

Professional's guide to Australian Standards for steel sheet and strip products

INTRODUCTION

This Technical Bulletin sets out to identify standards and codes that are relevant to the manufacture of metallic coated steel and prepainted steel products intended for use in common building applications. It also addresses standards related to design, installation and performance requirements of building elements manufactured from these materials. It also aims to explain the terminology of metallic coated steel sheet and strip adopted in Australian Standards in order to simplify their interpretation and use.

As consumers become increasingly aware of the various performance requirements imparted to building materials, so too must manufacturers and trades be aware of the relevant codes and standards that set those performance requirements.

In Australia, the National Construction Code (NCC) in conjunction with Australian Standards, provides a nationally accepted and uniform set of technical requirements for all areas of building, from design to construction. The NCC comprises the Building Code of Australia (BCA) and the Plumbing Code of Australia (PCA). The NCC presents performance-based requirements, incorporating Australian (and International) Standards to provide building solutions with a focus on safety, health, amenity and sustainability.

The Australian Standards called up in the NCC set out specific requirements which relate to products used by the building industry with

respect to, for example, resilience, durability, strength and installation procedures.

There are two Australian Standards for the base steel sheet materials used in building trades:

- AS 1397:2011 – Minimum requirements for continuous hot-dip metallic coated steel sheet and strip.
- AS/NZS 2728:2013 – Performance requirements for prepainted sheet metal products

In addition to material performance requirements, Australian Standards also specify requirements for the design, specification and installation of products manufactured from metallic coated and prepainted steel sheet materials.

These include:

- AS 1445:2013 – Design and tolerance requirements for corrugated steel profile
- AS 1562.1:2018 – Design and installation of metal roof sheets and wall cladding.
- AS 2050:2018 – Design and install requirements for steel roof battens for tile roofs.
- AS/NZS 2179.1:2014 – Design, material and performance requirements metal rainwater goods and accessories.
- AS/NZS 2904:1995 – Material requirements for products installed as flashings or damp-proof course.
- AS/NZS 3500 (Set) – Requirements for plumbing and drainage components.

Table 1: Recommended AS 1397:2011 compliant products for use in building applications.

APPLICATION	STEEL BUILDING PRODUCT STANDARD (or equivalent)	PRODUCT
Roof sheeting	AS 1562.1:2018	COLORBOND® steel AM100 / ZINCALUME® steel AM125
Wall Cladding	AS 1562.1:2018	COLORBOND® steel AM100 / ZINCALUME® steel AM125
Rainwater Goods	AS/NZS 2179.1:2014	COLORBOND® steel AM100 / ZINCALUME® steel AM125
Purlins	AS/NZS 4600:2018	GALVSPAN® steel Z350 or Z450
Steel Roof Battens	AS 2050:2002	TRUECORE® steel AM150

NOTE: BlueScope recommends ZINCALUME® steel sheet be specified for roof, wall and rainwater applications if a metallic coated finish is desired and TRUECORE® steel for ALL steel building frame installations. The outdoor performance of products manufactured from COLORBOND® steel sheet or strip is equivalent, or superior, to that of ZINCALUME® steel.

STEEL SHEET MATERIAL STANDARDS

Australian Standard AS 1397:2011

Continuous hot-dip metallic coated steel sheet and strip – Coatings of zinc and zinc alloyed with aluminium and magnesium.

All hot-dipped metallic coated sheet and strip produced by BlueScope for the Australian building industry complies with Australian Standard AS 1397:2011. The products in AS 1397:2011 include materials for a variety of building applications, examples of compliant products are shown in Table 1.

A critical aspect to comply with AS 1397:2011 is the mandatory requirement that all metallic coated steel produced to this standard, unless detrimental to the end use of the product, must be legibly and durably marked with the number of the standard, i.e. AS 1397:2011, the base steel thickness, and the designation of the steel base and coating.

Australian/New Zealand Standard AS/NZS 2728:2013

Prefinished/prepainted sheet metal products for interior/exterior building applications – Performance requirements

AS/NZS 2728:2013 specifies the physical properties of organic films (paint systems) and performance requirements of prepainted metal sheeting for a range of exterior service environments. Having the correct material used for building products is the responsibility of the building specifier.

For recommended finishes and details of the COLORBOND® steel type to perform in various environments, please refer to the following Technical Bulletins:

[Technical Bulletin TB-1A](#)

Steel Roofing Products – Selection Guide

[Technical Bulletin TB-1B](#)

Steel Walling Products – Selection Guide

TERMINOLOGY

Coating Class Designation

Coating class designation is a widely used terminology system which combines the coating mass of a metallic coated steel product with type of alloy coating used. The various coating class designations are defined in AS 1397:2011. The coating type describes the elemental makeup of the coating. For example, Type AM is an aluminium/zinc/magnesium alloy while Type Z is

zinc. The coating mass defines the minimum mass of coating per square metre of steel sheet (total of both surfaces). For reasons of compliance with AS 1397:2011 and to ensure appropriate product selection, it is not sufficient to simply state whether the sheet should be Type AM or Type Z without specifying the coating mass, i.e. the amount of corrosion protection required. Table 2 outlines the designation of two common coating classes.

