



# Installers Guide

July 2019



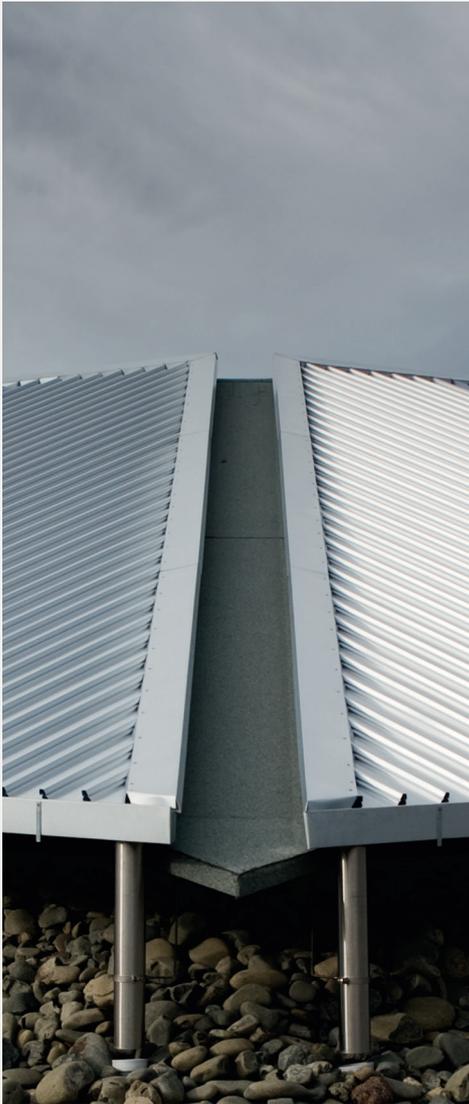


## INTRODUCTION

New Zealand Steel takes a great deal of pride in manufacturing top quality products and knows that the final appearance is influenced by the skills and care taken with the material. This guide provides recommendations on the correct installation of COLORSTEEL®, Zinalume® steel and Galvsteel® material. To obtain optimum durability of these products, handling and fixing procedures appropriate to the material, application and environment must be used.

# MATERIALS

A variety of steel coating systems are offered:



## **ZINCALUME®**

Steel with an alloy coating consisting of 55% aluminium, 45% zinc by weight which offers superior corrosion resistance compared to galvanised steel in most environments (particularly coastal environments).



## **GALVSTEEL®**

Traditional galvanised steel is offered under the trade name of Galvsteel®. This material is coated in 99% pure zinc.



## **COLORSTEEL®**

COLORSTEEL® describes those steel building materials which have an oven-cured paint system applied to a flat galvanised or Zincalume® base on a continuous 'coil to coil' operation at the New Zealand Steel Glenbrook works. The pre-painting process improves both the looks and the durability of the finished product.

**The brand name COLORSTEEL® is unique to materials manufactured by New Zealand Steel and must not be applied generically to other pre-painted products.**



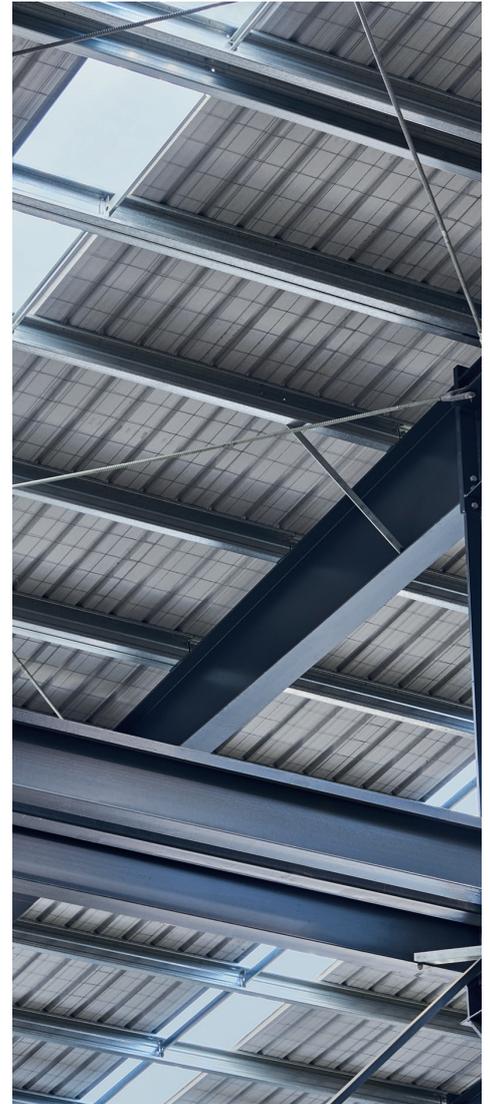
### **COLORSTEEL® ENDURA®**

Has a Zinalume® substrate with an AZ150 coating class, (i.e. 150 g/m<sup>2</sup> of aluminium/ zinc alloy). It is suitable for most moderate to severe marine applications.



