MOUR GROUP
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6593 Riverdale St.
San Diego, CA 92120

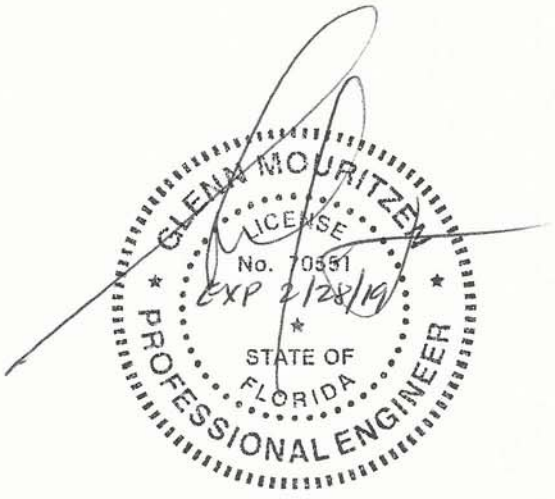
619-727-4800

Structural Calculations

for

CBKD-160 Roof Curb

Kit #80-266-49**
2017 Florida Building Code requirements

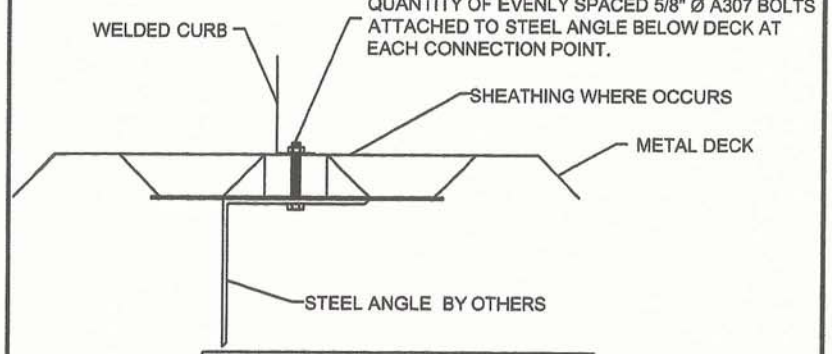


Prepared for:

PROVENT
3847 Wabash Drive
Mira Loma, CA 91725

Date: June 15, 2018
Project Number: PV1807

STEEL ATTACHMENT



CURB KIT	NO. OF ANCHORAGE BOLTS REQUIRED LONG SIDE *	SHORT SIDE *	UNIT
80-266-49	2 @ 34.5" o.c.	2 @ 19" o.c.	LXS
80-266-50	2 @ 34.5" o.c.	2 @ 29" o.c.	LXL
80-266-13	2 @ 61" o.c.	2 @ 25.3" o.c.	SUNLINE 3-6 TON
80-266-45	2 @ 58.4" o.c.	2 @ 28.2" o.c.	PRESTIGE SMALL
80-266-46	2 @ 72" o.c.	2 @ 41" o.c.	PRESTIGE LARGE
80-266-29	3 @ 34.7" o.c.	2 @ 39.5" o.c.	PREDATOR
80-266-19	3 @ 51.6" o.c.	2 @ 72" o.c.	ULTRA
80-266-18	4 @ 38.1" o.c.	3 @ 36" o.c.	SUNLINE 15-25 TON

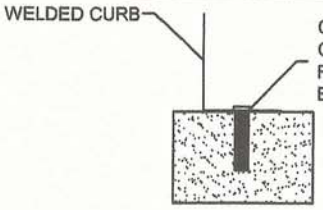
WIND AND SEISMIC LOAD ROOF ANCHORAGE DETAIL

Meets wind, seismic requirements for the following codes:
FBC 2017
based on ASCE 7-10.

Wind:
190 mph exposure D category III or IV building, max BLDG height: 60 ft
Kzt=1.00 max

Seismic:
Sds=0.30 max
Sd1=0.187 max
Site Class D
Importance Factor: Ip=1.5

CONCRETE ATTACHMENT

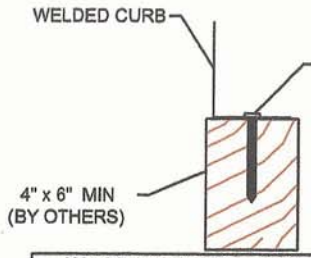


- NORMAL WEIGHT CONC SLAB
- f'c=4000 PSI MIN
- 6" MIN THICK CONC.
- SPECIAL INSPECTION REQUIRED (ESR-3187)

