CBWC Series
PRD3715
Form No: CBWC - 113

Prepared For:

PROVENT
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Prepared By:

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For wood, concrete and steel attachments see Roof Anchorage Detail, Form No. CB-24A.

STRUCTURALLY CALCULATED WELDED ROOF CURBS FOR YORK UNITS

ZT, ZR, ZJ, ZH 037-150
ZF, ZH, ZJ, ZR, XP, DH, DM, DF, DR, BP 078-150

ProVent P/N	A	WEIGHT
CBWCPRD371508	8"	125 Lbs
CBWCPRD371511	11"	141 Lbs
CBWCPRD371514	14"	157 Lbs
CBWCPRD371524	24"	208 Lbs

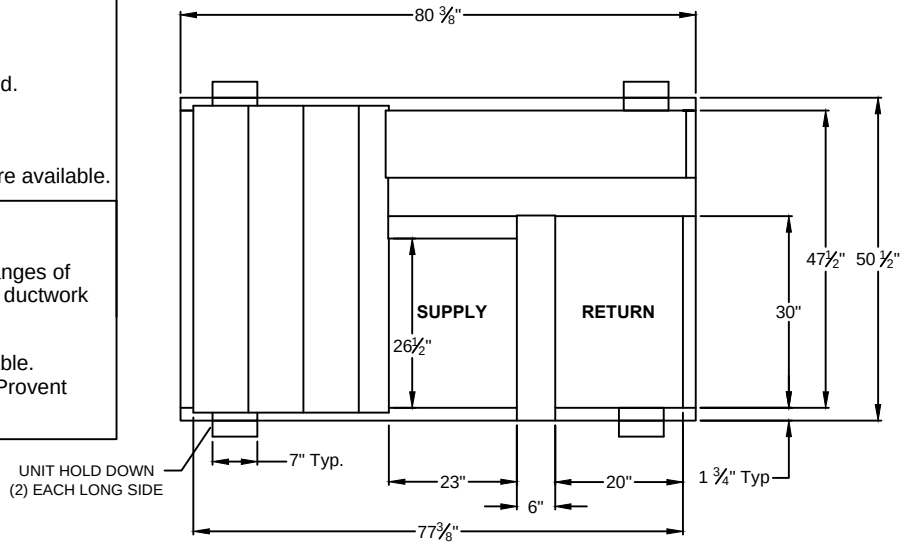
Meets seismic requirements for the following codes:
CBC 2013
IBC 2012

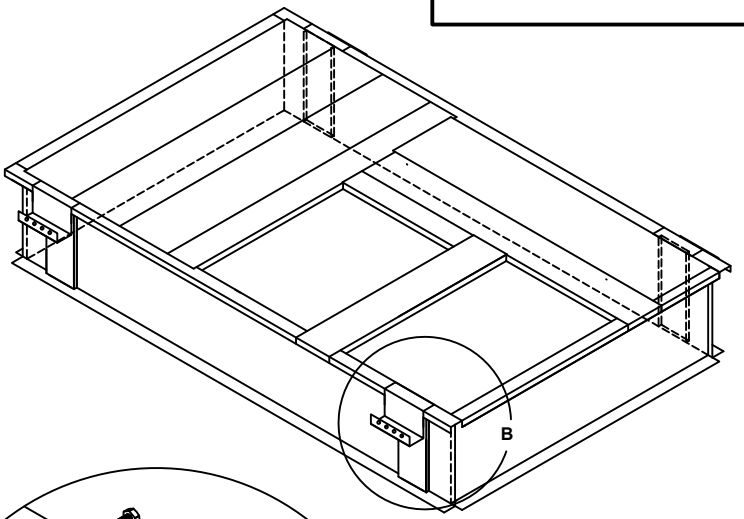
FEATURES

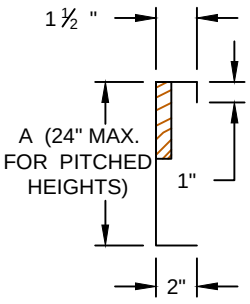
- Roof curb sides and ends are 16 ga. galvanized steel.
- Gasketing package provided.
- Heat treated wood nailer provided.
- Insulated deck pans provided.
- Pitched curbs and taller curbs are available.

