November 2005
(Replaces September 2003)

SPECIFIERS AND BUILDERS GUIDE

GALVSTEEL™ COLORSTEEL® Zincalume®

CONTENTS

DESCRIPTION

New Zealand Steel produces a range of coated steel products.

COLORSTEEL® prepainted steel describes those steel building materials which have oven-cured paint applied to a galvanised or ZINCALUME® steel base on a continuous 'coil to coil' operation at the New Zealand Steel Glenbrook works.

The prepainting process gives excellent adhesion of the coating to the substrate, allowing rollforming to be performed after painting without delamination or deterioration of the paint film.

A variety of COLORSTEEL® prepainted steel coating types is offered. All COLORSTEEL® products are produced using either a ZINCALUME® steel substrate with an AZ150 or AZ200 coating class, (i.e.: 150 g/m^2 or 200 g/m^2 of zinc/aluminium alloy), or a galvanised steel substrate with a ZM275 coating class (i.e. 275 g/m^2 of zinc).

Data sheets on each of the COLORSTEEL® prepainted steel coating types may be obtained from New Zealand Steel Limited or any stockists of COLORSTEEL® prepainted steel.

COLOUR FOR THE EXTREME

COLORSTEEL® MAXX™ products have a ZINCALUME® coated steel base. This product is intended for Very Severe environments.

COLOUR FOR THE FUTURE

COLORSTEEL® ENDURA™ prepainted steel has a ZINCALUME® coated steel base and is available in a range of colours, selected for their ability to provide optimum performance, durability and appeal.

ZINCALUME® zinc/aluminium alloy–coated steel has a 45% zinc, 55% aluminium alloy coating which offers superior corrosion resistance compared to galvanised steel in most environments (particularly coastal environments).

Traditional galvanised steel is offered under the trade name of GALVSTEEL™. This material has a 100% zinc coating and is available in a range of dimensions, grades, zinc coating weights and types.

Data sheets on each of the COLORSTEEL® prepainted steel coating types may be obtained from New Zealand Steel Limited or any stockists of COLORSTEEL® prepainted steel.

Where there is a requirement for a very durable product with high aesthetic appeal and low costs of installation and maintenance, then COLORSTEEL® prepainted steel products should be specified.

Each product is designed for application in a specific environment. These applications are discussed under the heading “The New Zealand Building Code” later in this publication.

QUALITY ACCREDITATION

The New Zealand Steel Limited Paint Line received accreditation to ISO 9002 in April 1992 and has subsequently been upgraded to ISO 9001 since July 1993. An on-going programme of continuous improvement will ensure that practice at New Zealand Steel Limited continues to reflect the best available international technology.

DESIGN FOR DURABILITY

Design has a major impact on the durability of the building. A good design will ensure that you will get the best possible life from your building and reduce maintenance costs.

The following design elements are presented alphabetically with guides to provide improved durability.

ANIMAL SHELTERS

Some agricultural applications may create internal environments in which the build-up of pollutants or fumes is a potential source of corrosion. A corrosive ammonia environment can develop within sheds used for intensive animal farming.

ZINCALUME®, COLORSTEEL® ENDURA™ or COLORSTEEL® MAXX™ should not be used for this application.

Design Guide:

1. Contact New Zealand Steel Limited for specialist advice.
2. ZINCALUME® STEEL OR COLORSTEEL® SHOULD NOT BE USED IN THIS ENVIRONMENT DUE TO EXTREME CORROSION RISK.

CORROSION

Dissimilar Metals Corrosion

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 effect commonly occurs with water flowing over dissimilar metals.

This form of corrosion is commonly found:

1. Where water is discharged from copper or brass systems over a galvanised, or COLORSTEEL® prepainted steel or ZINCALUME® coated steel roof.
2. Where unpainted lead flashings are applied directly to ZINCALUME® coated steel products. (Refer Information Bulletin No. 2 “Flashing Materials”).
3. Where fasteners are incompatible with the roofing material. (See Fixings and Fasteners, page 5)

Design Guide:

1. Separate dissimilar metals by using a barrier such as PVC tape, neutral cure silicone sealant or an appropriate paint system.
2. Prevent potential run-off from copper or brass pipes over GALVSTEEL™, ZINCALUME® coated steel or COLORSTEEL® prepainted steel surfaces by diverting the discharge clear of the roofing.

Note: Coastal areas with high salt levels and high humidity will increase the possibility of dissimilar metals corrosion.

Compatibility

More Active Metals

ZINC
ZINCALUME®
ALUMINIUM

STEEL

LEAD

COPPER

STAINLESS STEEL

More Noble Metals

This chart lists commonly used metals in a “Galvanic Series”. If any 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.

RUN-OFF FROM INERT MATERIALS

The zinc coating on galvanised steel products develops a protective surface film as a result of natural weathering. This provides the longevity of performance which we have come to expect from GALVSTEEL™ products.

When flowing over galvanised roofing, rainwater dissolves small amounts of minerals and salts from the zinc surface. These minerals and salts promote and maintain the protective film and enhance the corrosion resistance of downstream galvanised steel products (eg: lean-to roofs, gutters and valleys).

However when rainwater flows over, or is collected from roofing materials which do not promote this protective film (INERT MATERIALS), accelerated corrosion of unpainted galvanised steel roofs and gutters can occur.

Some Examples of Inert Materials:

• ZINCALUME® steel • Glass • Fibreglass • COLORSTEEL® prepainted steel • Glazed Tiles • PVC • Acrylic • Aluminium

Design Guide:

1. On galvanised roofing, run skylights down to the gutter.
2. To achieve maximum life from your rainwater goods we recommend that they are manufactured from either ZINCALUME® steel or COLORSTEEL® prepainted steel products.
3. Unpainted galvanised steel must not be used for roofing or rainwater goods, including valleys and gutters, to collect water run-off from ZINCALUME® coated steel products or any other inert material.

