MOUR GROUP
ENGINEERING + DESIGN

6593 Riverdale St.
San Diego, CA 92120
619-727-4800

Structural Calculations

for

CBKD-153 Series

CBKDLXL** SERIES

Prepared for:

PROVENT / RRS

3847 Wabash Drive
Mira Loma, CA 91725

Date: September 26, 2023

Project Number: PV2312

For wood,concrete, and steel attachments, see Roof Anchorage Detail, Form no. CB-60.

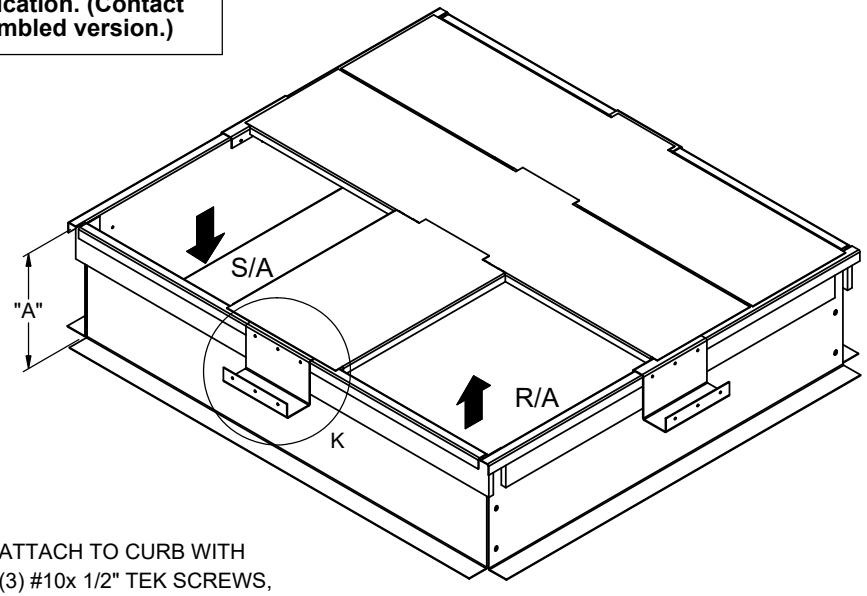
Will conform to seismic code requirements for knock-down or pre-assembled application. (Contact facory for assembled version.)

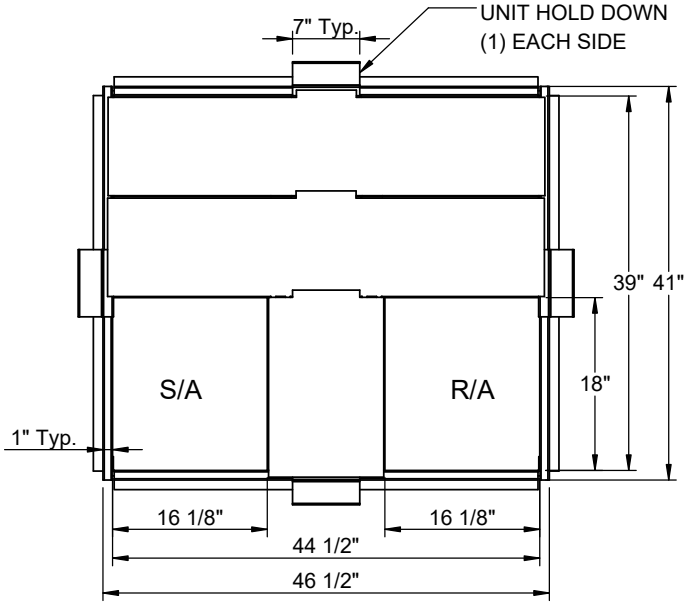
KNOCK-DOWN ROOF CURBS FOR YORK UNITS

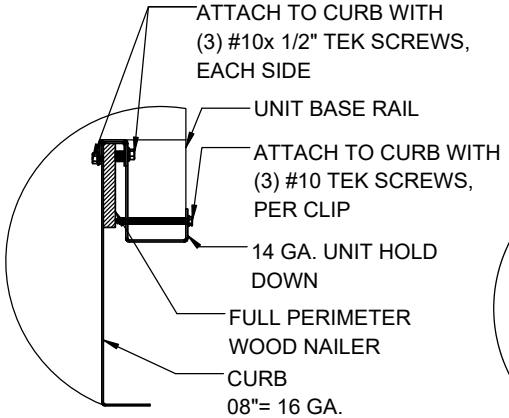
P***B ALL MODELS

PROVENT P/N	A	EST. WEIGHT	SEISMIC KIT P/N	WEIGHT
CBKDLXL08	8"	53 Lbs.	KDKITLX	5 Lbs.
CBKDLXL11	11"	64 Lbs.		
CBKDLXL14	14"	75 Lbs		

