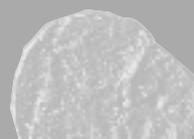
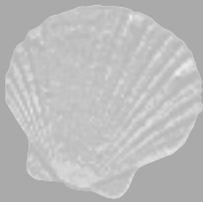
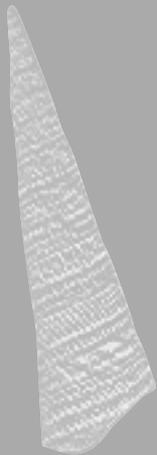
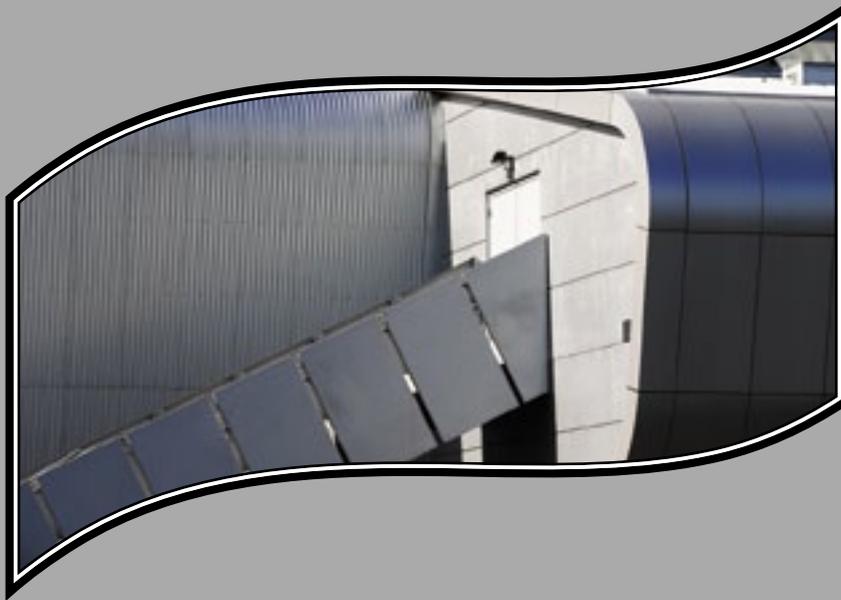




ZINCALUME®
COATED STEEL PRODUCTS **S**



ZINCALUME® COATED STEEL

New Zealand Steel Limited introduced ZINCALUME®, zinc/aluminium alloy coated steel to the New Zealand market in 1994. ZINCALUME® coated steel represents a significant improvement on the traditional zinc coated galvanised steel. Since its introduction, ZINCALUME® coated steel has been widely accepted and has the major share of the steel building products market.

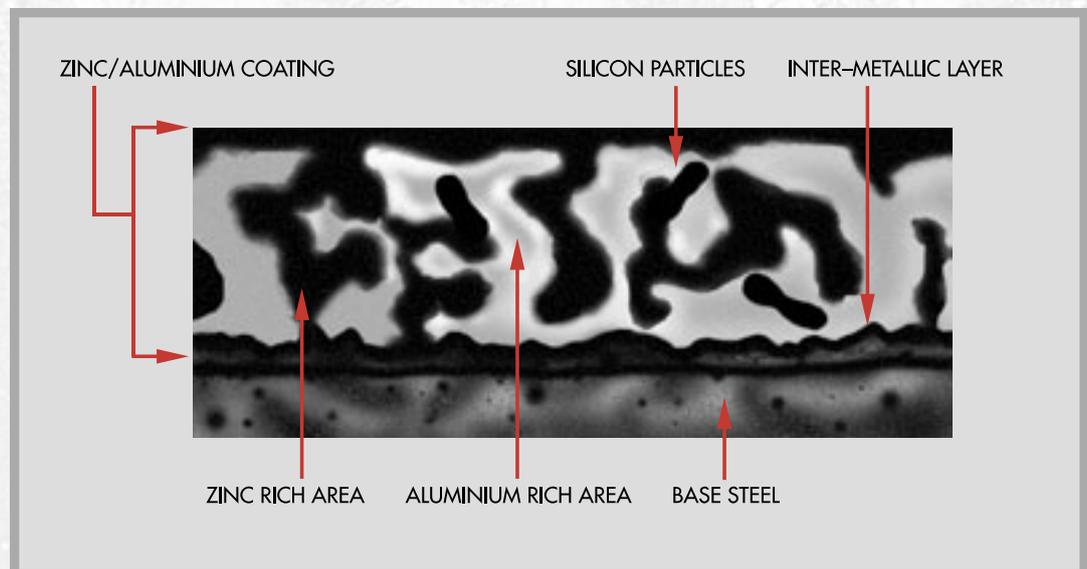
The ZINCALUME® coated steel has been formulated to give a significantly longer service life than a galvanised coating in the majority of applications*. This is of particular value in New Zealand where the prevailing winds carry corrosive salt laden air many kilometres inland.

