



# ISCAL Series AFF1860

Form No: ISCAL - 125

## 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 VIBRATION ISOLATION CURBS FOR YORK UNITS**

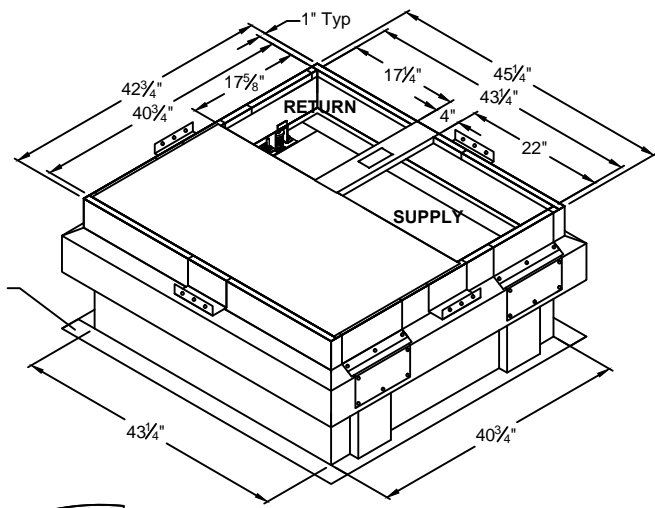
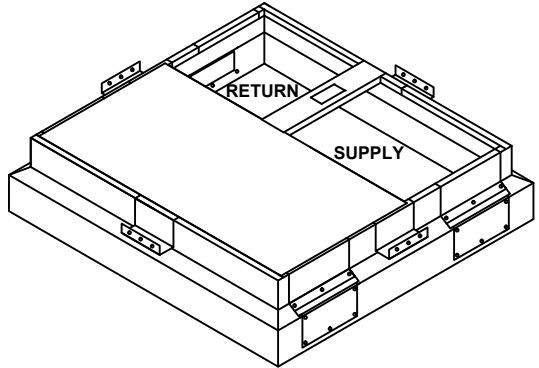
**DNQ/DNY/DNZ/DEQ/DEZ/BHQ/BHX/BHZ 024-060  
DNX/DEX 024-060, DEY 060**

ProVent P/N (2" Deflection)	A	B	WEIGHT	ProVent P/N (3" Deflection)	A	B	WEIGHT
ISCALAFF186018**	8"	18"	269 Lbs	ISCALAFF1860193**	8"	19"	299 Lbs
ISCALAFF186021**	11"	21"	281 Lbs	ISCALAFF1860223**	11"	22"	311 Lbs
ISCALAFF186024**	14"	24"	293 Lbs	ISCALAFF1860253**	14"	25"	323 Lbs

Welded isolation spring housings are standard. For bolted spring housings, neoprene pads and spring cups see Weldment and Bolting Detail, Form No. ISCAL-131.

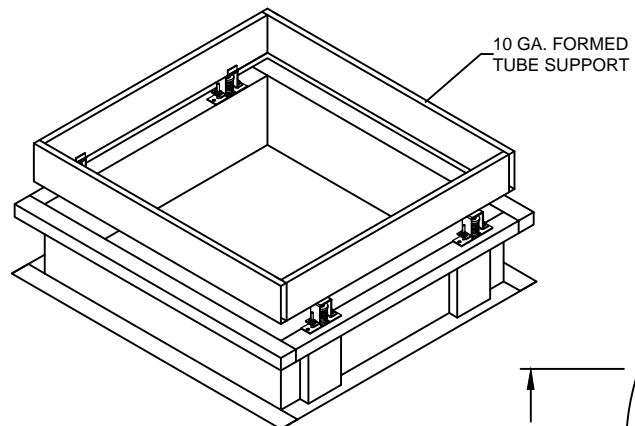
**\*\*Note:** Spring configuration must be added to part number at time of order.