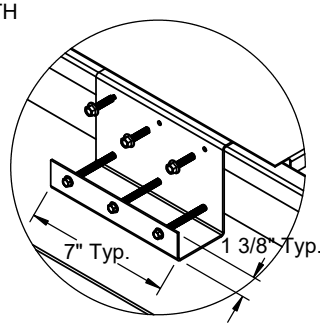
Meets seismic requirements for the following codes:
CBC 2022
IBC 2021



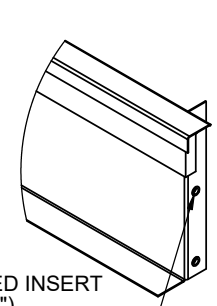


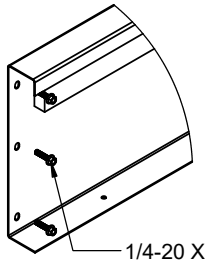


HOLD DOWN DETAIL



DETAIL K





CORNER DETAIL

ProVent

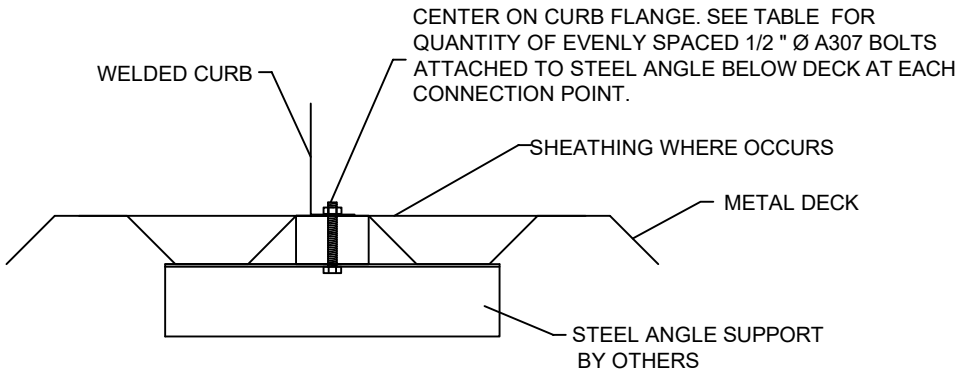
3847 WABASH DR.
MIRA LOMA, CA 91752

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

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

FORM NO:	PART NUMBER:	
CBKD-153	KDKITLXL SERIES	
DATE: 7/13/2023	REV: 8	DRAWN BY: JG

STEEL ATTACHMENT



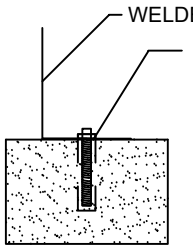
	NO. OF ANCHORAGE BOLTS REQUIRED	
CURB	LONG SIDE	SHORT SIDE
LXS	2 @ 34.5" O.C.	2 @ 19" O.C.
LXL	2 @ 34.5" O.C.	2 @ 29" O.C.
SUN3672	2 @ 60.5" O.C.	2 @ 24.75" O.C.
PRD3715	2 @ 68.88" O.C.	2 @ 39" O.C.
PRS	2 @ 58.88" O.C.	2 @ 28.69" O.C.
PRL	2 @ 72" O.C.	2 @ 41.5" O.C.
SAV1518	3 @ 54.56" O.C	2 @ 68.13" O.C.
SAV2025	3 @ 61.56" O.C	2 @ 68.13" O.C.
SAV28	3 @ 69.75" O.C	2 @ 68.13" O.C.

