CASCADIA METALS

55% Aluminum-Zinc Alloy Coated Steel

TECHNICAL BULLETIN #3

Fastener Selection for Roof and Siding Applications

3.0 Introduction.

Roofing, siding and accessory products manufactured from 55% Aluminum-Zinc Alloy Coated Steel will give long, trouble-free service when exposed to the atmosphere in environments ranging from benign to severe in terms of corrosive effect. The selection of the appropriate form of fastener is a task, however, which should not be solely influenced by cost. Fastener costs are minimal relative to the overall cost of a project and there is little benefit gained through the use of inferior fasteners.

3.1 Guidelines for Appropriate Fasteners.

1. The expected service life of the fastener should meet or exceed that of the 55% Aluminum-Zinc Alloy Coated Steel components used in the construction. The severity of environmental conditions and the corrosion resistance of the fastener should be considered.

2. The fastener must be compatible with the 55% Aluminum-Zinc Alloy Coated Steel components. When a more active metal is placed in direct electrical contact with another less active material the more active component will sacrifice itself to prevent the other from corroding. This is known as dissimilar metal contact or galvanic corrosion and can be extremely aggressive under certain conditions. Galvanic corrosion can be much faster in corrosive environments such as acid rain due to the increased conductivity of the electrolyte or rainwater. **For this reason lead, copper and copper containing alloys (such as Monel) should not be used in conjunction with 55% Aluminum-Zinc Alloy Coated Steel.** Stainless steel should not be used in severe environments as the 55% Aluminum-Zinc Alloy Coated Steel alloy coating can corrode sacrificially. Refer to Table 3 to ensure the fastener of your choice is compatible and has sufficient durability.

3. Careful consideration should be given not only to the expected performance of the head of the fastener, but the shank as well. This applies particularly if the shank of the fastener could be subject to the effects of aggressive substances, such as acid or chemical fumes or to prolonged humidity and condensation for example, within the confines of a building.

4. Fastener size, strength and correct fastening pattern are critical and are recommended by the panel manufacturer.

3.2 Guidelines for Installation of Fasteners.

1. **Do not overdrive screws or drive at an angle.** This can result in the washer piercing the steel panel or no longer mating with the area around the hole. The 55% Aluminum-Zinc Alloy Coated Steel coating will protect the damaged area for some time; however, rust may prematurely occur depending on how much steel is exposed and on the local environment. Overdriving a fastener can also cause a depression in the panel which can collect water and create localized ponding. Driving tools equipped with depth sensing nose pieces and suitable RPM speeds can assist in avoiding these problems. Impact type tools should not be used.

2. Washers - The rubber washer component of self-drilling screws must be manufactured from materials compatible with the roofing material. Washers containing significant levels of conductive carbon black fillers should not be used with 55% Aluminum-Zinc Alloy Coated Steel products. The use of carbon or graphite washers may lead to galvanic corrosion, especially in corrosive atmospheres. Black neoprene rubber is not recommended in any environment as they contain carbon pigmentation's which can also cause galvanic corrosion. Neoprene rubber other than black is acceptable.

CASCADIA METALS

TABLE 1 **Fastener Performance Rating**

A	Provides Excellent Long-term Durability and Compatibility
B	Provides Good Long-term Durability and Compatibility
C	Provides Acceptable Durability and Compatibility
NR	Not Recommended

TABLE 2 **Guide to Atmospheric Exposure Conditions & Distance From Corrosive Source**

Atmosphere	**Typical Exterior Atmosphere**	**Marine**	**Industrial**
Benign	Outer Urban, Semi Rural, Rural	More than 3/4 Mile	More than 1/2 Mile
Moderate	No Obvious Marine/Indust. Influence	1/2 Mile – 3/4 Mile	1/3 Mile - 1/2 Mile
Severe/Very	Surf, Indust. Pollution & Fumes	Up to 1/2 Mile	Up to 1/3 Mile

*(**Note:** Marine as a corrosive source is characterized by salt laden, moist air. Industrial as a corrosive source is characterized by fallout, acid laden air. Some commercial or agricultural applications may create internal environments in which the buildup of pollutants, fumes or humidity is a potential source of corrosion. Fastener selection in such cases should be made after careful evaluation of building design, nature of corrosive source.)*

TABLE 3 **Fastener Guidelines for use with 55% Aluminum-Zinc Alloy Coated Steel**

Fastener Type and External Atmosphere	Benign	Moderate	Severe - Very Severe (Coastal/Industrial)
300 series stainless (self-drill screws not available in this alloy)	A	A	Not Recommended in very severe environments – the 55% Aluminum-Zinc Alloy Coated Steel coating around fastener head may corrode sacrificially.
Zinc/Aluminum Alloy Cast Head (ZAC)	A	A	A
Solid Plastic/Nylon Molded Head2	A	A	A
Aluminum	A	A	A
Electroplated Zinc/Mechanically Coated Zinc (5.0 mil min.)	B	C	NR
Baked-On Organic Polymer Barrier Coat Over 5.0 Mil Plated Zinc Coating	A	A	B
400 Series Stainless Steel (1.0 mil Zinc coating)	A	A	C
Lead Head Nails and Washers	NR	NR	NR

1. Internal atmosphere should also be considered.

2. Subject to breakdown due to U.V. and heat; May fade at a different rate than pre-painted steel panel.

***NOTE:** Push or crimped-on caps can allow moisture to collect beneath them, causing corrosion of the head.*