



MOUR GROUP
ENGINEERING + DESIGN

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619-727-4800

**Structural Calculations
for
CBWC-112 Series**



Prepared for:
PROVENT / RRS
3847 Wabash Drive
Mira Loma, CA 91725

Date: July 29, 2019
Project Number: PV1806

For wood, concrete and steel attachments see Roof Anchorage Detail, Form No. CB60.

FEATURES

- Roof curb sides and ends are 16 ga. galvanized steel.
- Gasketing package provided.
- Heat treated wood nailer provided.
- Pitched curbs and taller curbs are available.

NOTES

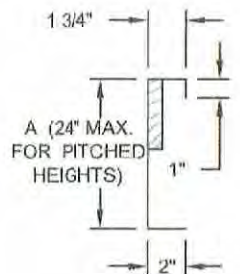
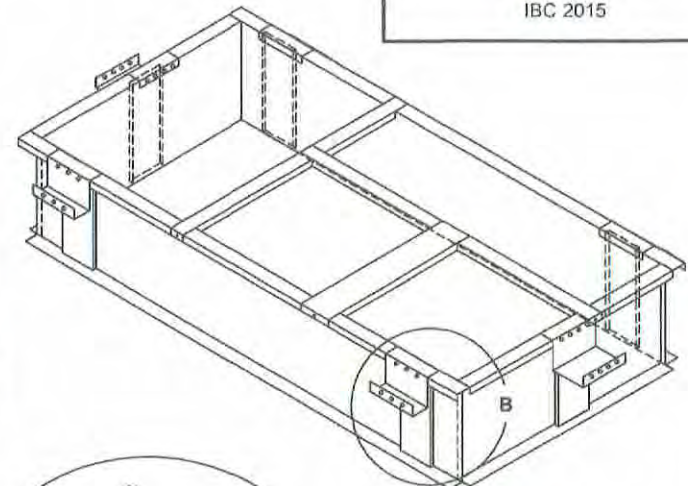
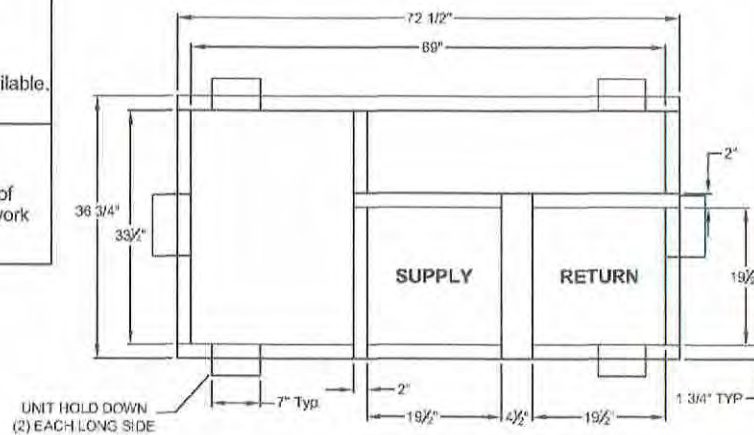
- Attach ductwork to roof curb. Flanges of duct rest on top of curb. Support ductwork below the curb.

STRUCTURALLY CALCULATED WELDED ROOF CURBS FOR YORK UNITS

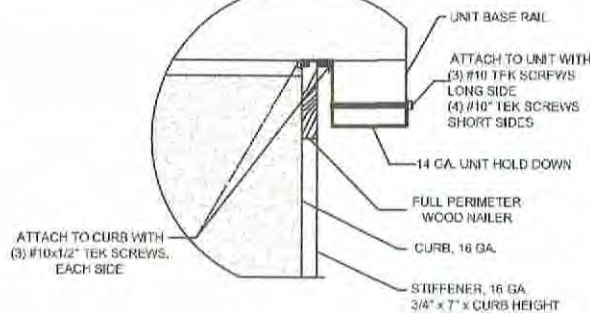
ZR 036-060, XP 036-060, ZF 036-072

ProVent P/N	A	WEIGHT
CBWCSUN367208	8"	80 Lbs
CBWCSUN367211	11"	95 Lbs
CBWCSUN367214	14"	109 Lbs
CBWCSUN367224	24"	189"