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



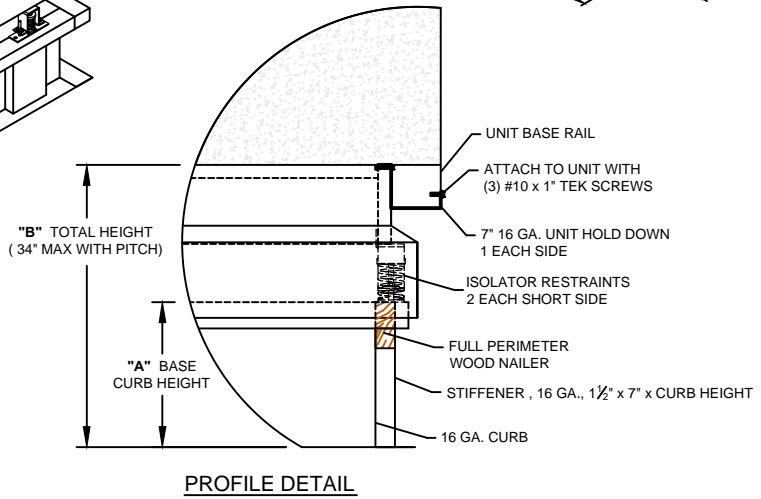
**FEATURES**

- Roof curb sides and ends are 16 ga. galvanized steel.
- Fully welded construction.
- Gasketing package provided.
- Heat treated wood nailer provided.
- Insulated deck pans provided.
- Pitched curbs and taller curbs are available.
- CalDyn OSHPD pre-approved 2" or 3" deflection seismic restraints. (OPA-0070), (JQA).



**NOTES**

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



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SUBMITTED TO: \_\_\_\_\_  
COMPANY: \_\_\_\_\_  
JOB NAME: \_\_\_\_\_  
EQUIPMENT: \_\_\_\_\_  
NOTES: \_\_\_\_\_

FORM NO:  
ISCAL-125  
  
DATE:  
7/23/14  
  
REV:  
2

PART NUMBER:  
ISCALAFF1860 SERIES  
  
DRAWN BY:  
JG

**Curb Information** HVAC UNIT: Affenity Vibration isolated Curbs

Curb Number:

Hcurb	14	(Height from support structure to top of curb)
Lcurb	43.25	(Length of Curb - In to In)
Wcurb	40.75	(Width of Curb - In to In)
Lclip	21.625	(min Length in Long dir from end to clip)
Total Hcurb	34	H curb+isolator curb "B"
# clips Long Side	2	(Shear + Uplift Clips)
# clips short side	0	(Shear Clips)

<b>Unit Information:</b>	845 lbs	(Max Weight)
Weight:	845 lbs	(Min Weight)
W c-max	401 lbs	(Maximum corner weight)
W c-min	110 lbs	(Minimum corner weight)
W mid	161 lbs	
H unit	41.50	(Height of unit above curb)
H cm	20.75	(Height from top of curb to center of mass of unit)
L unit	47.25	(Length of unit)
w unit	49.13	(Width of unit)

<b>Seismic Loading</b>	CBC2013	(DESIGN ALSO OK FOR IBC 2009/CBC2010)
Ss	2.00	ISO CURB <input type="text" value="Y"/>
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	2	
Fp max	3.1 Wp	(=0.4*ap*Sds*Wp*(1+2*z/h)/(Rp/Ip))
Fp ASD	1832 lbs	(=0.7*Fpmax)

<b>Wind Loading</b>	(DESIGN ALSO OK FOR IBC 2009/CBC2010)	
Code:	CBC2013	Roof Ht: <input type="text" value="60 ft"/> Maximum
Wind Exposure:	C	
V	120 mph	(Ultimate Wind Speed - Worst case:)
Kzt	1	
Kd	0.9	
Kh	1.13	
Gcf	1.9	
Iw	1.15	

<b>Wind Loading: Lateral</b>		
qh	43 psf	(ASD=0.6W)
F	82 psf (ultimate)	F 49 psf (service)
A net/transv.	14 sf	
Fwind transv	1115 lbs (ultimate)	Fwind trnsv 669 lbs (service)
A net/long	21 sf	
Fwind long	1719 lbs ultimate	Fwind long 1031 lbs (service)

**Controlling Lateral Load (Seismic vs. Wind)**

Transverse	1832 lbs (ASD)
Long	1832 lbs (ASD)

**Wind Loading: Uplift**

qh	43.1 psf
GCr	1.5

Fv (psf)	64.7 psf	(ultimate)		
Av	16 sf			
Fv	1042 lbs	(ultimate)	Fv	625 lbs (ASD: 0.6W)

**Curb Loading:**

Transverse direction:

OTM:	3167 lb-ft	0.6W: F max - transv * Hcm
M res.	495 lb-ft	0.6D: 2 * Wcrnmin * 0.6 * (width curb + 4.25")
Net OTM:	2672 lb-ft	0.6D+0.6W: OTM-RM
Max Comp	1182 lbs /side	1.0D+0.6W: (2 x Wcrnmax + (Mot-Mres)/ (width curb + 4.25"))
Max Tension	713 lbs /side	0.6D+0.6W: (Mot-Mres)/(width curb + 4.25") + Fv/(2 sides)
Max Tension	356 lbs /clip	0.6D+0.6W: Max tension/side /#clips
Max Corner:	632 lbs	W c-max+ (Mot-Mres)/((w/curb+4.25")/Lcurb*(N-corner)/2/12
Max Interior:	622 lbs	W mid+ (Mot-Mres)/(width curb + 4.25")/Lcurb*(N-mid)

Longitudinal direction:

OTM:	3167 lb-ft	0.6W: F max long * Hcm
RM	525 lb-ft	0.6D: 2 X Wcrnmin x (Lcurb+4.25in)/12 x 0.6
Net OTM:	2642 lb-ft	0.6D+0.6W: OTM-RM
Max Comp =	2074 lbs /side	1.0D+0.6W: (2*Wcmax + (NetOTM)/Lclip) + Fv/(U.C)
Max Tens =	1466 lbs /side	0.6D+0.6W: (Mot-Mres)/Lclip + Fv/(2 sides)
Max Tension =	733 lbs /clip	0.6D+0.6W: (Mot-Mres)/Lclip + Fv/(2 sides)/#clips/side
Max Corner:	653 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:	458 lbs/clip
Uplift:	733 lbs/clip
F diag	587 lbs/clip to curb

UPLIFT CLIPS:

	2	#10-16ga
Fdiag/screw	293	lbs/screw
F/screw outs.	183	lbs/screw

SCREWS OK

SHORTSIDE CLIPS

Shear:	#DIV/0!
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SHORTSIDE CLIPS

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

**Curb info**

H curb	14	in, curb height
Fy	50	ksi
E	29000	ksi
Fu	65	ksi
gage:	16	min
R	0.0849	

t	0.0566
R/t	1.50
h	13.77 in

**Interior Curb**

N	28	bearing length: 2*h
C	20	
C <sub>R</sub>	0.1	
C <sub>N</sub>	0.08	
C <sub>h</sub>	0.03	
φ <sub>w</sub>	0.85	
Ω <sub>w</sub>	1.75	
P <sub>n</sub>	4.16 k	
P <sub>all</sub>	2.38 k	
φP <sub>n</sub>	3.53 k	
P <sub>max</sub>	0.62 k	P <sub>all</sub> >P <sub>max</sub> ,curb OK,

**Exterior Curb:**

N total	28	2*curb height
N -BUS	1	bearing length with stiffener (built up section)
N - SWC	27	bearing length without stiffener (single web channel)

Exterior Curb SWC	
N	27
C	7.5
C <sub>R</sub>	0.08
C <sub>N</sub>	0.12
C <sub>h</sub>	0.05
φ <sub>w</sub>	0.85
Ω <sub>w</sub>	1.75
P <sub>n</sub>	0.86 k
P <sub>all</sub>	0.49 k
φP <sub>n</sub>	0.73 k

Exterior Curb BUS	
N	1
C	15.5
C <sub>R</sub>	0.09
C <sub>N</sub>	0.08
C <sub>h</sub>	0.04
φ <sub>w</sub>	0.75
Ω <sub>w</sub>	2
P <sub>n</sub>	2.22 k
P <sub>all</sub>	1.11 k
φP <sub>n</sub>	1.66 k

Corner:	
P <sub>all</sub>	1.60 k
φP <sub>n</sub>	2.40 k
P <sub>max</sub>	0.65 k
P <sub>all</sub> >P <sub>max</sub> ,curb OK,	

**Connection of Curb to Supporting Structure (ASD)**

Transverse:	<b>0.6D+0.6W</b>	
**Uplift (wind)=		1158 lbs
*Uplift (seismic)		2084 lbs
Uplift max=		2084 lbs/long side
**Shear (wind)		1171 lbs
*Shear (seis)		1832 lbs
Shear max=		1832 lbs/total curb

