



55% Aluminum-Zinc Alloy Coated Steel

TECHNICAL BULLETIN #1

Guide for Use in Roofing and Siding Applications

Panels fabricated from 55% Aluminum-Zinc Alloy Coated Steel will provide many years of trouble-free service when properly designed, installed and maintained. The key to obtaining all of the benefits of the corrosion resistant coatings applied to steel used in roofing, siding and rainwater items lies in correct material selection, good handling and installation practice, and sensible maintenance.

Few roofing or siding products are replaced because of an overall breakdown or general corrosion. Replacement is generally due to isolated component failure which could have been avoided by following a few simple rules. This Technical Bulletin sets out the general principles to follow. Attention to the following factors should ensure satisfactory performance and good service life. Manufacturers' specific recommendations about their particular products should be followed.

1.0 Correct Selection of Materials.

The correct selection of roofing and siding materials is the first step to ensuring a building's long life. The range of products supplied by Cascadia Metals are designed to provide good performance under normal environments from benign rural areas to corrosive industrial or salt-laden coastal atmospheres. Correct selection is a matter of choosing the right product for its intended use.

A roofing installation in a coastal environment has a completely different demand upon it than one in a benign rural location. Our experienced sales and technical personnel should be consulted if there is any doubt as to the correct metallic coated or painted product for a specific structure. This is especially true for the special requirements of severe coastal and industrial as well as animal confinement environments.

1.1 Designs for Durability.

There are many factors that should be considered in the design phase of any building to ensure the maximum trouble-free service life. The following factors are some of the primary considerations.

1.1.1 Minimum Roof Pitch.

A pitch must be designated/designed so that standing water conditions are not created. Water or condensate must freely drain from the roof panels. Where a roof includes several slopes, a valley gutter or other device should be installed to ensure adequate drainage. Specified minimum pitch will vary according to the depth of the roof profile and the means of fastening. Many standing seam roofing systems with deep profiles (i.e. panel seams ranging from 2-3 inches), fastened with concealed clips which do not penetrate the steel weathering membrane, may be installed down to a minimum slope.

A properly installed standing seam roofing system will allow the roof to drain effectively without "flooding" the laps. The concealed clips ensure the drainage part of the panel membrane is not breached by fastening holes through which water may leak. Perimeter detailing and flashing is also an important component of such a system.

Other roofing systems will typically require a greater pitch to ensure adequate roof drainage. A roof fixed to its minimum pitch must observe all of the criteria for correct installation. Supports must be carefully aligned to avoid creating low spots in the roof where ponding will occur, leading ultimately to reduce service life.

1.1.2 Correct Support Spacing.

Correct spacing of supports is important. Not only do the purlins, battens, etc., support the weight of the roof and the weight of the roofer during installation, they must be strong enough to prevent the sheets of decking from blowing away in high winds.

Support spacing near the eaves and the ridge is usually less than the intermediate spacing's. This allows the roof to handle the increased lift and forces created by wind turbulence. The supports hold the roof down and they must themselves be restrained. It is possible for a roof to be blown off with the purlins or pieces of poor quality lumber battens attached to the sheets.

1.1.3 Steel Thickness - Base Metal.

To protect steel sheet from the corrosive effects of the elements, a layer of metallic aluminum/zinc alloy is applied to the steel base in the hot-dip process. To enhance this protection as well as provide an attractive appearance, a pre-painted steel finish is also an option. These protective finishes are the major determinants of long service life and lasting good looks. The structural strength of the roofing or siding profile is derived entirely from the steel base and the profile of the particular steel panel.

An important consideration in the spanning capacity of a steel profile is its base metal thickness. Support spacing's are based on this. The total thickness of pre-painted steel sheet (the base metal steel plus a aluminum/zinc hot-dipped coating, plus pre-painted finish) is, at best, a very imprecise indicator of the base metal thickness which provides the strength of the roof sheeting.

The ability of the roof sheeting to span recommended distances without severe deflection, to support the installer, and to resist tearing away from fixing clips or screws largely depends on the base metal strength. Always ensure that the base metal thickness specified is according to recommendations. Most metal panel manufacturers provide load tables to assist in the selection of an appropriate profile for spanning conditions.