### **COLORSTEEL® MAXX®**

Has a Zinalume® substrate with an AZ200 coating class, (i.e. 200 g/ m<sup>2</sup> of aluminium/ zinc alloy), to give enhanced performance in very severe marine environments.



### **COLORSTEEL® DRIDEX® and DRIDEX+®**

Have an absorptive layer of fleece on the underside, negating the need for separate roofing underlay. These products must be installed by an accredited COLORSTEEL® Dridex® installer.

(Contact New Zealand Steel for details on how to become accredited).

# PRODUCT SELECTION

## Appearance

### Colour

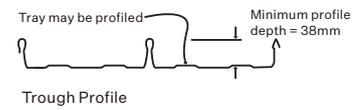
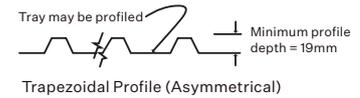
COLORSTEEL® comes in an extensive palette of colours. Refer to your supplier or the New Zealand Steel brochure Choosing COLORSTEEL® for details. New microwrinkle technology has led to the development of COLORSTEEL® Matte colours, in a limited colour range. COLORSTEEL® Matte requires special care during installation, refer to the COLORSTEEL® Matte installation guide bulletin.

### Glare

In some areas, colour choice may be limited by Council regulations, and this should be checked where applicable. Glare off light coloured roofs can sometimes be an annoyance to neighbours and if this is to be considered, refer to the COLORSTEEL® Glare Bulletin.

### Profile

Profiles may be described as Corrugated, Trapezoidal (rib) or Secret Fix (Trough, Tray, Standing Seam, Decking).



# Performance

## Strength

Different profiles and profile heights will have different strength characteristics. Generally, the higher the profile height the stronger it will be. Refer to roof manufacturer for specific information.

## Environment

The boundaries of different corrosion zones are difficult to define because many factors determine the corrosivity of a particular location. Issues such as difficulty of replacement, and access for maintenance should also be considered when making material choices. The designer should choose the appropriate materials for the location, which meet the minimum durability requirements of the NZBC and satisfy customer expectations.

For information on environments, warranties and maintenance see Environmental Categories, Warranty and Product Maintenance Recommendations brochure.

## Compatibility

When two different metals are in contact and moisture is present, one metal is relatively protected while the other suffers accelerated corrosion. This is known as galvanic or bi-metallic corrosion. A similar problem commonly occurs with water flowing over dissimilar metals.

### Copper

Copper is not compatible with Galvsteel®, Zinalume® or COLORSTEEL® products, especially where the two materials are in contact in the presence of water or where water can flow from copper to the coated product. Every effort must be made to prevent the overflow of water from copper pipes on to the roofing and guttering material.

### Lead

Lead is not compatible with Zinalume® products. Corrosion will result from contact between the two products, or from water run-off from lead to Zinalume® or COLORSTEEL®.

### Stainless Steel

Stainless steel must not be in contact with Zinalume® or COLORSTEEL® products, but run off from stainless steel onto these products is acceptable.

