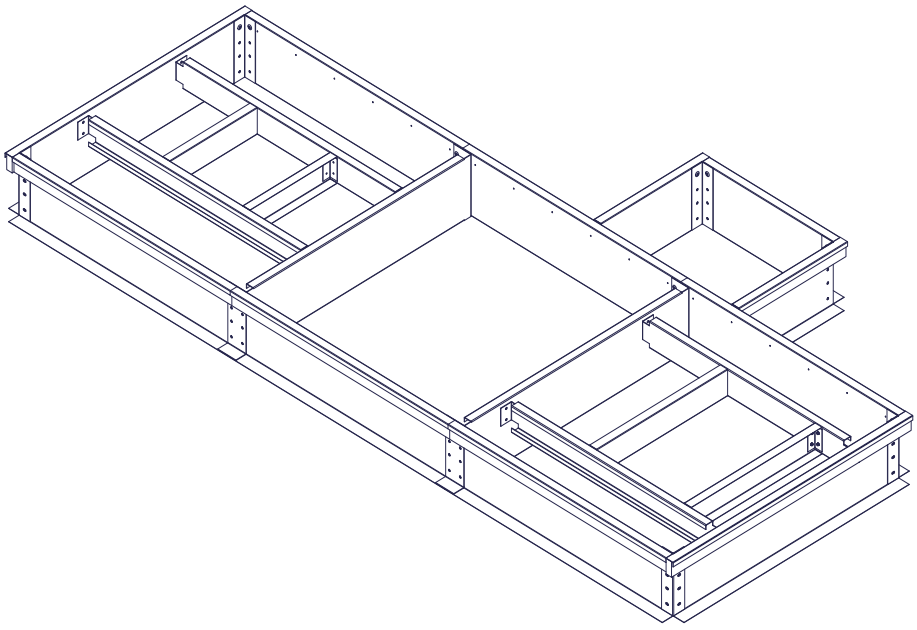
Installation Instructions

Roof Curbs

for Performance Climate Changer™ Air Handlers
Sizes 3-120



⚠SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

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Warnings, Cautions and Notices

Warnings, Cautions and Notices. Note that warnings, cautions and notices appear at appropriate intervals throughout this manual. Warnings are provided to alert installing contractors to potential hazards that could result in personal injury or death. Cautions are designed to alert personnel to hazardous situations that could result in personal injury, while notices indicate a situation that could result in equipment or property-damage-only accidents.

Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

ATTENTION: Warnings, Cautions and Notices appear at appropriate sections throughout this literature. Read these carefully.

⚠**WARNING:** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

***NOTICE*:** Indicates a situation that could result in equipment or property-damage-only accidents.

⚠WARNING
Personal Protective Equipment (PPE) Required!

Installing/servicing this unit could result in exposure to electrical, mechanical and chemical hazards.

- **Before installing/servicing this unit, technicians MUST put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. ALWAYS refer to appropriate MSDS and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to appropriate MSDS and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations.**
- **If there is a risk of arc or flash, technicians MUST put on all Personal Protective Equipment (PPE) in accordance with NFPA70E or other country-specific requirements for arc/flash protection PRIOR to servicing the unit.**

Failure to follow recommendations could result in death or serious injury.

Introduction

Overview of Manual

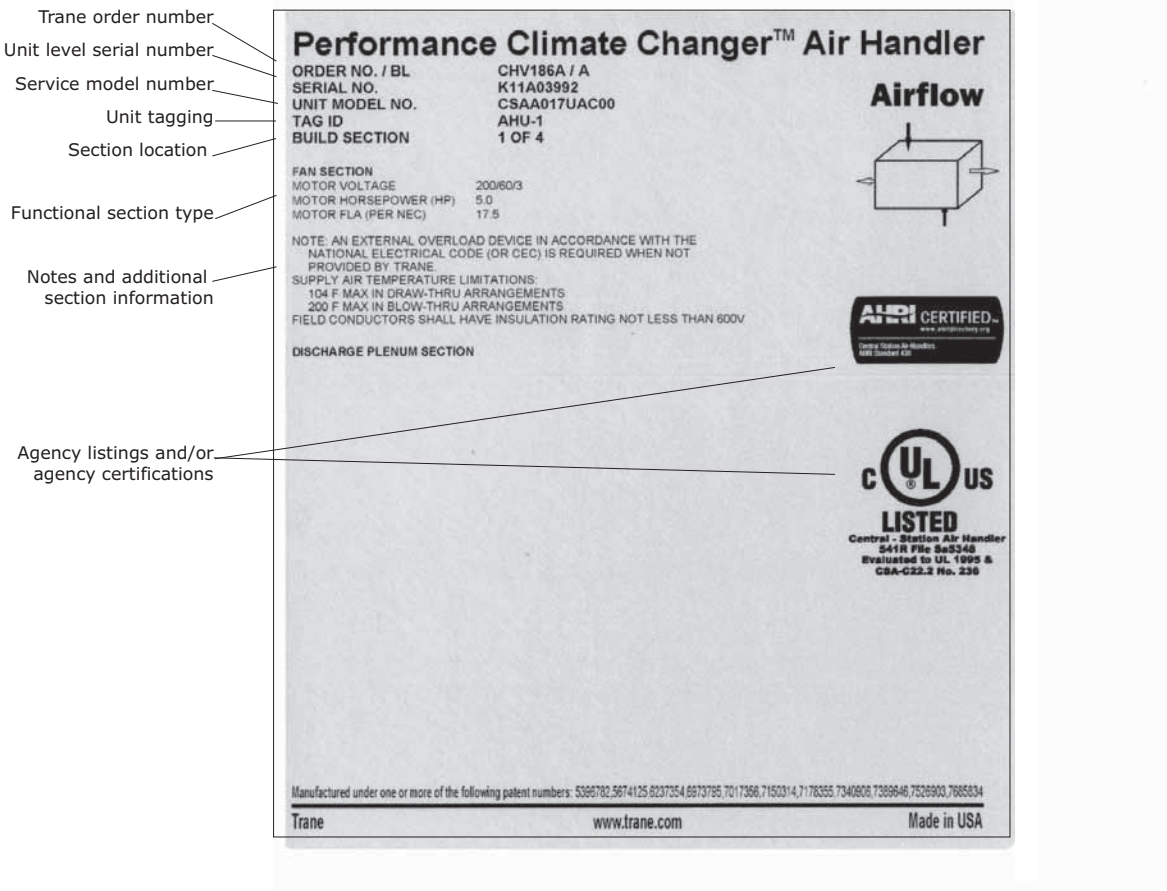
Performance Climate Changer™ air handlers may be mounted on the roof with a roof curb or pier mount. This manual includes the assembly instructions for Performance air handler roof curbs. Before proceeding with the installation, refer to the unit submittal drawings and unit tagging for correct placement of air handler sections. Failure to review the submittal drawings could result in performance or assembly problems. If there are any discrepancies, contact your local Trane sales engineer before proceeding. Carefully review the procedures discussed in this manual to minimize installation and startup difficulties.

Nameplate

Each Performance air handler section shipped includes at least one nameplate/label (see Figure 1), which identifies the type of section and functional components, customer tagging information, the unit serial number, the unit order number, the build section position for installation, and the unit model number. Refer to this information when ordering replacement parts or requesting service.