DRINKING WATER

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.

EDGE SEALING OF COLORSTEEL® PRODUCTS

Edge sealing of COLORSTEEL® products is not recommended. (See Environmental Categories and Product Recommendations section).

EXPANSION ALLOWANCE AND TEMPERATURE

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. Fixing systems must allow for expansion and accommodate the longitudinal movement which results.

Design Guide:

Typical Roof Temperatures Summer Average - Calm Conditions

	INSULATED	UNINSULATED
Light Colours (eg Titania)*	58˚C	48˚C
Medium Colours (eg Mist Green)	79˚C	67˚C
Dark Colours (eg Karaka)	92˚C	77˚C

Typical Roof Expansions

Based on 0.01mm/m/˚C

	8 METRE RUN	12 METRE RUN	18 METRE RUN
Light Colours*	5mm	7mm	11mm
Medium Colours	6mm	10mm	14mm
Dark Colours	7mm	11mm	17mm

**Light Colours include unpainted galvanised and ZINCALUME® steel material.*

FIXINGS AND FASTENERS

The selection of the appropriate form of fastener is a task which should not be solely influenced by cost. Fastener costs are minimal relative to the overall project and there is no benefit to be gained through the use of inferior fixings. The fastener durability should equal or exceed that of the roofing or cladding product.

The “Metal Roofing and Wall Cladding Code of Practice” provides some information on selection, fixing methods and placement of fasteners. This handbook is available on request from members of the New Zealand Metal Roofing Manufacturers Incorporated or New Zealand Steel Limited. More detailed information can also be obtained from fastener manufacturers.

Design Guide:

1. Fastener performance should conform with the requirements of AS3566 (and Amendments) “Screws – Self Drilling for the Building and Construction Industries”.
2. Stainless steel and stainless steel capped fasteners are not recommended for use with ZINCALUME® coated steel or COLORSTEEL® prepainted steel products in all environments due to incompatibility.
3. Low carbon, non conducting sealing washers are required for use with COLORSTEEL® prepainted steel products and ZINCALUME® coated steel products.

   The advice of specialist fastener manufacturers is readily available and these manufacturers should be consulted, particularly where COLORSTEEL® prepainted steel products are to be fixed in Very Severe or Severe Environments. (see Environmental Categories and Product Recommendations, page 15).
4. Fasteners with heavy zinc or zinc-tin coatings or zinc alloy coated heads complying with AS3566 Class 3 and 4 are fully compatible with all products.
5. Fasteners used on COLORSTEEL® prepainted steel products should be factory coated to provide an accurate colour match with COLORSTEEL® prepainted finishes.
6. ***Rivets:***

- Use aluminium rivets for joining all New Zealand Steel Limited roofing products. (Ensure rivet is of a suitable strength for the purpose. Refer to your rivet supplier).
- Monel rivets are not recommended as they are incompatible due to their copper content.

Fastener Recommendations

Environmental Category*	ISO	GALVSTEEL™	ZINCALUME®	COLORSTEEL® ENDURA™	COLORSTEEL® MAXX™
Coastal:					
Very Severe	C5	NR	NR	NR	4
Severe	C4	NR	NR	4	4
Moderate	C3	3,4	3,4	3,4	3,4
Industrial:					
Very Severe	C5	NR	NR	NR	4
Severe	C4	NR	NR	4	4
Moderate	C3	3,4	3,4	3,4	3,4
Inland:					
Moderate	C2	3	3	3	3,4

NR: New Zealand Steel product not recommended for these Environmental Categories.

4: Heavy zinc or zinc-tin coatings or zinc alloy coated heads complying with AS3566.2–2002 Class 4.

3: Heavy zinc or zinc-tin coatings complying with AS3566.2–2002 Class 3.

* See page 16 for definitions of Environmental Categories.

Note:

1. Stainless steel fasteners are not recommended for use with ZINCALUME® coated steel or COLORSTEEL® prepainted steel products in all environments.
2. Sealing washers that contain carbon black filler levels of more than 15% by volume may lead to corrosion of ZINCALUME® steel and COLORSTEEL® prepainted steel products. Therefore, all fasteners for New Zealand Steel roofing products should have low carbon, non-conducting sealing washers.
3. Refer to Information Bulletin 10.

FLUES – DOMESTIC/INDUSTRIAL

Natural gas, wood, coal or oil-fired heaters generate high levels of sulphur compounds. When vented over a roof, particularly in damp conditions, sulphuric acid forms which will lead to premature corrosion of the roof, guttering and downpipes.

Design Guide:

1. Design the height of the flue to allow combustion by-products to be dissipated.
2. Specify a COLORSTEEL® prepainted steel product designed for very severe environments.
3. Ensure that heaters are run as efficiently as possible to allow complete combustion.
4. Regularly wash the roof to remove contaminants.

FOOT TRAFFIC ON ROOFS

Repeated foot traffic and the dragging of maintenance or cleaning equipment, may damage the roof which will reduce its life expectancy.

Design Guide:

1. Design and install catwalks and platforms over the roof where necessary.
2. Aluminium or galvanised steel catwalks are recommended.
3. Design catwalks and platforms so as not to create an unwashed or ponding area on the roof.
4. Timber catwalks and platforms will cause preferential corrosion of underlying roof.

FUME EXTRACTORS AND 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.

Design Guide:

1. Install filter elements to contain hazardous material.
2. Specify a COLORSTEEL® prepainted steel product designed for very severe environments to be installed adjacent to the vent.
3. Consider applying a suitable protective coating to the affected area of the roof.
4. Maintain coal or oil fired boilers or incinerators so that they do not discharge high sulphur levels over the roof surface.
5. Regularly wash the roof to remove contaminants.

GEOTHERMAL AREAS

In areas of geothermal activity, hydrogen sulphides associated with bore emissions can cause corrosion problems. Although heavier than air, hydrogen sulphide can be drawn into rainwater down-pipes and accumulate in gutters. This can lead to corrosion of the gutters and the roof overhangs.