CURB KIT	NO. OF ANCHORAGE BOLTS REQUIRED LONG SIDE *	SHORT SIDE **	UNIT
80-266-49	5 @ 8.6" o.c.	4 @ 6.3" o.c.	LXS
80-266-50	5 @ 8.6" o.c.	5 @ 7.25" o.c.	LXL
80-266-13	9 @ 7.63" o.c.	6 @ 5.1" o.c.	SUNLINE 3-6 TON
80-266-45	6 @ 11.7" o.c.	4 @ 9.4" o.c.	PRESTIGE SMALL
80-266-46	6 @ 14.4" o.c.	5 @ 10.25" o.c.	PRESTIGE LARGE
80-266-29	16 @ 4.63" o.c.	10 @ 4.4" o.c.	PREDATOR
80-266-19	15 @ 7.4" o.c.	12 @ 6.5" o.c.	ULTRA
80-266-18	22 @ 5.4" o.c.	17 @ 4.5" o.c.	SUNLINE 15-25 TON

STEEL AND CONCRETE ANCHORS ARE 6" FROM EACH CORNER EVENLY SPACED

WOOD ATTACHMENT

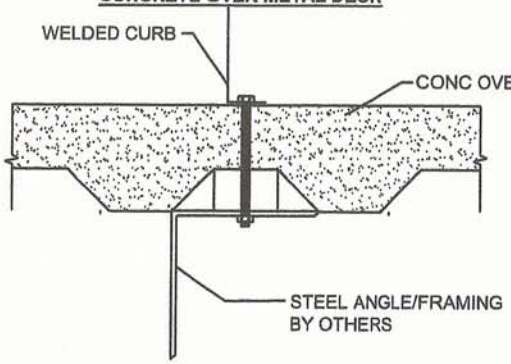


(SPECIFIC GRAVITY OF WOOD= 0.43 MIN)

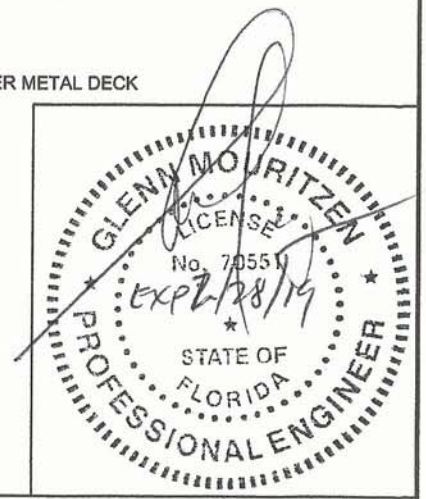
CURB KIT	NO. OF ANCHORAGE SCREWS REQUIRED LONG SIDE	SHORT SIDE	UNIT
80-266-49	5 @ 9.6" o.c.	3 @ 11.5" o.c.	LXS
80-266-50	5 @ 9.6" o.c.	5 @ 8.3" o.c.	LXL
80-266-13	8 @ 9.3" o.c.	4 @ 9.8" o.c.	SUNLINE 3-6 TON
80-266-45	6 @ 12.5" o.c.	3 @ 16.1" o.c.	PRESTIGE SMALL
80-266-46	6 @ 15.2" o.c.	4 @ 15" o.c.	PRESTIGE LARGE
80-266-29	14 @ 5.6" o.c.	7 @ 7.3" o.c.	PREDATOR
80-266-19	15 @ 7.7" o.c.	12 @ 6.9" o.c.	ULTRA
80-266-18	23 @ 5.4" o.c.	14 @ 5.8" o.c.	SUNLINE 15-25 TON

FOUR INCHES FROM EACH CORNER EVENLY SPACED.

CONCRETE OVER METAL DECK



NOTE: FOR CONC OVER METAL DECK OVER STEEL FRAMING USE STEEL ATTACHMENT



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SUBMITTED TO: _____
COMPANY: _____
JOB NAME: _____
EQUIPMENT: _____
NOTES: _____

FORM NO: CB-25

DATE:	REV:	DRAWN BY:
06/06/18	7	ALL

For wood, concrete and steel attachments see Roof Anchorage Detail, Form No. CB-26.

Will conform to wind load code requirements for knock-down or pre-assembled application. (Contact factory for assembled version.)