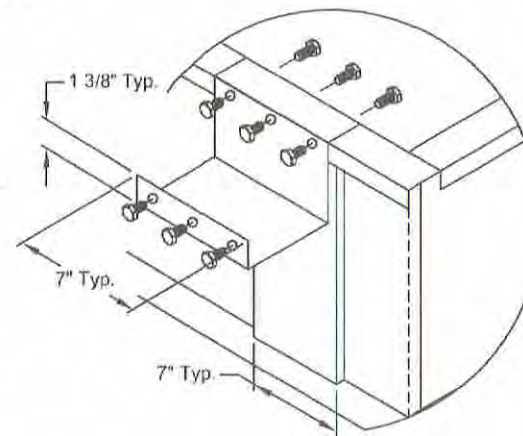
Meets seismic requirements for the following codes:
CBC 2016
IBC 2015



CURB DETAIL



HOLD DOWN DETAIL



DETAIL B



3847 WABASH DRIVE
MIRA LOMA, CA 91725

PHONE (951) 685-1101
FAX (619) 872-9799

SUBMITTED TO: _____

COMPANY: _____

JOB NAME: _____

EQUIPMENT: _____

NOTES: _____

FORM NO:

CBWC-112

DATE:

09/27/18

REV:

5

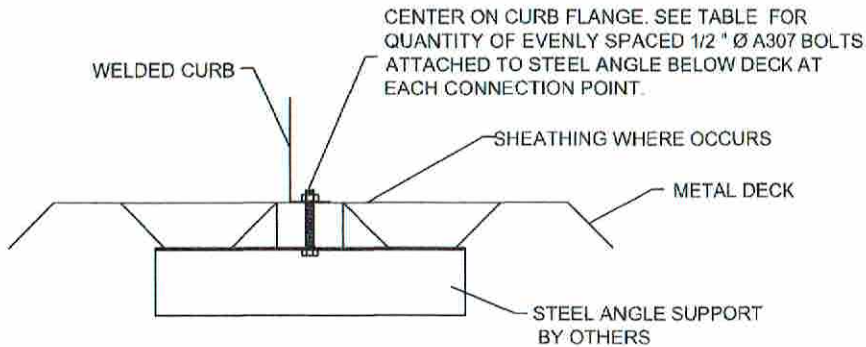
PART NUMBER:

CBWCSUN3672 SERIES

DRAWN BY:

ALL

STEEL ATTACHMENT



NO. OF ANCHORAGE BOLTS REQUIRED		
CURB	LONG SIDE	SHORT SIDE
LXS	2 @ 34.5" O.C	XX @ 2 @ 19" O.C
LXL	2 @ 34.5" O.C.XX	2 @ 29" O.C
SUN3672	2 @ 60" O.C	2 @ 24.25" O.C
PRD3715	2 @ 68.38" O.C	2 @ 38.5" O.C
PRS	2 @ 58.38" O.C	2 @ 28.19" O.C.
PRL	2 @ 72" O.C	2 @ 41" O.C
SLU180	2 @ 102.25" O.C.	2 @ 71" O.C.
SLM1830	2 @ 113.25" O.C	2 @ 71" O.C.

* SIX INCHES FROM EACH CORNER EVENLY SPACED.
** CENTERED.