Design Guide:

1. Install a water trap at the base of down-pipes.
2. Specify the appropriate COLORSTEEL® prepainted steel product.
3. Contact New Zealand Steel Limited for specialist advice.

MIXING OF BRANDS

Where different brands of prepainted 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.

Design Guide:

1. Specify either COLORSTEEL® ENDURA™ or COLORSTEEL® MAXX™ products.

OVERPAINTING OF COLORSTEEL® PREPAINTED STEEL PRODUCTS

COLORSTEEL® prepainted steel products are designed for durability. However, all paint coatings will deteriorate over time. Therefore, at some stage, it will be necessary to repaint to avoid serious deterioration of the product.

The main consideration is the paint coating integrity to perform a suitable bond for the overpainted system so that the durability of the new coating system is maintained.

New Zealand Steel's experience would indicate that this period to first repaint is around 15 years. However, local climatic conditions, building design and paint colour can have a significant influence on the performance of the paint system. Therefore you may need to consult New Zealand Steel or our paint suppliers, Akzo Nobel Coatings Ltd, Ameron (NZ) Ltd or PPG Industries NZ Ltd to help assess the most suitable time to repaint.

COLORSTEEL® prepainted steel products may be readily overpainted, after suitable preparation, for aesthetic reasons. Detailed information is available in the New Zealand Steel Limited Information Brochure: Overpainting New and Weathered Steel Roofing.

PROCESSING PLANTS

(Including Swimming Pools)

Some commercial applications may create internal environments in which the build-up of pollutants or fumes are a potential source of corrosion. Plants where chlorine vapours are released (including enclosed swimming pools) should have adequate ventilation to minimise the risks.

Design Guide:

1. Where pollutants or humidity levels are likely to be high, allow for frequent air changes.
2. Passive ventilation may be inadequate to cope with the problem and the installation of fan systems should be considered and incorporated at the design stage.
3. Contact New Zealand Steel Limited for specialist advice.

PROFILE BEND DIAMETERS – ROOFING, WALL CLADDING AND ACCESSORIES

New Zealand Steel Limited products are custom designed to ensure maximum compatibility with the roll-forming process. The paint systems are designed to be durable and adhere to the metal substrate so that they are not affected by good roll-forming practices. However, tight tension bends in the finished product should be avoided as small cracks may be formed which expose the metal substrate to the atmosphere.

For optimum corrosion performance no visible microcracking should be present in the finished product. There are many factors, substrate, paint, bend diameter and forming practice, that affect the tendency to microcrack. Therefore, it is not practical to have a fixed bend diameter that guarantees no microcracking.

Most products, formed in well designed and operated equipment, will not have microcracks at tension bends. It is important that visual checks for microcracking be made on the finished product to ensure a high quality standard is maintained.

Products with microcracking on the tension bends will show earlier signs of corrosion when used in unwashed areas in severe environments.

Design Guide:

1. The use of corrugated profiles in severe and 'special conditions' (e.g. Geothermal) will help to ensure greater durability.

SOLAR HEATING PANELS OR RUBBER MATS

During the installation of solar heating systems, care should be taken to prevent any damage to the roofing material. Because of the high temperatures created and the increased condensation which may result, care should be taken to maintain an air space between the roof and the heating unit. Follow manufacturers' recommendations concerning tube direction and the use of fixing support brackets.

Failure to do this may invalidate a COLORSTEEL® prepainted steel product warranty.

Design Guide:

1. Never place heating elements or plumbing units directly on the roof surface. Follow the system supplier's recommendations concerning installation.

SWARF STAINING OF ROOFING AND CLADDING

Swarf is the term given to steel debris arising from cutting or piercing operations when using friction saws, abrasive discs, drills etc., on steel roofing and cladding products. Whilst comprising mostly fine steel particles mixed with abrasive, in this context swarf may also be taken to include any other discarded steel objects such as rivet shanks, nails, screws and nuts, which may come into contact with coated products; ie: COLORSTEEL® prepainted steel, ZINCALUME® zinc/aluminium alloy-coated steel and galvanised steel.

Swarf particles, if left on the surface, will corrode and cause rust stains which will detract from the finished appearance of a project. These stains are often mistaken for early deterioration of the roofing and cladding itself.

Design Guide:

1. Never leave swarf material on the coated surface. Follow the recommendations included in the New Zealand Steel Limited Installers Guide or Information Bulletin 7.

UNWASHED AREAS

When contaminants such as windblown salt and dust accumulate on painted surfaces and become damp, corrosion will take place. Many windblown contaminants absorb moisture when exposed to high humidity and their presence on steel accelerates corrosion.

For this reason, areas on a building which are seldom washed by rain are particularly prone to early breakdown of the material.

This effect may first be noticed as a white corrosion product, typically seen on the underside of gutters, canopies, roof vents or on sheltered areas and the underside of profiles used horizontally as wall cladding. It will be more noticeable where tighter radius bends have been used in roll forming.

Even on coated steel where corrosion reactions are much slower, the presence of contaminants over long periods of time will increase the rate of corrosion.

The maintenance regimes for unwashed areas, necessary to meet the durability requirements of the Building Code, are shown on pages 17 and 18 of this publication.

When the underside of ZINCALUME® steel and COLORSTEEL® prepainted steel products is exposed in an unwashed area, e.g.: canopies, verandas, eaves, lean to buildings etc., additional maintenance, above that specified on pages 17 and 18, is required to ensure satisfactory performance of the product.

Design Guide:

1. Every effort must be made during the design of the building to eliminate or minimise sheltered or overhanging areas.
2. Consideration should be given during the design stage to ensure the underside of ZINCALUME® steel and COLORSTEEL® prepainted steel is enclosed and therefore not exposed to the environment.
3. Where unwashed areas cannot be designed out, specify regular washing of these areas as part of an ongoing maintenance programme. Refer to pages 17 and 18 for New Zealand Steel Limited recommendations.
4. Design consideration for easy access must be given to areas that require regular maintenance.
5. Ensure profile bends are not tighter than those recommended under the heading of “Profile Bend Diameters – Roofing, Wall Cladding and Accessories”, and that there are no microcracks in the finished product.

