



(Adapted from American Galvanizers Association.)

Life Expectancy of Masonry Cavity Wall Ties (years) [§]					
Probability of Occurrence (%)	Corrosion Rate (10 ⁻⁴ oz. zinc per sq.ft./year)	ASTM A153, Class B2		ASTM A153, Class B1	
		Minimum	Average	Minimum	Average
5	2415	5.2	6.2	7.5	8.3
10	1791	7.0	8.4	10.1	11.2
20	1075	11.6	14.0	16.7	18.6
25	875	14.3	17.1	20.6	22.9
33	656	19.1	22.9	27.4	30.5
50	393	31.8	38.2	45.8	50.9

[§] Data taken in climatic areas with a driving rain index of 2.5 to 5.0 (see Chapter 9). (Adapted from Clayford T. Grimm.)

Figure 7-5 Life expectancy of galvanized coatings.

of embedded metals in masonry. The standard is intended to establish minimum acceptable levels of corrosion protection for ties, anchors, fasteners, and inserts based on exposure conditions and perhaps even to a driving rain index (refer to Chapter 9).

The degree of galvanic corrosion which can occur between dissimilar metals depends on the intimacy of contact, the type of electrolyte, and the voltage developed between the two metals. An electric current is conducted through the electrolyte, corroding one metal (the anode) and plating the other (the cathode). The greater the potential difference between the two metals, the more severe is the corrosion. The metal that is lower in the galvanic series table is subject to corrosion by metals higher in the series (see Fig. 7-6). The density of the corrosion current is also important, or the size of the current relative to the anode surface. If a fastener has a surface that is small compared to the metal to be fastened, its current density will be high and therefore subject to rapid corrosion. Therefore, as a general rule, a fastener in a given environment should be more noble than the material to be fastened.

Metal or Alloy	Rank in Series	
Platinum	Cathode (-) Most Noble	
Gold		
Graphite		
Titanium		
Silver		
Austenitic stainless steel (passive)		
Ferritic stainless steel (passive)		
Nickel (passive)		
Silver solder		
Monel		
Bronze		
Copper		
Brass		
Nickel (active)		
Tin		
Lead		
Austenitic stainless steel, 18-8 series (active)		
Ferritic stainless steel, 400 series (active)		
4-6% Chromium steel		
Iron or carbon steel		
Aluminum, 2024-T4 alloy		
Cadmium		
Aluminum, 6061 alloy		
Aluminum, 5052 alloy		
Zinc		
Magnesium		(Anode (+) Least Noble)

The farther apart two metals are in the galvanic series, the greater the corrosion of the less noble metal

Figure 7-6 Galvanic series of metals.

To protect against galvanic corrosion when dissimilar metals are used, isolation can be provided by an electrical insulator such as neoprene or asphalt-impregnated felt. The table in *Fig. 7-7* lists compatibilities of metals commonly used in construction.

7.2 HORIZONTAL JOINT REINFORCEMENT

Horizontal joint reinforcement is used to control shrinkage cracking in concrete masonry unit (CMU) walls. It can also be used to tie the wythes of multi-wythe walls together, to bond intersecting walls, and to assure maximum flexural wall strength against lateral loads. The basic types of joint reinforcement available are shown in *Fig. 7-8*. Some designs are better for certain applications than others.