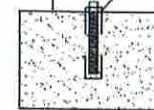
Meets seismic requirements for the following codes:
CBC 2016
IBC 2015

ASSUMES:
CONC SLAB
 $f_c = 4000$ PSI MINIMUM
6" MIN THICKNESS
NORMAL WEIGHT CONCRETE
OR SAND LIGHT WEIGHT

CONCRETE ATTACHMENT

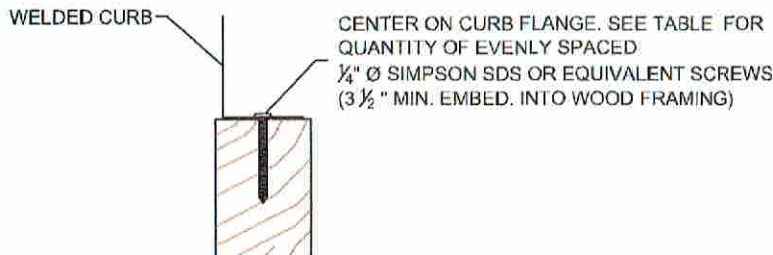
WELDED CURB

CENTER ON CURB FLANGE. SEE TABLE FOR QUANTITY OF EVENLY SPACED 3/4" Ø THREADED ROD IN HILTI HIT-HY 200 EPOXY WITH 4" EMBED



NO. OF ANCHORAGE BOLTS REQUIRED		
CURB	LONG SIDE	SHORT SIDE
LXS	10 @ 3.73" O.C.	9 @ 2.38" O.C.
LXL	8 @ 4.93" O.C.	7 @ 4.83" O.C.
SUN3672	9 @ 7.5" O.C.	6 @ 4.85" O.C.
PRD3715	17 @ 4.27" O.C.	13 @ 3.21" O.C.
PRS	9 @ 7.3" O.C.	7 @ 4.7" O.C.
PRL	11 @ 7.2" O.C.	9 @ 5.13" O.C.
SLU180	16 @ 6.82" O.C.	13 @ 5.92" O.C.
SLM1830	18 @ 6.66" O.C.	13 @ 5.92" O.C.

WOOD ATTACHMENT



NO. OF ANCHORAGE SCREWS REQUIRED		
CURB	LONG SIDE	SHORT SIDE
LXS	7 @ 6.42" O.C.	4 @ 7.67" O.C.
LXL	7 @ 6.42" O.C.	6 @ 6.6" O.C.
SUN3672	4 @ 21.33" O.C.	3 @ 14.13" O.C.
PRD3715	8 @ 10.34" O.C.	6 @ 8.5" O.C.
PRS	4 @ 20.79" O.C.	3 @ 16.09" O.C.
PRL	4 @ 25.33" O.C.	3 @ 22.5" O.C.
SLU180	7 @ 17.71" O.C.	7 @ 12.5" O.C.
SLM1830	8 @ 16.75" O.C.	6 @ 15" O.C.

FOUR INCHES FROM EACH CORNER EVENLY SPACED



3847 WABASH DRIVE
MIRA LOMA, CA 91725

PHONE (951) 685-1101
FAX (619) 872-9799

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

FORM NO:
CB-60

DATE:
07/31/18

REV:
3

DRAWN BY:
ALL



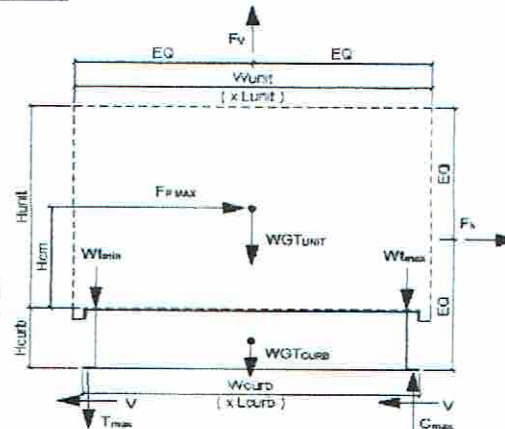
Client: ProVent PV1806
Description: CBWC-112 CBWCSUN3672**
Unit: ZR 036-060, XP 036-060, ZF 036-072

Curb Information

Hcurb = 24 in (Height of curb)
Lcurb = 72 in (Length of curb)
wcurb = 36.25 in (Width of curb)
WGTCurb = 189 lbs (Weight of curb)
Clips long side = 2 # Clips short side = 1