1.1.4 Fume Extractors & Vents.

Corrosive dust and particles can be released through roof vents and discharged onto the roof surface. The immediate area of the roof adjacent to the vent is then at increased risk of corrosion. The following design guidelines should be considered to avoid problems.

- Locate vents on the corner of the windward side of the building.
- Install filter elements to trap hazardous material.
- Specify pre-painted product or apply a protective coating to the affected area of the roof.
- Maintain coal or oil fired boilers or incinerators so they do not discharge sulfur compounds over the roof surface.
- Avoid condensate from copper tubing.

1.1.5 Foot Traffic.

Repeated foot traffic and the dragging of maintenance or cleaning equipment over the roof surface may damage the roof which will reduce its life expectancy. Catwalks and platforms should be designed and installed where necessary. **Where copper/chrome/arsenate treated lumber is specified it must be well dried after treatment and insulated from the roof.**

1.1.6 Roof Structures.

Equipment such as air conditioning units are often secured to uncoated steel channels. Uncoated steel used on a 55% Aluminum-Zinc Alloy Coated Steel roof should be cleaned, primed and given a suitable finish coating. If left unprotected the rust may bleed onto the 55% Aluminum-Zinc Alloy Coated Steel panels and stain the surface.

1.2 Site Storage before Erection.

Where possible do not leave uncovered coils or stacks of sheets lying in the open. Store materials indoors and away from openings to the outside. On arrival at site ensure the steel sheets are dry. If wet, open the pack immediately, separate the sheets and allow them to dry.

If it is absolutely necessary to store 55% Aluminum-Zinc Alloy Coated Steel outdoors please follow the following guidelines:

- a. Erect simple scaffolding around the material and cover it with a waterproof sheet or tarp. Ensure space is allowed between the cover and the material to allow air to circulate.
- b. Store material off the ground and on an incline so that if rain should penetrate the covering, water will drain away.
- c. Use only dry, untreated lumber spacers for block stacking.
- d. The storage site should be inspected regularly to ensure moisture has not penetrated the stack.
- e. Contact with wet cement should be avoided.

1.3 Installation Guidelines.

1.3.1 Allowance for Expansion.

All roofing and cladding will expand and contract with changes in temperature. Fastening/Fastener attachment systems used must accommodate the expansion to avoid problems of “canning”, ponding or roof noise. Expansion tables are usually available from the panel manufacturer.

1.3.2 Handling.

Handle panels carefully. Do not drag or slide sheets over other products or rough surfaces. Equipment and materials placed on to the roof should be clean and care taken to prevent damage to the surface.

Long panels are best lifted with the aid of a lifting boom. Flat, rubber soled footwear should be worn when walking on a roof. Shoes should be cleaned before going up on the roof.

1.3.3 Laying.

Pierced sheets should be installed with overlaps away from the weather. End laps in profiled metal roofing should be avoided where possible. The end lap of 55% Aluminum-Zinc Alloy Coated Steel and painted profiles should be sealed with a double bead of sealant.

1.3.4 Marking, Cutting & Drilling.

Black lead pencils should never be used for marking 55% Aluminum-Zinc Alloy Coated Steel products as the carbon in the pencil will promote corrosion which will etch the surface leaving a permanent mark. Use any other color pencil but black. Cut and drill pre-painted steel with care to avoid marking the high quality surface. Use a hand shear or nibbler instead of a friction blade to avoid damaging the 55% Aluminum-Zinc Alloy Coated Steel or paint coating. Remove all debris and metal filings as soon as possible.

1.3.5 Fasteners - Placement, Size, Type, Life Expectancy & Compatibility.

The security of a roof is no better than its fasteners. Correct choice and placement ensures fasteners are placed in effective positions. The use of nails is not advised for roofing and siding profiles. Screw type fasteners with washers are recommended and have been proven to have 2 to 3 times the holding power of nails. Larger washers are necessary when hurricane conditions apply to the location. This prevents screws being pulled through sheeting under high lift forces.

Fasteners used for external fixing of roofing and siding products must be compatible with 55% Aluminum-Zinc Alloy Coated Steel and have a life expectancy comparable with the 55% Aluminum-Zinc Alloy Coated Steel panel.