NOTES

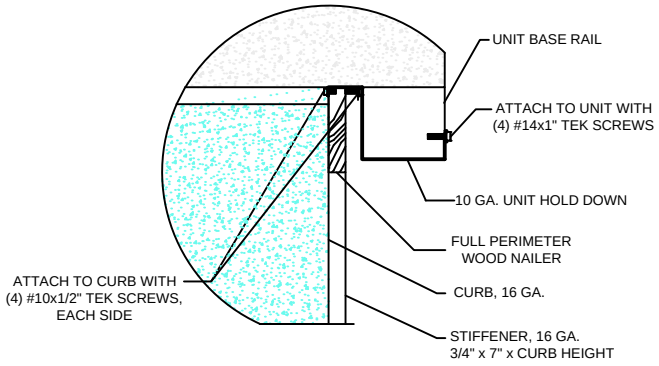
- Attach ductwork to roof curb. Flanges of duct rest on top of curb. Support ductwork below the curb.
- Thru the curbs utilities are available. Contact your York distributor or Provent directly.



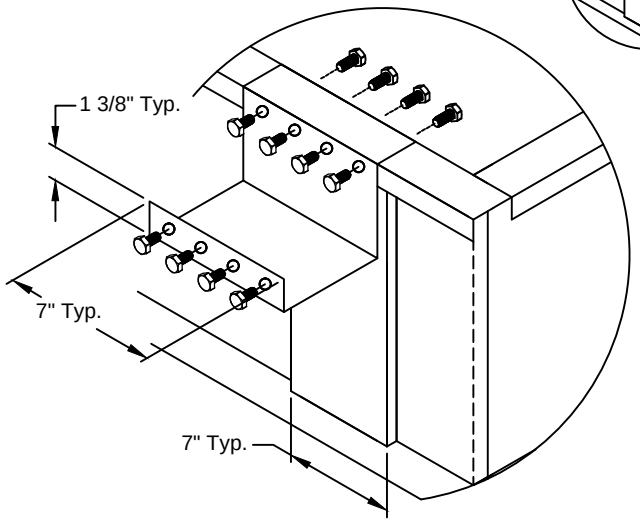




CURB DETAIL



HOLD DOWN DETAIL



DETAIL B

ProVent

3847 WABASH DR.
MIRA LOMA, CA 91725

PHONE (951) 685-1101
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SUBMITTED TO: _____
COMPANY: _____
JOB NAME: _____
EQUIPMENT: _____
NOTES: _____

FORM NO:		PART NUMBER:
CBWC-113		CBWCPRD3715 SERIES
DATE: 7/23/14	**REV:** 2	**DRAWN BY:** JG

Curb Information HVAC UNIT: Predator Welded Roof Curb 8-14"

Curb Number:

Hcurb	24	(Height from support structure to top of curb)
Lcurb	77.375	(Length of Curb - In to In)
Wcurb	47.5	(Width of Curb - In to In)
Lclip	66.625	(min Length in Long dir from end to clip)
# clips Long Side	2	(Shear + Uplift Clips)
# clips short side	0	(Shear Clips)

Unit Information:	2095 lbs	(Max Weight)
Weight:	2095 lbs	(Min Weight)
W c-max	719 lbs	(Maximum corner weight)
W c-min	293 lbs	(Minimum corner weight)
W mid	300 lbs	
H unit	50.75	(Height of unit above curb)
H cm	25.38	(Height from top of curb to center of mass of unit)
L unit	120.00	(Length of unit)
w unit	59.00	(Width of unit)

Seismic Loading	CBC2012	(DESIGN ALSO OK FOR IBC 2009/CBC2010)
Ss	2.00	
Fa	1.00	(worst case for site; Ss>1.25, Site Class D)
Sms	2.00	(=Fa*Ss)
Sds	1.33	(=2/3*Sms)
Ip	1.5	(=Worst case)
ap	2.5	
Rp	6	
Fp max	1.0 Wp	(=0.4*ap*Sds*Wp*(1+2*z/h)/(Rp/Ip))
Fp ASD	1534 lbs	(=0.7*Fpmax)

Wind Loading (Ultimate)