Unit Information

WGTunit = 704 lbs (Weight of Unit)
Wtmax = 234 lbs (Maximum corner weight)
Wtmin = 96 lbs (Minimum corner weight)
Hunit = 32.625 in (Height of unit above curb)
Hcm = 16.3125 in (Height to center of mass)
Lunit = 82.25 in (Length of unit)
Wunit = 44.875 in (Width of unit)



Seismic Loading - 2015 IBC/2016 CBC

Ss = 2.85 (Worst case for majority of CA - Design Category U)
Fa = 1 (Interpolated from Table 11.4-1 ASCE 7-10)
Sms = 2.850 (Fa*Ss)
Sds = 1.900 (2/3*Sms)
Ip = 1.25 (Importance Factor Category III Building)
Fpmax = 3.800 Wp (1.6*Sds*Ip*Wp)
FpmaxASD = 1873 lbs (0.7*Fpmax)
FpmaxASD = 2375 lbs (unit and curb)

Wind Loading - 2015 IBC/2016 CBC

*** Exposure Category C ***

Kz = 1.13 (For 60 ft roof height, Exposure C - Table 29.3-1 ASCE 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 = 115 (Max wind velocity, mph for Cat III & IV bldgs Exp. Cat C)
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 = 32.5 psf = 0.00256*Kz*Kzt*Kd*V² (Eq. 29.3-1 ASCE 7-10)
Fh ASD trans = 1199 lbs = 0.6*qz*GCr*Lunit*(Hunit+Hcurb) (Eq. 29.5-2)
Fh ASD long = 654 lbs = 0.6*qz*GCr*Wunit*(Hunit+Hcurb)
Fvert ASD = 750 lbs = 0.6*qz*GCr*Lunit*Wunit (Eq. 29.5-3)

Curb Loading

Transverse:

Compression_{SEISMIC} = 1435 lbs = [FpmaxASD*Hcm+2*(1+0.14S_{DS})*Wtmax*wcurb]/wcurb
Tension_{SEISMIC} = 1200 lbs = Comp_{SEISMIC}-(0.6-0.14S_{DS})*WGTunit
Compression_{WIND} = 445 lbs = [Fh trans ASD*Hcm+2*0.6*Wtmax*wcurb-Fvert ASD*wcurb/2]/wcurb
Tension_{WIND} = 773 lbs = Comp_{WIND}+Fvert-0.6*WGTunit

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

Longitudinal:

Compression_{SEISMIC} = 1017 lbs = [FpmaxASD*Hcm+2*(1+0.14S_{DS})*Wtmax*Lcurb]/Lcurb
Tension_{SEISMIC} = 782 lbs = Comp_{SEISMIC}-(0.6-0.14S_{DS})*WGTunit
Compression_{WIND} = 54 lbs = [Fh trans ASD*Hcm+2*0.6*Wtmax*Lcurb-Fvert ASD*Lcurb/2]/Lcurb
Tension_{WIND} = 382 lbs = Comp_{WIND}+Fvert-0.6*WGTunit

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

Governing Reactions:

Transverse:	Comp _{MAX} = 1435 lbs	----> Along long edge of curb.
(on long edge)	Tens _{MAX} = 1200 lbs	----> Along long edge of curb.
Longitudinal:	Comp _{MAX} = 1017 lbs	----> Along short edge of curb.
(on short edge)	Tens _{MAX} = 782 lbs	----> Along short edge of curb.