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 COLORSTEEL® prepainted 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. Pitches of less than 3 degrees 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.

Note: Please refer to "New Zealand Steel Limited Products and the New Zealand Building Code" on page 13 of this publication under "E2/AS1 External Moisture"

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.

WEATHERING OF COLORSTEEL® PRODUCTS

All building products will weather over time. The weathering of COLORSTEEL® prepainted steel products will result in changes to gloss and colour. Factors which influence the change are environmental pollution, UV levels, building orientation and paint colour.

Design Guide:

1. When adding to an existing building, consideration should be given to the weathered appearance of the COLORSTEEL® prepainted steel products in the older part of the building.

NEW ZEALAND STEEL LIMITED PRODUCTS AND THE NEW ZEALAND BUILDING CODE

The New Zealand Building Code defines durability requirements for many elements of buildings. These requirements are outlined in section B2 Durability. In general, most roofing and cladding is required to last a minimum of 15 years (or a nominated period), to water penetration, but in some cases where the material has a structural function, the requirement may be for 50 years. This can be achieved with suitable maintenance.

The New Zealand Building Code calls for durability performance which is relative to both maintenance and to working environments. The following information will assist specifiers to relate these variables to New Zealand Steel Limited products.

CONFORMING WITH THE BUILDING CODE

ZINCALUME® steel and the substrate used to produce COLORSTEEL® prepainted steel products, conform to AS1397:2001. Both ZINCALUME® coated steel and COLORSTEEL® prepainted steel products have been appraised by BRANZ as being suitable as feed stock for the manufacture of roof and wall cladding systems, cladding accessories, spouting, downpipes and other rainwater goods.

EXTERNAL MOISTURE E2/AS1

Adequate Pitch

The New Zealand Building Code provides an Acceptable Solution to the problem of roof pitch. The pitch figures shown in E2/AS1 “Acceptable Solutions” are reproduced, in part, below for your convenience.

Refer specific enquiries to the Profile Manufacturer who may have an alternative Acceptable Solution.

ROOF PITCH REQUIREMENTS

Product	Minimum Pitch	
For corrugated and low profile metal sheet	Sheet Length ≤ 10m	> 10m
Long-run steel	8°	10°
End lapped steel	10°	12°
Metal decking and trough sections	3°	5°
Metal Tiles (Standard Profile)	12°	12°

Source: New Zealand Building Code: E2/AS1 “Acceptable Solutions”

Note: Figures in brackets apply to roofs which may be subject to snow loadings. All metal gutters should have sufficient fall to ensure that no ponding occurs.

FIRE: “SPREAD OF FIRE” – BUILDING CODE C3/AS1

New Zealand Steel Limited materials, when used in a roofing product:

COLORSTEEL® prepainted steel comprises a non-combustible substrate, with a combustible surface finish. When used as an external roof cladding, it will meet the requirements of Paragraph 4.9.1 of NZBC C3/AS1, for all purpose groups.

ZINCALUME® coated steel is non-combustible and therefore is suitable for forming into roofing which, when either painted or not painted, will meet the requirements of NZBC C3/AS1 for all purpose groups.

New Zealand Steel Limited materials, when used in wall cladding applications:

COLORSTEEL®: Table 2 of NZBC C3/AS1 specifies reaction-to-fire properties* for surface finishes of walls in various locations and purpose groups. Because COLORSTEEL® prepainted steel comprises a non-combustible** substrate with a combustible coating of thickness less than 1mm its use is not restricted by Acceptable Solution C3/AS1 except as below.

COLORSTEEL® prepainted steel external wall cladding must only be coated with a combustible coating of thickness greater than 1mm if the provisions of Paragraph 4.9.2 and Table 2 of C3/AS1 will be complied with.

ZINCALUME®: NZBC C3/AS1 specifies reaction-to-fire properties* for surface finishes of walls in various locations and purpose groups. Because ZINCALUME® steel is non-combustible there are no restrictions when it is unpainted, or finished with a coating of less than 1mm in thickness. When ZINCALUME® steel wall cladding is finished with a combustible coating of greater than 1mm thickness, its use must be in accordance with Paragraph 4.9.2 and Table 2 of Acceptable Solution C3/AS1 if applicable.

*** when tested to AS1530 Pt.3**
**** when tested to AS1530 Pt.1 or BS 476 Pt.4**

Specifiers should be familiar with the Acceptable Solution C3/AS1 Section 4.0 “External Walls and Roofs”, which covers vertical and horizontal spread of fire.

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 regular manual washing.

Regular washing of COLORSTEEL® prepainted steel products increases the durability by reducing attack from airborne salts and pollutants. GALVSTEEL™ products and ZINCALUME® steel products will also benefit from routine washing.

COLORSTEEL® prepainted 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.

Overpainting of COLORSTEEL® prepainted steel products is discussed on Page 8 of this publication.

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.

ENVIRONMENTAL CATEGORIES AND PRODUCT RECOMMENDATIONS

Important: As product use is dictated by local conditions, seek advice from your roofing supplier or fixer for the best New Zealand Steel Limited product to suit your specific environment.

The following four pages present a guide to New Zealand's environmental categories, the products recommended for specific conditions and residential roofing warranties.

INTRODUCTION

New Zealand has a wide range of environmental conditions, from the harsh West Coast beaches, to the relative shelter of the Waikato farming region. Therefore, New Zealand Steel Limited offers a range of steel products which are suitable for most locations.

VERY SEVERE – ISO CATEGORY 5

Characterised by:

- Heavy salt deposits.
- The almost constant smell of salt spray in the air.
- Close to breaking surf (typically 0-100 metres) such as is found on exposed coasts.