CALCULATED WIND AND SEISMIC ROOF CURBS FOR YORK UNITS

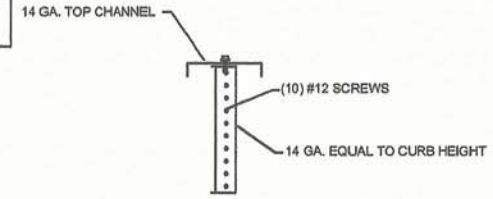
P***A ALL MODELS

ProVent P/N	A	WEIGHT	CALCULATED KIT P/N	WEIGHT
80-268-4914	14"	101 Lbs	80-266-4914	28 Lbs
80-268-4918	18"	120 Lbs	80-266-4918	33 Lbs

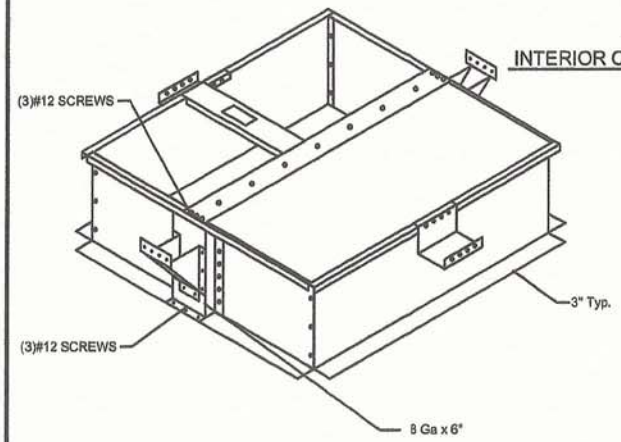
Meets wind, seismic requirements for the following codes:
FBC 2017
based on ASCE 7-10.

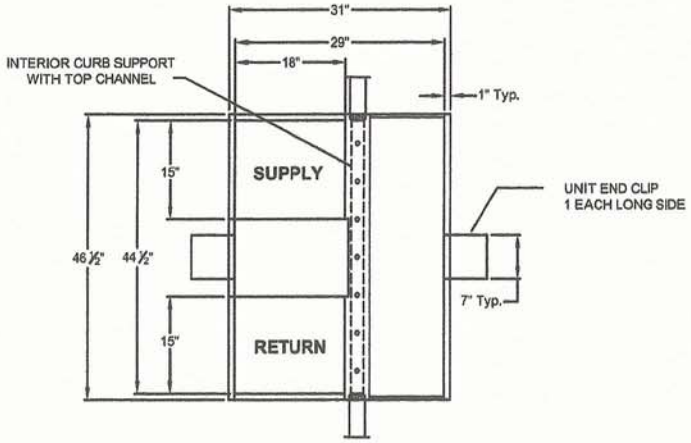
Wind:
190 mph exposure D category III or IV building, max BLDG height: 60 ft
Kzt=1.00 max

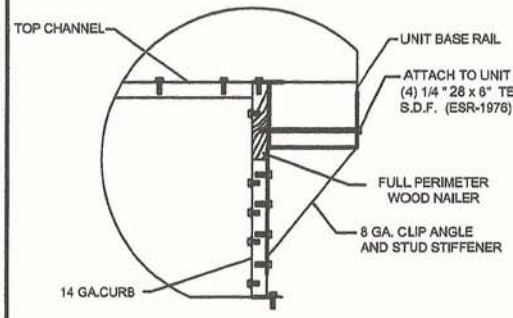
Seismic:
Sds=0.30 max
Sd1=0.187 max
Site Class D
Importance Factor: Ip=1.5



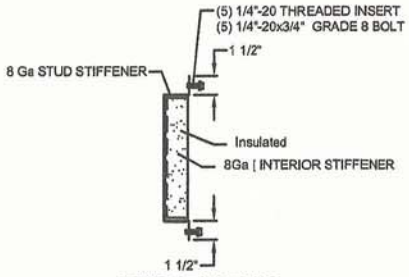
INTERIOR CURB SUPPORT



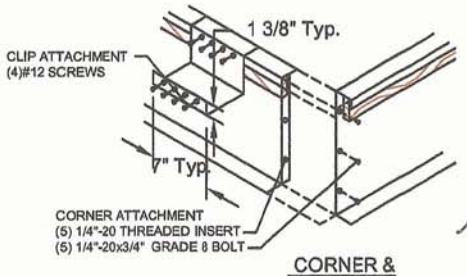




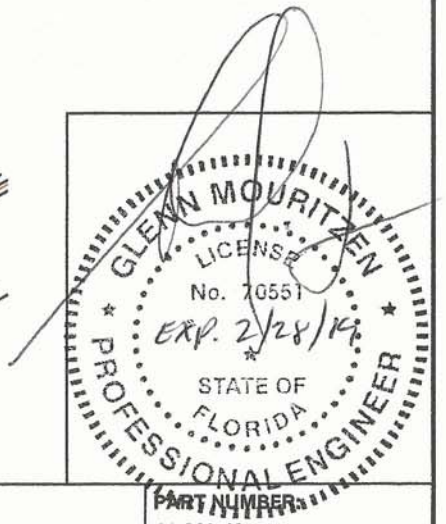
HOLD DOWN DETAIL



STUD STIFFENER



CORNER & END CLIP DETAIL



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SUBMITTED TO: _____
COMPANY: _____
JOB NAME: _____
EQUIPMENT: _____
NOTES: _____