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

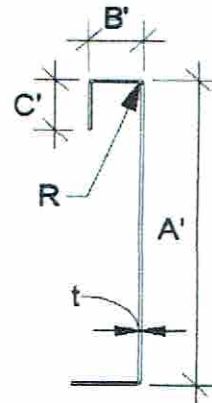


Curb Design

$F_y = 50$ ksi $F_u = 65$ ksi $t = 0.0566$ 16 Gauge
 $E = 29500$ ksi

Calculate Section Properties of Curb

$A' = 24.000$ in	$a = 23.717$ in $= A' - (2r + t)$
$B' = 2.000$ in	$a' = 23.943$ in $= A' - t$
$C' = 0.000$ in (0 if no lips)	$b = 1.859$ in $= B' - [r + t/2 + a(r + t/2)]$
$a = 0.000$ in (0 - no Lip; 1 w/ lip)	$b' = 1.972$ in $= B' - [t/2 + a(r + t/2)]$
$R = 0.0849$ (Inside bend radius)	$c = 0.000$ in $= a[C' - (r + t/2)]$
$t = 0.0566$ in	$c' = 0.000$ in $= a[C' - t/2]$
$r' = 0.113$ in $= R + t/2$	$u = 0.178$ in $= \pi r/2$
$x = 0.140$ in (Distance between centroid and web centerline)	
$I_x = 95.991$ in (Moment of Inertia about X-Axis)	
$I_y = 0.258$ in (Moment of Inertia about Y-Axis)	
$A = 1.57$ in ²	
$r_x = 7.81$ in	
$r_y = 0.405$ in	
$r_{min} = 0.405$ in	



Axial Compression

$P_u = 0.936$ k (Max Axial Comp) $\Omega_c = 1.80$
 $P_n/\Omega_c = 21.697$ k
 $F_e = 29.90$ ksi
 $\lambda_c = 1.29$
 $F_n = 24.83$ ksi
 $L_y = 50$ in
 $k_y L_y/r_y = 99$

If $\lambda_c \leq 1.5$: $F_n = (0.658^{\lambda_c^2}) F_y$
If $\lambda_c > 1.5$: $F_n = \frac{0.877}{\lambda_c^2} F_y$

$\lambda_c = \sqrt{\frac{F_y}{F_e}}$ $F_e = \frac{\pi^2 E}{(kL/r)^2}$

Lateral unbraced length (assume $k=0.8$)

Compression Check = **O.K.**

Check Web Crippling

$h = 24$ in -- Check limits: $C = 4.00$
 $t = 0.0566$ in $h/t = 424.03 \leq 200$ $C_R = 0.14$
 $N = 7.00$ $N/t = 123.67 \leq 210$ $C_N = 0.35$
 $\Omega_w = 1.75$ $N/h = 0.291667 \leq 2.0$ $C_h = 0.02$
 $P_n = 1.366$ k
 $P_n/\Omega_w = 0.780$ k
Long side: $P_{u,trans} = 0.718$ k
Short side: $P_{u,long} = 1.017$ k

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

O.K. # clips = 2
web stiffener REQ'D # 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 $t_s = 0.0566$ 16 Gauge
web of stiff. $w = 6.717$ in $R_s = 0.0849$ in
***Check $w/t_s \leq 1.28\sqrt{E/F_y}$ $\Omega_c = 1.70$
 $w/t_s = 118.675$
 $1.28\sqrt{E/F_y} = 31.091$ --> w/t_s over limit Use C3.7.2
 $P_n = 0.7(P_{wc} + A_e F_y) \geq P_{wc}$
 $P_{wc} = 1.366$ k $A_e = 0.380$ in²
 $P_n = 14.262$ k $P_n/\Omega = 8.390$ k

O.K.

Corner Connections

1/4" ϕ SAE Grade 8 bolts w/ 1/4-20-UNC Threaded inserts
 $T_{crnmax} = 468$ lbs $\text{Max}[F_{tmaxASD}/4 - OR - F_{hASDtrans}/4 \text{ corner connections}]$
 $V_{crnmax} = 600$ lbs (Max Ten/2 corner connections per side)
Bolt: $T_{all} = 2480$ lbs $V_{all} = 1096$ lbs
Threaded Insert: $T_{all} = 2860$ lbs $V_{all} = 1714$ lbs
of Bolts required for Tension = 0.2
of Bolts required for Shear = 0.5
of Bolts Used = 1.0
Check Combined Stress in Bolts & Inserts: 0.736 **O.K.** StressComb = 0.368 **O.K.**
***If combined fails: USE --> 2.0