### Galvanised Steel

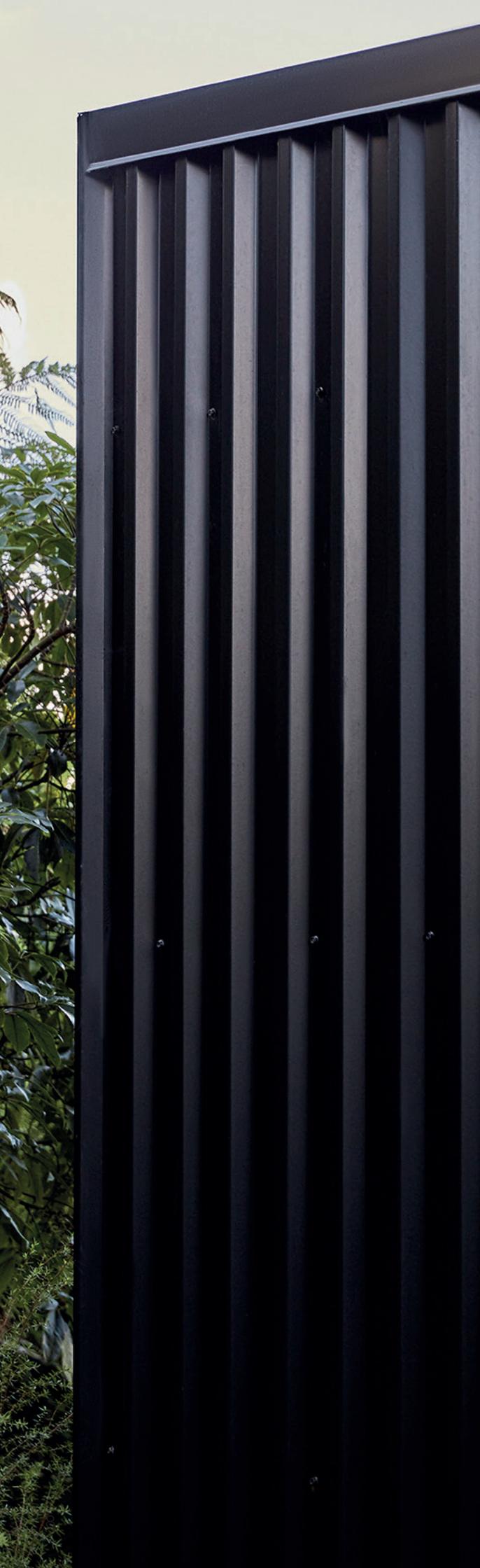
Galvanised steel is compatible in contact with Zinalume®, COLORSTEEL®, aluminium or zinc but these materials must not discharge onto unpainted galvanised steel, as they are inert. Other inert surfaces include any painted surface, glass, PVC and glazed clay tiles.

## Minimum Pitch

Different profiles have different minimum pitch limitations.

Profile	Rib Height	Minimum Pitch
Trapezoidal asymmetrical	20 – 25 mm	4°
Trapezoidal asymmetrical	25 – 35 mm	3°
Trapezoidal asymmetrical and symmetrical	36 – 60 mm	3°
Trapezoidal symmetrical	20 – 35 mm	4°
Secret-Fix	>30 mm	3°
Secret-Fix	<30 mm	8°
Standing seam fully supported flat sheet metal	>30 mm	3°
All other types of fully supported flat sheet metal		5°
Corrugated and other profiled sheeting	16.5 – 20 mm	8°
Corrugated and other profiled sheeting	21 – 35 mm	4°

Zinc / Zinalume® / Aluminium	<b>MORE ACTIVE MATERIALS</b>  <b>MORE NOBLE METALS</b>	<p>This chart lists commonly used metals in a 'Galvanic series'. If any two of these metals are in damp contact or a run-off situation, the metal higher on the table will sacrifice itself to protect the metal lower on the scale. Therefore the simple rule is to remember that you can run water down but not uphill. For example zinc to copper is alright but copper to zinc is not.</p>
Steel		
Lead		
Copper and Brass		
Stainless Steel		