Note: The unit serial number and order number is required when ordering parts or requesting service for a Trane air handler.

Figure 1. Performance air handler section nameplate



General Information

As-built submittals show the intended layout of the various air handler sections to meet job site requirements. Installation information (unit dimensions, clearances, weights, curb location and roof opening dimensions and locations) may vary with special equipment and applications. For exact information, always refer to the specific unit submittals, which can be obtained from your local Trane sales office.

Roof curbs for Performance air handlers are shipped “knocked down” for assembly at the job site.

Preparing the Unit Site

Ensure the installation site can support the total weight of the air-handling unit, including accessories and the roof curb. For approximate air handler section weights, refer to Performance Climate Changer™ Air Handler IOM, CLCH-SVX07C-EN. Units with special options or arrangements will differ in dimensions, clearances, weights and roof opening dimensions and locations. Always refer to unit submittals before marking off the dimensions of the unit roof curb, pipe cabinet curb (if pipe cabinet is ordered), and roof openings. For roof curbs supplied by Trane, approximate roof curb weights are in Table 1.

Note: To calculate the total curb weight, find the unit length, multiply by the factor supplied in Table 1 for the applicable roof curb height, and add the curb end weight for the applicable roof curb height.

Table 1. Curb weights

Curb height	Unit Size	3	4	6	8	10	12	14	17	21	25
14-inch	Curb end and duct support weight	117.23	155.82	155.82	175.88	209.84	225.27	242.25	242.25	266.94	266.94
	Curb side weight	Take total length in inches, multiply by 0.56 pounds, and add to the above curb end & duct support weight.									
18-inch	Curb end and duct support weight	148.76	197.59	197.59	222.98	265.95	285.48	306.96	306.96	338.21	338.21
	Curb side weight	Take total length in inches, multiply by 1.05 pounds, and add to the above curb end & duct support weight.									
22-inch	Curb end and duct support weight	171.54	227.14	227.14	256.05	304.98	327.22	351.68	351.68	387.26	387.26
	Curb side weight	Take total length in inches, multiply by 1.22 pounds, and add to the above curb end & duct support weight.									
26-inch	Curb end and duct support weight	215.31	286.02	286.02	322.78	385.00	413.28	444.39	444.39	489.64	489.64
	Curb side weight	Take total length in inches, multiply by 2.00 pounds, and add to the above curb end & duct support weight.									
30-inch	Curb end and duct support weight	240.72	319.23	319.23	360.06	429.15	460.56	495.11	495.11	545.36	545.36
	Curb side weight	Take total length in inches, multiply by 2.25 pounds, and add to the above curb end & duct support weight.									
36-inch	Curb end and duct support weight	278.82	369.05	369.05	415.98	495.38	531.48	571.18	571.18	628.93	628.93
	Curb side weight	Take total length in inches, multiply by 2.63 pounds, and add to the above curb end & duct support weight.									

Curb height	Unit Size	30	35	40	50	57	66	80	100	120
14-inch	Curb end and duct support weight	308.62	328.68	367.27	407.39	407.39	453.70	453.70	496.91	581.80
	Curb side weight	Take total length in inches, multiply by 0.56 pounds, and add to the above curb end & duct support weight.								
18-inch	Curb end and duct support weight	390.95	416.34	465.17	515.95	515.95	574.54	574.54	629.23	736.65
	Curb side weight	Take total length in inches, multiply by 1.05 pounds, and add to the above curb end & duct support weight.								
22-inch	Curb end and duct support weight	447.31	476.22	531.82	589.64	589.64	656.36	656.36	718.63	840.95
	Curb side weight	Take total length in inches, multiply by 1.22 pounds, and add to the above curb end & duct support weight.								
26-inch	Curb end and duct support weight	566.00	602.77	673.47	747.00	747.00	831.85	831.85	911.03	1066.58
	Curb side weight	Take total length in inches, multiply by 2.00 pounds, and add to the above curb end & duct support weight.								
30-inch	Curb end and duct support weight	630.15	670.98	749.50	831.15	831.15	925.37	925.37	1013.31	1186.04
	Curb side weight	Take total length in inches, multiply by 2.25 pounds, and add to the above curb end & duct support weight.								
36-inch	Curb end and duct support weight	726.38	773.30	863.54	957.38	957.38	1065.66	1065.66	1166.73	1365.24
	Curb side weight	Take total length in inches, multiply by 2.63 pounds, and add to the above curb end & duct support weight.								

Note: Example: Size 21 Performance air handler with airfoil damper mixing section, small coil section, medium access section, medium coil section, small blank section, VFD control section, and fan section (down discharge) total unit length is 156.75 inches. Total roof curb weight for the 18-inch curb would be 502.80 lbs (156.75 x 1.05 = 164.5875 lbs + 338.21 = 502.7975 lbs.)

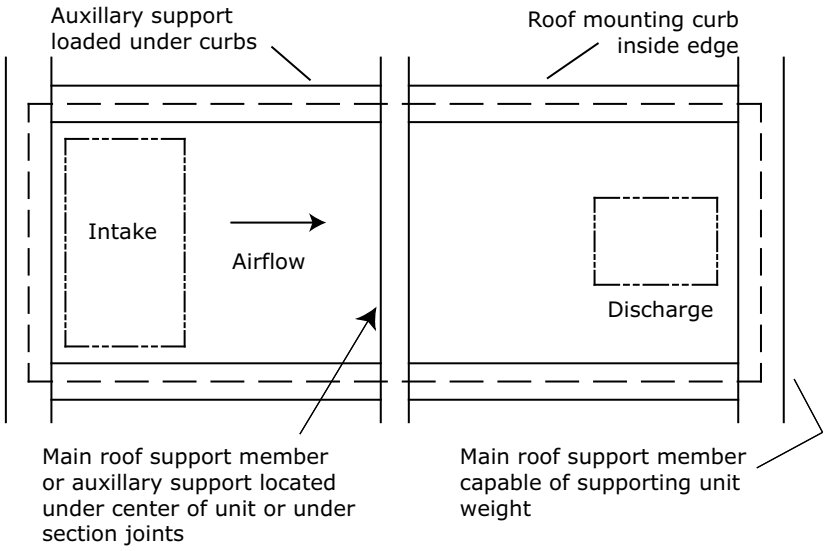
Installation Considerations

- Isolation rails should not be installed on top of Trane roof curbs. If isolation rails or isolation curbs are required, the entire curb system should be supplied by a specialty curb company.

Note: For proper operation, the unit must be supported around the entire unit base perimeter.

The roof curb must be supported along its entire perimeter. The curb may be set parallel or at right angles to roof support members. If at right angles to the support members, there must be adequate supporting roof cross members between the ends (in the direction of airflow). Be sure the cross members do not interfere with the connection of supply and return ducts to the unit. See Figure 2 for details.

Figure 2. Unit set perpendicular to roof curb members



- When mounting the unit on its roof curb, make sure that the gasketing between the roof curb and unit base provides an airtight seal.

Note: When pulling shipping split sections together, the field-supplied gasket material may bunch up between bases. Make certain this does not prevent tight contact between shipping sections.