ASSUMES:
CONC SLAB
f'c= 4000PSI MINIMUM
4" MIN THICKNESS
NORMAL WEIGHT CONCRETE
MIN. 7-1/4" EDGE DISTANCE

Meets seismic requirements for the following codes:
CBC 2022
IBC 2021

ROOF ANCHORAGE DETAIL	
CBKD Series	CBWC Series
LXS	LXS
LXL	LXL
SUN3672	SUN3672
PRD3715	PRD3715
PRS	PRS
PRL	PRL
SAV1518	SAV1518
SAV2025	SAV2025
SAV28	SAV28

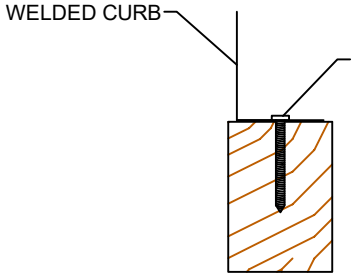
CONCRETE ATTACHMENT



	NO. OF ANCHORAGE BOLTS REQUIRED	
CURB	LONG SIDE	SHORT SIDE
LXS	2 @ 34.5" O.C.	2 @ 19.0" O.C.
LXL	2 @ 34.5" O.C.	2 @ 29" O.C.
SUN3672	2 @ 60.5" O.C.	2 @ 24.75" O.C.
PRD3715	4 @ 22.96" O.C.	2 @ 39" O.C.
PRS	2 @ 58.88" O.C.	2 @ 28.69" O.C.
PRL	3 @ 36" O.C.	2 @ 41.5" O.C.
SAV1518	4 @ 36.38" O.C.	2 @ 68.13" O.C.
SAV2025	4 @ 41.04" O.C.	3 @ 34.06" O.C.
SAV28	5 @ 34.88" O.C.	3 @ 34.06" O.C.

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

WOOD ATTACHMENT



	NO. OF ANCHORAGE SCREWS REQUIRED	
CURB	LONG SIDE	SHORT SIDE
LXS	4 @ 12.83" O.C.	3 @ 11.5" O.C.
LXL	4 @ 12.83" O.C.	3 @ 16.5" O.C.
SUN3672	4 @ 21.5" O.C.	3 @ 14.38" O.C.
PRD3715	7 @ 12.15" O.C.	5 @ 10.75" O.C.
PRS	4 @ 20.96" O.C.	3 @ 16.35" O.C.
PRL	6 @ 15.2" O.C.	4 @ 15.17" O.C.
SAV1518	6 @ 22.63" O.C.	5 @ 18.03" O.C.
SAV2025	7 @ 21.19" O.C.	5 @ 18.03" O.C.
SAV28	8 @ 20.5" O.C.	5 @ 18.03" O.C.

FOUR INCHES FROM EACH CORNER EVENLY SPACED

ProVent

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:	REV:	DRAWN BY:
8/28/2023	10	FMM

MOUR GROUP
ENGINEERING + DESIGN

6593 Riverdale St.
San Diego, CA 92120
(619)727-4800

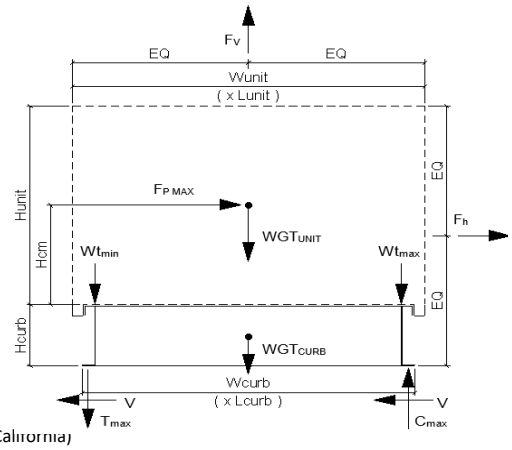
Client:	ProVent PV2312
Description:	CBPKD-153 LXL
Unit:	ALL P***B MODELS

Curb Information

Hcurb =	14	in	(Height of curb)
Lcurb =	46.5	in	(Length of curb)
wcurb =	41	in	(Width of curb)
WGTcurb =	80	lbs	(Weight of curb)
# Clips long side =	1		# Clips short side = 1

Unit Information

WGTunit =	656	lbs	(Oper. Weight of Unit)
Wtmax =	180	lbs	(Maximum corner weight)
Wtmin =	139	lbs	(Minimum corner weight)
Hunit =	55	in	(Height of unit above curb)
Hcm =	27.5	in	(Height to center of mass)
Lunit =	51.25	in	(Length of unit)
Wunit =	45.75	in	(Width of unit)



Seismic Loading - 2021 IBC/2022 CBC

Ss =	2.85		(Worst case for majority of California)
Fa =	1.20		(Default Site Class D - Table 11.4-1 ASCE 7-16)
Ip =	1.50		(Importance Factor Category III Building)
Sms =	3.420		(Fa*Ss)
Sds =	2.280		(2/3*Sms) ap = 2.5
Fpmax =	1.710	Wp	(0.4*ap*Sds*Ip)*Wp*3/Rp <=1.6*Sds*Ip*Wp Rp = 6
FpmaxASD =	785	lbs	(0.7*Fpmax) FpmaxASD = 881 lbs
	(unit only)		(unit and curb)

