

# 7

## MASONRY ACCESSORIES

Accessory items are important and integral components of masonry construction. Steel lintels, shelf angles, horizontal joint reinforcement, metal anchors, ties, fasteners, flashing materials, and other accessories must be of the highest quality to equal the quality of the masonry units themselves.

### 7.1 METALS AND CORROSION

*Steel*, which is most frequently used for fabrication of masonry accessories, requires protective coatings to isolate the metal from the corrosive effects of wet mortar. Several non-ferrous metals are also used for masonry accessories. *Copper* and copper alloys are essentially immune to the corrosive action of wet concrete and mortar. Because of this immunity, copper can be safely embedded in fresh mortar even under saturated conditions. Galvanic corrosion will occur, however, if copper and steel items are either connected or in close proximity to one another. The presence of soluble chlorides will also cause copper to corrode.

*Aluminum* is also attacked by fresh portland cement mortar and produces the same expansive pressures. Galvanic corrosion also occurs if aluminum and steel are embedded in the mortar in contact with one another. If aluminum is to be used in reinforced masonry, it should be electrically insulated by a permanent coating of bituminous paint, alkali-resistant lacquer, or zinc chromate paint. If the coating is not kept intact, chlorides can greatly accelerate corrosion.

Most metal connectors used in masonry construction are of steel wire, sheet steel, or structural steel. The table in *Fig. 7-1* lists the various ASTM standards which govern these materials. Steel wire for reinforcement and connectors is cold-drawn wire made from low-carbon steel rods (ASTM A82, *Standard Specification for Steel Wire, Plain, for Concrete Reinforcement*). It is less ductile than conventional hot-rolled structural steel and has a less well-defined yield point. Stainless steel wire is nickel-chromium stainless steel (ASTM A580, *Standard Specification for Stainless and Heat-Resisting Steel Wire*) that is annealed in the manufacturing process and, as a result, has a yield stress more consistent with structural steel. Annealed nickel-chromium stainless steels are austenitic and non-magnetic. The table in *Fig. 7-2* lists properties of steel wire used in masonry.

Function	ASTM Specification	Minimum Yield Strength (psi)	Minimum Tensile Strength (psi)
Wire ties and anchors	ASTM A82 Cold-Drawn Steel Wire for Concrete Reinforcement	70,000 30,000	80,000 75,000
	ASTM A580 Stainless and Heat-Resisting Wire		
Sheet metal ties and anchors	ASTM A366 Cold-Rolled Carbon Steel Sheet, Commercial Quality	—	—
	ASTM A525 General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process (Class G60)	30,000	75,000
	ASTM A167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip		
Anchor bolts	ASTM A307 Carbon Steel Bolts and Studs (Grade A)	—	—
Plate and bent bar anchors	ASTM A666 Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar for Structural Applications	30,000	75,000
Rolled shapes, lintels, and plate and bent bar anchors	ASTM A36 Carbon Structural Steel	36,000	58,000 to 80,000

**Figure 7-1** ASTM standards for metals used in masonry accessories.

ASTM Wire Size	Wire Gauge No.	Nominal Diameter (in.)	Nominal Area (sq.in.)	Nominal Perimeter (in.)	Weight (lb./ft.)	Tensile Strength	
						Yield (lb.)	Ultimate (lb.)
W1.1	11	0.1205	0.0114	0.379	0.0387	798	912
W1.7	9	0.1483	0.0173	0.466	0.0587	1,211	1,384
W2.1	8	0.1620	0.0206	0.509	0.0700	1,442	1,648
W2.8	3/16 in.	0.1875	0.0276	0.589	0.1250	1,932	2,228
W4.9	1/4 in.	0.2500	0.0491	0.785	0.1667	3,437	3,928

**Figure 7-2** Common wire sizes used in masonry.

Sheet metal anchors are made from either cold-rolled carbon steel (ASTM A366, *Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality*) or stainless steel (ASTM A167, *Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip*, Type 304). The table in *Fig. 7-3* lists sheet metal thicknesses and standard gauges. Steel reinforcing bars may conform to a number of ASTM standards depending on the strength desired. Structural steel used for lintels, shelf angles, or strap anchors should conform to ASTM A36, *Standard Specification for Structural Steel*.

Corrosion of metals occurs from weathering, direct chemical attack, and galvanic action. Since most metals used in masonry construction are concealed within the masonry, exterior weathering is generally not a concern. However, corrosion may be caused by prolonged exposure to moisture which condenses within a wall section or in open cavities or collar joints, water which penetrates the exterior face shell of single-wythe walls or the exterior wythe of cavity or veneer walls, or atmospheric humidity in excess of 75% in hollow cores and