $^1/_2$ inch (12.0 mm), $^5/_8$ inch (16.0 mm), and $^3/_4$ inch (20.0 mm), with each diameter of bolt available in three lengths. Figure 1 provides a picture of the BoxBolt®. Table 1 provides part codes, dimensions and installation information. Table 2 provides BoxBolt® Type C fastener strength information.

3.2 Materials:

3.2.1 Core Bolt: The core bolt is manufactured from steel complying with ISO 4017, Class 8.8 in accordance with ISO 898-1, having a specified tensile strength, F_u, of 116,030 psi (800 MP_a) for the M12 and M16 bolts, and 120,380 psi (830 MP_a) for the M20 bolts.

3.2.2 Body, Collar and Cone: The body, collar, and cone are manufactured from steel complying with BS EN 10083 Grade C22E (1.1151).

3.2.3 Finish: All components are hot dip galvanized in accordance with BS EN ISO 1461 with a mean coating thickness of 2.2 mil (55 μm), as described in the report holder's quality documentation.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The BoxBolt® Type C Blind Fasteners are alternatives to bolts described in Section J3 of AISC 360, which is referenced in Section 2205.1 of the IBC, for bearing-type connections and for slip-critical connections.

The design of the BoxBolt® Type C Blind Fasteners must comply with this report, Section J3 of AISC 360 and the information for the BoxBolt® provided in Tables 1 and 2 of this report.

For BoxBolt® Type C Blind Fasteners used in structures assigned to Seismic Design Categories (SDCs) D, E and F, the fasteners are intended to be used as force-controlled components and are not expected to undergo inelastic deformations. The construction documents (including structural calculations and engineering plans) specifying the BoxBolt® Type C Blind Fasteners, must consider this requirement for a force-controlled behavior, and additional requirements in AISC 341, as applicable.

The load-carrying capacity of a connection utilizing BoxBolt® Type C Blind Fasteners depends on the fasteners' capacities as shown in Table 2, the affected elements of members and connecting elements, and the interaction between the fasteners and the connected elements. All applicable limit states of a connection must be checked to determine the load-carrying capacity of the connection. The available strength of a connection is limited by the governing limit state (or the limit state with the least available strength), which occurs in the weakest component in the connection, typically the steel section itself in the case of thin steel sections, or the BoxBolt® in the case of thick wall steel sections, or a combination of the two.

Connections subjected to combined static tension loading and static shear-bearing loading must comply with the following:

$$\left(\frac{Tension\ Demand}{Tension\ Capacity}\right)^2 + \left(\frac{Shear\ Demand}{Shear\ Capacity}\right)^2 \leq 1.0$$

4.2 Installation:

The BoxBolt® Type C Blind Fasteners must be installed in accordance with the details noted in this section, the manufacturer's installation instructions and the approved plans. In case of a conflict between this report and the report holder's installation instructions, the most restrictive requirement governs.

1. Holes must be drilled into the sections to be connected, ensuring that the resulting holes have the correct diameter, spacing and edge distance according to the report holder's published specifications, this evaluation report and the correct design requirements for the connection, as indicated in the approved plans. Holes must be standard diameter holes conforming to AISC 360, where the bolt hole diameters must be no greater than the bolt shell diameter plus $^1/_{16}$ inch (1.6 mm).
2. Burrs in the holes must be removed before insertion of the BoxBolt® Type C Blind Fasteners.
3. The structural steel elements to be fastened adjacent to each other must be positioned to ensure:
   a. That the two sections are lined up and rest one against the other without any gap. Clamps must be used as necessary to hold the two sections together and prevent formation of gaps.
   b. That the holes are aligned, using a mandrel if necessary.
4. The core bolts must be positioned in the holes. The collar must rest flat against the section with no gap.
5. The collar must be held in position using a suitable open-ended wrench, and then the core bolt must be tightened to the specified torque, as noted in Table 1 of this report.
6. The tightening tool must then be removed and the tightening torque on the bolt must be verified. If necessary, the tightening torque must be corrected.

4.3 Special Inspection:

Special inspection is required in accordance with 2015 and 2012 IBC Sections 1704.3, 1705.1.1 and 1705.2 (2009 IBC Sections 1704.3, 1704.15 and 1705), as applicable). The report holder must submit inspection procedures to verify proper installation of the BoxBolts® Type C Blind Fasteners. Where BoxBolts® Type C Blind Fasteners are used for seismic or wind load resistance, special inspection must comply with 2015 IBC Sections 1705.11, 1705.12 and 1705.13 (2012 IBC Sections 1705.10, 1705.11 and 1705.12; 2009 IBC Sections 1706, 1707 and 1708; as applicable).

