

Basic Primer for Sheet Metal Curbs

Rooftop HVAC units normally require some type of penetration through the roof to allow air to be transferred to and from the unit. These pieces of equipment are supported on a curb that is built around the penetration in the roof. This allows the roof to be attached to the curb and permanently sealed from the elements.

One of the most popular constructions for curbs is the sheet metal curb. Sheet metal curbs are light, economical, and easily installed. They may be field fabricated or purchased in pre-fabricated sections from a curb manufacturer. The plan view of the curb may be rectangular, square, or "L" shaped. In this document, and the ones to follow, we will be concerned with curbs that have a rectangular plan view. Shown in Figure 6.2.1-1 is a plan view of a rectangular sheet metal curb.

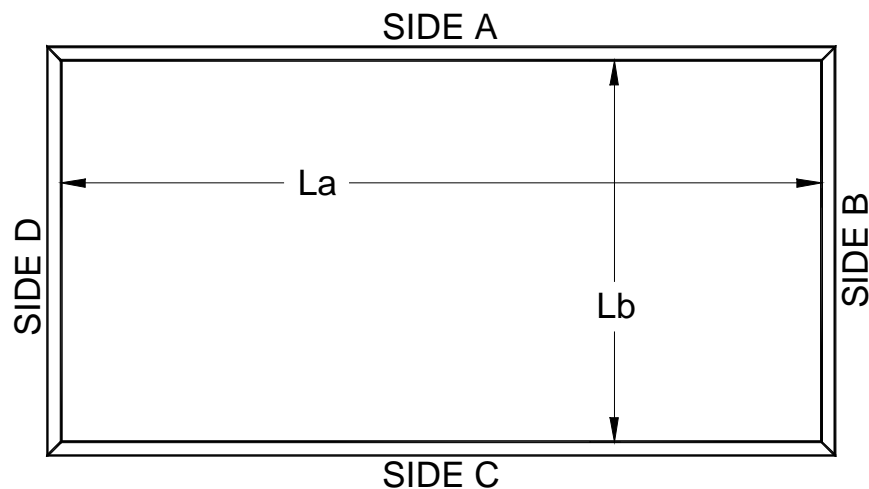


Figure 6.2.1-1. Plan View of Rectangular Sheet Metal Curb.

The two long sides will be identified as SIDE A and SIDE C as shown in Figure 6.2.1-1. The short sides will be labeled as SIDE B and SIDE D, as in figure 6.2.1-1. The term L_a will be the inside length of the long sides of the curb. The term L_b will represent the inside length of the curb's short sides. Another term we will need to define now for later use is the inside perimeter of the curb, L_p . The value of the inside perimeter will be as follows:

$$L_p = 2(L_a + L_b) \quad (\text{Eq. 6.2.1-1})$$

Figure 6.2.1-2 shows two section views through a typical sheet metal curb. Each of the views represents a slightly different construction. Some manufacturers use a 2 X 2 nailer,

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and others use a 2 X 4 nailer. The purpose of the wooden nailer is to permit the equipment and the roof flashing to be easily attached to the curb. The wooden nailer also adds some strength to the curb. However, the wood used is often sub-standard and cannot be counted on to carry more than the roof flashing. Purpose-built seismic roof curbs should have a good grade of treated lumber specified for the nailer.

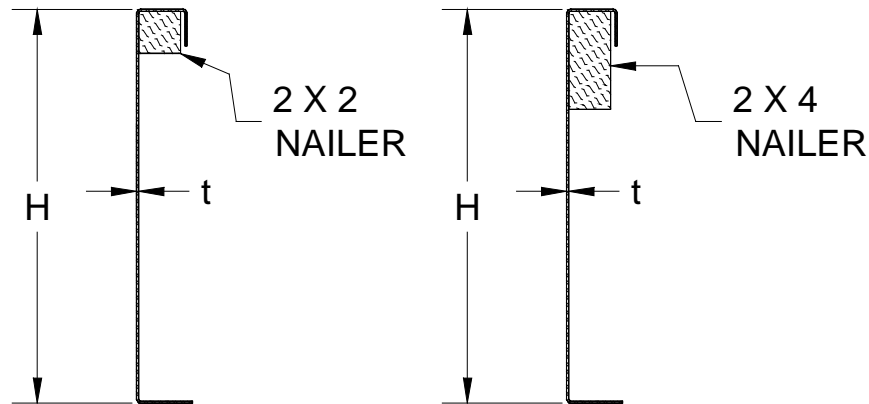


Figure 6.2.1-2. Typical Sheet Metal Curb Sections.

In Figure 6.2.1-2, H is the height of the curb. Normally, the standard height of the curb is 14 inches. This provides enough standoff to accommodate most roofing systems and still allow for the flashing. The height of the curb can vary depending on the requirements of the equipment, the sound attenuation equipment, and the slope of the roof, if any. The term t is the thickness of the sheet metal used to construct the curb. There are three basic material thickness values commonly used for the construction of curbs: 18 gage (0.0478 inches), 16 gage (0.0598 inches), and 14 gage (0.0747 inches).

The curb height, H, and the sheet metal thickness, t, will determine the loads that can be carried by the curb, as we shall see in Documents 6.2.3 and 6.2.4. It should be mentioned here, as well as Document 6.2.3, that all of the loads must be carried in the plane side walls of the curb. The sides of the curb do not behave as a beam. The curb walls are really very thin plates that are loaded in compression on their long edges due to the equipment weight, and in uniform shear along each edge. The principal failure mode of the curb wall will be buckling. Documents 6.2.3, 6.2.4, 6.2.5, and 6.2.6 go into greater detail concerning the applications and limitations of sheet metal curbs in areas prone to earthquakes.

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