- If a unit is pier-mounted, at a minimum, locate one pier at each corner directly underneath any shipping split (ensure full support under each side), and then every four feet at equally spaced intervals around the perimeter of the unit. Both the unit and the pipe cabinet should be supported by their base channel around the entire perimeter (see Figure 3 and Figure 4).

Figure 3. Pier locations (typical)

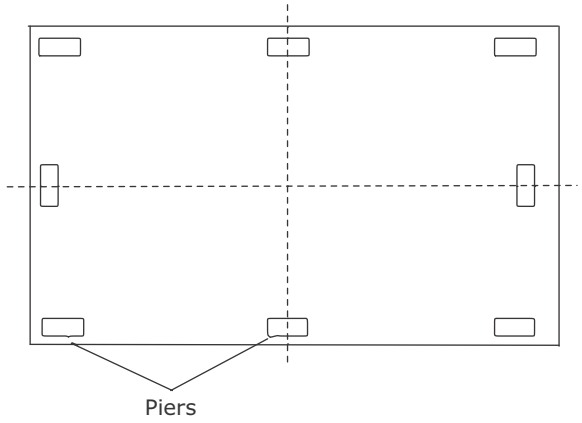
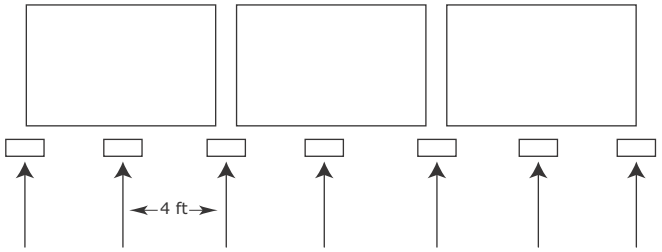


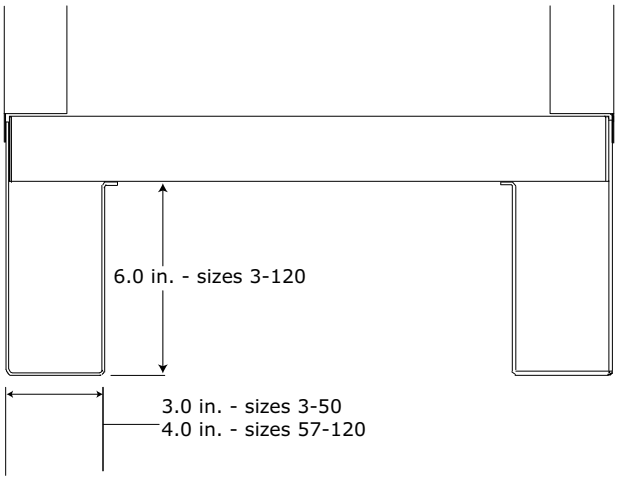
Figure 4. Side view with shipping splits



Note: Piers beneath shipping splits must be structurally sound to support the weight of the unit.

See Figure 5 for typical cross section for pier- or slab-mounted base.

Figure 5. Typical cross section for pier-mounted or slab-mounted base.



- *For new building construction*, the roof curb may be installed as soon as the roof support members are in place. Trane recommends that the roof curb be placed directly on the roof support members and welded into place. If the curb is mounted on the roof deck, additional support is necessary directly below the curb flanges to minimize vibration.

- *Do not overlap counter flashing over the top of the roof curb*. Counter flashing should extend to the bottom of the roof curb drip lip. Attach counter flashing with fastener through the wooden nailer. Figure 6, Figure 7 and Figure 8 show typical roof curb installations and detail.

Note: Materials that attach to the roof curb are supplied by the installer, including flashing, insulating material and cant. Gasket and 2 x 4 nailer are supplied by Trane.

Figure 6. Typical roof curb installation - existing building

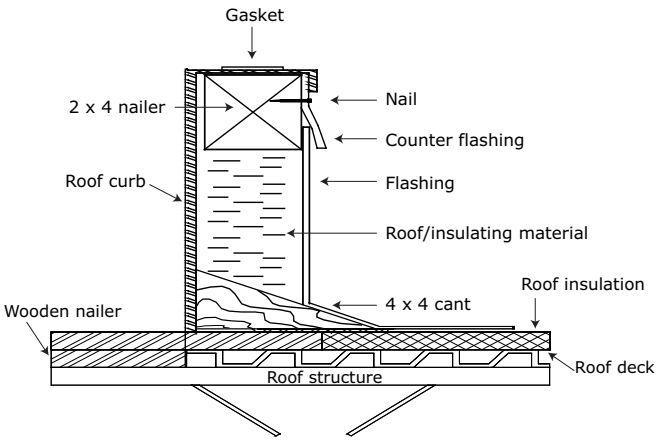


Figure 7. Typical roof curb installation - new construction

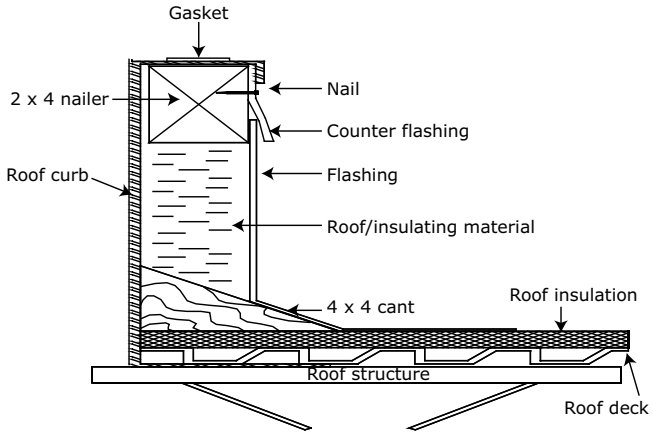
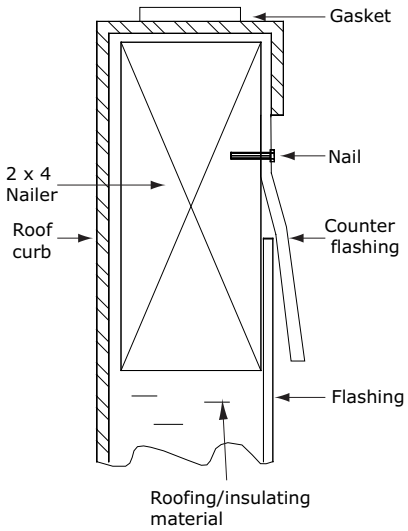