4.4 Packaging:

Each package of the BoxBolt® Type C Blind Fasteners must include the following information: installation and safety instructions, minimum and maximum fixing ranges (or the total thickness of elements to be connected), installation torque, design loads and special inspection requirements.

5.0 CONDITIONS OF USE

The BoxBolt® Type C Blind Fasteners described in this report comply with, or are suitable alternatives to what is specified in, the codes noted in Section 1.0 of this report, subject to the following conditions:

5.1 Steel structures utilizing BoxBolt® Type C Blind Fasteners must be designed in accordance with the IBC including its referenced standards (such as AISC 360 and AISC 341) and this evaluation report; and must be installed in accordance with this evaluation report and the report holder's installation instructions. In case of a conflict between this evaluation report and the report holder's installation instructions, the most restrictive requirement governs.

5.2 Calculations and details, justifying the use of the BoxBolt® Type C Blind Fasteners is in compliance with the applicable code and this evaluation report, including showing that the BoxBolt® fasteners, the affected elements of members and connecting elements are adequate to resist the applied loads, must be submitted to the code official for approval. The calculations and details must be signed and sealed by a registered design professional, when required by the statutes of the jurisdiction in which the project is to be constructed.

5.3 **Fire-resistive Construction:** Where not otherwise prohibited in the code, BoxBolt® Type C Fasteners are permitted for use with fire-resistance-rated construction provided that at least one of the following conditions is fulfilled:

- The BoxBolt® fasteners are used to resist wind or seismic forces only.
- BoxBolt® fasteners that support a fire-resistance-rated envelope or a fire-resistance-rated membrane, are protected by approved fire-resistance-rated materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
- The BoxBolt® fasteners are used to support nonstructural elements.

5.4 Special inspection must be provided as specified in Section 4.3 of this report.

5.5 For BoxBolt® Type C Blind Fasteners used in structures assigned to Seismic Design Categories (SDCs) D, E and F, the fasteners are intended to be used as force-controlled components and are not expected to undergo inelastic deformations, and the design professional must consider this force-controlled behavior in his design.

5.6 The BoxBolt® Type C Fasteners addressed in this evaluation report are manufactured under a quality program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Expansion Bolts in Structural Steel Connections (AC437), dated October 2014 (editorially revised December 2016).

7.0 IDENTIFICATION

7.1 The BoxBolt® Type C fastener package is labeled with the product part number, quantity, batch number, image of the product, report holder's name (LNA Solutions—A Kee Safety Logistic Ltd.), and the evaluation report number (ESR-3217).The fastener is identified by a nine-character alphanumeric part number (BQXGALXXC). The first three characters (BQX) indicate the length of the fastener (Size 1, 2, or 3). The second three characters (GAL) indicate the fasteners are coated with a hot dip galvanized coating. The last three characters (XXC) indicate the diameter and type of fastener, where XX is the numeric diameter in millimeters (12, 16 or 20), and C identifies the fastener as a Type C fastener. Each core bolt is stamped with a head marking of "ATBX". Each collar is stamped with "BOXBOLT" and part number.

7.2 The report holder's contact information is the following:

LNA SOLUTIONS—A KEE SAFETY LOGISTIC LTD
3924A VARSITY DRIVE
ANN ARBOR, MICHIGAN 48108
(888) 724-2323
www.LNASolutions.com

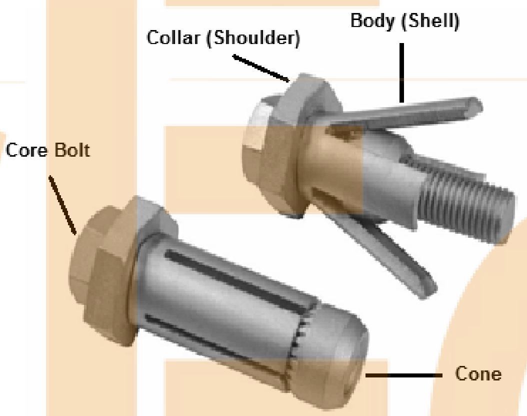


FIGURE 1—TYPICAL BOX BOLT® TYPE C BLIND FASTENER

TABLE 1—BOXBOLT® TYPE C BLIND FASTENER DIMENSIONAL AND INSTALLATION INFORMATION[1]