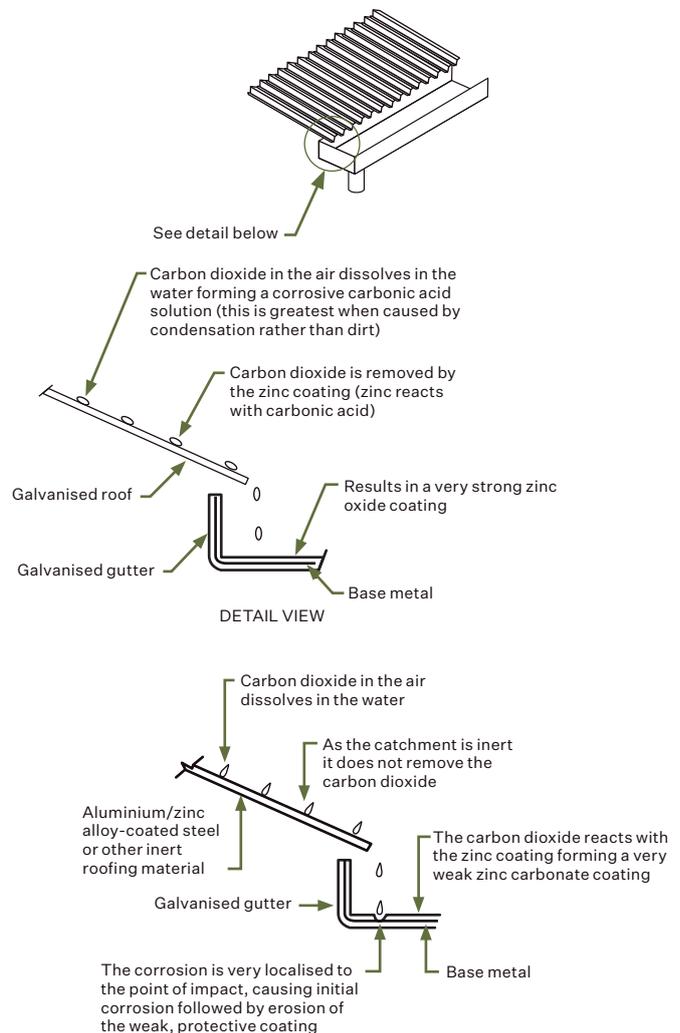


## Inert Catchment

Run-off from inert surfaces such as glazed tiles, aluminium and aluminium-dominant metallic coatings, fibreglass, pre-coated metals, glass or any painted surface can cause corrosion of unpainted galvanised steel and other zinc-dominant metallic coatings. This is known as 'drip-spot corrosion' or inert catchment corrosion.

Water sitting on a surface absorbs carbon dioxide forming carbonic acid, which is reactive with zinc. On a galvanised surface, the carbonic acid reacts with the zinc and becomes neutral. On an inert surface discharging into an unprotected zinc surface, the carbonic acid is not neutralised, and reaction will be concentrated on the drip points of the inert surface onto the zinc surface.

As the formation of carbonic acid takes time to occur, inert catchment corrosion is normally seen at specific drip points of dew off a roof rather than below rain washed painted walls and windows.



## Flashings

Flashings and ridge capping should be manufactured from the same coating system as used for the main roof area, i.e. all COLORSTEEL® products. Higher performance flashings can be used with the main roof i.e. COLORSTEEL® Maxx® flashings with a COLORSTEEL® Endura® main roof, but not the other way around, i.e. COLORSTEEL® Endura® flashings with a COLORSTEEL® Maxx® main roof. Where greater durability is required for flashings behind cladding or other building elements, colour matched alternative metals may be used. It is likely that these flashings will weather at a different rate than the COLORSTEEL®, and differential appearance may occur.

# TAKING DELIVERY

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## Checking

Check the delivery to make sure you have the right product, delivered in prime condition. Verify that it is genuine COLORSTEEL®, Zinalume® or Galvsteel® material. Where different brands of pre-painted material are used on the same building, differences in colour, gloss and weathering performance may appear obvious within a short period of time. This will be due to the different paint formulations used by different manufacturers. New Zealand Steel Limited will not accept liability for problems caused by the mixing of brands.

Ensure that the order is complete including all fasteners, accessories etc required to commence installation.

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## Unloading

Set out flat area and supporting dunnage to ensure sheets will not be damaged by site debris. When unloading by crane, ensure lifting boom has a spreader bar and that tightening strops do not damage sheet laps. If unloading by hand lift each sheet off the stack without sliding over under sheets, as that may cause damage to the paint.