Wind Loading - 2021 IBC/2022 CBC

Kz =	1.13		(For 60 ft roof height, Exposure C - Table 26.10-1 ACSE 7-16)
Kzt =	1.0		(No topographic effects assumed for rooftop mounted units)
Kd =	0.85		(Directionality factor Table 26.6-1 ASCE 7-16)
V =	115		(Wind velocity, mph for Occupancy Cat III-IV bldgs Exp. Cat C, Fig 25.5-1D, ASCE7-16)
$GCr_{(horiz)}$ =	1.9		(Refer Sect 29.4.1 ASCE 7-16)
$GCr_{(vert)}$ =	1.5		(Refer Sect 29.4.1 ASCE 7-16)
qz	32.5	psf	= 0.00256*Kz*Kzt*Kd*V^2 (Eq. 26.10-1 ASCE 7-16)
$F_{h\ ASD\ trans}$ =	910	lbs	= 0.6*qz*GCr*Lunit*(Hunit+Hcurb) (Eq. 29.4-2)
$F_{h\ ASD\ long}$ =	813	lbs	= 0.6*qz*GCr*Wunit*(Hunit+Hcurb)
$F_{vert\ ASD}$ =	477	lbs	= 0.6*qz*GCr*Lunit*Wunit (Eq. 29.4-3)

Curb Loading

Transverse:

$Compression_{SEISMIC}$ =	1003	lbs	=[FpmaxASD*Hcm+2*(1+0.14S_{DS})*Wtmax*wcurb]/wcurb
$Tension_{SEISMIC}$ =	448	lbs	=[FpmaxASD*Hcm-2*(0.6-0.14S_{DS})*Wtmin*wcurb]/wcurb
$Compression_{WIND}$ =	589	lbs	=[$F_{h\ ASD\ trans}$*Hcm+2*0.6*Wtmax*wcurb-$F_{vert\ ASD}$*wcurb/2]/wcurb
$Tension_{WIND}$ =	682	lbs	=[$F_{h\ ASD\ trans}$*Hcm-2*0.6*Wtmin*wcurb+$F_{vertASD}$*wcurb/2]/wcurb

---> Negative values indicate opposite load.

Longitudinal:

$Compression_{SEISMIC}$ =	940	lbs	=[FpmaxASD*Hcm+2*(1+0.14*S_{DS})*Wtmax*Lcurb]/Lcurb
$Tension_{SEISMIC}$ =	386	lbs	=[FpmaxASD*Hcm-2*(0.6-0.14S_{DS})*Wtmin*Lcurb]/Lcurb
$Compression_{WIND}$ =	459	lbs	=[$F_{h\ ASD\ long}$*Hcm+2*0.6*Wtmax*Lcurb-$F_{vertASD}$*Lcurb/2]/Lcurb
$Tension_{WIND}$ =	552	lbs	=[$F_{h\ ASD\ long}$*Hcm-2*0.6*Wtmin*Lcurb+$F_{vertASD}$*Lcurb/2]/Lcurb

---> Negative values indicate opposite load.

Governing Reactions:

Transverse:	$Comp_{MAX}$ =	1003	lbs	---> Along long edge of curb.
(on long edge)	$Tens_{MAX}$ =	682	lbs	---> Along long edge of curb.
Longitudinal:	$Comp_{MAX}$ =	940	lbs	---> Along short edge of curb.
(on short edge)	$Tens_{MAX}$ =	552	lbs	---> Along short edge of curb.

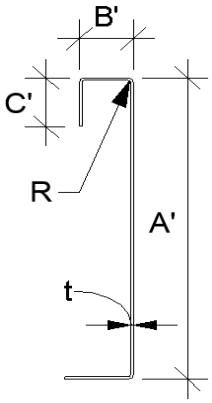
---> Negative values indicate opposite load.