This environment may be extended inland by prevailing winds and local conditions.

Roofing

Wall Cladding

Gutters/downpipes

Fascia

SEVERE – ISO CATEGORY 4

Characterised by:

- Light salt deposits.
- A frequent smell of salt in the air.
- Typically 100-500 metres from breaking surf such as is found on exposed coasts.
- In the immediate vicinity of large expanses of calm salt water such as harbour foreshores.

This environment may be extended inland by prevailing winds and local conditions.

Roofing

Wall Cladding

Gutters/downpipes

Fascia

MODERATE COASTAL – ISO CATEGORY 3

Characterised by:

- Little or no salt deposits.
- The occasional smell of salt in the air.
- Typically 500-1000 metres from breaking surf such as is found on exposed coasts, OR
- In the immediate vicinity of calm salt water such as estuaries.

MODERATE INLAND – ISO CATEGORY 2

Characterised by:

- No obvious marine or industrial influences.
- Typically more than 1000 metres from the exposed coasts or more than 500 metres from industrial emissions.

Roofing

Wall Cladding

Gutters/downpipes

Fascia

COMMERCIAL WARRANTY

Such as schools, warehouses and buildings, refer to New Zealand Steel Limited for details of commercial warranties. Maximum warranty offered on commercial buildings is 15 years.

IMPORTANT

- As product use is dictated by local conditions, seek advice from your roofing supplier or fixer for the best New Zealand Steel Limited product to suit your specific environment.
- Gutters should be installed according to manufacturer's instructions.
- Unwashed and high risk areas – manual washing every 3 months.

0 metres

50 metres

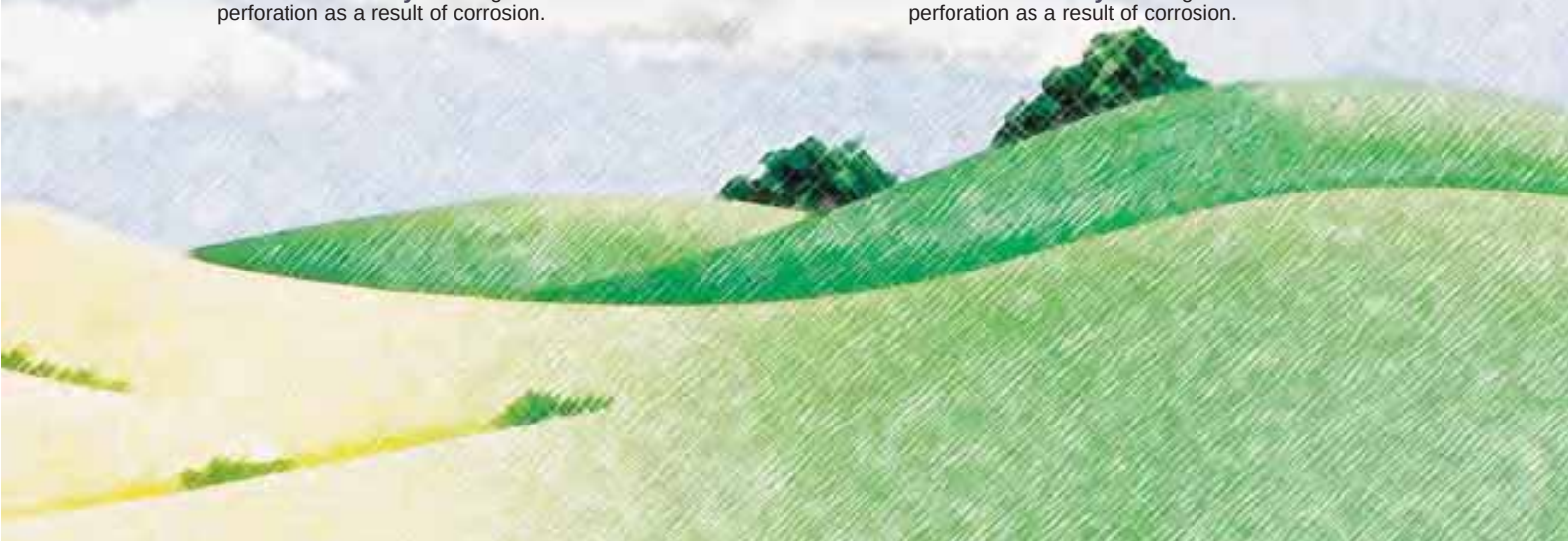
COLORSTEEL® Maxx™
COLOUR FOR THE EXTREME

Greater than 50m from breaking surf on the East Coast.
Greater than 100m from breaking surf on the West Coast.

WARRANTIES	MAINTENANCE
15 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Rain washing
15 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Rain washing plus manual washing every 3 months.
10 years: covering the paint surface against flaking, peeling and excessive fade. **10 years:** against perforation as a result of corrosion.	• Manual washing every month.
10 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Manual washing every month.
15 years: covering the paint surface against flaking, peeling and excessive fade. **20 years:** against perforation as a result of corrosion.	• Rain washing
15 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Rain washing plus manual washing every 6 months.
10 years: covering the paint surface against flaking, peeling and excessive fade. **10 years:** against perforation as a result of corrosion.	• Manual washing every 3 months.
10 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Manual washing every 3 months.
15 years: covering the paint surface against flaking, peeling and excessive fade. **30 years:** against perforation as a result of corrosion.	• Rain washing
15 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Rain washing plus manual washing every year.
10 years: covering the paint surface against flaking, peeling and excessive fade. **10 years:** against perforation as a result of corrosion.	• Manual washing every 6 months.
10 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Manual washing every 6 months.