FORM NO:		PART NUMBER:
CBKD-160		80-268-49
DATE:	REV:	DRAWN BY:
6/12/18	3	JG

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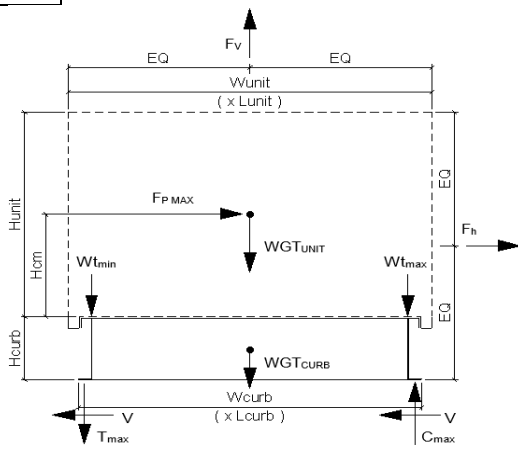
Client: ProVent PV1807
Description: CBKD-160 (80-266-49**)
Unit: York - All P***A models



Curb Information

Hcurb =	18	in	(Height of curb)
Lcurb =	46.5	in	(Length of curb)
wcurb =	31	in	(Width of curb)
WGTcurb =	153	lbs	(Weight of curb)

Unit Information

WGTunit =	367	lbs	(Weight of Unit)
Wtmax =	120	lbs	(Maximum corner weight)
Wtmin =	71	lbs	(Minimum corner weight)
Hunit =	49	in	(Height of unit above curb)
Hcm =	24.5	in	(Height to center of mass)
Lunit =	51.25	in	(Length of unit)
Wunit =	35.75	in	(Width of unit)

Seismic Loading - 2017 FBC/2015 IBC

Ss =	0.15	(Worst Case for state of Florida)
Fa =	2.5	(Worst case Site class E from Table 11.4-1 ASCE 7-10)
Sms =	0.375	(Fa*Ss)
Sds =	0.250	(2/3*Sms)
Ip =	1.5	(Importance Factor Category III or IV Building)
Fpmax =	0.6000 Wp	(1.6*Sds*Ip)*Wp
FpmaxASD =	154 lbs	(0.7*Fpmax) FpmaxASD = 218 lbs
	(unit only)	(unit and curb)

Wind Loading - 2017 FBC/2015 IBC

*** Exposure Category D ***

Kz =	1.31	(For 60 ft roof height, Exposure D - Table 29.3-1 ACSE 7-10)
Kzt =	1.0	(No topographic effects assumed for rooftop mounted units)
Kd =	0.85	(Directionality factor Table 26.6-1 ASCE 7-10)
V =	190	(Wind velocity, mph for Occupancy Cat III-IV bldgs Exp. Cat D)
$GCr_{(horiz)}$ =	1.9	(Refer Sect 29.5.1 ASCE 7-10)
$GCr_{(vert)}$ =	1.5	(Refer Sect 29.5.1 ASCE 7-10)
qz	102.9 psf	= 0.00256*Kz*Kzt*Kd*V^2 (Eq. 29.3-1 ASCE 7-10)
$F_{h\ ASD\ trans}$ =	2797 lbs	= 0.6*qz*GCr*Lunit*(Hunit+Hcurb) (Eq. 29.5-2)
$F_{h\ ASD\ long}$ =	1951 lbs	= 0.6*qz*GCr*Wunit*(Hunit+Hcurb)
$F_{vert\ ASD}$ =	1178 lbs	= 0.6*qz*GCr*Lunit*Wunit (Eq. 29.5-3)

Curb Loading

Transverse:

$Compression_{SEISMIC}$ =	370 lbs	=[FpmaxASD*Hcm+2*(1+0.14S_{DS})*Wtmax*wcurb]/wcurb
$Tension_{SEISMIC}$ =	163 lbs	= $Comp_{SEISMIC}$-(0.6-0.14S_{DS})*WGTunit
$Compression_{WIND}$ =	1766 lbs	=[$F_{h\ transASD}$*Hcm+2*0.6*Wtmax*wcurb-$F_{vertASD}$*wcurb/2]/wcurb
$Tension_{WIND}$ =	2724 lbs	= $Comp_{WIND}$+Fvert-0.6*WGTunit

---> Negative values indicate Compression load rather than Tension.