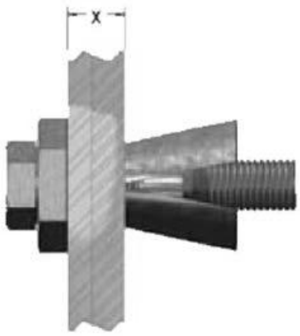
PART NUMBER AND DESCRIPTION			DIMENSIONAL INFORMATION[3]							INSTALLATION INFORMATION[3]	
BoxBolt® (Part Code)	BoxBolt® (Core Bolt Diameter)	Description[2]	Core Bolt Length	Clamping Range (dim x) Min	Clamping Range (dim x) Max	Across Flats of Shoulder	Collar Thickness	Dim A	Dim B	Dim C Drill Dia	Torque (ft-lb)
BQ1GAL12C	1/2" (12 mm)	1/2" BoxBolt® Size 1	2 3/16" (55 mm)	1/2"	15/16"	1" (26 mm)	5/16" (8.4 mm)	2 1/16" (52 mm)	1 1/8"	13/16"	60
BQ2GAL12C	1/2" (12 mm)	1/2" BoxBolt® Size 2	3 1/8" (80 mm)	3/4"	1 7/8"	1" (26 mm)	5/16" (8.4 mm)	2 1/16" (52 mm)	1 1/8"	13/16"	60
BQ3GAL12C	1/2" (12 mm)	1/2" BoxBolt® Size 3	4" (100 mm)	1 1/2"	2 11/16"	1" (26 mm)	5/16" (8.4 mm)	2 1/16" (52 mm)	1 1/8"	13/16"	60
BQ1GAL16C	5/8" (16 mm)	5/8" BoxBolt® Size 1	3" (75 mm)	5/8"	1 3/8"	1 7/16" (36 mm)	3/8" (9.4 mm)	2 11/16" (68 mm)	1 3/8"	1 1/16"	140
BQ2GAL16C	5/8" (16 mm)	5/8" BoxBolt® Size 2	4" (100 mm)	1"	2 5/16"	1 7/16" (36 mm)	3/8" (9.4 mm)	2 11/16" (68 mm)	1 3/8"	1 1/16"	140
BQ3GAL16C	5/8" (16 mm)	5/8" BoxBolt® Size 3	4 3/4" (120 mm)	2"	3 1/16"	1 7/16" (36 mm)	3/8" (9.4 mm)	2 11/16" (68 mm)	1 3/8"	1 1/16"	140
BQ1GAL20C	3/4" (20 mm)	3/4" BoxBolt® Size 1	4" (100 mm)	3/4"	1 13/16"	1 13/16" (46 mm)	7/16" (11.4 mm)	3 7/16" (87 mm)	1 3/4"	1 3/8"	220
BQ2GAL20C	3/4" (20 mm)	3/4" BoxBolt® Size 2	5 1/8" (130 mm)	1 5/16"	3"	1 13/16" (46 mm)	7/16" (11.4 mm)	3 7/16" (87 mm)	1 3/4"	1 3/8"	220
BQ3GAL20C	3/4" (20 mm)	3/4" BoxBolt® Size 3	6" (150 mm)	2 9/16"	4"	1 13/16" (46 mm)	7/16" (11.4 mm)	3 7/16" (87 mm)	1 3/4"	1 3/8"	220

For **SI:** 1 inch = 25.4mm; 1 lbf = 4.448N; 1 ft-lb = 1.356 N-m.

[1]When dimensions are expressed in both US Customary and SI units; BoxBolt® dimensions in US Customary units are converted from the corresponding SI units.

[2]BoxBolt® size is determined by core bolt length.

[3]Dimension "X" is the total thickness of the connected steel elements (or the grip); "A" is the minimum spacing between fasteners; "B" is the minimum edge distance for the fasteners; and "C" is the standard hole diameters for the fasteners.