Code:	CBC2012	(DESIGN ALSO OK FOR IBC 2009/CBC2010 - 90MPH)
Wind Exposure:	C	
V	120 mph	(Ultimate Wind Speed)
Kzt	1	
Kd	0.9	
Kh	1.13	for 60 foot roof height
GCf	1.9	
Wind Loading: Lateral		

qh	37 psf			(ASD=0.6W)	
F	71 psf	(ultimate)	F	43 psf	(service)
A net/transv.	42 sf				
Fwind transv	3013 lbs	(ultimate)	Fwind trnsv	1808 lbs	(service)
A net/long	21 sf				
Fwind long	1481 lbs	(ultimate)	Fwind long	889 psf	(service)

Controlling Lateral Load (Seismic vs. Wind)

Transverse	1808 lbs	(ASD)
Long	1534 lbs	(ASD)

Wind Loading: Uplift

qh	37.5 psf				
GCr	1.5				
Fv (psf)	56.2 psf	(ultimate)			
Av	49 sf				
Fv	2765 lbs	(ultimate)	Fv	1659 lbs	(ASD: 0.6W)

Curb Loading:

Transverse direction:

OTM:	3823 lb-ft		0.6W: F max - transv * Hcm
M res.	1516 lb-ft		0.6D: 2 * Wcrnmin *0.6* (width curb +4.25")
Net OTM:	2307 lb-ft		0.6D+0.6W: OTM-RM
Max Comp	1738 lbs	/side	1.0D+0.6W: (2 x Wcrnmax + (Mot-Mres)/ (width curb +4.25"))
Max Tension	1364 lbs	/side	0.6D+0.6W: (Mot-Mres)/(width curb +4.25")) + Fv/(2 sides)
Max Tension	682 lbs	/clip	0.6D+0.6W: Max tension/side /#clips
Max Corner:	885 lbs		W c-max+ (Mot-Mres)/((w/curb+4.25")/Lcurb*(N-corner)/2/12
Max Interior:	632 lbs		W mid+ (Mot-Mres)/(width curb +4.25")/Lcurb*(N-mid)

Longitudinal direction:

OTM:	3243 lb-ft		0.6W: F max long * Hcm
RM	2399 lb-ft		0.6D: 2 X Wcrnmin x (Lcurb+4.25in)/12 x 0.6
Net OTM:	845 lb-ft		0.6D+0.6W: OTM-RM
Max Comp =	1302 lbs	/side	1.0D+0.6W: (2*Wcmax + (NetOTM)/Lclip)+ Fv/(U.C)
Max Tens =	982 lbs	/side	0.6D+0.6W: (Mot-Mres)/Lclip) + Fv/(2 sides)
Max Tension =	567 lbs	/clip	0.6D+0.6W: (Mot-Mres)/Lclip) + Fv/(2 sides)/#clips/side
Max Corner:	785 lbs		W c-max+ (Mot-Mres)/Lcurb/Wcurb*(N-corner)/2

Connection of Unit to Curb

Screws - metal ga

Screws in Uplift clips	#10-16ga	Vall=	582	lbs/screw
Screws in Short Side Clips	#10-16ga	Vall=	582	lbs/screw

UPLIFT CLIPS:

Shear:	383 lbs/clip		
Uplift:	682 lbs/clip		
F diag	513	lbs/clip to curb	

UPLIFT CLIPS:

	2	#10-16ga
Fdiag/screw	257	lbs/screw
F/screw outs.	171	lbs/screw

SCREWS OK

SHORTSIDE CLIPS

Shear: #DIV/0!

SHORTSIDE CLIPS

	2	#10-16ga
F screw	#DIV/0!	lbs/screw

#DIV/0!

Curb info

H curb	24	in, curb height max
Fy	50	ksi
E	29000	ksi
Fu	65	ksi
gage:	16	
R	0.0849	
t	0.0593	
R/t	1.50	
h	23.77	in

Interior Curb

N	48	bearing length: 2*h
C	20	
C_R	0.1	
C_N	0.08	
C_h	0.03	
ϕ_w	0.85	
Ω_w	1.75	
Pn	4.04 k	
Pall	2.31 k	
ϕPn	3.43 k	
Pmax	0.63 k	Pall>Pmax,curb OK,

Exterior Curb:

N total	48	2*curb height
N -BUS	7	bearing length with stiffener (built up section)
N - SWC	41	bearing length without stiffener (single web channel)