Our recommendations on type and compatibility of fasteners are published in “55% Aluminum-Zinc Alloy Coated Technical Bulletin #3 - Fastener Selection for Roof & Siding Applications”.

There are some fasteners on the market with only minimal corrosion protection. These will quickly rust and present an unsightly appearance. Fasteners made of some alloy materials are highly corrosion resistant in their own right but a galvanic couple may occur when they are in contact with 55% Aluminum-Zinc Alloy Coated Steel. This may cause an increased rate of corrosion of the steel around the fasteners. Screw manufacturers/suppliers should be consulted to ensure correct usage.

1.3.6 Clean-up.

After erection has been completed the roof panels and gutters should be swept to remove dirt and debris such as unused fasteners, metal filings, pop-rivet stems, and pieces of flashing. The shank of a fastener left lying on a roof will rust very quickly and will run down onto the panel causing an unsightly stain. The process of cutting roof and wall sheeting to size with discs, or drilling to fix with fasteners, can create debris which is unsightly and can create localized corrosion and shorten the service life. “55% Aluminum-Zinc Alloy Coated Technical Bulletin #4 - Prevention of Damage to Steel Roofing & Siding Products from Metal Filings” covers this in greater detail.

Mud and dirt tracked onto the roof panels, and greasy hand and foot-prints, can be removed by washing with a cleaner consisting of 1/3 cup mild detergent (e.g., Tide[®]) in one gallon of water applied with a mop or soft broom. The roof should then be thoroughly rinsed with water. High pressure spray applications and strong alkaline detergents should not be used. If washing with a detergent solution is found to be inadequate, solvents such as mineral spirits can be used to remove more stubborn stains. More aggressive and highly volatile solvents such as acetone or toluene should be avoided for safety reasons, as well as their incompatibility with many paint systems used on building panels. The compatibility of any solvent on paint should be tested or known prior to its use.

1.3.7 Compatibility of Accessories Including Flashing & Sealants.

There are basic facts regarding compatibility of metal products that are usually predictable and well documented. These have been summarized into a few simple rules for roof installers in “55% Aluminum-Zinc Alloy Coated Technical Bulletin #2 – Guide to Flashing Materials” which covers this topic in much more detail. The mix of incompatible metals or materials with dissimilar service life is poor practice and will significantly affect service life. Correct choice of sealants to suit materials and location is important. Sealants containing amine or acidic acid should never be used. High quality sealants, such as neutral cure silicones, provide good performance in most applications. They may cost a little extra but are a good investment. Recommendations on sealant selection are covered in “55% Aluminum-Zinc Alloy Coated Technical Bulletin #5 - Sealants Guide”.

1.3.8 Maintenance Procedures to Contribute to Long Life.

At least once a year, the building owner should have the following roof maintenance performed:

- Check panels, rain gutters and downspouts to ensure they are clear and allow free drainage of rainwater from the roof. Valley gutters and grates should also be cleaned.
 - Inspect and clean areas under eaves and wall/soffit areas under overhangs not get washed by rain.
 - Remove accumulations of leaves, branches and other debris at ridge caps and in corners.
 - Check the condition of auxiliary equipment such as air conditioner supports, drains and housings. Any exposed metal susceptible to rust or has rusted should be painted.
 - Remove trash thrown on the roof likely to clog drains or cause silt buildup.
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Regular cleaning of surfaces, and the removal of accumulated debris such as leaves, dirt, pollution fallout, etc., will help prevent the setting up of localized areas where accelerated corrosion might occur. Accumulation of windborne salty deposits in seaside localities can have a particularly aggressive effect on steel products. Being fairly soluble, these salty deposits are readily removed by a gentle hosing with clean water.

Any technical information or advice contained in this bulletin is provided without charge as a service to the industry. The use of this information or advice may produce unexpected results, and any persons intending to make use of this information are urged to carry out tests of their own to satisfy themselves they are using the correct materials, approach and techniques. Correctly following the information and advice should produce a satisfactory result but Cascadia Metals assumes no responsibility whatsoever in relation to such information or advice. Please ensure you have the most current Technical Bulletin.

