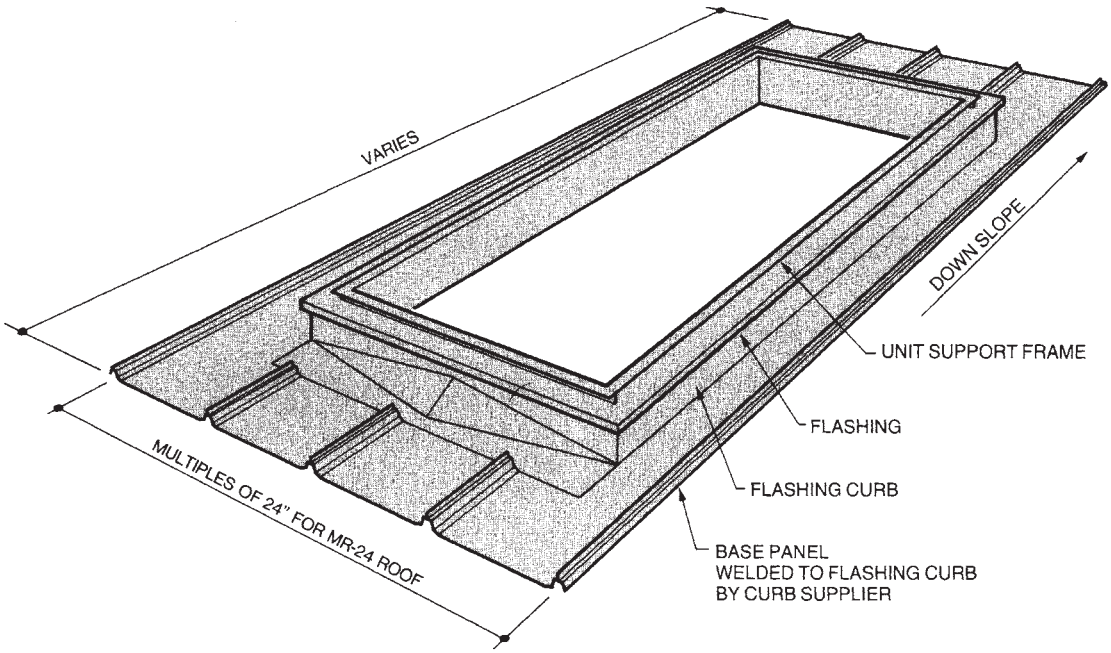

FIGURE 10.10 Metal roof curb for standing-seam roof. (*Butler Manufacturing Co.*)

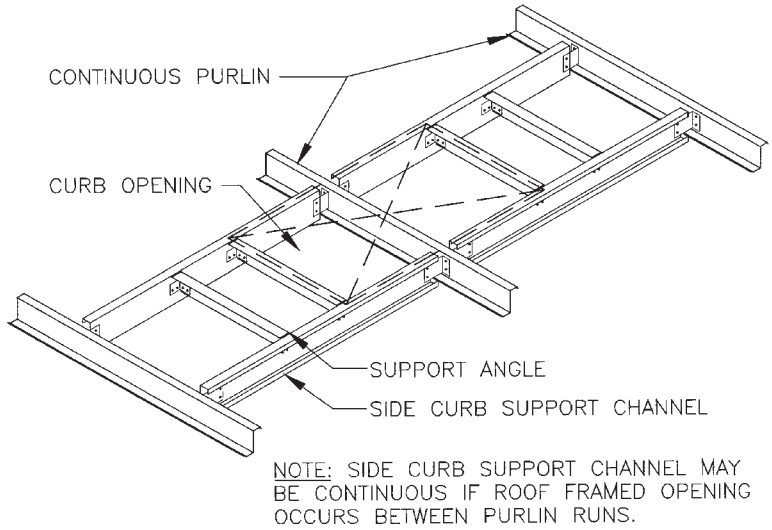

FIGURE 10.11 Support framing for floating/structural curb. According to the manufacturer, this detail is appropriate when the weight of the rooftop unit does not exceed 1200 lb and the maximum load applied to a line of purlins does not exceed 600 lb. (*Nucor Building Systems.*)

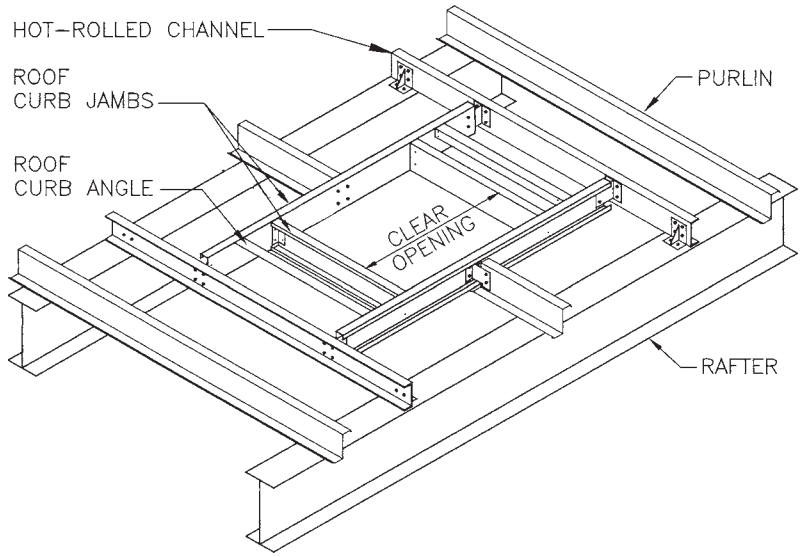

FIGURE 10.12 Support framing appropriate for rooftop units between 1200 and 6000 lb or when any line of purlins would receive more than a 600-lb load. (*Nucor Building Systems.*)

Figure 10.11 can be used for a floating curb carrying modest loading. Here, the curb bears on purlins and angle sections. Figure 10.12, intended for heavier loading, uses structural steel sections spanning between the primary frames parallel to purlins. Light-gage channels are framing the opening between the hot-rolled sections. The manufacturer may require that this light perimeter framing be placed slightly above the other purlins.

It goes without saying that the curb materials should be compatible with the roofing. For Galvalume roofs, consider curbs of Galvalume, aluminized steel, aluminum, or stainless steel.[6]

10.5.3 Elevated Frame on Legs

An elevated steel frame concentrates the equipment weight on four legs (Fig. 10.13). These point loads often exceed a load-carrying capacity of the purlins and require wide-flange steel beams for support. For this reason, it is better to bear the legs on the main building frames wherever possible.

As with metal curbs, the issue of weathertightness arises anytime a frame support leg penetrates the roof. A common solution is to use an elastomeric boot pipe flashing (also known as roof jack) covering the penetration. Available in several sizes for various pipe or column diameters, boot flashing must be able to accommodate the differential movement between metal roofing and structural supports below. Otherwise it is certain to invite leaks. The boots are commonly but incorrectly installed through the roofing corrugations, which invites water leakage through difficult-to-seal panel seams made unprotected by the penetration. A better detail is to locate roof penetrations in the flat part of the panel where more effective waterproofing can be made.[5] The detail would be similar to Fig. 10.14, which shows the boot flashing at a vent stack penetration.

Who designs the rooftop structural frames? Some architect-engineer firms prefer to design the frames in-house and have them provided separately from the pre-engineered framing. Some others prefer to ease the coordination by requiring the manufacturer to design and provide the frames. That way, the roof openings are likely to be incorporated into the metal building design, any interferences between the purlins, purlin bracing, and support beams noticed and addressed, the weights of the units included in structural loading on the roof, and flashing provided for all the penetrations.