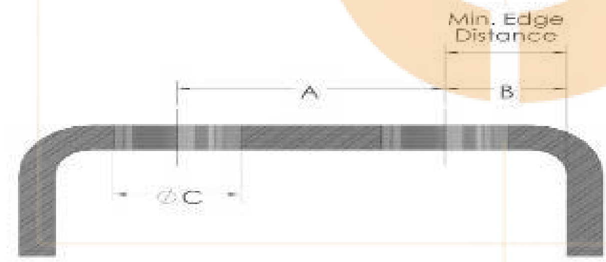


TABLE 2—BOXBOLT® TYPE C BLIND FASTENER STRENGTH INFORMATION

PART CODE	LRFD STRENGTHS[1] (lbf)						ASD STRENGTHS[2] (lbf)					
	Static Dominant Loads[3]			Seismic SDC D, E or F[4]			Static Dominant Loads[3]			Seismic SDC D, E or F[4]		
	Shear-bearing	Shear-slip resistance	Tension	Shear-bearing	Shear-slip resistance	Tension	Shear-bearing	Shear-slip resistance	Tension	Shear-bearing	Shear-slip resistance	Tension
BQ1GAL12C	7680	150	5250	6900	150	4730	4800	90	3280	4320	100	2960
BQ2GAL12C	7680	150	5250	6900	150	4730	4800	90	3280	4230	100	2960
BQ3GAL12C	7680	150	5250	6900	150	4730	4800	90	3280	4320	100	2960
BQ1GAL16C	12200	170	13100	11000	170	11400	7650	110	8230	6870	110	7120
BQ2GAL16C	12200	170	13100	11000	170	11400	7650	110	8230	6870	110	7120
BQ3GAL16C	12200	170	13100	11000	170	11400	7650	110	8230	6870	110	7120
BQ1GAL20C	17600	790	15000	11800	790	13500	11000	490	9400	7380	500	8470
BQ2GAL20C	17600	790	15000	11800	790	13500	11000	490	9400	7380	500	8470
BQ3GAL20C	17600	790	15000	11800	790	13500	11000	490	9400	7380	500	8470

For **SI:** 1 lbf = 4.448N.

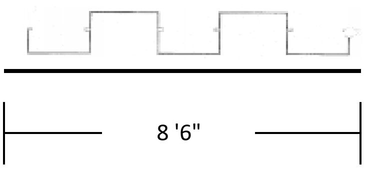
[1]Load and Resistance Factor Design (LRFD) strengths are derived in accordance AC437, Sections 3.4, 3.5, 3.7 and 3.8, based on test data per AC437 Section 4.0.
[2]Allowable Strength Design (ASD) strengths are derived in accordance AC437, Sections 3.4, 3.5, 3.9 and 3.10, based on test data per AC437 Section 4.0.
[3]Static dominant loads include load combinations with gravity and wind loads for structures assigned to all Seismic Design Categories and load combinations with seismic loads for structures assigned to Seismic Design Category (SDC) A, B or C.
[4]Seismic SDC D, E or F refer to load combinations with seismic loads for structures assigned to Seismic Design Category (SDC) D, E or F.

DECK DESIGN - CANOPY #5 SECTION C

Project Number	ETC 222-413	Sheet			
Project Name		Designed by		Date	
Subject	DECK DESIGN	Checked by		Date	

Deck Design

Max Span on Deck = 8.5 ft



WL on Deck = 45.858 psf
RLL on Deck = 20 psf

For 8 ft Span

Allowable Wind Load =	**90 psf**	**>**	**45.9** psf
Allowable Live Load =	**93 psf**	**>**	**20.0** psf

USE 2-3/4" X 6" X 0.078" ALUMINIUM DECKING as per page 1,118

Deck Fastner Design

Uplift on Deck = 45.858 psf X $\frac{6"}{12"/ft}$ X $\frac{8.50\ ft}{2}$ = **97.4 Lbs**

Pull out strength of Steel Binder Heavy guage #12 screws = 996 lbs as per page 1,119