The ZINCALUME® steel coating combines the corrosion protection of aluminium with the sacrificial protection of zinc, giving the advantages of both metals. The resulting alloy coating enhances corrosion resistance, making it ideal for such applications as roofing and cladding.



ZINCALUME® coated steel is produced by a continuous hot dip process similar to that used to manufacture galvanised steel. While both ZINCALUME® steel and galvanised steel products have a steel base, galvanised steel has a coating of 100% zinc, whereas ZINCALUME® coated steel has an alloy coating of 43.5% zinc, 55% aluminium and 1.5% silicon. ZINCALUME® coated steel has met the requirements of AS1397:2001, and is manufactured under a quality management system to monitor ongoing compliance with this Standard.

Cross Section of ZINCALUME® Coated Steel



* Refer INFORMATION TO HELP YOU AVOID PROBLEMS (page 5) and SPECIAL ENVIRONMENTS (page 11) for more information.

ZINCALUME® coated steel is recommended for the manufacture of:

- roofing and flashings
- wall cladding
- gutters and downpipes
- fences
- garage doors
- garden sheds
- some vehicle exhaust components
- flues

and other applications where long life is an essential requirement. It is formable, weldable and readily accepts paint finishes.

ZINCALUME® COATED STEEL CONTINUES A TRADITION OF DEPENDABILITY

Zinc/aluminium coated steel has an impressive track record with over 100 million tonnes produced worldwide to the end of 2008.

The zinc/aluminium alloy coating was originally developed in the USA by Bethlehem Steel. BHP Steel in Australia was first to take full advantage of the ZINCALUME® steel coating's characteristics. It was introduced into Australia in 1976 and quickly gained wide acceptance among users. Architects, engineers and builders saw the practical and aesthetic merits of the new product.



FLASHINGS AND ACCESSORIES

Flashings and ridge capping should be manufactured from the same coating system as used for the main roof area to ensure equal durability for COLORSTEEL® pre-painted steel and ZINCALUME® coated steel products. Extended ridge caps, soft zinc, or practices such as cutting and notching are recommended.

Where penetration flashings are required, neoprene or silicone rubber, EPDM aluminium or soft zinc all give excellent performance.

MARKING ZINCALUME® COATED STEEL

Black lead pencils must **never** be used for marking GALVSTEEL™, ZINCALUME® coated steel or COLORSTEEL® pre-painted steel products. The carbon in the pencil promotes corrosion which will etch the surface, leaving a permanent mark. Use a pencil of any other colour.