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## Storage

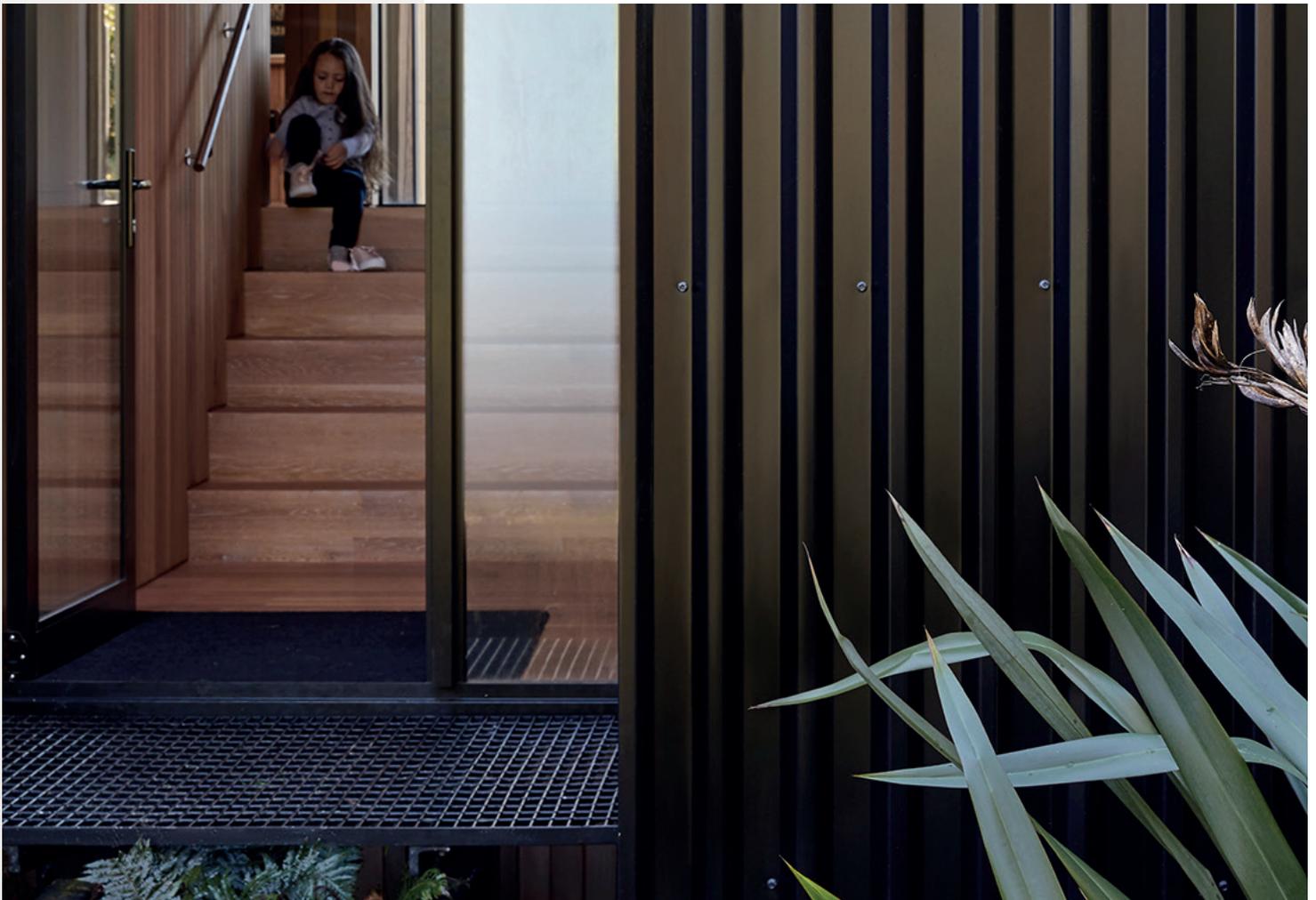
Close stacked sheets may deteriorate rapidly if water enters the pack. Sheets that are delivered wet or become wet in storage must be used immediately or dried. Drying can be done by filleting sheets or cross stacking them on a slope to allow water to drain and air to circulate between the sheets.

Long term storage may only be done in a dry, well ventilated environment.

Protect from contamination from corrosive and damaging substances such as acid, cement, swarf etc.

## Wet Storage Damage

Failure to follow these handling and storage precautions could result in spoiling the surface appearance of the products and severely reducing their service life. On Galvsteel® material this will appear as a white corrosion product (white rust), whereas on Zinalume® the corrosion product is black. This should not be confused with fretting. On COLORSTEEL®, the result of wet storage damage could be a bubbling of the paint surface. Damage resulting from such failure invalidates the warranty and is not recoverable from New Zealand Steel Limited.



# INSTALLATION



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## Safety

Installing roofs involves many hazards including laceration, electrocution, puncture and falling from height. Prudent PPE and installation practices must be employed, and the guidelines of MBIE “Best Practices for Safe Working at Height” must be strictly adhered to.

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## Handling

New Zealand Steel products are of high quality and perform best when handled correctly.

- Don’t handle them roughly or carelessly.
- Don’t drag or slide new sheets over other sheets or rough surfaces.
- All equipment and materials taken on to the roof should be clean and care taken to prevent damaging the surface.