Longitudinal:

$Compression_{SEISMIC}$ =	330 lbs	=[FpmaxASD*Hcm+2*(1+0.14*S_{DS})*Wtmax*Lcurb]/Lcurb
$Tension_{SEISMIC}$ =	122 lbs	= $Comp_{SEISMIC}$-(0.6-0.14S_{DS})*WGTunit
$Compression_{WIND}$ =	583 lbs	=[$F_{h\ transASD}$*Hcm+2*0.6*Wtmax*Lcurb-$F_{vertASD}$*Lcurb/2]/Lcurb
$Tension_{WIND}$ =	1541 lbs	= $Comp_{WIND}$+Fvert-0.6*WGTunit

---> Negative values indicate Compression load rather than Tension.

Governing Reactions:

Transverse:	$Comp_{MAX}$ =	1766	lbs	---> Along long edge of curb.
(on long edge)	$Tens_{MAX}$ =	2724	lbs	---> Along long edge of curb.
Longitudinal:	$Comp_{MAX}$ =	583	lbs	---> Along short edge of curb.
(on short edge)	$Tens_{MAX}$ =	1541	lbs	---> Along short edge of curb.

---> Negative values indicate Compression load rather than Tension.

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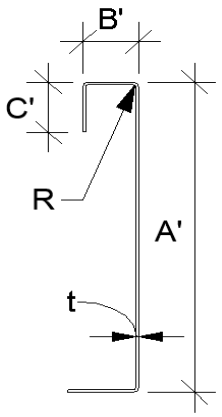
Curb Design

Fy = 50 ksi Fu = 65 ksi t = 0.0713 [14 Gauge]

E = 29500 ksi



Calculate Section Properties of Curb

A'=	[18.000] in	a =	17.644 in	= A'-(2r+t)
B'=	[2.000] in	a'=	17.929 in	= A'-t
C'=	[0.000] in (0 if no lips)	b =	1.822 in	= B'-[r+t/2+α(r+t/2)]
α =	[0.000] (0 - no Lip; 1 w/ lip)	b'=	1.964 in	= B'-(t/2+αt/2)
R =	0.1069 (Inside bend radius)	c =	0.000 in	= α[C'-(r+t/2)]
t =	0.0713 in	c'=	0.000 in	= α(C'-t/2)
r'=	0.143 in = R+t/2	u =	0.224 in	= πr/2
x =	0.178 in (Distance between centroid and web centerline)			
Ix =	56.073 in (Moment of Inertia about X-Axis)			
Iy =	0.311 in (Moment of Inertia about Y-Axis)			
A =	1.55 in^2			
rx =	6.02 in			
ry =	0.448 in			
rmin =	0.448 in			

Axial Compression

Pu = 1.399 k (Max Axial Comp) Ωc = 1.80

Pn/Ωc = 24.287 k

Fe = 36.56 ksi

$$\frac{P_n}{\Omega_c} = \frac{F_n A}{\Omega_c} \qquad If\ \lambda_c \le 1.5;\ F_n = \left(0.658^{\lambda_c{}^2}\right) F_y \qquad If\ \lambda_c > 1.5;\ F_n = \frac{0.877}{\lambda_c{}^2} F_y$$

$$\lambda_c = \sqrt{\frac{F_y}{F_e}} \qquad F_e = \frac{\pi^2 E}{\left(kl/r\right)^2}$$

λc = 1.17

Fn = 28.21 ksi

Ly = 50 in Lateral unbraced length

$k_y L_y/r_y$ = 89 (assume k=0.8)

Compression Check = O.K.