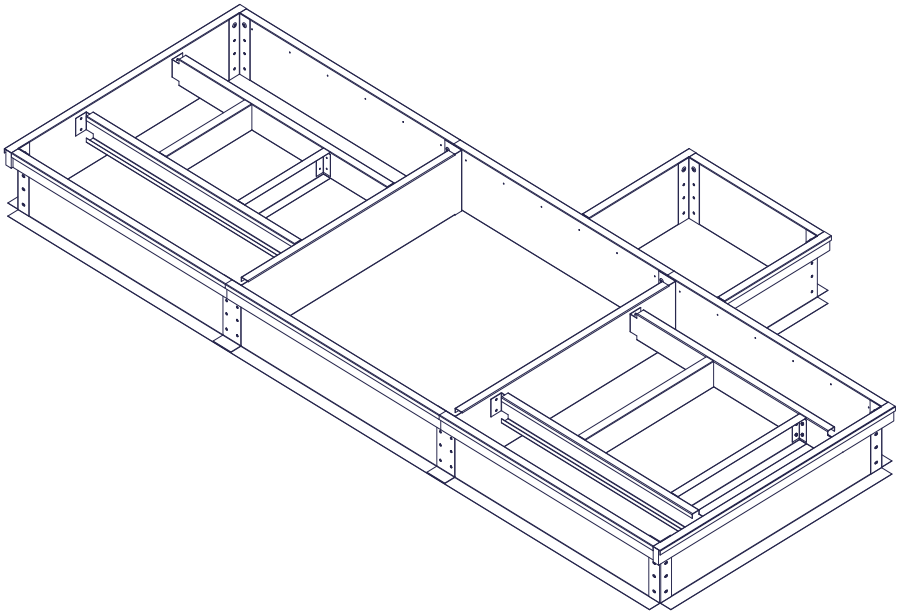
Figure 8. Detail of installation



Assembly and Installation

The following procedure explains how to assemble and install roof curbs provided by Trane. An attachment specific to your roof curb is shipped with your Trane-ordered roof curb. See typical exploded view and parts list in Figure 17, p. 14 and Figure 3, p. 14. In order to properly locate the duct supports (if required) and external piping cabinet (if ordered), it is recommended that you have a copy of the as-built curb drawings from the submittal package. For specialty or field-fabricated roof curbs please see the section entitled "Specialty Roof Curbs" on page 16 for important information.

Figure 9. Typical roof curb provided by Trane



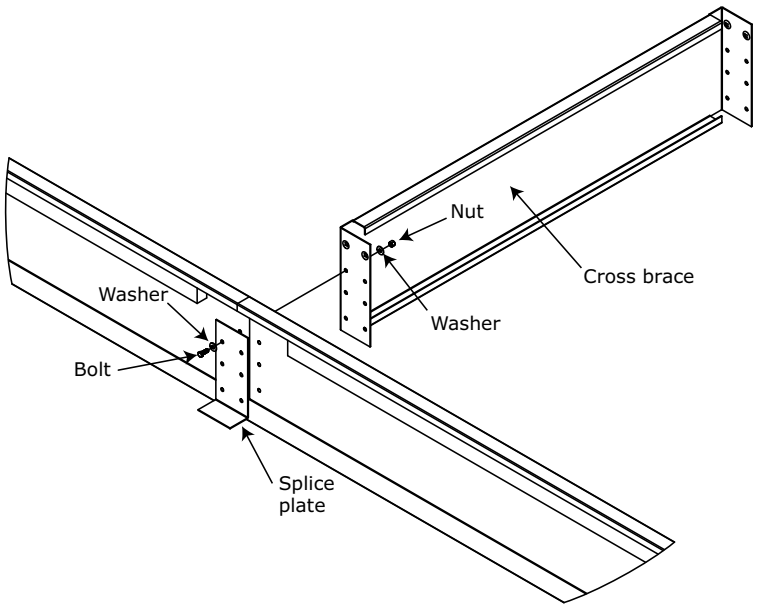
⚠ WARNING

Support Curb Span Joists!

Make certain that the curb span joist space is supported. Failure to do so could cause the supporting metal to collapse. Failure could result in death, serious injury, or equipment damage.

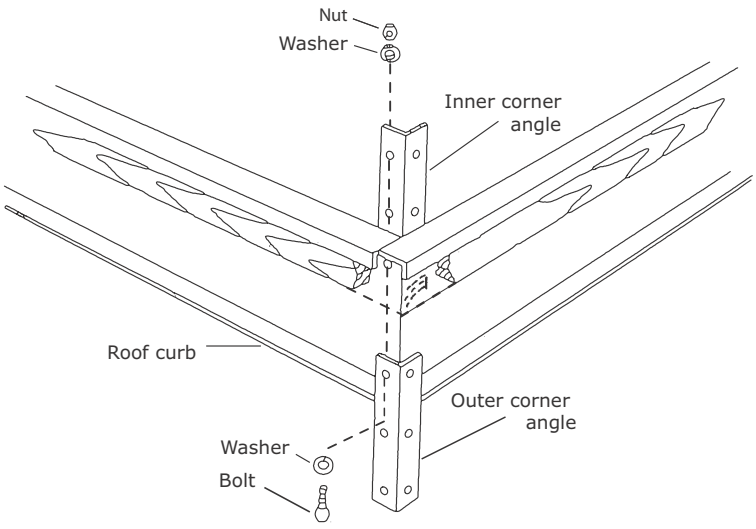
1. Attach cross brace and outer side splice plates at splice locations (see Figure 10).

Figure 10. Side splice detail



2. Attach outer and inner corner splice plates (4 places) (see Figure 11.

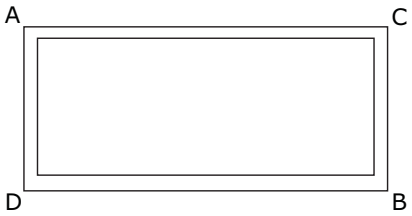
Figure 11. Corner splice detail



Check curb dimensions for squareness (see Figure 12). Measurements from A-B should equal measurement from C-D (± 1/8-inch).

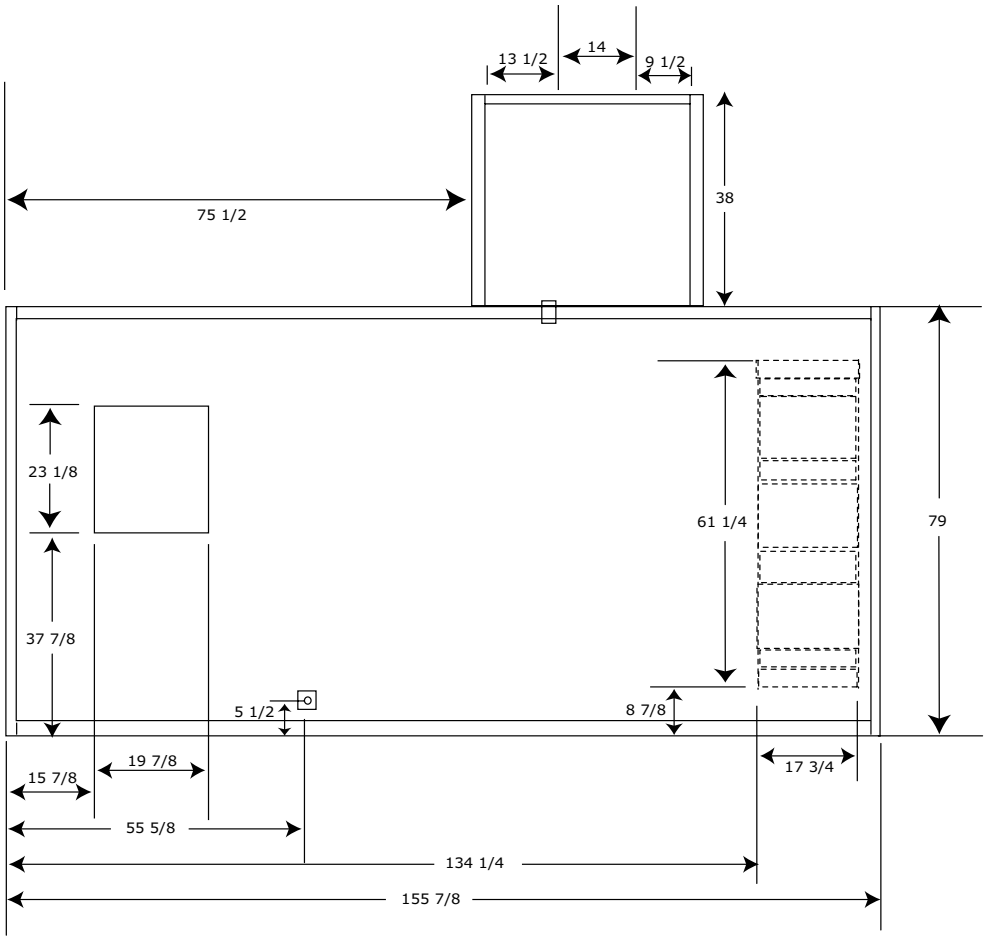
Note: Measurements A-C, D-B, A-D, and B-C are inside curb dimensions and are supplied with the unit-specific roof curb manual.