Check 1/8" welded connection

---- USE WELD $\Omega = 2.35$
Assume $L/t > 25$: $25 \times t = 1.415$ in $P_n/\Omega = \frac{1}{\Omega} 0.75 t L F_u \geq V_{req}$ $L_{req'd} = \frac{V_{req} \Omega}{0.75 t F_u}$
 $L_{req'd} = 0.511$ in



Connection Unit to Curb Clip

#10 SMS screw

$\Omega = 3.0$

$t_1 = 0.0566$ in

$F_{u1} = 65$ ksi

$t_2 = 0.1017$ in (unit base rail thickness)

$F_{u2} = 65$ ksi

$d = 0.190$ in (screw diameter)

$d_w = 0.375$ in (nom. washer diameter)

$t_2/t_1 = 1.8$

For $t_2/t_1 \leq 1.0$:

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

$P_{ns} = 1887$ #

3.86 k

For $t_2/t_1 \geq 2.5$:

$P_{ns} = 1887$ #

$P_{ns} = 2.7t_1dF_{u1}$

1.89 k

$P_{ns} = 2.7t_1dF_{u1}$

1.89 k

$P_{ns} = 2.7t_2dF_{u2}$

3.39 k

$P_{ns} = 2.7t_2dF_{u2}$

3.39 k

$P_{ns}/\Omega = 629$ #

$P_{ss}/\Omega = 540$ # <- Controls

Tension: $P_{not} = 1.068$ k (screw pull-out strength) $P_{not} = 0.85t_c d F_{u2}$

$P_{nov} = 2.069$ k (screw pull-over strength) $t_c = \min(t_1, t_2)$

$P_{ts}/\Omega = 356$ # <- Controls $P_{nov} = 1.5t_1 d_w F_{u1}$

$P_{ts}/\Omega = 820$ # (full tensile screw capacity)

Long side:	Shear (k)	# clips	V_{clip} (k)	V_{allow} (lb)	# screws	spacing
	1.873	2	0.94	540 #	2	6.00 in
Short side:	1.873	1	1.87	540 #	4	2.00 in

Check Block shear rupture: O.K.

$F_y = 50$ ksi

$A_{gv} = 0.368$ in²

$R_n/\Omega = 5.954$ k

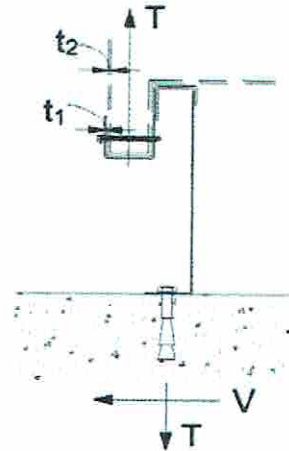
$\Omega = 2.22$ bolt/screw connection

$A_{nv} = 0.330$ in²

$R_n = 0.6F_y A_{gv} + F_u A_{nt} \leq 0.6F_u A_{nv} + F_u A_{nt}$

(AISI Sect. E5.3)

BSR O.K.