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## Footware

- Anyone walking on the roof should wear clean flat rubber-soled footwear to prevent marking.
- Put an old mat or piece of carpet at the base of the ladder so that shoes can be cleaned before going up on the roof, or dirty shoes should be removed and replaced at base of ladder
- Care should be taken walking on roofs as they may be slippery at times.

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## Strippable protective film

Strippable film is a clear pressure sensitive polyethylene plastic film that is applied to some COLORSTEEL® products in the New Zealand Steel paint line to assist in protecting the COLORSTEEL® surface from damage and scratching during forming, transportation, handling, storage and erection.

Strippable film is designed to provide some protection to the COLORSTEEL® product prior to and during installation on the building. It is not designed to protect against corrosion, humidity or chemicals.

## Storage

COLORSTEEL® product with film applied must be stored at temperatures less than 50°C and out of direct sunlight to avoid prolonged UV exposure. The product needs to be kept dry to prevent moisture ingress between the film and the painted surface. In the longer term this may cause issues to the COLORSTEEL® and in the shorter term cause the film adhesive to whiten and breakdown leaving residue on the painted surface when the film is removed.

## Usage

Storage requirements for formed products on building sites are as above. The film is intended to protect the painted product up to and during installation, it must be removed directly before or immediately after installation. Failure to do so may result in the film adhesive leaving a residue on the painted surface.

On removal of the film the painted surface must be inspected and any adhesive residue cleaned off. Mild household cleaners may be used, check that the cleaning product manufacturer recommends the product as being suitable for use with painted surfaces and all of the recommended safety precautions are followed. Ensure the cleaning product is washed off the COLORSTEEL® surface with fresh water after use.

### Marking

Black lead pencils must never be used for marking COLORSTEEL®, Zinalume® or Galvsteel® products. The carbon in the pencil promotes corrosion which will etch the surface of the material, leaving a permanent mark. Use a pencil of any colour other than black, a marker pen, chalk or crayon.

### Cutting

Cut COLORSTEEL® with care to avoid marring the high-quality finish. Cut by shear only, using nibblers or hand shears. Friction blades and high-speed saw blades must not be used. These blades will damage both the metallic coating and the COLORSTEEL® surface by creating excessive heat, and generate large amounts of hot swarf which may embed into the coating surface.

All debris must be swept off the job at the end of each day. Prevention of swarf damage is far easier than its cure. See Swarf Staining Bulletin for more information.

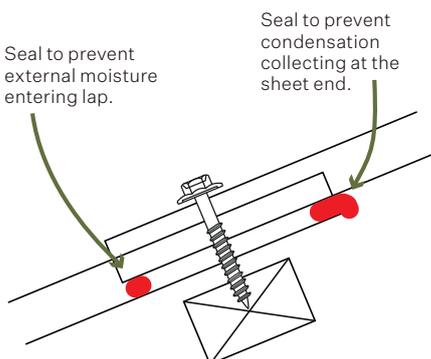
### Sealing and joining

#### Sealing

Soldering should not be used on COLORSTEEL® or Zinalume®, use only neutral cure silicone rubber or MS polymer sealants. Pre-align the pieces to be joined and pre-drill if possible. Thoroughly clean off surplus sealant and swarf using a dry, lint-free cloth or plastic scraper. Apply two beads of sealant close to each edge of the joint. Align pieces together and fasten with sealed rivets at 50mm centres.

#### End Laps

End laps in profiled metal roofing should be avoided where possible. When unavoidable, the end laps should be sealed with a double bead of sealant as in the illustration below.



### Fastening

The selection of the appropriate form of fastener is important. Fastener durability should equal or exceed that of the material being fastened. Fasteners used on COLORSTEEL® products should be factory colour matched prior to installation.

#### Screw fasteners

Screw fasteners of a length sufficient to give adequate penetration into supporting structure are to be used. Refer to manufacturer for specific recommendations. Fasteners should be a minimum of Class 4 for severe environments, and Class 5 for very severe. They should be manufactured and coated in materials compatible with the material being fastened, and be fitted with a low carbon, non-conducting sealing washer.

#### Rivets

Rivets should be minimum 4mm diameter aluminium. Sealed rivets are preferred over unsealed as they do not require the addition of a dab of sealant on the face to achieve weatherproofing.

#### Spacing

Fasteners should be of grade and type suitable for the application, installed at spacings required by design loads and manufacturer's recommendations. On buildings constructed to NZS 3604 a consistent fixing pattern should be used on all fastener rows, for other buildings, greater fastener density may be required around the periphery. All purlins must be fastened so that they each contribute to resisting uplift forces.