COLORSTEEL® Endura™
COLOUR FOR THE FUTURE

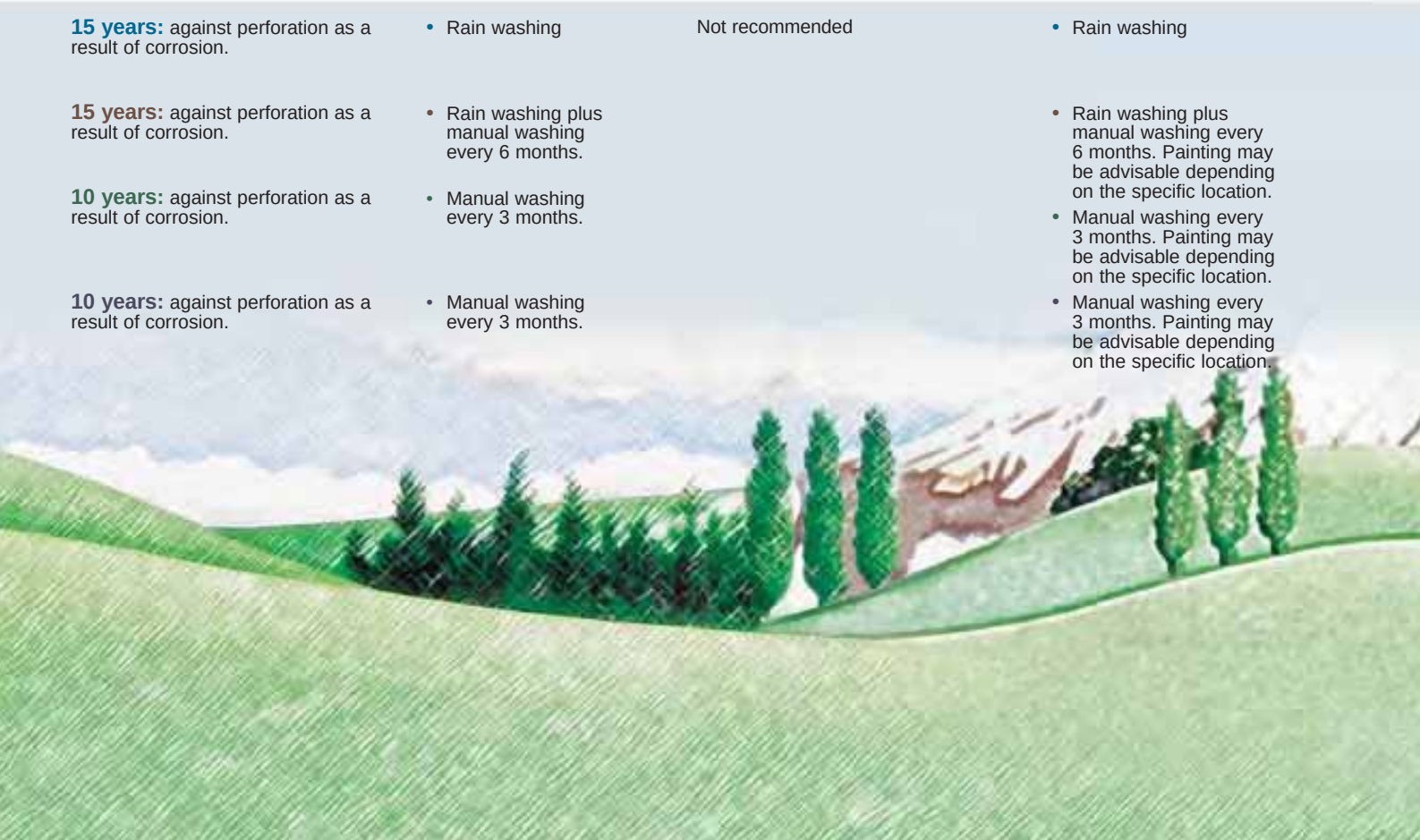
WARRANTIES	MAINTENANCE
Not recommended	Not recommended
15 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Rain washing
Not recommended	• Rain washing plus manual washing every 6 months.
5 years: covering the paint surface against flaking, peeling and excessive fade. **10 years:** against perforation as a result of corrosion.	• Manual washing every 3 months.
5 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Manual washing every 3 months.
18 years: covering the paint surface against flaking, peeling and excessive fade. **30 years:** against perforation as a result of corrosion.	• Rain washing
15 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Rain washing plus manual washing every year.
10 years: covering the paint surface against flaking, peeling and excessive fade. **10 years:** against perforation as a result of corrosion.	• Manual washing every 6 months.
10 years: covering the paint surface against flaking, peeling and excessive fade. **15 years:** against perforation as a result of corrosion.	• Manual washing every 6 months.



VERY SEVERE COASTAL
100 metres

SEVERE COASTAL
500 metres

Zincalume®		GALVSTEEL™	
WARRANTIES	**MAINTENANCE**	**WARRANTIES**	**MAINTENANCE**
Not recommended	Not recommended	Not recommended	Not recommended
Not recommended	Not recommended	Not recommended	Not recommended
15 years: against perforation as a result of corrosion.	• Rain washing	Not recommended	• Rain washing
15 years: against perforation as a result of corrosion.	• Rain washing plus manual washing every 6 months.		• Rain washing plus manual washing every 6 months. Painting may be advisable depending on the specific location.
10 years: against perforation as a result of corrosion.	• Manual washing every 3 months.		• Manual washing every 3 months. Painting may be advisable depending on the specific location.
10 years: against perforation as a result of corrosion.	• Manual washing every 3 months.		• Manual washing every 3 months. Painting may be advisable depending on the specific location.



MODERATE COASTAL — **500** metres

MODERATE INLAND — **1000** metres

SPECIAL ENVIRONMENTS

In New Zealand there are areas where local conditions create an increased likelihood of corrosion. Special consideration should be given to material selection in these areas. They include:

1. **Geothermal Areas**
   Hydrogen sulphide associated with geothermal activity creates a corrosive environment. Variations in natural activity or draw-off from steam bores plus the effects of weather conditions make the high risk areas hard to define. Please consult New Zealand Steel Limited for further details.