Check Web Crippling

h = 18 in -- Check limits: C = 4.00

t = 0.0713 in h/t = 252.45 ≤ 200 C_R = 0.14

N = 7.00 N/t = 98.18 ≤ 210 C_N = 0.35

Ω_w = 1.75 N/h = 0.388889 ≤ 2.0 C_h = 0.02

(See table C3.4.1-2, fastened to support, one flange, end loading)

P_n = 2.296 k R/t = 1.50 ≤ 9.0

$$P_n = Ct^2 F_y \sin(90)\left(1 - C_R\sqrt{\frac{R}{t}}\right)\left(1 + C_N\sqrt{\frac{N}{t}}\right)\left(1 - C_h\sqrt{\frac{h}{t}}\right)$$

P_n/Ω_w = 1.312 k

Long side: Pu_{Trans} = 1.766 k **web stiffener REQ'D** # clips = 1

Short side: Pu_{Long} = 0.583 k **O.K.** # clips = 1

*****h/t > 200; use web stiffeners**

Check Web Stiffener

16Ga x 3/4" x 7" (C-channel)

width of stiffener = 7.000 in ts = 0.0566 [16 Gauge]

web of stiff. w = 6.717 in Rs = 0.0849 in

***Check w/ts ≤ 1.28√E/Fys Ωc = 1.70

w/ts = 118.675

1.28√(E/Fys) = 31.091 --> w/ts over limit Use C3.7.2

$$P_n = 0.7\left(P_{wc} + A_e F_y\right) \ge P_{wc}$$

Pwc = 2.296 k Ae = 0.380 in^2

Pn = 14.913 k Pn/Ω = 8.773 k

O.K.

Corner Connections

1/4" φ SAE Grade 8 bolts w/ 1/4-20-UNC Threaded inserts

Tcrnmax = 699 lbs Max($F_{pmaxASD}$/4 -OR- $Fh_{ASDtrans}$/4 corner connections)

Vcrnmax = 1362 lbs (Max Ten/2 corner connections per side)

Bolt:	Tall =	[2480] lbs	Vall =	[1096] lbs
Threaded Insert:	Tall =	[2860] lbs	Vall =	[1714] lbs

# of Bolts required for Tension = 0.3

# of Bolts required for Shear = 1.2 ***If combined fails:

# of Bolts Used = [2.0] USE --> 3.0

Check Combined Stress in Bolts & Inserts: 0.762 O.K. StressComb = 0.508 **O.K.**

Check 1/8" welded connection

<--- USE WELD Ω = 2.35

Assume L/t > 25: 25*t = 1.783 in

Lreq'd = 0.921 in

$$P_n/\Omega = \frac{1}{\Omega} 0.75 t L F_u \ge V_{req} \qquad L_{req'd} = \frac{V_{req}\Omega}{0.75 t F_u}$$

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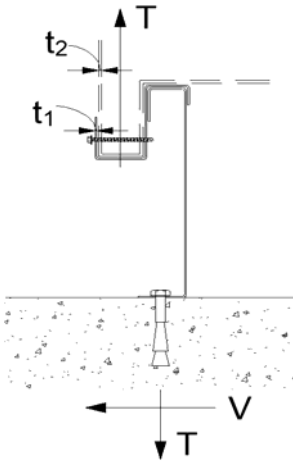
Connection Unit to Curb Clip | #12 SMS screw | Ω = 3.0

t1 = 0.0713 in | Fu1 = 65 ksi

t2 = 0.1017 in (unit base rail thickness) | Fu2 = 65 ksi

d = 0.216 in (screw diameter) | dw = 0.375 in (nom. washer diameter)

t2/t1 = 1.4



For t2/t1 ≤ 1.0: | Pns = 2703 #

Shear: $P_{ns} = 4.2F_{u2}\sqrt{t_2^3 d}$ = 4.12 k

$P_{ns} = 2.7t_1 dF_{u1}$ = 2.70 k

$P_{ns} = 2.7t_2 dF_{u2}$ = 3.86 k

Pns/Ω = 901 #

Pss/Ω = 840 # <- Controls

For t2/t1 ≥ 2.5: | Pns = 2703 #

$P_{ns} = 2.7t_1 dF_{u1}$ = 2.70 k

$P_{ns} = 2.7t_2 dF_{u2}$ = 3.86 k

Tension: Pnot = 1.214 k (screw pull-out strength)

Pnov = 2.607 k (screw pull-over strength)

$P_{not} = 0.85t_c dF_{u2})$

$t_c = \min(t_1, t_2)$

$P_{nov} = 1.5t_1 d_w F_{u1}$

Pts/Ω = 405 # <- Controls

Pts/Ω = 845 # (full tensile screw capacity)

	Shear (k)	# clips	V_{clip} (k)	V_{allow}(lb)	# screws	spacing
Long side:	2.797	1	2.80	840 #	4	2.00 in
Short side:	1.951	1	1.95	840 #	3	3.00 in

clip width (in) = 7.00 | clip height = 2.5 in

min spacing = 0.65 in | edge distance = 0.5 in (min. 1.5d)