Base Metal Thickness

The appropriate approach to specification of coated steel is by nominating the Base Metal Thickness (BMT), this relates to the thickness of the steel substrate of the product. BMT is specified due to the base steel being the component that provides structural load bearing capability, rigidity and other mechanical properties. In isolated instances Total Coated Thickness (TCT) may also need to be expressed (in addition to BMT) where dimensional tolerances are critical, but for engineering purposes, TCT quoted in isolation may lead to confusion and potential structural failure and must not be used in this manner.

However, measuring the TCT can be used to indicate whether the specified BMT has been supplied if the coating class of the product is known. Table 3 provides the approximate overall thickness (approximate TCT) for a nominated BMT and coating classes.

Mechanical Properties

Mechanical properties of steel products generally refer to the behavioural characteristics steel such as its strength, flexibility/elongation or hardness. For the majority of building application specifications, the mechanical properties of steel refer only the yield strength of the steel. Yield strength is the point to which steel can be stressed before it deforms permanently. Yield strength is expressed in megapascals (MPa), with a higher number indicating greater structural capacity.

The guaranteed minimum yield strength is

expressed by a number (in MPa) following the letter “G”. This indicates that the mechanical properties of the steel were obtained by inline heat treatment prior to hot-dip metallic coating. For example:

- G250 is a structural grade with minimum yield strength of 250MPa.
- G300 is a slightly higher strength grade ideal for roll-forming.
- G550 is a very high strength steel commonly used for roof sheets or light gauge structural sections.

Specifications

Ideally, specifications should combine the coating class and minimum yield strength with the BMT (mm). For example:

- 0.42mm G550 AM125 for ZINCALUME® steel
- 0.60mm G300 Z450 for zinc-coated steel

STEEL BUILDING PRODUCT STANDARDS

These are Australian Standards for finished goods made from steel sheet materials:

1. Australian Standard AS 1445:2013 “Hot-dipped zinc-coated, aluminium/ zinc-coated or aluminium/zinc/magnesium-coated steel sheet – 76mm pitch corrugated”.
2. Australian / New Zealand Standard AS/NZS 2179.1:1994 “Specifications for rainwater goods, accessories and fasteners. PART 1: Metal shape or sheet rainwater goods, and metal accessories and fasteners”.

Such standards encompass aspects of finished end-products related to design, manufacture, specification and installation. In many instances, material requirements for metallic coated steels nominated in these standards is premised upon conformance to AS 1397:2011.

Specification of the base steel sheet Australian Standard in conjunction with the steel building product Australian Standard will ensure the correct material is used and that the finished product is made to specified quality Australian Standards.

Table 2: Designation of two common coating classes.

COATING CLASS DESIGNATION	COATING TYPE	COATING MASS (minimum grams of coating per square metre – total of both surfaces)
AM125	Aluminium / zinc / magnesium alloy	125
Z450	Zinc	450

Technical Bulletin 14

May 2019. Revision 8.
This issue supersedes all previous issues.



Table 3: Approximate Total Coated Thickness for a given Base Metal Thickness and Coating Class

ZINCALUME® STEEL		BMT (mm)	ZINC-COATED STEEL	
APPROXIMATE TCT (mm)	COATING CLASS		COATING CLASS	APPROXIMATE TCT (mm)
0.39	AM125	0.35	Z275	0.39
0.46	AM125	0.42	Z275	0.46
0.54	AM125	0.50	Z275	0.54
0.59	AM125	0.55	Z275	0.59
0.64	AM125	0.60	Z450	0.67
0.645	AM150	0.60	Z600	0.69

NOTE: The service life of metallic coated steel is dependent on the type and thickness of the metallic coating, not the thickness of the steel base.

INSTALLATION STANDARDS

These Australian Standards ensure that building products are incorporated into a building in an appropriate manner. Australian Standards that reference building products made from metallic coated and prepainted steel sheets include:

1. Australian Standard AS 1562.1:2018 "Design and installation of sheet roof and wall cladding – PART 1: Metal".
2. Australian Standard AS 2050:2018 "Installation of roof tiles" (for the selection and installation of metal roofing battens under roof tiles).
3. Australian/New Zealand Standard AS/NZS 2904:1995 "Damp-proof courses and flashings" (for the selection and installation of flashings).
4. Australian/New Zealand Standard AS/NZS 3500 (Set) "Plumbing and drainage".
 - a. AS/NZS 3500.3:2018 "Plumbing and drainage – PART 3: Stormwater drainage".
 - b. AS/NZS 3500.5:2012 "Plumbing and drainage – Housing installations".