Connection of Curb to Supporting Structure

Roof Loading

SEISMIC: $(0.6-0.14SDS)D + 0.7E$

WIND: $0.6D + W$

Transverse:	Uplift _{MAX}	2909 lbs	Shear _{MAX}	1188 lbs
Compression _{SEISMIC}	3207 lbs	$= [F_{pmaxASD} \cdot (H_{cm} + H_{curb}) + (1 + 0.14S_{DS}) \cdot (WGT_{unit+curb}/2) \cdot w_{curb}] / w_{curb}$		
Tension _{SEISMIC}	2909 lbs	$= Comp_{SEISMIC} - (0.6 - 0.14S_{DS}) \cdot (WGT_{unit+curb})$		
Compression _{WIND}	1226 lbs	$= [F_{htransASD} \cdot (H_{cm} + H_{curb}) + 0.6 \cdot (WGT_{unit+curb}/2) \cdot w_{curb} - F_{vertASD} \cdot w_{curb}/2] / w_{curb}$		
Tension _{WIND}	1441 lbs	$= [F_{htransASD} \cdot (H_{cm} + H_{curb}) - 0.6 \cdot (WGT_{unit+curb}/2) \cdot w_{curb} + F_{vertASD} \cdot w_{curb}/2] / w_{curb}$		
Longitudinal:	Uplift _{MAX}	1597 lbs	Shear _{MAX}	1188 lbs
Compression _{SEISMIC}	1895 lbs	$= [F_{pmaxASD} \cdot (H_{cm} + H_{curb}) + (1 + 0.14S_{DS}) \cdot (WGT_{unit+curb}/2) \cdot L_{curb}] / L_{curb}$		
Tension _{SEISMIC}	1597 lbs	$= Comp_{SEISMIC} - (0.6 - 0.14S_{DS}) \cdot (WGT_{unit+curb})$		
Compression _{WIND}	259 lbs	$= [F_{htransASD} \cdot (H_{cm} + H_{curb}) + 0.6 \cdot (WGT_{unit+curb}/2) \cdot L_{curb} - F_{vertASD} \cdot L_{curb}/2] / L_{curb}$		
Tension _{WIND}	473 lbs	$= [F_{htransASD} \cdot (H_{cm} + H_{curb}) - 0.6 \cdot (WGT_{unit+curb}/2) \cdot L_{curb} + F_{vertASD} \cdot L_{curb}/2] / L_{curb}$		

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

$T_{allmetal} = 946.67$ lbs $V_{allmetal} = 1043.33$ lbs

Transverse: $T_{allwood} = 1195.95$ lbs $V_{allwood} = 1024$ lbs

of Screws Req'd for Uplift = 3.07 COMBINED LOADING: 0.898 O.K.

of Screws Req'd for Shear = 1.16 Screw Spacing = 21.3 in o.c.

Total # of screws Required = 4

Use 5/8" ϕ wood lag screws @ 21.3 in o.c. along long side of curb

Longitudinal:

of Screws Req'd for Uplift = 1.7 COMBINED LOADING: 0.832 O.K.

of Screws Req'd for Shear = 1.2 Screw Spacing = 14.1 in o.c.

Total # of screws Required = 3

Use 5/8" ϕ wood lag screws @ 14.1 in o.c. along short side of curb

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

$T_{allbolt} = 6903$ lbs $V_{allbolt} = 3682$ lbs

Transverse: $T_{allbolt} = 6903$ lbs $V_{allbolt} = 3682$ lbs

of Bolts Req'd for Uplift = 0.42 COMBINED LOADING: 0.122 O.K.

of Bolts Req'd for Shear = 0.32 Bolt Spacing = 60.0 in o.c.

Total # of Bolts Required = 2

Use 5/8" ϕ A307 Bolts attached to steel angle below deck @ 60 in o.c. along long side of curb

Longitudinal:

of Bolts Req'd for Uplift = 0.23 COMBINED LOADING: 0.075 O.K.

of Bolts Req'd for Shear = 0.32 Req'd Min Spacing = 24.3 in o.c.

Total # of Bolts Required = 2

Use 5/8" ϕ A307 Bolts attached to steel angle below deck @ 24.3 in o.c. along short side of curb