Check Block shear rupture: O.K. | thinnest part = 0.0713 AISI BSR applies

Fy = 50 ksi | Ω = 2.22 bolt/screw connection

Agv = 0.463 in^2 | Anv = 0.410 in^2 | Ant = 0.081 in^2

Rn/Ω = 8.647 k | $R_n = 0.6F_y A_{gv} + F_u A_{nt} \leq 0.6F_u A_{nv} + F_u A_{nt}$

BSR O.K. (AISI Sect. E5.3)

Connection of Curb to Supporting Structure

Roof Loading | SEISMIC: (0.6-0.14SDS)D + 0.7E | WIND: 0.6D + W

Transverse:	$Uplift_{MAX}$ = 4268 lbs	$Shear_{MAX}$ = 1399 lbs	
$Compression_{SEISMIC}$ =	569 lbs	=[FpmaxASD*(Hcm+Hcurb)+(1+0.14S_{DS})*($WGT_{unit+curb}$/2)*wcurb]/wcurb	
$Tension_{SEISMIC}$ =	275 lbs	=$Comp_{SEISMIC}$-(0.6-0.14S_{DS})*(WGTunit+curb)	
$Compression_{WIND}$ =	3402 lbs	=[$F_{h\ transASD}$*(Hcm+Hcurb)+0.6*($WGT_{unit+curb}$/2)*wcurb-$F_{vertASD}$*wcurb/2]/wcurb	
$Tension_{WIND}$ =	4268 lbs	=[$F_{h\ transASD}$*(Hcm+Hcurb)-0.6*($WGT_{unit+curb}$/2)*wcurb+$F_{vertASD}$*wcurb/2]/wcurb	
Longitudinal:	$Uplift_{MAX}$ = 2217 lbs	$Shear_{MAX}$ = 976 lbs	
$Compression_{SEISMIC}$ =	469 lbs	=[FpmaxASD*(Hcm+Hcurb)+(1+0.14S_{DS})*($WGT_{unit+curb}$/2)*Lcurb]/Lcurb	
$Tension_{SEISMIC}$ =	175 lbs	=$Comp_{SEISMIC}$-(0.6-0.14S_{DS})*(WGTunit+curb)	
$Compression_{WIND}$ =	1350 lbs	=[$F_{h\ transASD}$*(Hcm+Hcurb)+0.6*($WGT_{unit+curb}$/2)*Lcurb-$F_{vertASD}$*Lcurb/2]/Lcurb	
$Tension_{WIND}$ =	2217 lbs	=[$F_{h\ transASD}$*(Hcm+Hcurb)-0.6*($WGT_{unit+curb}$/2)*Lcurb+$F_{vertASD}$*Lcurb/2]/Lcurb	

Wood Attachment: **Use 5/8" φ wood lag screws** **w/ 3.5" Min. Embed**

$Tall_{metal}$ = 946.67 lbs | $Vall_{metal}$ = 1043.33 lbs

Transverse: $Tall_{wood}$ = 1195.95 lbs | $Vall_{wood}$ = 1024 lbs

# of Screws Req'd for Uplift = 4.51 | COMBINED LOADING: 0.987 O.K.

# of Screws Req'd for Shear = 1.37 | Screw Spacing = 9.6 in o.c.

Total # of screws Required = 5

Use 5/8" φ wood lag screws @ 9.6 in o.c. along long side of curb

Longitudinal:

# of Screws Req'd for Uplift = 2.3 | COMBINED LOADING: 0.935 O.K.

# of Screws Req'd for Shear = 1.0 | Screw Spacing = 11.5 in o.c.

Total # of screws Required = 3

Use 5/8" φ wood lag screws @ 11.5 in o.c. along short side of curb

Steel Deck Attachment: **Use 5/8" φ A307 Bolts attached to steel angle below deck**

$Tall_{bolt}$ = 6903 lbs | $Vall_{bolt}$ = 3682 lbs

Transverse: 6903 lbs | 3682 lbs

# of Bolts Req'd for Uplift = 0.62 | COMBINED LOADING: 0.204 O.K.

# of Bolts Req'd for Shear = 0.38 | Bolt Spacing = 34.5 in o.c.

Total # of Bolts Required = 2

Use 5/8" φ A307 Bolts attached to steel angle below deck @ 34.5 in o.c. along long side of curb

Longitudinal:

# of Bolts Req'd for Uplift = 0.32 | COMBINED LOADING: 0.082 O.K.

# of Bolts Req'd for Shear = 0.27 | Req'd Min Spacing = 19.0 in o.c.

Total # of Bolts Required = 2

Use 5/8" φ A307 Bolts attached to steel angle below deck @ 19 in o.c. along short side of curb