Allowable Pull Out = 996 lbs/4 (factor of Safety) = **249.0 Lbs** > **97.4 Lbs**

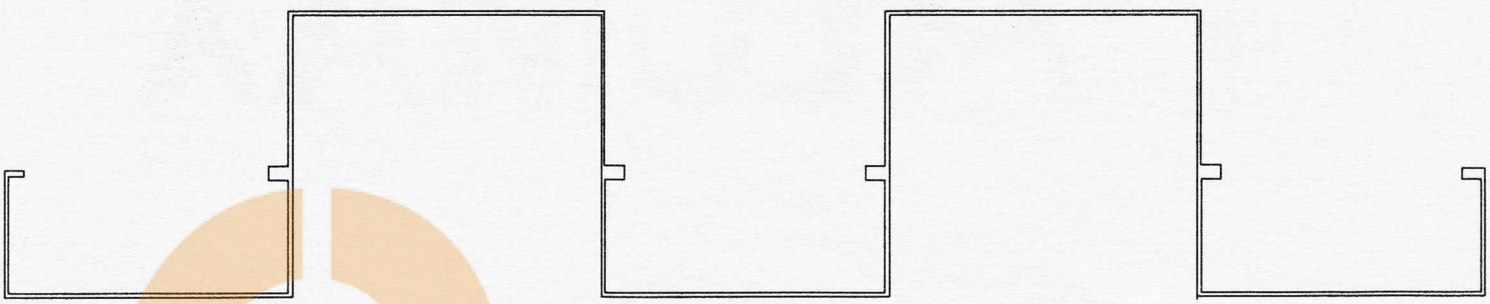
SAFE

USE [2 #12 screws @6" o.c.]

SAFETY FACTOR OF 1.95 FROM ULTIMATE STRESS
CHARTS SHOW TOTAL ALLOWABLE LOAD PER BENT.
1502
ALL PROFILES ARE 6063-T6 IN ACCORDANCE WITH ASTM STDS. WELD STRESS IN ACCORDANCE WITH ALUMINUM ASSOCIATION STANDARDS. ALL DESIGN STRESS AND FACTORS OF SAFETY.

1118

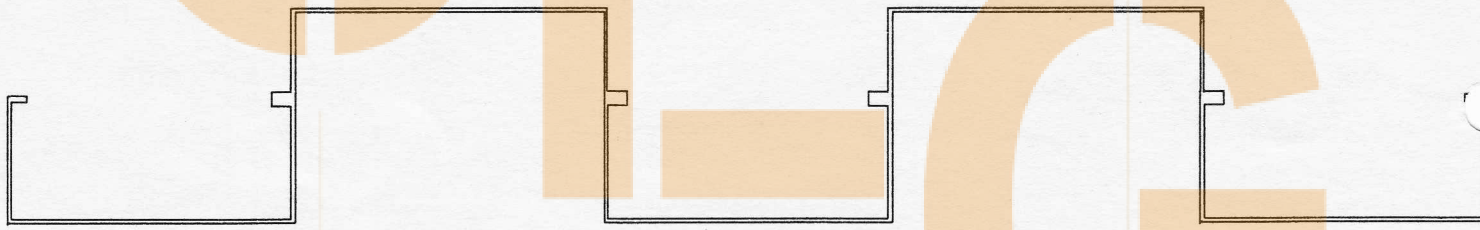
WALKWAY COVER DECKS



6″ DECK

Span (FT.)	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Gravity *	57	51	46	41	38	34	31	29	26	24	23	21	20	18	17	16	15	14
Wind *	68	61	54	49	45	41	37	34	31	29	27	25	23	22	20	19	18	17
L/180 *	69	58	49	42	36	32	28	24	22	19	17	15	14	12	11	10	9	9

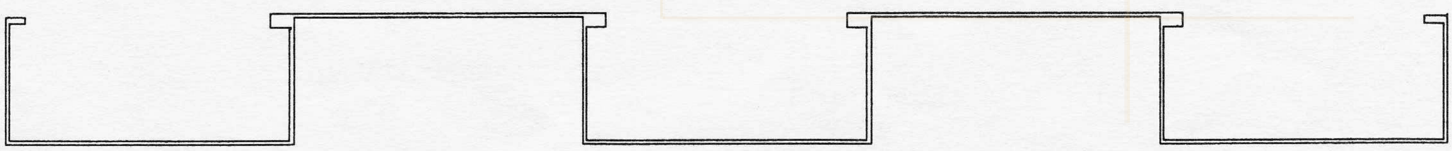
* (PFS)



4-1/2″ DECK

Span (FT.)	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Gravity *	75	64	55	48	42	38	33	30	27	25	22	21	19	17	16	15	14	13
Wind *	89	76	65	57	50	44	39	35	32	29	26	24	22	20	19	18	16	15
L/180 *	95	75	60	49	40	34	28	24	21	18	15	14	12	11	9	8	8	7