2. **West Coast, South Island**
   In this area, smoke from the coal burning fires may cause high concentrations of sulphur dioxide in the air. The combination of this and the high rainfall for the region creates an aggressive situation which must be considered when choosing the appropriate COLORSTEEL® prepainted steel coating. The effects of a severe coastal environment aggravate the situation.

   This area combines the most severe features of both industrial and coastal environments. Please contact your local supplier for the best COLORSTEEL® prepainted steel product to use.

3. **Internal Environments**
   Some commercial or agricultural applications may create internal environments in which the build-up of pollutants or fumes is a potential source of corrosion. Similarly a corrosive environment can develop within sheds used for intensive animal farming. Please consult New Zealand Steel Limited for further details.

4. **Industrial Environments**
   Close to corrosive industrial emissions and subject to heavy fallout from them. Please consult New Zealand Steel Limited for further details.

Further Assistance

Further advice on the selection of the appropriate product to suit your particular location can be obtained from New Zealand Steel Limited or your local COLORSTEEL® prepainted steel supplier.

VERY SEVERE SPECIAL ENVIRONMENTS

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 “Metal Roofing and Wall Cladding Code of Practice”.

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.

INSTALLATION INFORMATION

Details relating to the installation of all products are provided in the “Installers Guide”. This booklet covers New Zealand Steel Limited’s recommendations for handling, cutting, fixing, sealing, site storage, etc. Additional copies of this publication may be obtained from New Zealand Steel Limited.

INFORMATION TO HELP YOU AVOID PROBLEMS

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

ZINCALUME® coated steel and COLORSTEEL® prepainted steel products 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.
- 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.
- Buildings for intensive animal farming.

CORROSION PROTECTION

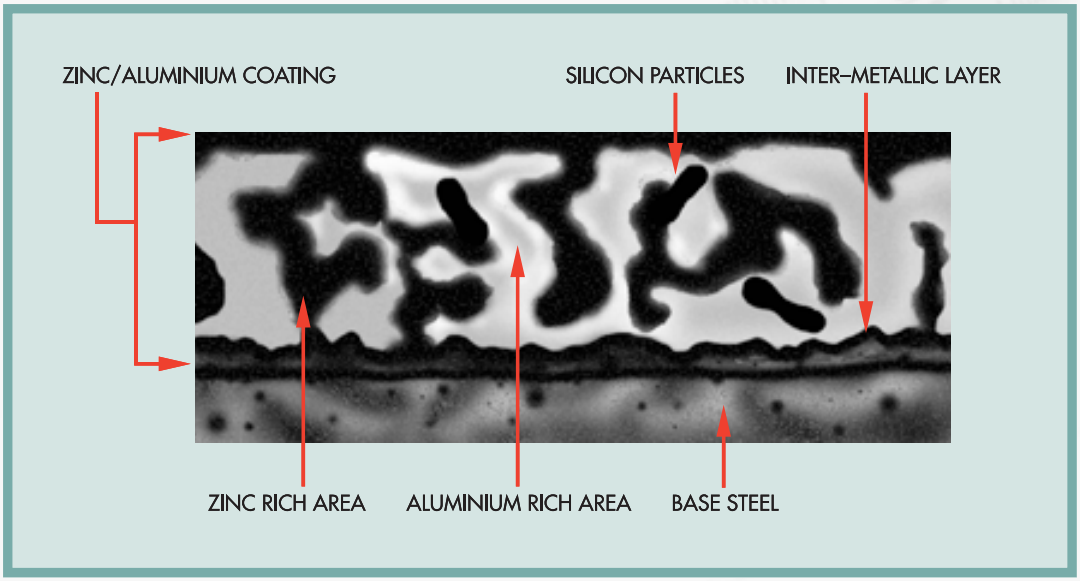
The long established method of protecting steel against corrosion has been to apply a coating of zinc (galvanising). The zinc surface forms a hard, impervious layer which limits further corrosion. This provides for the longevity of performance which we have come to expect from galvanised steel products.

The zinc coating also possesses another very useful property. Small exposed surfaces of the underlying steel such as scratches or cut edges do not corrode because of an effect known as sacrificial protection.

ZINCALUME® steel, a zinc/aluminium alloy coating, provides a superior performance to that of galvanised steel. It combines the barrier protection of aluminium and the sacrificial protection of zinc, thus giving the best of both worlds.

It follows that by coating these substrates with an added paint system, the steel core will be protected for a longer period. It is for this reason that the COLORSTEEL® prepainted steel coating systems were developed. Each coating is designed to protect the substrate from specific environmental conditions.

Cross Section of ZINCALUME® Coated Steel



UV PROTECTION

New Zealand experiences some of the most extreme UV conditions in the world. UV light can cause breakdown of the resin used in some paints. This leads to erosion and chalking of the paint film. UV light can also cause the breakdown of pigments (particularly organic based pigments) resulting in fading.

In response to this threat, an on-going programme of product improvement has led to the formulation of the current COLORSTEEL® prepainted steel paint systems. These systems utilise pigments and resins which have been selected for their colour stability, flexibility and durability.

PROFILE DESIGN INFORMATION

Specifications relating to roofing and cladding profiles and pricing details should be sought from the specialist roofing manufacturers concerned. New Zealand Steel Limited does not provide a rollforming service.

Profile designs from your local supplier will specify the grade and BMT appropriate to any contract.