MOUR GROUP
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For Concrete anchorage: SEISMIC $(0.6-0.14SDS)D + 0.7\Omega_o E$ (Ω_o = 2.5)

Concrete Attachment: 3/4" φ Hilti Hit-HY 200 adhesive anchors w/ 4" embed

$Tall_{LRFD}$ = 1722 lbs $Vall_{LRFD}$ = 2032 lbs $\propto = (1 + 0.2SDS)D + 2.5E$ =1.87

$Tall_{ASD} = Tall_{LRFD}/\alpha$ = 920.9 lbs $Vall_{ASD} = Vall_{LRFD}/\alpha$ = 1086.6 lbs $(D = 0.465, E = 0.535)$

Transverse: $Uplift_{MAX}$ = 4268 lbs $Shear_{MAX}$ = 1399 lbs

$Compression_{SEISMIC}$ = 1018 lbs =[2.5*FpmaxASD*(Hcm+Hcurb)+(1+0.14S_{DS})*($WGT_{unit+curb}$/2)*wcurb]/wcurb

$Tension_{SEISMIC}$ = 724 lbs =$Comp_{SEISMIC}$-(0.6-0.14S_{DS})*(WGTunit+curb)

$Shear_{SEISMIC}$ = 273 lbs =2.5*FpmaxASD/2

Min Bolts Req'd Uplift = 4.64 spacing = 5.63 in o.c. Tapplied = 853.7 lbs

Min Bolts Req'd Shear = 2.00 spacing = 22.5 in o.c. Vapplied = 279.7 lbs

Try using 5 bolts
spaced at 8.63 in o.c.

COMBINED LOADING = $\frac{T_{applied}}{T_{allow,ASD}} + \frac{V_{apllied}}{V_{allow,ASD}} \leq 1.2$ = 1.18

Use 5 - 3/4" φ Hilti Hit-HY 200 adhesive anchors @ 8.6 in o.c. max. along long side of curb w/ 4" embed

Longitudinal: $Uplift_{MAX}$ = 2217 lbs $Shear_{MAX}$ = 1399 lbs

$Compression_{SEISMIC}$ = 768 lbs =[2.5*FpmaxASD*(Hcm+Hcurb)+(1+0.14S_{DS})*($WGT_{unit+curb}$/2)*Lcurb]/Lcurb

$Tension_{SEISMIC}$ = 474 lbs =$Comp_{SEISMIC}$-(0.6-0.14S_{DS})*(WGTunit+curb)

$Shear_{SEISMIC}$ = 273 lbs =2.5*FpmaxASD/2

Min Bolts Req'd Uplift = 2.41 spacing = 3.5 in o.c. Tapplied = 554.2 lbs

Min Bolts Req'd Shear = 2.00 spacing = 7 in o.c. Vapplied = 349.7 lbs

Try using 4 bolts
spaced at 6.33 in o.c.

COMBINED LOADING = $\frac{T_{applied}}{T_{allow,ASD}} + \frac{V_{apllied}}{V_{allow,ASD}} \leq 1.2$ = 0.92

Use 4 - 3/4" φ Hilti Hit-HY 200 adhesive anchors @ 6.3 in o.c. max. along short side of curb w/ 4" embed

CURB DESIGN SUMMARY: CBKD-160

CURB RAIL THICKNESS: 0.0713 in 14 Gauge

UNIT CLIP THICKNESS: 0.0713 in 14 Gauge

 # OF CLIPS (LONG SIDE) - 1 clips with 4 - #12 SMS screws each clip

WEB STIFFENER: 16Ga x 3/4" x 7" (C-channel) stiffener at each clip

 # OF CLIPS (SHORT SIDE) - 1 clips with 3 - #12 SMS screws each clip

WEB STIFFENER: 16Ga x 3/4" x 7" (C-channel) stiffener at each clip

CORNER CONNECTION: Use 3 - 1/4" φ SAE Grade 8 bolts w/ 1/4-20-UNC Threaded inserts

CURB ANCHORAGE	WOOD	STEEL	CONCRETE
	5/8" φ lag screw w/ min. 3.5" embed (SGmin=0.43)	5/8" φ A307 bolts	3/4" φ thrd'd rod in Hilti HIT-HY 200 epoxy, min. 4" embed
LONG DIRECTION	5 @ 9.63 in o.c.	2 @ 34.5 in o.c.	5 @ 8.63 in o.c.
SHORT DIRECTION	3 @ 11.5 in o.c.	2 @ 19 in o.c.	4 @ 6.33 in o.c.