* (PSF)

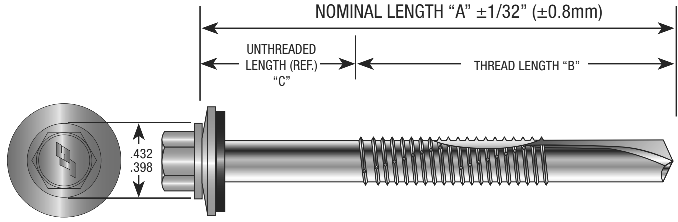


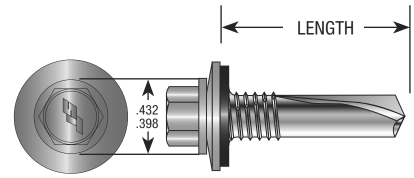
2-3/4″ DECK

Span (FT.)	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Gravity *	118	93	75	62	52	45	38	34	29	26	23	21	19	17	16
Wind *	114	90	73	61	51	43	37	33	29	25	23	20	18	17	15
L/180 *	123	86	63	47	36	29	23	19	15	13	11	9	8	7	6

* (PSF)

Steelbinder® Heavy Gauge





SPECIFICATIONS SUMMARY

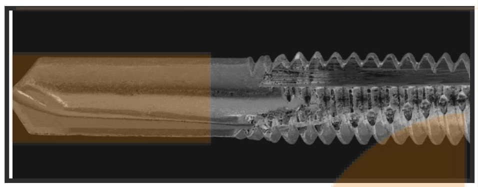
#12-24 Dimensions:

Drill Point: #4/#5
Major Diameter: .215"/.209"
Minor Diameter: .164" REF
Hex Across Flats: .311/.305

SIZE	HEAD STYLE	CARTON QTY.	WEIGHT/M
12-24 x 7/8"	HWH	2500	12.0
12-24 x 1-1/4"	HWH	2500	12.6
12-24 x 1-1/2"	HWH	2000	16.2
12-24 x 2"	HWH	1500	22.1

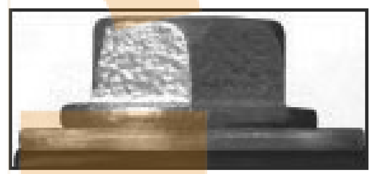
PERFORMANCE DATA

PULL OUT STRENGTH VALUE (LBS. ULT.)		MATERIAL			
		HRS Primed Only		HRS PLATE	
	NOM. GAUGE	14	12	3/16"	1/4"
	THICKNESS	.070	.106	.187	.250
#12-24 HEAVY GAUGE		924	1627	2556	3298

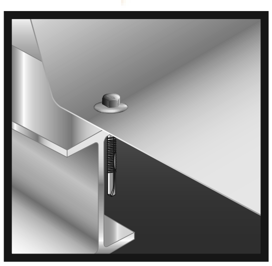


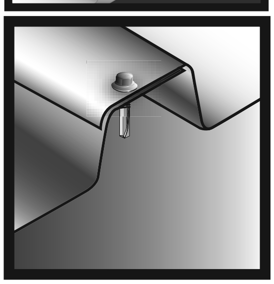
Long Drill point assures proper clearance of heavy gauge metal before any thread engagement begins

PULL OVER STRENGTH VALUE (LBS. ULT.)	DESIGNATION	MATERIAL		
		AZ55 GALVALUME		
	NOM. GAUGE	26	24	22
	THICKNESS	.019	.024	.032
BONDED WASHER (14mm O.D.)		801	996	1258
(.398/.432 HWH DIA.)		775	956	1078



HWH with EPDM bonded washer provides a secure seal to prevent leaks.





- Fastener lengths over 1-1/4"are designed to penetrate steel thickness up to .500". 12-24 x 7/8" is designed to drill up to .250".
- Thread to point ratio engineered to provide maximum pull out strength in heavy gauge steel.
- EPDM rubber is vulcanized to steel washer. Moisture has no place to penetrate. The washer provides a secure seal even when driven at an angle.
- Applications include metal deck to structural steel or bar joists, & retrofit clips to structural steel.
- Fastener is also available without a bonded sealing washer.

NOTES: *1. HRS (Hot Rolled Steel)*
2. All strength values shown are ultimate values, expressed in LBS. Apply an appropriate safety factor to obtain design limits.

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