Definitions

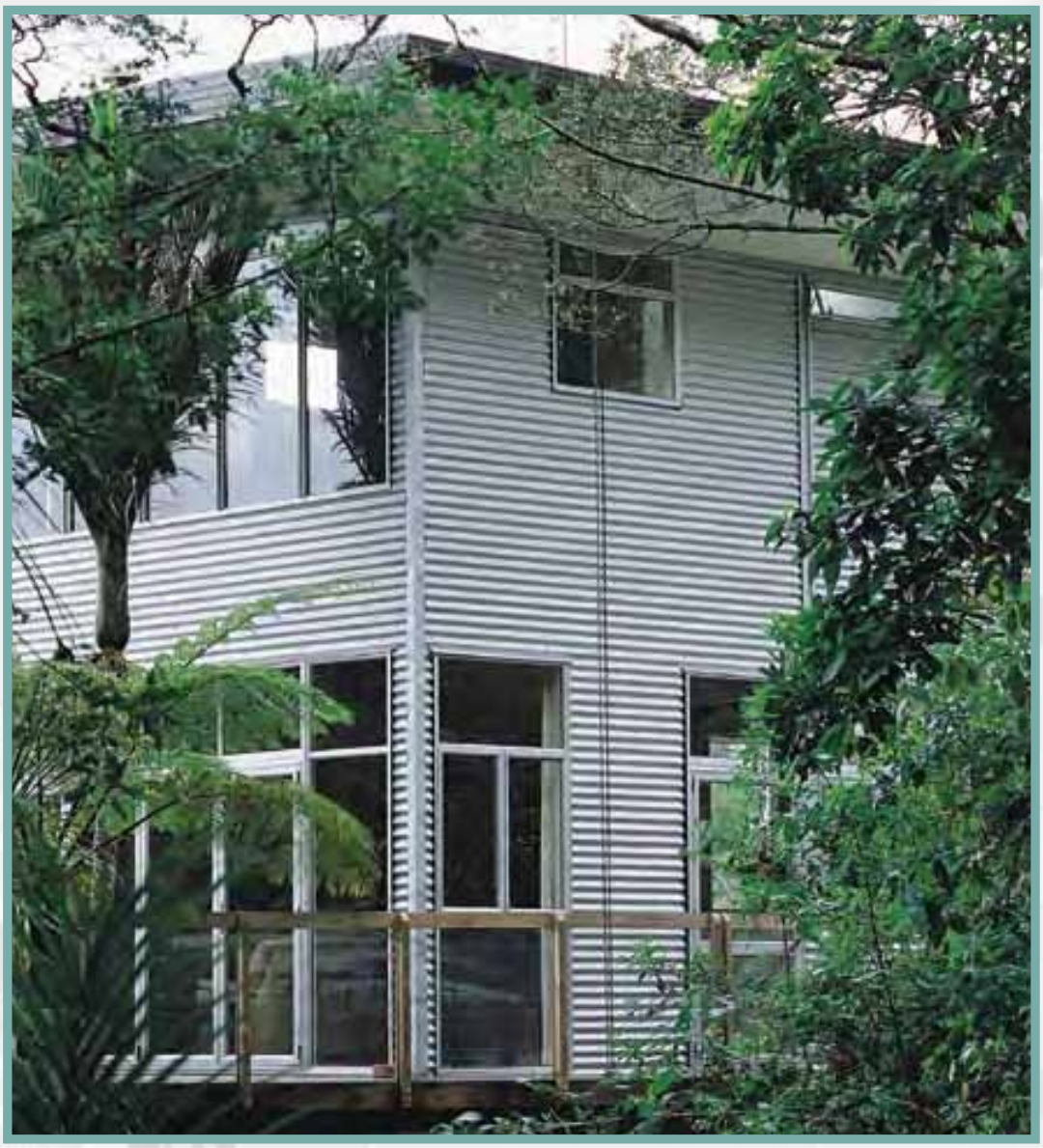
1. BMT: Base metal thickness is the thickness of the uncoated steel core. The finished thickness of the material will increase by the accumulation of coatings during manufacture by New Zealand Steel Limited.
2. Grade: The mechanical strength of the steel substrate is expressed in yield strength values measured in MPa. Low strength steel may be rated as G1, G250 or G300. As the yield strength of the material increases, so do the values, so that G550 has the highest strength.
3. Span: The distance between purlins, as recommended by the Rollformer for each particular profile.

HOW TO SPECIFY NEW ZEALAND STEEL LIMITED ROOFING AND CLADDING PRODUCTS

- Product (ZINCALUME®, GALVSTEEL™, COLORSTEEL® ENDURA™, COLORSTEEL® MAXX™)
- Profile
- Colour (Where applicable)
- BMT (eg: 0.40 or 0.55mm)
- Grade (eg: G300 or G550)

ZINCALUME®

Steel Cladding.



FURTHER COATING/SURFACE OPTIONS

In addition to the products making up the standard COLORSTEEL® prepainted steel product range, New Zealand Steel Limited produce non-standard coatings for special applications (eg: high reflectance finishes). For specialised options please contact New Zealand Steel Limited.

FURTHER INFORMATION

For additional information, literature or technical assistance please contact:

Roofing and Cladding Sector
New Zealand Steel Limited
Private Bag 92 121, Auckland
Telephone: 0-9-375 8999
Facsimile: 0-9-375 8213
Free Phone: 0800 100 523
Email Address: info@colorsteel.co.nz
http://www.colorsteel.co.nz

NOTE: With New Zealand Steel Limited's commitment to continuous improvement, information provided in this publication may be subject to modification. At the time of publication we believe the information contained in this document is the best available. Nonetheless, we reserve the right to modify any product, technique, equipment or statement to reflect improvements in the manufacture and application of coil coated products. The information is supplied without prejudice to New Zealand Steel Limited's standard terms and conditions of sale. In the event of any conflict between this information and the standard terms and conditions, the standard terms and conditions shall prevail.

This edition of the New Zealand Steel Specifiers and Builders Guide supersedes all previous editions.

NEW ZEALAND STEEL

COLORSTEEL® THE ROOF OF NEW ZEALAND®

New Zealand Steel Limited, Private Bag 92 121, Auckland, New Zealand. Ph 0-9-375 8999 Fax 0-9-375 8213

YOUR LOCAL SUPPLIER

BH957795
W3429