ZINCALUME® – BUILDING FOR THE FUTURE

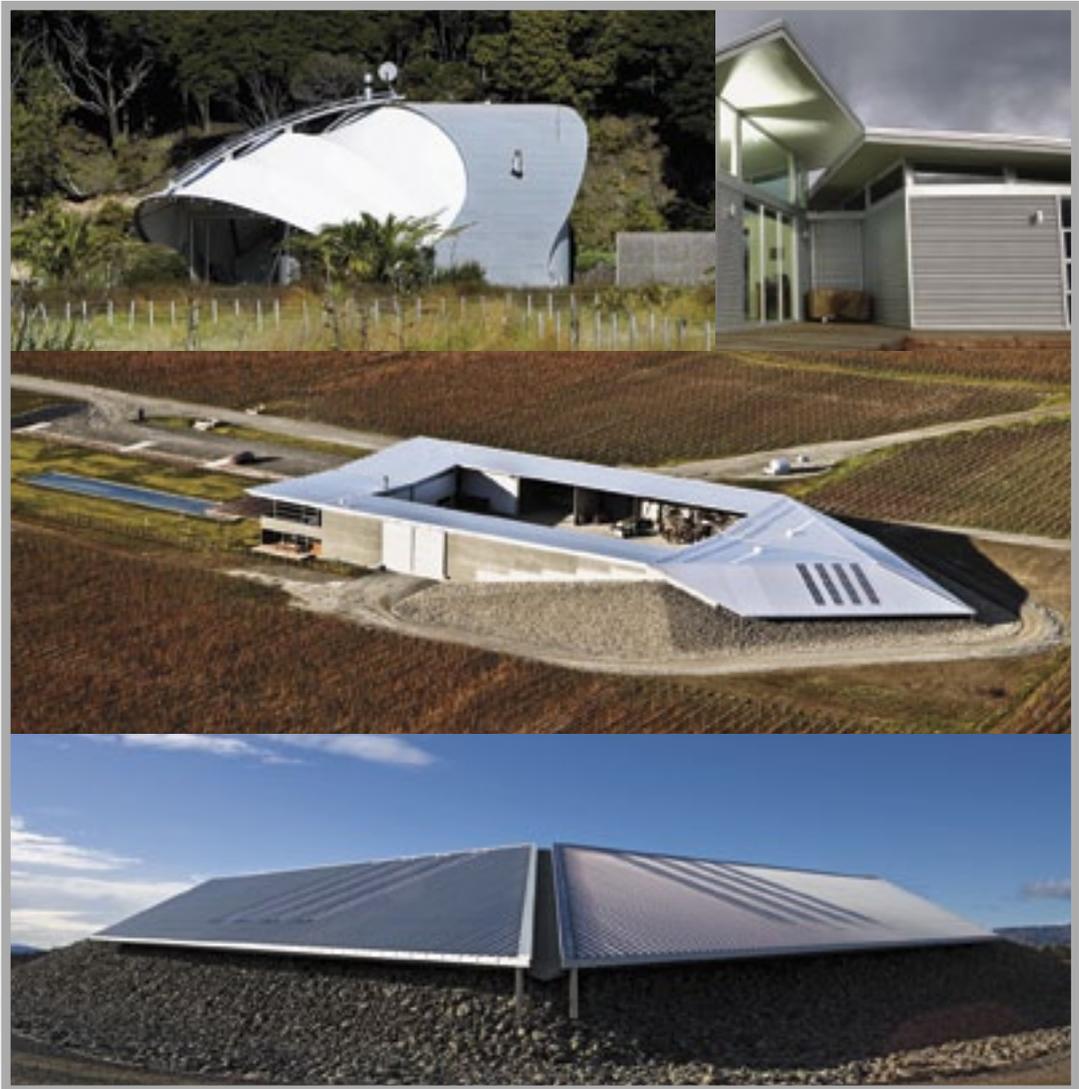
The galvanising process which brought sheet steel into wide popularity as a roofing material was first patented by a French chemist in 1837. The same basic principles are still applied to produce today's hot dip galvanised and ZINCALUME® steel coatings.

Commercial production of 'galvanised iron' began in Britain in 1838. For roofing, flat sheets of galvanised iron had to be supported or underlaid if they were to be structurally sound. The principle of corrugation solved this problem. When the two ideas of galvanising and corrugating were combined, a new era in building technology was born.

In New Zealand the 'corrugated iron' roof is as much a part of our European heritage as the gum diggers of Northland and the Goldminers of Central Otago.

New Zealand Steel first commissioned the galvanising line in 1968. This was the first time that continuously coated galvanised coil had been locally produced. In 1994 the same line, following a considerable upgrade, started production of a new product, ZINCALUME® coated steel, which has proved to be of exceptional benefit to the building industry.

The upgraded line is capable of producing both traditional galvanised steel and ZINCALUME® coated steel using a 'dual pot system'. The line modifications also included equipment to apply the most recently developed passivation system for unpainted ZINCALUME® coated steel product.