Figure 12. Unit roof curb perimeter



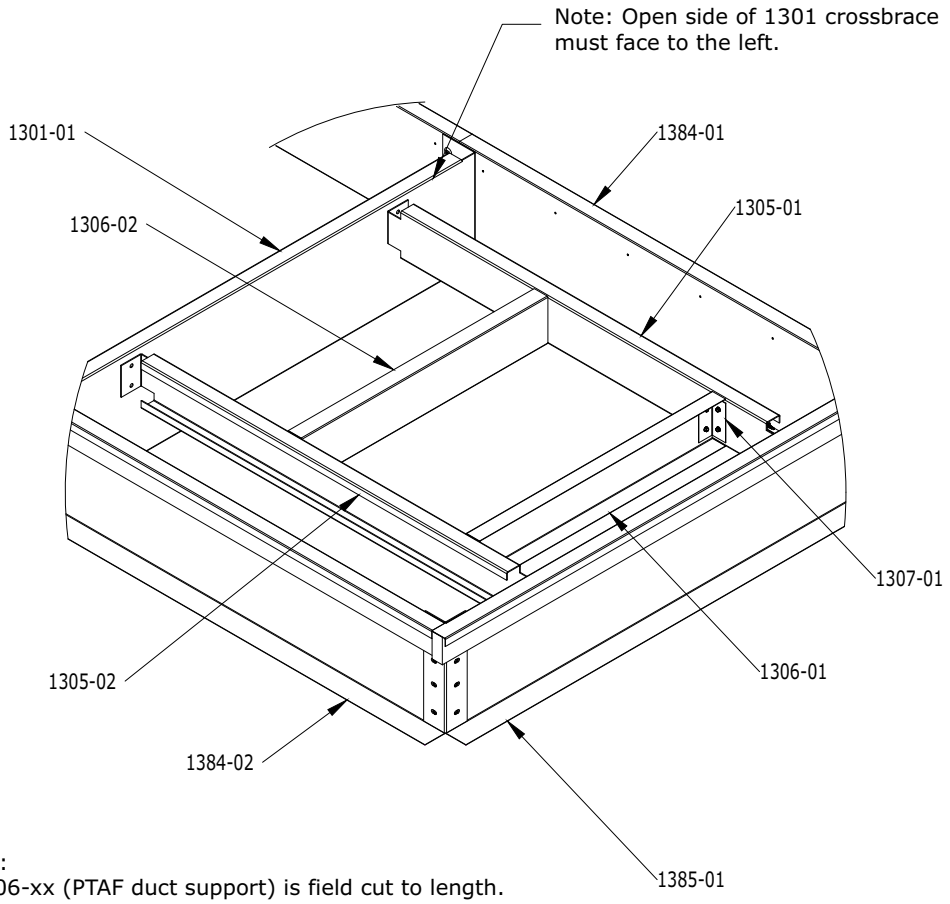
3. Tighten nuts/bolts at all locations. Ensure lock nuts are securely tightened.
4. Review the details curb plan view as-built to determine the location of the supply and/or return openings and placement of duct support members. See Figure 13.

Figure 13. Typical as-built curb detail plan view (inches) from submittal package



5. Attach duct support members to each side of roof curb perimeter wall with self-drill screws. See Figure 14.

Figure 14. Duct support detail

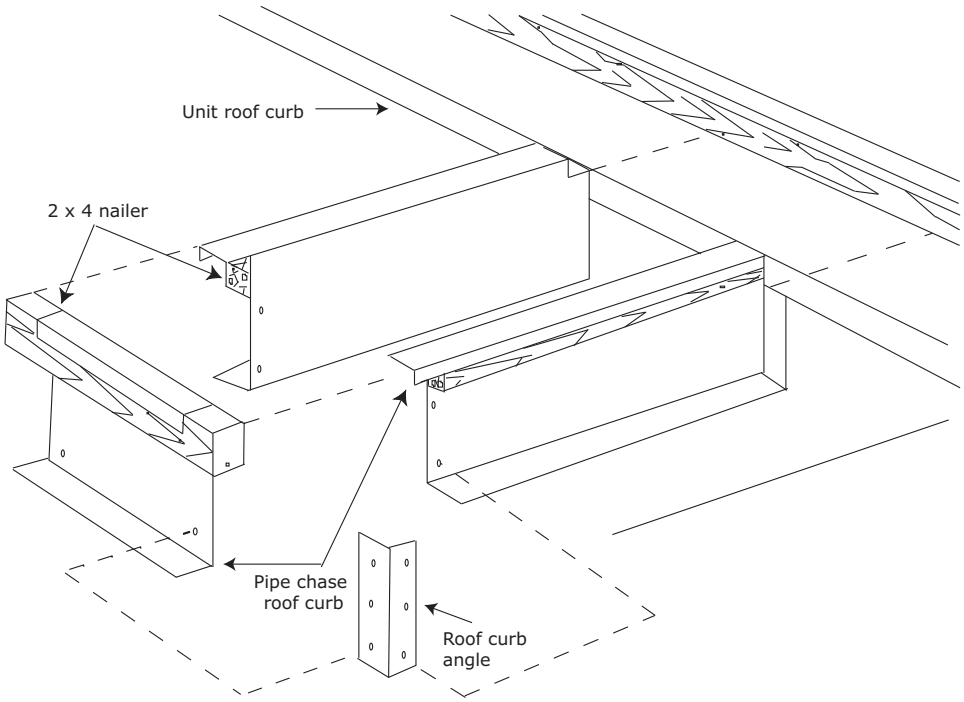


Notes:
1. 1306-xx (PTAF duct support) is field cut to length.
2. Use self drillers (included) to attach 1307-xx (duct support angle) to 1305-xx and 1606-xx.

