10.6.3 Brick and CMU Veneer

Brick veneer is most commonly used over wood stud walls in residential buildings and over metal stud backing in steel or concrete structural frames in commercial buildings (*see Fig. 10-40*). Flexible metal anchors permit horizontal and vertical movement parallel to the plane of the wall but resist tension and compression perpendicular to it. The veneer must transfer lateral wind loads to the backing, and these metal anchors and their mechanical fasteners are the weakest component of the system. Code requirements for spacing of veneer anchors are shown in *Fig. 10-41.* Additional anchors should be located within 12 in. of openings larger than 16 in. in either dimension at a spacing not to exceed 36 in. on center.

Wire anchors are used to attach veneer to structural steel. For concrete, wire or flat-bar dovetail anchors are recommended. Wire anchors should be at least W2.8 gauge ($^3/_{16}$-in. diameter), with the wire looped and closed (see Chapter 7). Flat-bar dovetail anchors should be 16 gauge, $^7/_8$ in. wide, and fabricated so that the end embedded in the masonry is turned up $^1/_4$ in.

For securing brick veneer to residential wood frame construction, corrugated sheet metal anchors are often used. These should be 22-gauge galvanized steel, at least $^7/_8$ in. wide $\times$ 6 in. long. Corrosion-resistant nails should penetrate the stud a minimum of $1^1/_2$ in. exclusive of sheathing. The free end of the anchor should be placed in the mortar rather than on top of the brick, and should extend at least 2 in. into the joint (*see Fig. 10-42*). Corrugated anchors are weak in compression, and provide load transfer only if the horizontal leg is properly aligned in plane with the mortar bed joint and the nail is positioned within ½ in. of the 90° bend. Anchors randomly attached to the backing wall and bent out of plane to align with bed joints serve no useful purpose, and cracking failures are frequent. Corrugated anchors should be used only in low-rise construction, and only if the cavity width does not exceed 1 in.

Brick veneer is anchored to metal stud frames with 9-gauge corrosion-resistant wire hooked through a slotted connector or looped eye for flexibility. Anchors are attached through the sheathing and into the studs with corrosion-resistant, self-tapping screws. Stainless steel screws with a rubber washer will provide a higher level of performance than ordinary galvanized screws. Additional moisture protection is provided by applying a layer of building paper, 15-lb asphalt-saturated felt, or non-woven, non-perforated building wrap over the sheathing. This moisture-resistant membrane is required by code over plywood or OSB sheathing, but will also help protect paper-faced gypsum sheathing. The membrane should be shingle lapped and cover the top edge of the masonry flashing. A protective membrane is not necessary over moisture-resistant sheathing such as fiberglass-faced gypsum panels, but the sheathing joints should be sealed to prevent air or moisture penetration.

The use of brick veneer over metal stud backing is relatively recent in the long history of masonry construction. The system was first introduced as an economical substitute for CMU backup, but it was a false economy based on inadequate size and spacing of studs. Problems with cracking in the brick veneer raised questions about the relative rigidity of masonry veneer versus the flexibility of the stud frame in resisting lateral loads. The BIA now recommends a deflection limit of $L/600$ to provide adequate stiffness in the studs. Lateral bracing or stiffeners in the stud wall may also be required for adequate rigidity to prevent veneer cracking and subsequent moisture intrusion. Sheathing or gypsum board must be attached on both sides to add stiffness, and for typical applications, studs should never be less than a minimum of 16

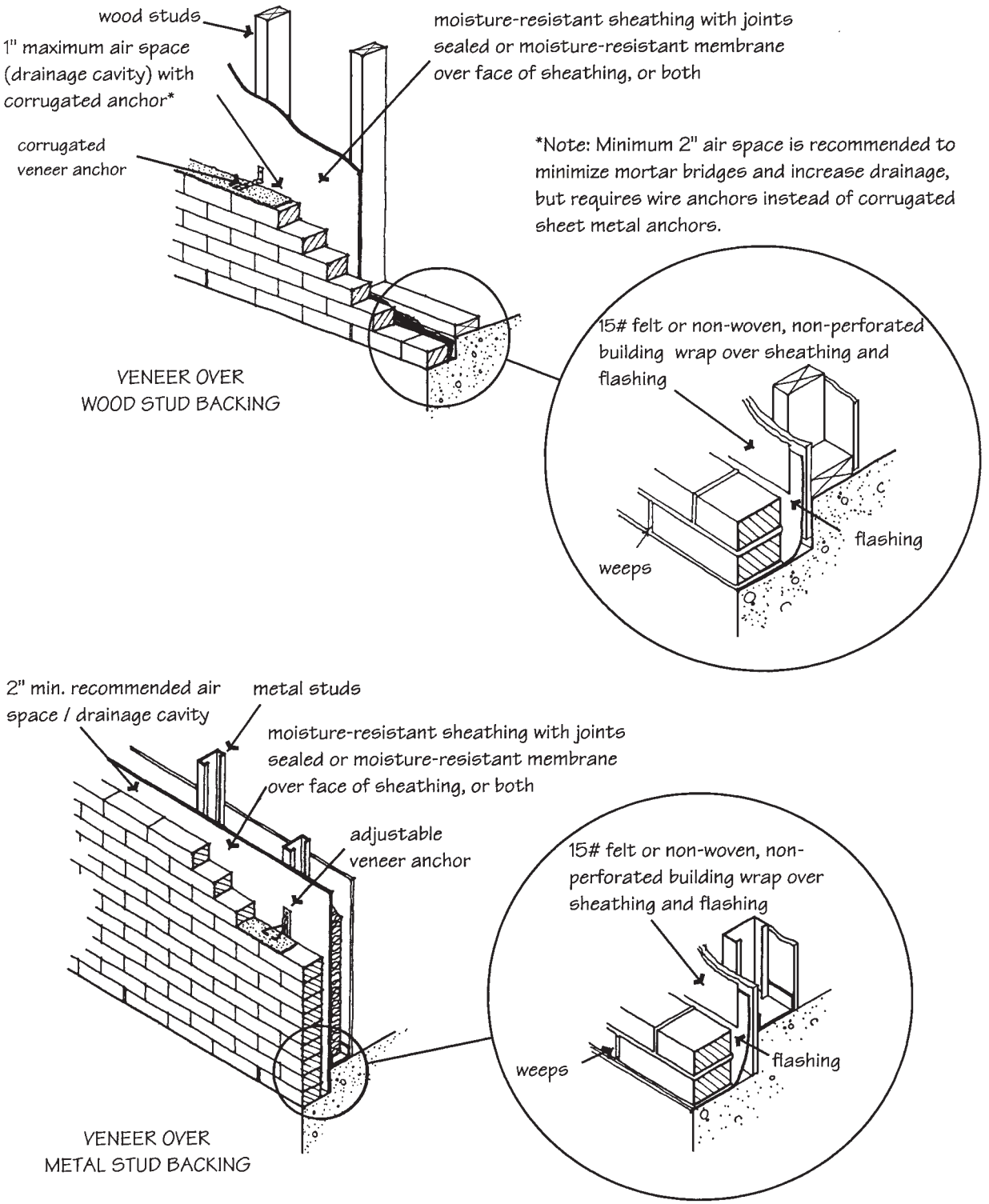

Figure 10-40 Brick veneer walls.