Rivets on flashings should be placed at 50mm centres.

#### Setting

Fasteners should be seated snugly to give a good seal, without distorting the roofing profile. Overdriving, over-tightening or using too many fasteners can cause purlin marking and other damage, and can contribute to roof noise.

#### Driving

Impact screw guns can cause damage to the heads of screws and cause damage to protective coatings, as can worn driving sockets. Use only drivers recommended by the fastener supplier, and snug fitting drive sockets.

#### Allowance for expansion

All roofing and cladding is subject to expansion and contraction due to temperature extremes. This is particularly evident with darker colours and long spans where the expansion may be as much as 8.0mm for a 10.0 metre sheet. Screws fitted with profiled washers for the purposes of allowing thermal expansion must be installed centrally through a 9mm diameter pre-drilled hole in the roof sheeting.

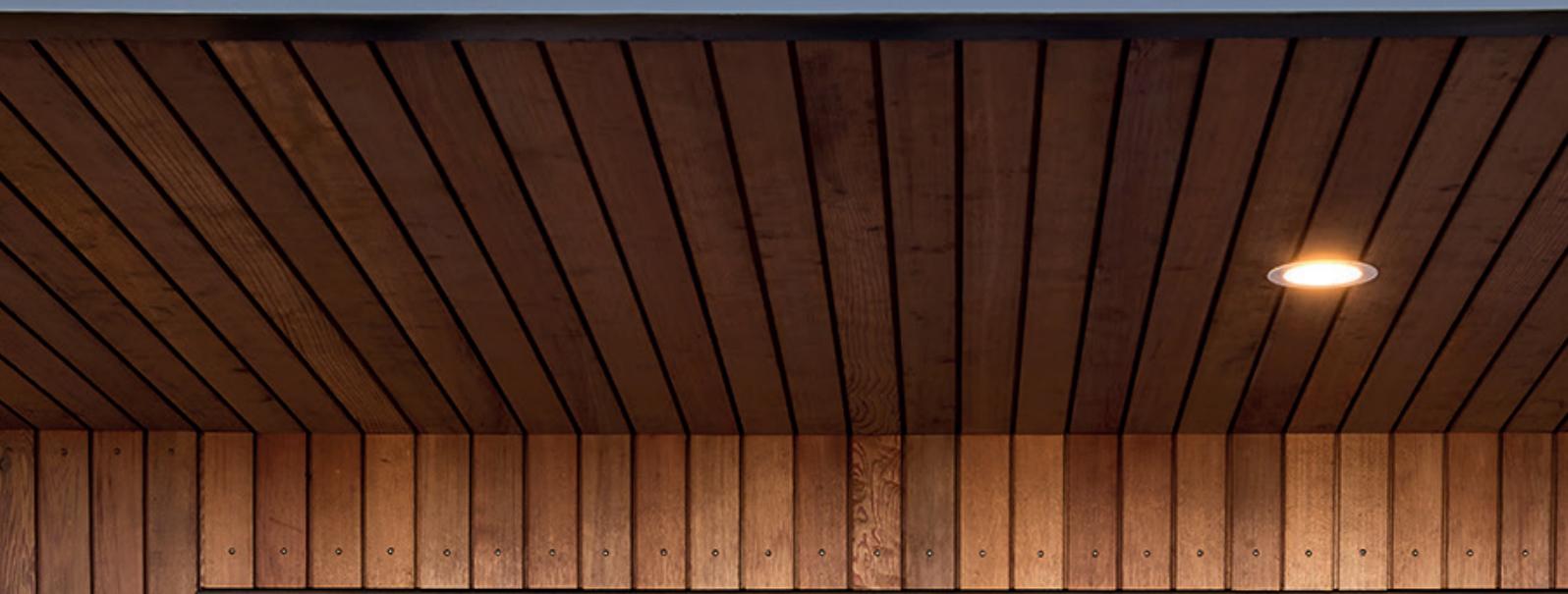
### Flashings

For transverse flashings, aluminium soft edging may be used, or flashings may be notched into rib and secret fixed profiles. Where penetration flashings are required, proprietary EPDM boot flashings may be used, or bespoke flashings may be fabricated in accordance with the Profiled Metal Roofing Code of Practice.