HOW THE ZINCALUME® STEEL COATING ENHANCES STEEL

CORROSION RESISTANCE

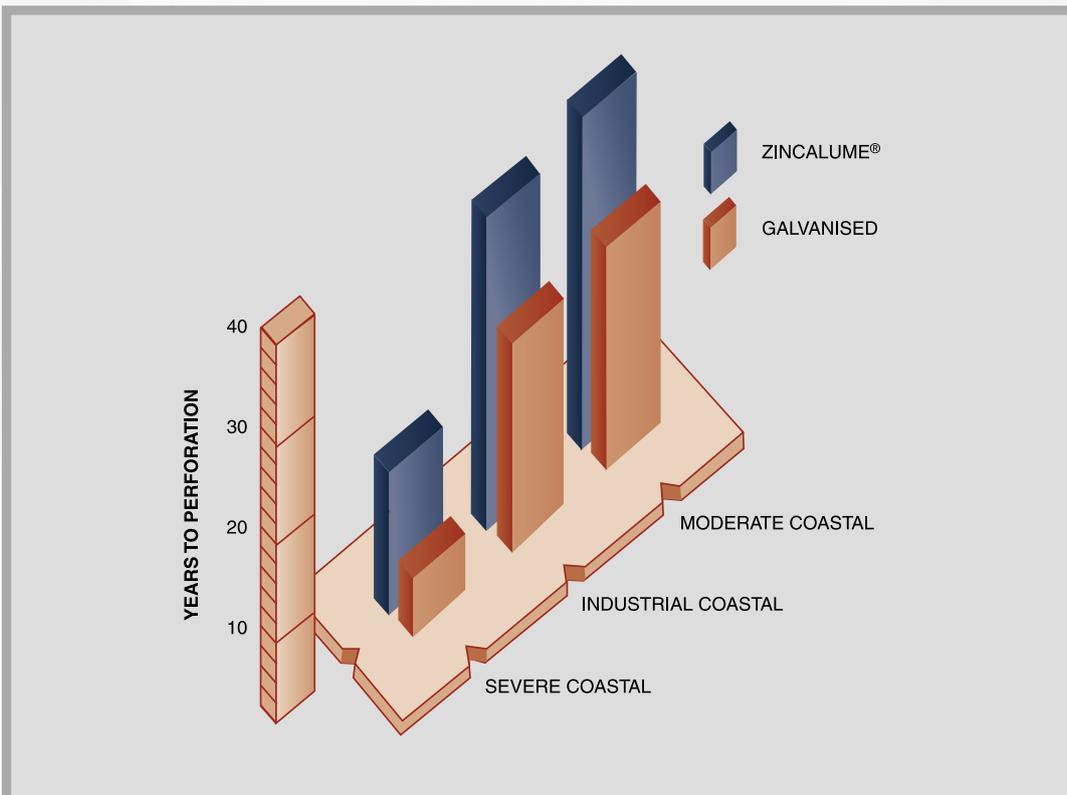
ZINCALUME® coated steel has superior long term corrosion resistance in most atmospheric conditions. This is achieved through the combination of the sacrificial protection of the zinc and the barrier protection of the aluminium.

Test sites from around the world over a period of twenty-five years have provided a wealth of information about comparative performance of galvanised and ZINCALUME® coated steel products. Test sites are placed in many different environments, ranging from typical rural, to severe marine. Corrosion rates are determined by exposing samples of ZINCALUME® coated steel and galvanised steel on standard test racks and regularly monitoring the coating performance over a number of years.



Though corrosion rates vary according to the severity of conditions, ZINCALUME® steel coatings out-perform galvanised coatings in almost all environments. This is particularly true in marine environments where ZINCALUME® coated steel will provide a significantly longer service life than galvanised steel.

Estimated life of galvanised and ZINCALUME® coated steel



APPEARANCE

ZINCALUME® coated steel has a finely spangled silvery matt finish. After exposure the surface finish darkens over time as the resin coating weathers away. This can occur at varying rates due to differences in aspect, degree of shading and the effect of rain rivulets over the ZINCALUME® surface. This change is a natural one and is visual only. The protective properties of the product are not affected.