6. Assemble the pipe cabinet roof curb (when supplied). See Figure 15.

Note: If pipe cabinet roof curb interferes with splice plates, field drill holes to match those in the splice plate. Attach the pipe cabinet roof curb with splice plate bolts. Self-drill the other end.

Figure 15. Pipe cabinet roof curb assembly



7. Install gasket along the perimeter of the pipe chase roof curb and unit roof curb. Gasketing is provided with the roof curb when ordered from Trane.
8. Install the curb. The curb may be set on structural framing (by others). This curb is designed to transfer the load to a continuous underlying structural frame. The structural members (by others) should span the perimeter of the curb.
9. Complete all ductwork, piping, and electrical connections only after mounting the unit. Refer to unit submittals.

Pipe Cabinet Roof Curbs

Pipe cabinets ordered from Trane for field installation require special attention with regard to joining the unit roof curb and pipe cabinet roof curb. A good joint will prevent any water management problems within the pipe cabinet.

The pipe cabinet roof curb should be three-sided and have dimensions as shown in Figure 16, a top view of the pipe cabinet roof curb, and Table 2. Dimension 'L' is from the outside of the unit roof curb to the outside of the pipe cabinet roof curb. Dimension 'X' is the outside-to-outside width dimension of the pipe cabinet roof curb. Dimension 'Z' locates the pipe chase roof curb along the unit roof curb in the direction of airflow. This measurement is from the outside of the unit roof curb to the outside of the pipe cabinet roof curb.

The basic formula becomes Z = LDS – 1, where LDS is the total length of the sections downstream of the pipe cabinet.

Figure 16. Top view of unit and pipe cabinet roof curb

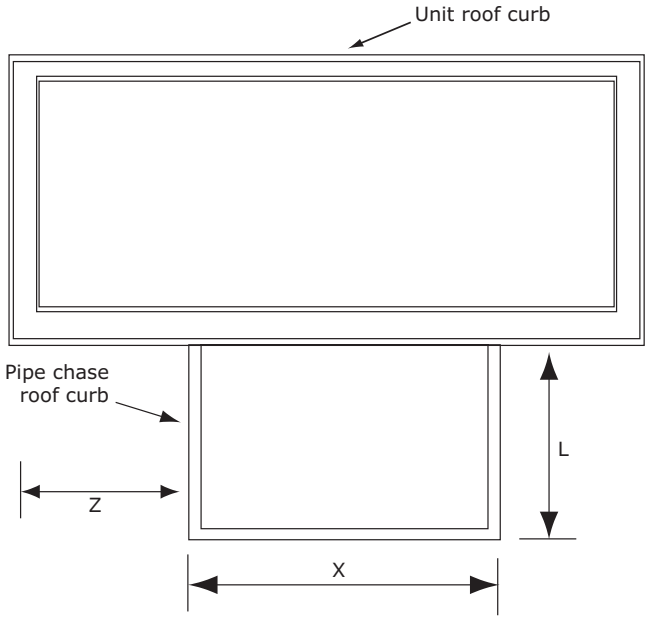


Table 2. Pipe cabinet roof curb dimensions

	L dimension		
Unit size	**Reduced**	**Standard**	**Extended**
3 - 50	26.00	38.00	50.00
57-120	26.50	38.50	50.50

Unit sizes 3-120	X dimension
Reduced	Lp + 3
Standard	Lp + 3
Extended	Lp + 3

Note: Lp is the sum of the section length(s) covered by the pipe cabinet. Refer to submittal.

Figure 17. Typical exploded view of curb with part numbers

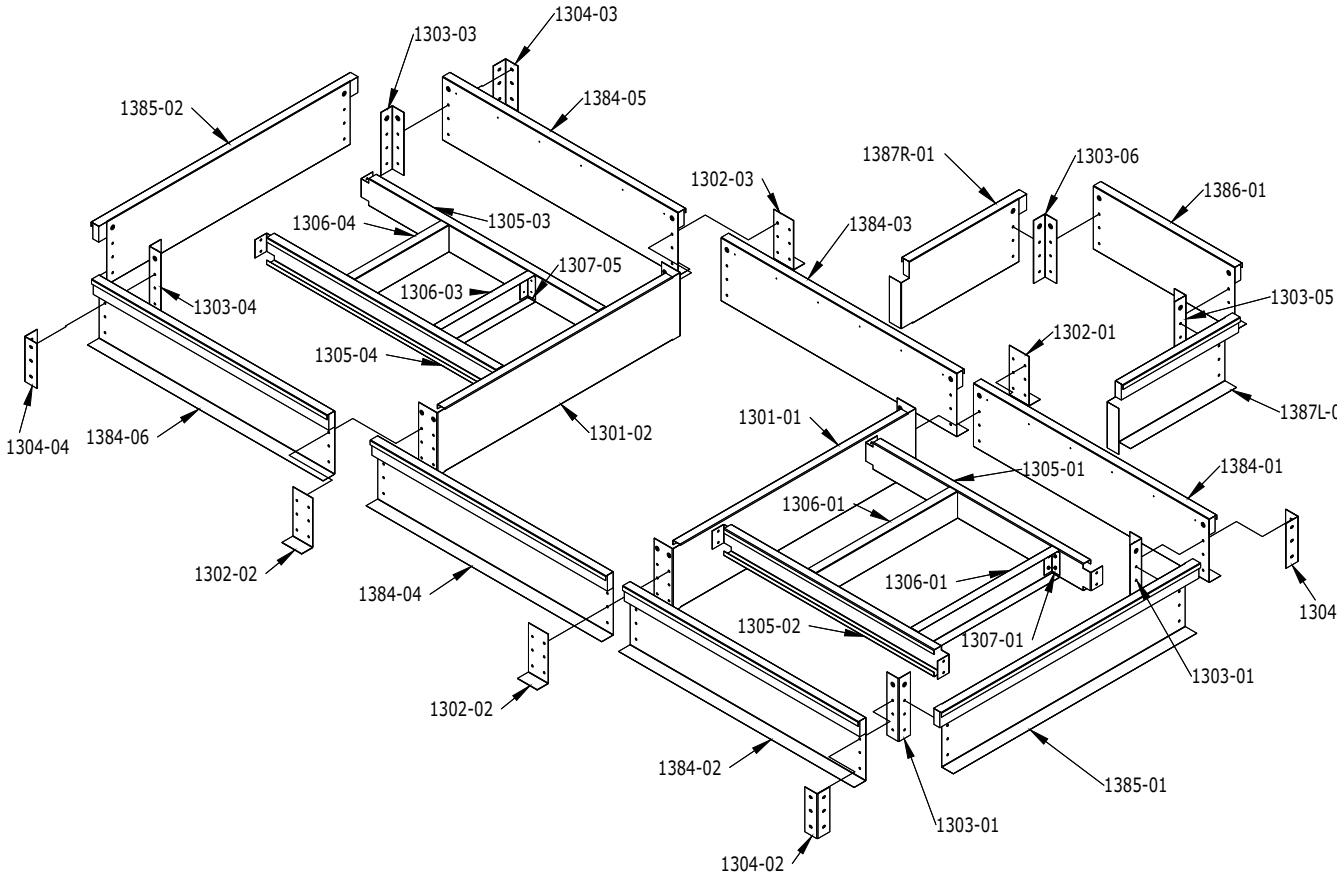


Table 3. Typical customer parts list

Customer Parts List

Thank you for purchasing the roof curb accessory for the Trane Performance Climate Changer™ air handler for this project. We at Trane appreciate your business, and strive constantly to improve products. To that end, we welcome any comments or suggestions you may have regarding this product.