MOUR GROUP
ENGINEERING + DESIGN

6593 Riverdale St.
San Diego, CA 92120
(619)727-4800

Curb Design

Fy =	50	ksi	Fu =	65	ksi
E =	29500	ksi	t =	0.0713	14 Gauge



Calculate Section Properties of Curb

A'=	14.000	in	a =	13.644	in = A'-(2r+t)
B'=	1.000	in	a'=	13.929	in = A'-t
C'=	0.000	in (0 if no lips)	b =	0.822	in = B'-[r+t/2+α(r+t/2)]
α =	0.000	(0 - no Lip; 1 w/ lip)	b'=	0.964	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 =	0.059	in (Distance between centroid and web centerline)			
Ix =	22.312	in^4	rx =	4.46	in
Iy =	0.039	in^4	ry =	0.186	in
A =	1.12	in^2	rmin =	0.186	in

Axial Compression

Pu =	0.455	k	(Max Axial Comp)
Pn/Ωc =	4.331	k	
Fe =	7.92	ksi	
λc =	2.51		
Fn =	6.95	ksi	
Ly =	45	in	Lateral unbraced length
k_yL_y/r_y =	192		(assume k=0.8)

Ωc = 1.80

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

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

Compression Check = O.K.

Check Web Crippling

h =	14	in	-- Check limits:		C = 4.00
t =	0.0713	in	h/t =	196.35 ≤ 260	C_R = 0.14
N =	7.00		N/t =	98.18 ≤ 210	C_N = 0.35
Ω_w =	1.75		N/h =	0.5 ≤ 2.0	C_h = 0.02
P_n =	2.422	k	R/t =	1.50 ≤ 9.0	
P_n/Ω_w =	1.384	k			
Long side: Pu_{Trans} =	1.003	k	**O.K.**	# clips = 1	
Short side: Pu_{Long} =	0.940	k	**O.K.**	# clips = 1	

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

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

Check Web Stiffener 16Ga x 3/4" x 6" (C-channel)

width of stiffener =	6.000	in	ts =	0.0566	16 Gauge
web of stiff. w =	5.717	in	Rs =	0.0849	in
***Check w/ts ≤ 1.28√E/Fys			Ωc =	1.70	
w/ts =	101.007				
1.28√(E/Fys) =	31.091	--> w/ts over limit	Use C3.7.2		

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

Pwc =	2.422	k	Ae =	0.324	in^2
Pn =	13.021	k	Pn/Ω =	7.659	k

Not Req'd

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

Tcrnmax =	228	lbs	Max($F_{pmaxASD}$/4 -OR- $Fh_{ASDtrans}$/4 corner connections)			
Vcrnmax =	501	lbs	Max(Tens/2 -OR- Comp/2 corner connections per side)			
Bolt:	Tall =	2480	lbs	Vall =	1208	lbs
Threaded Insert:	Tall =	2860	lbs	Vall =	1536	lbs

# of Bolts required for Tension = 0.1

# of Bolts required for Shear = 0.4

# of Bolts Used = 3.0

Check Combined Stress in Bolts & Inserts: 0.169 **O.K.**

Check 1/8" welded connection <--- USE WELD Ω = 2.35

Assume L/t > 25: 25*t =	1.783	in
Lreq'd =	0.339	in

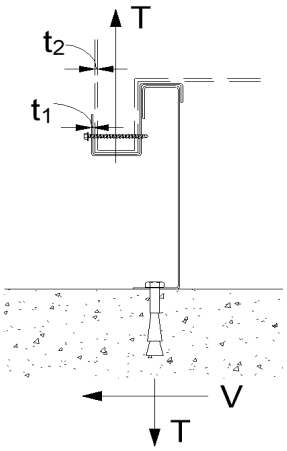
$$P_n/\Omega = \frac{1}{\Omega}0.75tLF_u \ge V_{req} \qquad L_{req'd} = \frac{V_{req}\Omega}{0.75tF_u}$$

MOUR GROUP
ENGINEERING + DESIGN

6593 Riverdale St.
San Diego, CA 92120
(619)727-4800

Connection Unit to Curb Clip | #10 SMS screw | Ω = 3.0

t1 = 0.0713 in | Fu1 = 65 ksi
t2 = 0.1017 in (unit base rail thickness) | Fu2 = 65 ksi
d = 0.190 in (screw diameter) | dw = 0.375 in (nom. washer diameter)
t2/t1 = 1.4



For t2/t1 ≤ 1.0:

Shear: $P_{ns} = 4.2F_{u2}\sqrt{t_2^3 d}$ Pns = 2377 # = 3.86 k

$P_{ns} = 2.7t_1 dF_{u1}$ = 2.38 k

$P_{ns} = 2.7t_2 dF_{u2}$ = 3.39 k

Pns/Ω = 792 #
Pss/Ω = 540 # <- Controls

For t2/t1 ≥ 2.5:

Pns = 2377 # = 2.38 k

$P_{ns} = 2.7t_1 dF_{u1}$ = 2.38 k

$P_{ns} = 2.7t_2 dF_{u2}$ = 3.39 k

Tension: Pnot = 1.068 k (screw pull-out strength)
Pnov = 2.607 k (screw pull-over strength)
Pts/Ω = 356 # <- Controls
Pts/Ω = 820 # (full tensile screw capacity)

$P_{not} = 0.85t_c dF_{u2})$
$t_c = \min(t_1, t_2)$
$P_{nov} = 1.5t_1 d_w F_{u1}$

	Shear (k)	# clips	V_{clip} (k)	V_{allow}(lb)	# screws	spacing
Long side:	0.910	1	0.91	540 #	2	6.00 in
Short side:	0.813	1	0.81	540 #	2	6.00 in

clip width (in) = 7.00 | clip height = 1.4 in
min spacing = 0.57 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 = 0.443 in^2 | Ant = 0.042 in^2
Rn/Ω = 7.500 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: $(0.6\text{-}0.14S_{DS})D + 0.7E$ WIND: 0.6D + W

Transverse: $Uplift_{MAX}$ = 939 lbs | $Shear_{MAX}$ = 455 lbs

$Compression_{SEISMIC}$ = 1377 lbs =[FpmaxASD*(Hcm+Hcurb)+(1+0.14S_{DS})*$WGT_{unit+curb}$*wcurb/2]/wcurb
$Tension_{SEISMIC}$ = 788 lbs =[FpmaxASD*(Hcm+Hcurb)-(0.6-0.14S_{DS})*$WGT_{unit+curb}$*wcurb/2]/wcurb
$Compression_{WIND}$ = 904 lbs =[$F_{h\ ASD\ trans}$*(Hcm+Hcurb)+0.6*$WGT_{unit+curb}$*wcurb/2-$F_{vert\ ASD}$*wcurb/2]/wcurb
$Tension_{WIND}$ = 939 lbs =[$F_{h\ ASD\ trans}$*(Hcm+Hcurb)-0.6*$WGT_{unit+curb}$*wcurb/2+$F_{vertASD}$*wcurb/2]/wcurb

Longitudinal: $Uplift_{MAX}$ = 743 lbs | $Shear_{MAX}$ = 440 lbs

$Compression_{SEISMIC}$ = 1272 lbs =[FpmaxASD*(Hcm+Hcurb)+(1+0.14S_{DS})*$WGT_{unit+curb}$*Lcurb/2]/Lcurb
$Tension_{SEISMIC}$ = 683 lbs =[FpmaxASD*(Hcm+Hcurb)-(0.6-0.14S_{DS})*$WGT_{unit+curb}$*Lcurb/2]/Lcurb
$Compression_{WIND}$ = 708 lbs =[$F_{h\ ASD\ long}$*(Hcm+Hcurb)+0.6*$WGT_{unit+curb}$*Lcurb/2-$F_{vert\ ASD}$*Lcurb/2]/Lcurb
$Tension_{WIND}$ = 743 lbs =[$F_{h\ ASD\ long}$*(Hcm+Hcurb)-0.6*$WGT_{unit+curb}$*Lcurb/2+$F_{vertASD}$*Lcurb/2]/Lcurb

Wood Attachment: **1/4"ϕ x 3.5" Simpson SDS screws w/ 2.25" threaded emb** (SGmin = 0.43)

Transverse: $T_{all_{metal}}$ = 997 lbs | $V_{all_{metal}}$ = 1097 lbs
$T_{all_{wood}}$ = 616 lbs | $V_{all_{wood}}$ = 672 lbs
# of Screws Req'd for Uplift = 1.52 | COMBINED LOADING: 0.734 O.K.
# of Screws Req'd for Shear = 0.68 | Screw Spacing = 19.3 in o.c.
Total # of screws Required = 3

1/4"ϕ x 3.5" Simpson SDS screws @ 19.3 in o.c. along long side of curb w/ 2.25" threaded embed

Longitudinal:
# of Screws Req'd for Uplift = 1.2 | COMBINED LOADING: 0.931 O.K.
# of Screws Req'd for Shear = 0.7 | Screw Spacing = 33.0 in o.c.
Total # of screws Required = 2

1/4"ϕ x 3.5" Simpson SDS screws @ 33 in o.c. along short side of curb w/ 2.25" threaded embed