Flashings should not have edges that impinge on adjacent coated surfaces, and longitudinal edges such as barge downturns must have a small gap between downturn edge and neighbouring pan.

### Sheet ends

The pans at the top end of sheets must be turned up to form a stop end. On roof pitches below 8°, ensure that the gutter end of profiled sheets is turned down.



# PREVENTING PROBLEMS

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## Water ponding

### Roofs

Ponding will create prolonged time of wetness, and increase the build-up of debris. Ponding will detract from coated steel product life and will invalidate the product warranty.

Where the roof pitch is low, changes in structure alignment or damage to the roof sheets may result in a negative pitch and consequently lead to water ponding. The following conditions commonly cause water ponding:

- Over-spaced purlins
- Deformation of timber purlins
- Placement of external loads such as air conditioning units
- Careless roof foot traffic
- Excessive canning of the profile pans
- Incorrectly installed penetrations

### Gutters

Gutters must be installed with adequate fall to ensure all water is transported to appropriately located downpipes. The installation and downpipe construction should allow the gutter to drain completely. Regular gutter cleaning and maintenance is required to remove leaves and other debris that may restrict water flow to downpipes. Particular care should be taken at the entrance to downpipes and corners, to avoid blockages leading to water ponding.

A gutter protection system (or any other product) that entraps debris and/or water between itself and any steel product surfaces, restricting the coated steel's ability to dry, is not recommended and is an exclusion in the product warranty.

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## Foot traffic

1. Use purlin spacing guidelines for Heavy Traffic if roofs are to be accessed by maintenance personnel.
2. Consider the use of walkways to prevent damage where the roof may be subject to heavy foot traffic.
3. Do not use the roof surface as staging for work on adjacent building facets.

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## Colour match paint

Colour match paint is designed for matching accessories to the COLORSTEEL® material. Colour match paint is not designed for repairing marks or blemishes. Fasteners and accessories requiring colour matching should be painted prior to installation.

### Minor scratches

Air-dried paints used to disguise marks will weather at a rate different from that of COLORSTEEL®, sometimes dramatically so, and will often become more apparent than the mark they are intended to disguise. Minor scratches are best left alone, they will not affect the performance of the COLORSTEEL® product due to the self-healing qualities of the primer and metallic coating, and become less evident as the coating weathers.

Minor scratches may be described as scratches that do not extend to the metallic coating, are less than 3mm in width, and are not visually noticeable from a distance of 3 metres. This definition will however vary with the concentration of the scratches, and the visibility of the area affected.

Widespread coating damage to any COLORSTEEL® product can only be rectified by replacement of the affected sheets.

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## Lichen

Temperature, dust and rainfall can create a good environment for lichens to establish and flourish, and this can occur on almost any surface. For more information on Lichen treatment refer to Removal of Lichen bulletin.

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## Sunscreen

Sunscreen containing titanium dioxide or zinc oxide can accelerate the degradation of organic materials including auto finishes and COLORSTEEL® surfaces. This damage is irreparable so prevention of its occurrence is the only defence. See Sunscreen bulletin for more information.

# FIELD PAINTING

Zincalume® and Galvsteel® are readily paintable using good quality primers and topcoats. Metallic coated roofs can be painted immediately after installation. Dirt, grease and any loose materials must be cleaned off so the surface is clean and dry prior to the first coat being applied. A popular solution is to apply a good quality galvanised iron primer and two topcoats, following the manufacturer's recommendations.

COLORSTEEL® can be painted after exposure to weather. Normally 12-18 months exposure is required to achieve surface modification of the surface to allow the new coating to adhere.

Side laps of unpainted Zincalume® steel do not require lap priming.

# MAINTENANCE

Regular maintenance will increase the life of your COLORSTEEL®, Zincalume® or Galvsteel® roof. Rain washing will keep most exposed roofs clean and free of contaminants, but regular inspections should be conducted and any localised build-up of debris removed. Unwashed roof areas and wall cladding may require regular manual washing in accordance with New Zealand Steel guide: *Maintenance Recommendations*.

# WARRANTIES

Warranties specific to each contract are issued through the Rollformer by New Zealand Steel Limited. In order to ensure the appropriate product is specified for the intended service life in any given environment, New Zealand Steel Limited recommends that they be consulted as early as possible in the design stage to ensure correct material selection and backing by an appropriate warranty. For information on environments, warranties and maintenance see Environmental Categories, Warranty and Product Maintenance Recommendations brochure.





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