Job Number	**123456-1-1**	**E-Bolts:**	**20**
Length (I.D.)	**157.25** inches	**Bolts:**	**60**
Width (I.D.)	**45.50** inches	**Nuts:**	**80**
Weight (EST.):		**Washers:**	**140**
		Weight:	**267.33**
Project Name:		**Self Drillers:**	**56**
Tags:	**RTU-1**		

Part Description	Dimensions	Qty
TP1301 Cross Brace		
TP1301-01 Cross Brace	45.50 x 14.00 x 14.00	1
TP1301-02 Cross Brace	45.50 x 14.00 x 14.00	1
TP1302 Outer Side Plate		
TP1302-01 Outer Side Plate	9.88 x 5.00	1

Table 3. Typical customer parts list

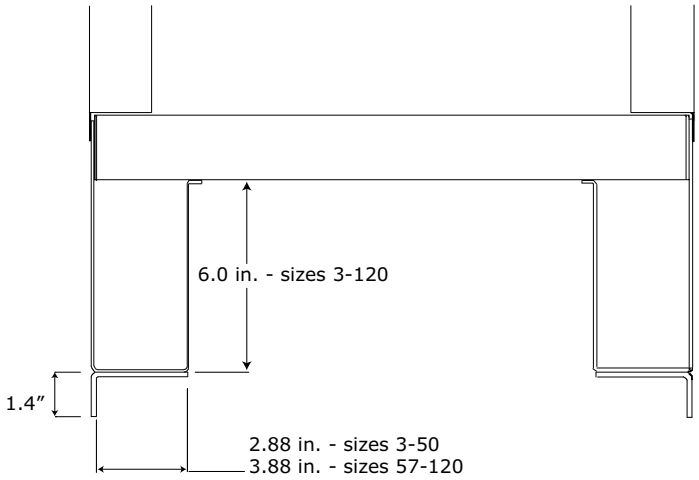
TP1302-02 Outer Side Plate	9.88 x 5.00	1
TP1302-03 Outer Side Plate	9.88 x 5.00	1
TP1302-04 Outer Side Plate	9.88 x 5.00	1
TP1303 Inner Corner Angle		
TP1303-01 Inner Corner Angle	13.88	1
TP1303-02 Inner Corner Angle	13.88	1
TP1303-03 Inner Corner Angle	13.88	1
TP1303-04 Inner Corner Angle	13.88	1
TP1303-05 Inner Corner Angle	13.88	1
TP1303-06 Inner Corner Angle	13.88	1
TP1304 Outer Corner Angle		
TP1304-01 Outer Corner Angle	9.88	1
TP1304-02 Outer Corner Angle	9.88	1
TP1304-03 Outer Corner Angle	9.88	1
TP1304-04 Outer Corner Angle	9.88	1
TP1305 Duct Support		
TP1305-01 Duct Support	56.50	1
TP1305-02 Duct Support	56.50	1
TP1305-03 Duct Support	42.50	1
TP1305-04 Duct Support	42.50	1
TP1305 Duct Support Cross		
TP1306-01 Duct Support Cross	45.50	1
TP1306-02 Duct Support Cross	45.50	1
TP1306-03 Duct Support Cross	45.50	1
TP1306-04 Duct Support Cross	45.50	1
TP1305 Duct Support Angle		
TP1307-01 Duct Support Angle	5.00 x 2.00 x 2.00	1
TP1307-02 Duct Support Angle	5.00 x 2.00 x 2.00	1
TP1307-03 Duct Support Angle	5.00 x 2.00 x 2.00	1
TP1307-04 Duct Support Angle	5.00 x 2.00 x 2.00	1
TP1307-05 Duct Support Angle	5.00 x 2.00 x 2.00	1
TP1307-06 Duct Support Angle	5.00 x 2.00 x 2.00	1
TP1307-07 Duct Support Angle	5.00 x 2.00 x 2.00	1
TP1307-08 Duct Support Angle	5.00 x 2.00 x 2.00	1
TP1384 Side Wall		
TP1384-01 Side Wall	58.88 x 14.00 x 14.00	1
TP1384-02 Side Wall	58.88 x 14.00 x 14.00	1
TP1384-03 Side Wall	58.13 x 14.00 x 14.00	1
TP1384-04 Side Wall	58.13 x 14.00 x 14.00	1
TP1384-05 Side Wall	40.25 x 14.00 x 14.00	1
TP1384-06 Side Wall	40.25 x 14.00 x 14.00	1
TP1385 End Wall Dog Ear Both Ends		
TP1385-01 End Wall Dog Ear Both Ends	49.50 x 14.00 x 14.00	1
TP1385-02 End Wall Dog Ear Both Ends	49.50 x 14.00 x 14.00	1
TP1386 Chase Side		
TP1386-01 Chase Side	35.00 x 14.00 x 14.00	1
TP1386 Left Chase End		
TP1386-01 Chase Side	39.00 x 14.00 x 14.00	1
TP1387 Right Chase End		
TP1387-01 Right Chase End	39.00 x 14.00 x 14.00	1
Tools Required for Assembly: 2 Sockets with 9/16 Drive		

Specialty Roof Curbs

Units to be mounted on a roof curb not supplied by Trane require special attention.

Center the unit base on the roof curb (see Figure 18).

Figure 18. Cross section



A typical unit roof curb and unit base cross-section without a pipe cabinet is shown in Figure 19.

Figure 19. Roof curb with flashing

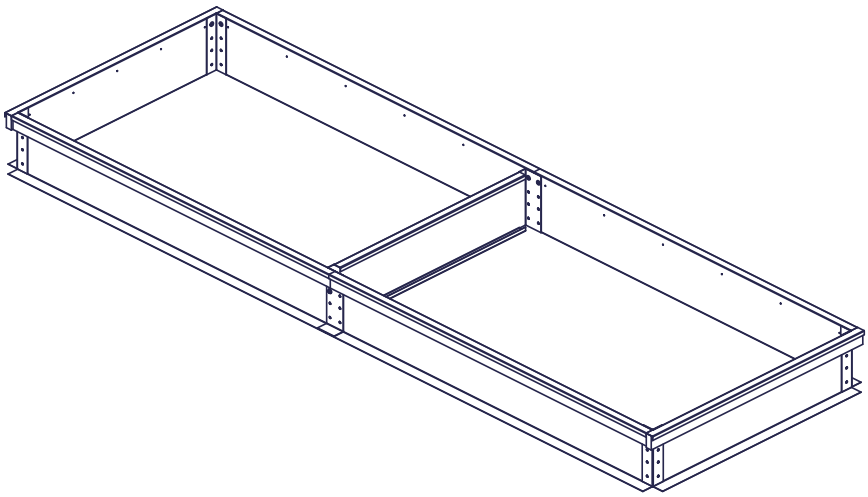


Table 4 lists the outside-to-outside dimensions for over all width and length of the roof curb for each size unit. Length is dependent on the various unit options ordered. Refer to submittals for section lengths.