Steel Deck Attachment: **1/2" ϕ A307 Bolts to steel angle below deck**

Transverse: $T_{all_{bolt}}$ = 3927 lbs | $V_{all_{bolt}}$ = 2209 lbs
$T_{all_{metal}}$ = 2086 lbs | $V_{all_{metal}}$ = 2192 lbs
# of Bolts Req'd for Uplift = 0.45 | COMBINED LOADING: 0.106 O.K.
# of Bolts Req'd for Shear = 0.21 | Bolt Spacing = 34.5 in o.c.
Total # of Bolts Required = 2

1/2" ϕ A307 Bolts to steel angle below deck @ 34.5 in o.c. along long side of curb

Longitudinal:
# of Bolts Req'd for Uplift = 0.36 | COMBINED LOADING: 0.078 O.K.
# of Bolts Req'd for Shear = 0.20 | Req'd Min Spacing = 29.0 in o.c.
Total # of Bolts Required = 2

1/2" ϕ A307 Bolts to steel angle below deck @ 29 in o.c. along short side of curb

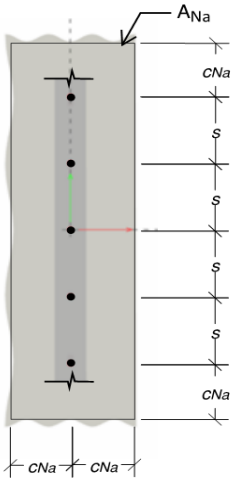
MOUR GROUP
ENGINEERING + DESIGN

6593 Riverdale St.
San Diego, CA 92120
(619)727-4800

For Concrete anchorage: SEISMIC $(0.6\text{-}0.14S_{DS})D + 0.7\Omega_o E$ Ωo = 2.0

Concrete Attachment: 1/2"ϕ HAS rods in Hilti HIT-HY 200 V3 epoxy w/ 2.75in embed

Epoxy: Hilti HIT-HY 200 V3 (ICC ESR 4868)



f'c =	3000	psi		
h =	4	in (concrete thickness, t_min = h_ef + 2do)	O.K.	
h_ef =	2.75	in (effective embedment)		
da =	0.5	in (anchor diameter)	do = 0.625	in (hole diameter)
n =	2	(number of dummy anchors to check capacity with spacing effect)		
s =	16.9	in (initial spacing estimate)		
τk,cr / uncr =	1135	2220 psi (from ESR 4868, Table 14, Temp range B)		
τk,cr / uncr =	1156	2261 psi	If $f'_c > 2500$,	$multiply\ by\ (f'_c/2500)^{0.1}$
c_Na=	7.15	in (min. edge distance for full capacity);	$c_{Na} = 10d_a\sqrt{\frac{\tau_{uncr}}{1100}}$	

Tension:

Bond strength

$$N_{ag} = \frac{A_{Na}}{A_{Nao}}\varphi_{ec,Na}\varphi_{ed,Na}\varphi_{cp,Na}N_{ba} \quad \text{(ACI318-14, 17.4.5.1b)}$$

$$\varphi_{ec,Na}\varphi_{ed,Na}\varphi_{cp,Na} = 1.0$$

***Bond strength will govern over concrete breakout

A_{Na}=	408.98	in²		
A_{Nao}=	204.49	in²		
N_{ba} =	4943	lbs	$N_{ba} = \lambda_a\tau_{cr}\pi d_a h_{ef}\alpha_{n,seismic}$	$\alpha_{n,seismic} = 0.99$
N_{ag} =	9886	lbs (group)		λ_a =1.0
øN_{ag} =	4820	lbs (group)	CONTROLS	λ_a =1.0 for normal weight conc; 0.6 for lightv

Breakout strength

$$N_{cbg} = \frac{A_{Nc}}{A_{Nco}}\varphi_{ec,N}\varphi_{ed,N}\varphi_{cp,N}N_b \qquad N_b = \lambda_a k_c\sqrt{f'_c}h_{ef}^{1.5}$$

A_{Nc} =	207.4875	in²	N_b = 4246	lbs	$ø_{conc}$ =	0.75
A_{Nco} =	68.0625	in²	kc = 17		$ø_{bond}$ =	0.65
N_{cbg} =	12945	lbs (group)			$ø_{seis}$ =	0.75
øN_{cbg} =	7281	lbs (group)			$ø_{steel}$ =	0.65

Shear:

