55% Aluminum-Zinc Alloy Coated Steel

TECHNICAL BULLETIN #6

Cut Edge Protection

6.0 Effect of Cut Edges.
The single aspect most frequently vexing prospective users of zinc-coated and zinc/aluminum alloy-coated steel sheet is cut edge performance. It is an established fact the sacrificial protection afforded to the steel at cut edges will delay corrosion while there is zinc or zinc/aluminum alloy left in the vicinity of the edges. Almost every metal coated steel product has cut edges and when piercing occurs within the area of the sheet a further “cut” edge is generated.

Prime examples of such products are roofing, guttering and spouting. These items are first slit-to-width then cut-to-length. Holes are often pierced to accommodate fasteners however corrosion in these areas has never constituted a problem. Regardless of the environment, when more metallic coating is present, the steel has more protection both on flat unmarked surfaces and at cut edges.

6.1 Measure of Protection.
Zinc/aluminum alloy hot dip metallic coated steel sheet is produced by passing continuous steel strip through a bath of molten metal. As the strip emerges from the bath the thickness of the coating is precisely adjusted according to the coating class required. The coating class is a designation describing the coating type and amount of coating applied.

The coating type is generally described by the capital letter of the chemical symbols of the metals in the coating. The amount of coating is indicated by the minimum "coating mass" measured by the triple spot test specified in ASTM A792/A792M – 09.

Examples: Coating Classes AZ50  
AZ = Aluminum/Zinc  
50 = Minimum of .50oz./ft², the total on both sides.

The severity of the intended application should dictate the coating class specified. Heavier coating thicknesses should be used in more severe environments.

6.2 Two Way Protection.
The zinc/aluminum alloy metallic coating performs in two ways:
1. The aluminum acts as a barrier when the steel base is completely enclosed by the coating. Protection is afforded by the corrosion resistance of the coating itself.
2. As a sacrificial coating at edges when the barrier is broken by slitting, shearing, piercing or scratching. The barrier effect is universally recognized. However, it is the sacrificial protection this bulletin addresses.

6.3 Protection is Automatic.
Complete coating of steel sheet products is not practical, economical or generally necessary. It is normal practice and has been since zinc-coated sheet has been produced, to have slit, sheared, drilled or sawn edges.
In service, galvanic action causes zinc compounds to automatically build up at cut edges and scratches by an electrolytic reaction when water or moisture is present. These slow the rate at which the surrounding coating is consumed around damaged areas. This effect is sometimes referred to as the “self-healing” property of coatings containing zinc.

6.4 Comparison of Zinc and Zinc/Aluminum Coatings.
It is natural with the wide spread use of 55% Aluminum-Zinc Alloy Coated Steel sheet in traditional zinc-coated building applications, the question of comparative cut edge performance should be raised. Unpainted 55% Aluminum-Zinc Alloy Coated Steel will perform in a very similar manner to zinc-coated sheet in the relatively thin range of thickness associated with roofing, wall cladding, gutters and down-pipes.

This has been tested by removing coating of similar thickness from 55% Aluminum-Zinc Alloy Coated Steel and galvanized sheet down to the steel base, using scribe marks ranging from .016” to .16” in width. When exposed to the atmosphere, the differences in the samples are slight, particularly at the thinner scribe marks.

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