Note: Center the unit base on the roof curb.

Table 4. Specialty roof curb dimensions

Unit Size	Width	Length
3	30.50	Ls-1
4	43.00	Ls-1
6	43.00	Ls-1
8	49.50	Ls-1
10	60.50	Ls-1
12	65.50	Ls-1
14	71.00	Ls-1
17	71.00	Ls-1
21	79.00	Ls-1
25	79.00	Ls-1
30	92.50	Ls-1
35	99.00	Ls-1
40	111.50	Ls-1
50	124.50	Ls-1
57	123.50	Ls-2
66	138.50	Ls-2
80	138.50	Ls-2
100	152.50	Ls-2
120	180.00	Ls-2

Note: Where Ls is the sum of all section lengths in the unit.

Figure 20. Top view of unit and pipe cabinet roof curb

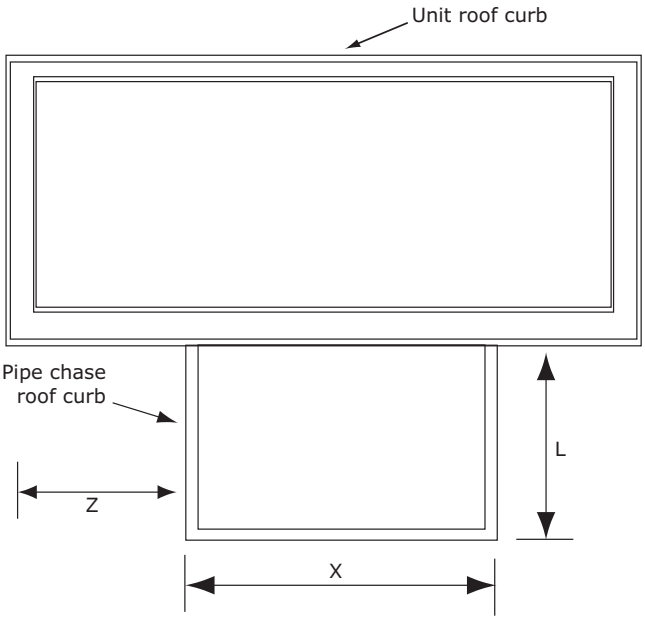


Table 5. Pipe cabinet for specialty roof curb dimensions

	L dimension		
Unit size	Reduced	Standard	Extended
3 - 50	26.00	38.00	50.00
57-120	26.50	38.50	50.50

Unit sizes 3-120	X dimension
Reduced	Lp + 3
Standard	Lp + 3
Extended	Lp + 3

Note: Lp is the sum of the section length(s) covered by the pipe cabinet. Refer to submittal.

Ductwork Recommendations

Sound Attenuation

Noise is produced by unit supply fans, and exhaust fans. Supply fan noise is substantially attenuated by the ductwork, provided it is properly constructed.

SMACNA recommendations for metal gauge thickness and installation should be followed carefully. Lightly constructed ductwork can produce “oil canning”-a rapid in-and-out pulsating motion of the duct walls-resulting in sound problems.

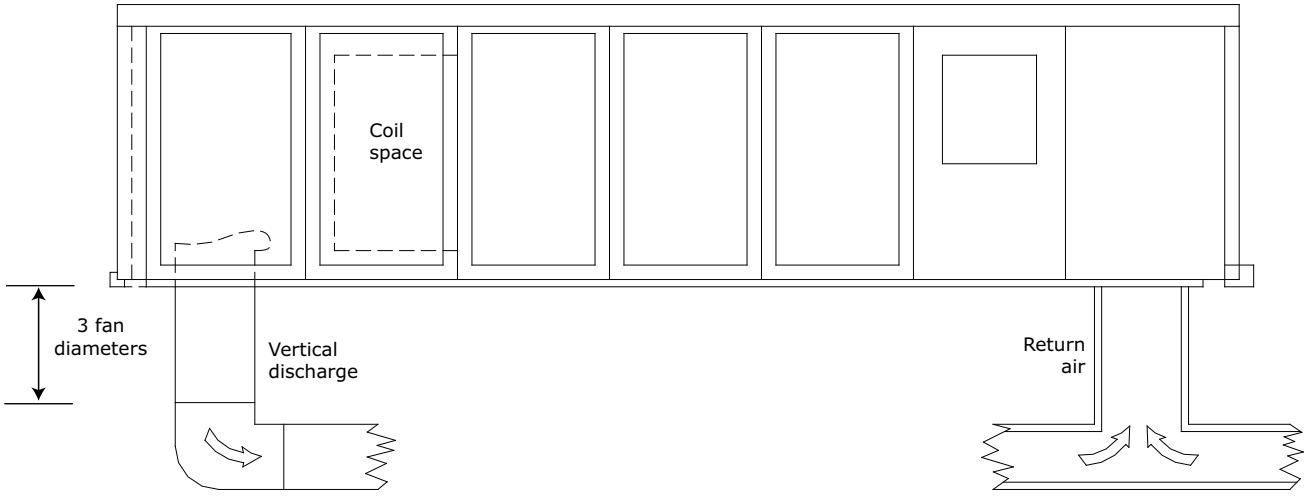
Note: If roof decking cannot be placed under the unit, an acoustical barrier can be installed.

Corrugated steel decking is acoustically ideal for the installation of the roof curb and connecting ductwork. Closely toleranced holes must be cut in the roof deck for the supply and return ductwork. When the duct is installed, caulking must be used to seal the decking to the duct. Even a small air leak between the duct and the deck will destroy most of the attenuation available from the steel decking.

In addition, special consideration may be required to ensure that the weight of the unit does not crush the roof deck at those points where the deck is between the curb and support joist. Poured insulation will usually add the required strength, while the use of rigid insulation may require placement of three-inch support channels on the decking.

As a general rule, exhaust fan noise is not a problem and can be adequately attenuated by the return ductwork. For critical applications where return ductwork is not required, however, installation of an acoustically-lined “return T” is recommended; see Figure 21.

Figure 21. Typical supply and return ductwork



Use lined duct for all returns (1-inch thick, 6-pound density fiberglass recommended).

Supply and Return Air Ductwork

Ductwork for all units must be fabricated and installed by the installing contractor; to ensure proper duct construction and installation, SMACNA recommendations should be closely followed.

Below are several typically used guidelines for ductwork construction:

- Elbows with turning vanes or splitters are recommended to minimize air noise and resistance.

- The first elbow in the ductwork leaving the unit should be no closer than 3 fan diameters from the unit, thereby minimizing noise and resistance.

In those instances where the unit is installed over an acoustically critical area, additional treatment of the ductwork is recommended. Both supply and return ductwork should be lined internally with glass fiber duct liner 1-inch thick. The external surface of the supply duct should be covered with an acoustical barrier material such as one or two pound/sq. ft. sheet lead (1/64-inch or 1/32-inch) or loaded vinyl sheet or gypsum board for the first 10 ft. of ductwork. The lining should extend from the point where the duct penetrates the roof to a distance of 10 ft. beyond the vertical drop from the unit.

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