Exterior Curb SWC	
N	41
C	7.5
C_R	0.08
C_N	0.12
C_h	0.05
ϕ_w	0.85
Ω_w	1.75
Pn	-0.01 k
Pall	0.00 k
ϕPn	0.00 k

Exterior Curb BUS	
N	7
C	15.5
C_R	0.09
C_N	0.08
C_h	0.04
ϕ_w	0.75
Ω_w	2
Pn	1.81 k
Pall	0.90 k
ϕPn	1.35 k

Corner:	
Pall	0.90 k
ϕPn	1.35 k
Pmax	0.88 k

Pall>Pmax,curb OK,

Connection of Curb to Supporting Structure (ASD)

Transverse:	**0.6D+0.6W**				
**Uplift (wind)=	2173	lbs			
*Uplift (seismic)	1105	lbs			
Uplift max=	2173	lbs/long side			
**Shear (wind)	2359	lbs			
*Shear (seis)	1534	lbs			
Shear max=	2359	lbs/total curb			
Longitudinal:					
**Uplift (wind)=	1086	lbs			
*Uplift (seismic)	705	lbs	T max	2173	lbs/long
Uplift max=	1086	lbs/long side	V max	2359	lbs/total
**Shear (wind)	1227	lbs			
*Shear (seis)	1534	lbs			
Shear max=	1534	lbs/total curb			

Wood Attachment: (Use 1/4" ϕ x 3.5" SDS SCREWS)
(3.5" minimum embed into DF or SP wood)

W' 616 lbs
V' 256 lbs

total screws required=	10	
# screws: LONG SIDE	4	
# screws: SHORT SIDE	1	
W/screw (uplift)	2	lbs
V/Screw	236	lbs

WOOD SCREWS OK

Steel Deck Attach.: (Use 5/8" ϕ A307 Bolts attached to L5x5x1/4 below deck at each conn.point)

Tall= 6900 lbs
Vall= 3680 lbs

total bolts required=	6		
# bolts: LONG SIDE	2		
# bolts: SHORT SIDE	1		
T/bolt (uplift)	1087	lbs	
V/bolt	393	lbs	
fv	1.3	ksi	OK
ft	3.5	ksi	OK
Fnt'	53.7	ksi	
Fnv	24.0	ksi	

BOLTS OK

Connection of Curb to Concrete Supporting Structure - STRENGTH DESIGN

Transverse:	**0.9D +1.0(E or W)**					
**Uplift (wind)=	3681	lbs				
*Uplift (seismic)	10291	lbs	*Rp*1.3/1.5/0.7asd			
Uplift max=	10291	lbs/side	(Per long side curb)			
**Shear (wind)	3931	lbs	(Maximum Lateral Force) (seismic: Rp=1.5 max)			
*Shear (seis)	11392	lbs	*Rp*1.3/1.5/0.7asd			
Shear max=	11392	lbs	(Total Curb)			
Longitudinal:						
**Uplift (wind)=	1882	lbs				
*Uplift (seismic)	7795	lbs		Tu max	10291	lbs
Uplift max=	7795	lbs/side	(Per long side curb)	Vu max	11392	lbs
**Shear (wind)	2045	lbs				
*Shear (seis)	11392	lbs				
Shear max=	11392	lbs	(Total Curb)			

Concrete Attach.: (Use 5/8"ϕ Simpson Strong Bolt 2)			phi-Tn	2600	lbs
			phi-Vn	1100	lbs
	(LRFD design)				
Anchors Required for Uplift (long side only)=	4.0				
Anchors Required for Shear (Total Curb)=	10.4				
Anchors Required (long side only) =	4.0			Conc Anchors	
		anchors (long side)	4.0	OK	
Simpson Strong Bolt 2		anchors (short side)	2.0		
3 5/8" Embed		anchors (total)	12	OK	
(f'c=4000psi, 6" min total thickness - normal weight concrete, 12" E.D.)		Tu	2573	OK	
ESR Report - 3037		Vu	949	OK	
Special Inspection Required					

*Uplift and Shear seismic anchorage forces have been designed for an Rp of 1.5 max per ASCE 13.4.2
Anchorage design per ASCE 14.2.2.17/ACI D3.3 with strength reduction factors
not required in combination with Rp=1.5
** For wind force, shear at base for anchorage design, accounts for add'l area from curb width and height