Steel strength	Vsa,eq =	4940	(from ESR4868, Table 11)		$\alpha_{v,seismic}$ =	0.6
	øVsa,eq =	1927				
	$Tall_{LRFD}$ =	2410	lbs (anchor)	$Vall_{LRFD}$ = 3067	lbs	$\propto = (1 + 0.2SDS)D + 2.5E$
	$Tall_{ASD} = Tall_{LRFD}/\alpha$ =	1411	lbs	$Vall_{ASD} = Vall_{LRFD}/\alpha$ = 1796	lbs	D =0.758 E =0.242 $\propto$ =1.709

Transverse:

$Uplift_{MAX}$ =	1680 lbs	$Shear_{MAX}$ =	881 lbs

$Compression_{SEISMIC}$ =	2269 lbs	=[Ωo*FpmaxASD*(Hcm+Hcurb)+(1+0.14S_{DS})*$WGT_{unit+curb}$*wcurb/2]/wcurb
$Tension_{SEISMIC}$ =	1680 lbs	=[Ωo*FpmaxASD*(Hcm+Hcurb)-(0.6-0.14S_{DS})*$WGT_{unit+curb}$*wcurb/2]/wcurb
$Shear_{SEISMIC}$ =	881 lbs	=Ωo*FpmaxASD/2

Min Bolts Req'd Uplift =	1.19	spacing =	17.25	in o.c.	Tapplied =	840.1 lbs
Min Bolts Req'd Shear =	2.00	spacing =	34.50	in o.c.	Vapplied =	220.2 lbs

Try using 2 bolts spaced at 34.50 in o.c.

COMBINED LOADING = $\frac{T_{applied}}{T_{allow,ASD}} + \frac{V_{apllied}}{V_{allow,ASD}} \le 1.2$ = 0.72 O.K.

Use 2 - 1/2"ϕ HAS rods in Hilti HIT-HY 200 V3 epoxy @ 34.5 in o.c. max. along long side of curb w/ 2.75in embed

Longitudinal:

$Uplift_{MAX}$ =	1469 lbs	$Shear_{MAX}$ =	881 lbs

$Compression_{SEISMIC}$ =	2058 lbs	=[Ωo*FpmaxASD*(Hcm+Hcurb)+(1+0.14S_{DS})*$WGT_{unit+curb}$*Lcurb/2]/Lcurb
$Tension_{SEISMIC}$ =	1469 lbs	=[Ωo*FpmaxASD*(Hcm+Hcurb)-(0.6-0.14S_{DS})*$WGT_{unit+curb}$*Lcurb/2]/Lcurb
$Shear_{SEISMIC}$ =	881 lbs	=Ωo*FpmaxASD/2

Min Bolts Req'd Uplift =	1.04	spacing =	14.50	in o.c.	Tapplied =	734.6 lbs
Min Bolts Req'd Shear =	2.00	spacing =	29.00	in o.c.	Vapplied =	220.2 lbs

Try using 2 bolts spaced at 29.00 in o.c.

COMBINED LOADING = $\frac{T_{applied}}{T_{allow,ASD}} + \frac{V_{apllied}}{V_{allow,ASD}} \le 1.2$ = 0.64 O.K.

Use 2 - 1/2"ϕ HAS rods in Hilti HIT-HY 200 V3 epoxy @ 29 in o.c. max. along short side of curb w/ 2.75in embed

CURB DESIGN SUMMARY:	CBPKD-153 LXL	**Unit:**	ALL P***B MODELS
CURB RAIL THICKNESS:	0.0713 in 14 Gauge		
UNIT CLIP THICKNESS:	0.0713 in 14 Gauge		
# OF CLIPS (LONG SIDE) -	1 clips with 2 - #10 SMS screws each clip		
WEB STIFFENER:	16Ga x 3/4" x 6" (C-channel) stiffener at each clip		
# OF CLIPS (SHORT SIDE) -	1 clips with 2 - #10 SMS screws each clip		
WEB STIFFENER:	16Ga x 3/4" x 6" (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
	1/4"ϕ x 3.5" Simpson SDS screws w/ 2.25" threaded embed	1/2" ϕ A307 Bolts to steel angle below deck	1/2"ϕ HAS rods in Hilti HIT-HY 200 V3 epoxy w/ 2.75in embed
LONG DIRECTION	3 @ 19.25 in o.c.	2 @ 34.5 in o.c.	2 @ 34.5 in o.c.
SHORT DIRECTION	2 @ 33 in o.c.	2 @ 29 in o.c.	2 @ 29 in o.c.