HOW TO SPECIFY FOR BEST PRODUCT PERFORMANCE

In addition to information contained within the National Construction Code and Australian Standards, it is essential to consult manufacturer's literature with regard to appropriate use of materials for expected applications and service environments in addition to other information that may be relevant with regard to maintenance or design considerations.

Prior to product specification of BlueScope products, it is recommended to consult:

Technical Bulletin TB-13 General guide to good practice in the use of steel roofing and walling products,

which includes information and advice on material selection, common design considerations, storage of material on site, handling of material, installation, selection of fasteners, cutting and avoidance of swarf damage, compatibility of accessories (including flashings and sealants) and maintenance procedures to contribute to long product life.

In addition to the information contained in Technical Bulletin TB-13, specifications should consider the following:

- Minimum coating class shall be as specified in Table 1.
- All metallic-coated steel sheet and strip used for roofing, walling and rainwater goods shall be formed from ZINCALUME® steel complying with Australian Standard AS 1397:2011 and branded accordingly.

- All prepainted steel sheet and strip used for roofing, walling and rainwater goods shall be formed from COLORBOND® steel complying with Australian Standard AS/NZS 2728:2013 with a substrate complying with AS 1397:2011.
- Rainwater products shall be COLORBOND® steel or ZINCALUME® steel and shall comply with Australian/New Zealand Standard AS/NZS 2179.1:2014 (or equivalent) and Australian/New Zealand Standard AS/NZS 3500.3:2018.
- If a corrugated profile has been chosen, the finished product shall comply with Australian Standard AS 1445:2013.
- End-product profiles are typically offered in select combinations of base steel grade and base metal thickness.
- All accessories shall be of similar material and durability to the finished product(s).

CONFORMING VS. COMPLYING

The terms conforming/conformance and complying/compliance in reference to Australian Standards and the National Construction Code are often used interchangeably, but in fact have two very distinct applications in relation to manufactured products and their application in construction.

When the properties of a material or the process of its manufacture of are subject to requirements of one or more Australian Standards, then a product that meets all requirements is said to be a "conforming product".

When the implementation of a product in construction is subject to requirements of an Australian Standard or the National Construction Code, then a product that is used or specified correctly it is considered to be compliant.

By this logic, if a material meeting the requirements of relevant standards is specified or installed in a manner contrary to the requirements of the National Construction Code, then it is possible for a conforming product to be used in a non-compliant manner.

Advice regarding product conformance of materials for construction should be sought from the manufacturer or distributor of the products. Issues pertaining to complaint installation will be subject to independent certification.

Technical Bulletin 14

May 2019. Revision 8.
This issue supersedes all previous issues.



CONCLUSION

It is in the best interest of the specifier and end-user of hot-dipped metallic coated steel products to demand products that conform with relevant Australian Standards and are implemented compliance with the National Construction Code.

By combining the appropriate base steel strength, thickness and type of coating, associated materials and installation practice, the greatest potential value and product performance are often met at no extra cost

REFERENCED AUSTRALIAN STANDARDS

AS 1397:2011 – *Continuous hot-dip metallic coated steel sheet and strip – Coatings of zinc and zinc alloyed with aluminium and magnesium.*

AS/NZS 2728:2013 – *Prefinished/ prepainted sheet metal products for interior/exterior building application – Performance requirements.*

AS 1445:2013 – *Hot-dipped zinc-coated, aluminium/zinc-coated or aluminium/zinc/magnesium-coated steel sheet – 76mm pitch corrugated.*

AS 1562.1:1992 – *Design and installation of sheet roof and wall cladding – Metal.*

AS 2050:2002 – *Installation of roof tiles.*

AS/NZS 2179.1:1994 – *Specifications for rainwater goods, accessories and fasteners – Metal shape or sheet rainwater goods, and metal accessories and fasteners.*

AS/NZS 2904:1995 – *Damp-proof courses and flashings.*

AS/NZS 3500 (Set) – *Plumbing and drainage.*

steel.com.au

To ensure you have the most current Technical Bulletin

1800 800 789

steeldirect@bluescopesteel.com

If you have any questions regarding this Bulletin, contact Steel Direct



The information and advice contained in this Technical Bulletin ('Bulletin') is of a general nature only and has not been prepared with your specific needs in mind. You should always obtain specialist advice to ensure that the materials, approach and techniques referred to in this Bulletin meet your specific requirements. BlueScope Steel Limited makes no warranty as to the accuracy, completeness or reliability of any estimates, opinions or other information contained in this Bulletin and to the maximum extent permitted by law, BlueScope Steel Limited disclaims all liability and responsibility for any loss or damage, direct or indirect, which may be suffered by any person acting in reliance on anything contained in or omitted from this Bulletin. COLORBOND®, ZINCALUME®, TRUECORE®, BlueScope and the BlueScope brand mark are registered trademarks of BlueScope Steel Limited. © 2019 BlueScope Steel Limited ABN 16 000 011 058. All rights reserved.