Longitudinal:

**Uplift (wind)=	2647 lbs		
*Uplift (seismic)	4346 lbs	T max	4346 lbs/long
Uplift max=	4346 lbs/long side	V max	1832 lbs/total
**Shear (wind)	1504 lbs		
*Shear (seis)	1832 lbs		
Shear max=	1832 lbs/total curb		

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

W'	616 lbs
V'	400 lbs

total screws required=	18
# screws: LONG SIDE	6
# screws: SHORT SIDE	3
W/screw (uplift)	543 lbs
V/Screw	102 lbs

WOOD SCREWS OK

**Steel Attach.: (Use 1/2" min  $\phi$  A307 Bolts attached to Steel member below deck at each conn.point)**

total bolts required=	8		
# bolts: LONG SIDE	3		
# bolts: SHORT SIDE	1		
T/bolt (uplift)	4346 lbs		
V/bolt	229 lbs		
fv	1.1 ksi	OK	
ft	21.7 ksi	OK	
Fnt'	54.2 ksi		
Fnv	24.0 ksi		
1/2" diam BOLTS OK			

**Connection of Curb to Concrete Supporting Structure - STRENGTH DESIGN**

Transverse:	<b>0.9D +1.0(E or W)</b>		
**Uplift (wind)=	1952 lbs		
*Uplift (seismic)	3918 lbs		
Uplift max=	3918 lbs/side	(Per long side curb)	
**Shear (wind)	1952 lbs		
*Shear (seis)	3402 lbs	*Rp*1.3/Rp/0.7asd - Anchor is ACI 355.2 tested	
Shear max=	3402 lbs	(Total Curb)	

Longitudinal:			
**Uplift (wind)=	4460 lbs		
*Uplift (seismic)	8175 lbs	Tu max	8175 lbs
Uplift max=	8175 lbs/side	Vu max	3402 lbs
**Shear (wind)	2507 lbs		
*Shear (seis)	3402 lbs		

Shear max= 3402 lbs (Total Curb)

**Concrete Attach.: (Use 5/8"  $\phi$  Simpson Strong Bolt 2)**

phi-Tn	2600	lbs
phi-Vn	1100	lbs

(LRFD design)

Anchors Required for Uplift (long side only)= 3.1  
 Anchors Required for Shear (Total Curb)= 3.1  
 Anchors Required (long side only) = 4.0

Simpson Strong Bolt 2  
 3 5/8" Embed  
 ( $f'_c=4000$ psi, 6" min total thickness - normal weight concrete, 12" E.D.)  
 ESR Report - 3037  
 Special Inspection Required

Conc Anchors	
anchors (long side)	4.0 OK
anchors (short side)	2.0
anchors (total)	12 OK
Tu	2044 OK
Vu	283 OK

\*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

**Curb Support and Isolator Information**

# Isolators long side	2	(minimum for OPA-0070 load rating check & box support check)
# Isolators short side	0	(actual amount of isolators by curb mfr spring load rating governed)
Total # isolators	4	
Edge dist/ long side	4	in (approximate)
Long side/spacing	21.6	max spacing btwn isolators (tube span)
Isolator bearing length	6	

**Isolators: Assembly by CalDyn**

(min 1 at ea corner long side)

<b>Isolator:</b>	<b>JQA</b>
Vert	1660 lbs
Horz	800 lbs

Isolator Loading:

Vmax:	458 lbs/isolator	Isolator OK for shear
Rmax- long side:	867 lbs/isolator	Isolator OK for Rall
Rmax- short side:	N/A lbs/isolator	N/A

Uplift max- long side:	550 lbs/isolator	Isolator OK for Rall
Uplift max- short side:	159 lbs/isolator	Isolator OK for Rall

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**Frame: 10 Ga Box Support**

Fy=50ksi

6inch x 1.125in x 10 ga tube

Load/long side:	47.9 lb/in
Mmax	2.80 k-in
Vmax	0.6 k

## Allowable:

Moment:	50 k-in	OK
Max Lu:	72 in	OK
Web Crippling:	5 k	OK
Shear:	2.2 k	OK

Tube Support OK

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\*NOTE: ACTUAL # OF ISOLATORS TO BE DETERMINED BY PROVENT,  
DEPENDENT ON E SPRINGS RATED LOAD HOUSED IN ISOLATORS