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

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

$$\begin{aligned} T_{all,LRFD} &= 1722 \text{ lbs} & V_{all,LRFD} &= 2032 \text{ lbs} & \alpha &= (1 + 0.2SDS)D + 2.5E = 1.87 \\ T_{all,ASD} = T_{all,LRFD}/\alpha &= 920.9 \text{ lbs} & V_{all,ASD} = V_{all,LRFD}/\alpha &= 1086.6 \text{ lbs} & (D = 0.465, E = 0.535) \\ \text{Transverse:} & & & & & \\ \text{Uplift}_{MAX} &= 6871 \text{ lbs} & \text{Shear}_{MAX} &= 2969 \text{ lbs} \\ \text{Compression}_{SEISMIC} &= 7169 \text{ lbs} & &= [2.5 * F_{pmaxASD} * (H_{cm} + H_{curb}) + (1 + 0.14SDS) * (WGT_{unit+curb}/2) * w_{curb}] / w_{curb} \\ \text{Tension}_{SEISMIC} &= 6871 \text{ lbs} & &= \text{Comp}_{SEISMIC} - [0.6 - 0.14SDS] * (WGT_{unit+curb}) \\ \text{Shear}_{SEISMIC} &= 2969 \text{ lbs} & &= 2.5 * F_{pmaxASD} / 2 \\ \text{Min Bolts Req'd Uplift} &= 7.46 \text{ spacing} = 6.86 \text{ in o.c.} & T_{applied} &= 763.4 \text{ lbs} \\ \text{Min Bolts Req'd Shear} &= 2.73 \text{ spacing} = 24 \text{ in o.c.} & V_{applied} &= 329.9 \text{ lbs} \\ \text{Try using } 9 \text{ bolts spaced at } 7.50 \text{ in o.c.} & & \text{COMBINED LOADING} &= \frac{T_{applied}}{T_{allow,ASD}} + \frac{V_{applied}}{V_{allow,ASD}} \leq 1.2 = 1.13 \end{aligned}$$

Use 9 - 3/4" ϕ Hilti Hit-HY 200 adhesive anchors @ 7.5 in o.c. max. along long side of curb w/ 4" embed

$$\begin{aligned} \text{Longitudinal:} & & & & & \\ \text{Uplift}_{MAX} &= 3592 \text{ lbs} & \text{Shear}_{MAX} &= 2969 \text{ lbs} \\ \text{Compression}_{SEISMIC} &= 3890 \text{ lbs} & &= [2.5 * F_{pmaxASD} * (H_{cm} + H_{curb}) + (1 + 0.14SDS) * (WGT_{unit+curb}/2) * L_{curb}] / L_{curb} \\ \text{Tension}_{SEISMIC} &= 3592 \text{ lbs} & &= \text{Comp}_{SEISMIC} - [0.6 - 0.14SDS] * (WGT_{unit+curb}) \\ \text{Shear}_{SEISMIC} &= 2969 \text{ lbs} & &= 2.5 * F_{pmaxASD} / 2 \\ \text{Min Bolts Req'd Uplift} &= 3.90 \text{ spacing} = 4.083333 \text{ in o.c.} & T_{applied} &= 598.7 \text{ lbs} \\ \text{Min Bolts Req'd Shear} &= 2.73 \text{ spacing} = 6.125 \text{ in o.c.} & V_{applied} &= 494.9 \text{ lbs} \\ \text{Try using } 6 \text{ bolts spaced at } 4.85 \text{ in o.c.} & & \text{COMBINED LOADING} &= \frac{T_{applied}}{T_{allow,ASD}} + \frac{V_{applied}}{V_{allow,ASD}} \leq 1.2 = 1.11 \end{aligned}$$

Use 6 - 3/4" ϕ Hilti Hit-HY 200 adhesive anchors @ 4.9 in o.c. max. along short side of curb w/ 4" embed

CURB DESIGN SUMMARY: CBWC-112			
CURB RAIL THICKNESS: 0.0566 in 16 Gauge			
UNIT CLIP THICKNESS: 0.0566 in 16 Gauge			
# OF CLIPS (LONG SIDE) - 2 clips with 2 - #10 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 4 - #10 SMS screws each clip			
WEB STIFFENER: 16Ga x 3/4" x 7" (C-channel) stiffener at each clip			
CORNER CONNECTION: Use 2 - 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	4 @ 21.33 in o.c.	2 @ 60 in o.c.	9 @ 7.5 in o.c.
SHORT DIRECTION	3 @ 14.13 in o.c.	2 @ 24.25 in o.c.	6 @ 4.85 in o.c.