PAINTING ZINCALUME® COATED STEEL

ZINCALUME® coated steel is readily paintable using good quality primers and water-based acrylic topcoats. Paint manufacturers' instructions should be followed.

Dirt, grease and any loose materials must be cleaned off so the surface is clean and dry prior to the first coat being applied.

INFORMATION TO HELP YOU AVOID PROBLEMS

In almost all applications, ZINCALUME® coated steel will out-perform galvanised steel. There are however, a small number of applications for which galvanised steel is more suitable.

ZINCALUME® coated steel must not be used for:

- Formwork in contact with wet concrete.
- Products to be embedded in concrete. However, where very small volumes of concrete are involved (e.g. splashes) which are able to cure quickly, there is little corrosive effect.
- Animal shelters where ammonia levels are constantly high.
- Fertiliser storage sheds and containers.
- Culverts, or where ZINCALUME® coated steel material is buried in the ground.
- Water tanks.
- Highly alkaline environments (e.g. cement manufacture).
- Coolroom products.

COLORSTEEL® Maxx™
COLOUR FOR THE EXTREME

COLORSTEEL® Endura™
COLOUR FOR THE FUTURE

Since 1994 ZINCALUME® has been used as the substrate for New Zealand Steel's architectural range of prepainted steel products.

Because the entire coating operation is carried out under strict factory-controlled conditions, COLORSTEEL® prepainted steel coatings provide a far superior finish to most site applied coatings in terms of strength, durability and flexibility.

The colours offered in the COLORSTEEL® prepainted steel product range are specially selected to complement New Zealand architectural styles and our landscape.

MAINTENANCE

All roofing and cladding products are subject to the cumulative effects of weather, dust and other deposits. Normal rain washing will remove most accumulated atmospheric contaminants from roofs. For wall cladding, manual washing every 3 to 12 months, depending on the paint system, is recommended in moderate to very severe environments to prevent accumulation of dirt, debris or other material not removed by rain washing. For areas that do not receive any or adequate rain washing (called unwashed areas) such as soffits, wall cladding under eaves, underside of gutters, fascias, sheltered areas of garage doors and unwashed roof areas, more extensive manual washing is required. Similarly, other **High Risk** areas, around flues, under television aerials or overhanging trees and sites prone to mould, lichen, bird droppings or debris, need to have extensive manual washing. Regular washing of steel products increases the durability by reducing attack from airborne salts and pollutants.



Steel surfaces should be manually washed with water and a sponge or a soft nylon-bristled brush. For large areas it may be more appropriate to use water blasting at pressures up to 20Mpa.

If New Zealand Steel Limited products are maintained according to the following recommendations, the requirements of the New Zealand Building Code B2 for 15 year durability for roofs and exterior walls will be met or exceeded.

Note:

1. The New Zealand Building Code durability requirement does not include aesthetic appearance.
2. The New Zealand Building Code requires a durability of 15 years minimum (with maintenance) for roofing, including valleys, and wall cladding products. This means no moisture penetration due to product failure.
3. The New Zealand Building Code requires a durability of 5 years minimum (with maintenance) for rainwater products, gutters and downpipes. This means no perforation due to product failure.
4. New Zealand Steel Limited products are designed to exceed the New Zealand Building Code B2: Durability requirements. Continued maintenance and overpainting will greatly extend the ultimate life of all products.
5. Where a 50 year durability is required OR where a product is to be used in aggressive internal environments, New Zealand Steel Limited should be consulted.
6. In Industrial Environments, the type of pollution generated may alter the above recommendations. If in doubt, consult New Zealand Steel Limited.

The following maintenance information in the Environmental Chart is for guidance only. Each proprietary building product should carry its own manufacturers' recommendations for usage. New Zealand Steel Limited will not accept responsibility for proprietary roofing and cladding products which do not conform to our recommendations for manufacturing, environmental use or maintenance.

UNWASHED AREAS

Compared to galvanised steel, ZINCALUME® coated steel performs exceptionally well in most areas not regularly washed by rainwater. However, as with any steel based product, regular washing of areas not naturally rain washed is essential to ensure that a satisfactory life is realised from the product.

*ZINCALUME® steel
cladding with large
soffits resulting in
unwashed areas.*



RAINWATER SYSTEMS

Rainwater collected from roofs clad with products made from GALVSTEEL™, ZINCALUME® coated steel and COLORSTEEL® prepainted steel, will comply with the provisions of NZBC G12.3.1, provided the water is not contaminated from other sources.

The first 25mm of rainfall from a newly installed roof must be discarded before drinking water collection starts.

Where a paint or paint system is applied to the roof, its suitability for the collection of drinking water must be established from the paint manufacturer.

*ZINCALUME® steel
cladding.*



WATER PONDING

Roofs

Where the roof pitch is low, changes in roof loadings may result in a negative pitch and consequently lead to water ponding. Water ponding is detrimental to the performance of ZINCALUME® coated steel products. The following conditions commonly cause water ponding:

- Over-spaced purlins.
- Deformation of timber purlins.
- Placement of external loads such as air conditioning units.
- Rigid fixing on long spans which causes deformation of the profile as a result of thermal expansion.

Design Guide:

1. Never use a pitch of less than 3 degrees or the recommended for the profile, whichever is the greater. Pitches of less than this invalidate the warranty.
2. Design the roof according to the profile manufacturer's specifications.
3. On minimum pitch roofs, ensure that the gutter end of profiled sheets is turned down.
4. Allow for thermal expansion to prevent profile distortion.
5. Consider the use of walkways to prevent damage where the roof may be subject to heavy foot traffic.
6. Ensure roof penetrations do not block the flow of water from the roof.

Gutters

Gutters must be installed with adequate fall to ensure all water is transported to appropriately located downpipes. Ponding occurs when water remains in the gutter when the fall is inadequate. Over time, this causes degradation to the coating and ultimately leads to gutter perforation. Perforation of the gutter as a consequence of inadequate fall or ponding invalidates both the manufacturer and producer warranties. 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 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.

WORKING WITH ZINCALUME® STEEL

ZINCALUME® coated steel and galvanised products have very similar working characteristics. However, there are a few characteristics that you should be aware of.

PROTECTION AT CUT EDGES

At the cut edge, ZINCALUME® steel provides similar protection to galvanised coatings. The zinc/aluminium alloy coating of ZINCALUME® coated steel provides galvanic protection to bare steel exposed at cut edges and by deep scratches.

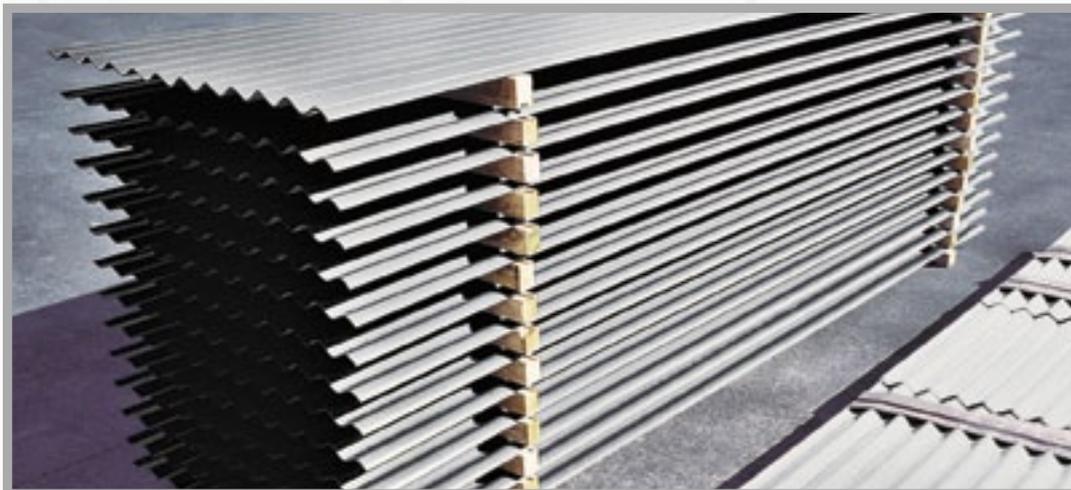
PASSIVATION

Surface passivation enhances the protection of the galvanised and ZINCALUME® steel product during storage, forming, handling and fixing. It largely eliminates the need for rollforming oils, offers improved wet stack corrosion resistance and generally makes the product more mark resistant during handling and fixing.

HANDLING AND STORAGE

The normal storage care, site cleanliness and installation procedures used for GALVSTEEL™ products apply to ZINCALUME® coated steel products.

Although passivation provides improved protection during storage, care should still be taken. If ZINCALUME® coated steel becomes wet during storage, the product should be immediately separated, wiped with a clean cloth and placed in a position where it can completely air dry.



FORMING

As with GALVSTEEL™, ZINCALUME® coated steel is suitable for all but the most severe forming operations.

With ZINCALUME® coated steel, the passivation system acts as a dry lubricant and in most cases will eliminate the need for additional lubrication in most forming operations. Solvent-based lubricants must not be used.

WELDING

ZINCALUME® steel can be satisfactorily welded using the following techniques:

- GMA (Gas Metal-Arc, often called MIG)
- Resistance welding (spot or seam)
- MMA (Manual Metal-Arc)

When welding ZINCALUME® steel, excessive weld currents must be avoided. With correct welding procedures, sufficient coating is normally left on the ZINCALUME® coated steel sheet to protect the substrate from corrosion. Weld repair should be carried out by coating with a zinc-rich paint.

Adequate ventilation must be provided even though the welding of ZINCALUME® coated steel gives off fewer fumes than galvanised steel.

JOINING AND SEALING

ZINCALUME® coated steel cannot be soldered. Join ZINCALUME® coated steel in the same way as recommended for COLORSTEEL® prepainted steel products. Use a neutral cure silicone sealant in conjunction with mechanical fasteners such as blind rivets. Care should be exercised in the choice of rivets. Aluminium rivets are recommended. Monel, stainless steel and carbon steel rivets must not be used.

FASTENERS

Most fasteners complying with the corrosion requirements of Australian Standard AS3566 "Screws – Self-drilling for the building and construction industry", are suitable for use with ZINCALUME® steel.

- Stainless steel fasteners should not be used with ZINCALUME® coated steel or COLORSTEEL® prepainted steel products in any environment.
- Lead headed nails must not be used.
- Use only low carbon (<15%) non-conductive sealing washers.

COMMERCIAL WARRANTIES

Commercial warranties are issued through the Rollformer by New Zealand Steel Limited and the terms are specific to each contract.

In order to ensure the appropriate product is specified for the intended service life in any given environment, New Zealand Steel Limited is keen to be consulted as early as possible in the design stage to ensure correct material selection and backing by an appropriate warranty.

Warranty applications are generally made through the roofing manufacturer and warranty periods and conditions are assessed by New Zealand Steel Limited.

Factors such as roof design, roof pitch, profile, coating type, internal and external environments and special conditions (such as requirement for "Clean in Place") are all assessed at the time of the warranty application. Maintenance requirements will be specified as part of the warranty.

Draft warranties are available from New Zealand Steel Limited to support tenders for specific projects. The terms and conditions of the draft will remain unchanged providing that the terms of the project are unaltered.

A warranty is issued on the satisfactory completion of the contract. Installation must be carried out in accordance with New Zealand Steel Limited's requirements and according to good trade practices as detailed in the "NZ Metal Roof and Wall Cladding Code of Practice", available from the NZ Metal Roofing Manufacturers Inc.

A site inspection by New Zealand Steel Limited may be carried out prior to the issuing of any warranty.

The maintenance programme specified in the warranty must be complied with to validate the warranty.



FURTHER INFORMATION

For additional information, literature or technical assistance, please contact:

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Zincalume®

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GALVSTEEL™

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COLORSTEEL® Maxx™
 COLOUR FOR THE EXTREME

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THE ROOF OF NEW ZEALAND®

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This edition of the New Zealand Steel ZINCALUME® Guide supersedes all previous editions.

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