Hot Dip Galvanizing: Manufactured to last

An introduction to the new Standard AS/NZS 4680

New Standard released June 2025

Australian/New Zealand Hot Dip Galvanizing Standards

Manufacturing

AS/NZS 4680
Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods.

AS/NZS 1214
Fasteners – Hot dip galvanized coatings.

Design & Durability

AS/NZS 2312.2
Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings – Part 2: Hot dip galvanizing.

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Background

AS/NZS 4680 originated in 1934 as part of the AS K53 series, later to be redesignated AS 1650 upon metrication in 1974. The designation AS/NZS 4680 was first adopted in 1999 when separate Standards for zinc coated steel, wire, strip, and hollow sections were developed for Australia and New Zealand. AS/NZS 4680 has traditionally been technically aligned with ISO 1461, itself adopting a 4th edition in 2022.

This latest edition of AS/NZS 4680 released in June 2025 takes account of the technical changes in ISO 1461 and the American ASTM A123, adopting the concepts of the ISO Standard, while providing a local focus.

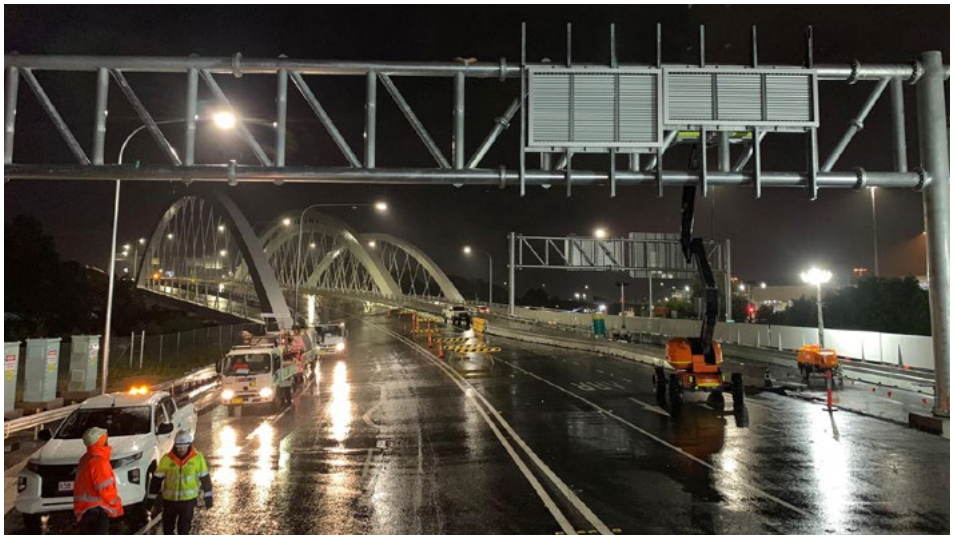
Designers wishing to specify fabricated HDG need only reference two Standards: one covering the design and durability of HDG steel (AS/NZS 2312.2), and the other dealing with the manufacturing process and tolerances (AS/NZS 4680). For those designers requiring hot dip galvanized threaded fasteners used in structural applications, AS/NZS 1214 is normally specified.

This Advisory Note introduces the key features of the hot dip galvanizing Standard, AS/NZS 4680:2025.

Design and durability

All design and durability advice are now contained in AS/NZS 2312.2, although the new Standard does expand on the need for specific safety details such as venting and draining. It provides an appendix on corrosion resistance of galvanized coatings with the details contained in AS/NZS 2312.2 and specific advice for New Zealand in NZS TS 3404.

New appendices have been included on methods for obtaining thicker coatings and the development of a specification for hot dip galvanized rebar, which is otherwise not included in AS/NZS 4671.



Hot dip galvanized coating thickness

AS/NZS 4680 recognises that the coating thickness developed with some aluminium-killed steels varies from that developed with silicon-killed steels and these steels are often used by fabricators to improve processing speeds with a reduced kerf when laser cut. Examples include BlueScope Steel's XLERPLATE® Lasercut 250 and 350 steel grades. In AS/NZS 4680 these steels are called ultra-low reactive (ULR) steels. Some hollow sections also use ULR steels as feedstock.

ULR steels are defined in AS/NZS 4680 as those steels with a silicon content of 0.01 % or less and these have a thinner coating requirement than other steel types. Items made from ULR steels are commonly ancillary to corrosion protection (for example, when used as stiffeners, cleats, end plates and brackets) and the coating thickness on ancillary items are usually not required to be measured. Where a test certificate or declaration of conformance is required, AS/NZS 4680 requires the purchaser to provide the galvanizer with steel test certificates prior to galvanizing the article.

Table 1 (below) shows the nominal coating thickness and mass for a selected range of steel types and thicknesses where the articles are not centrifuged. Castings and centrifuged items have different requirements and these are contained in the Standard.

Where the coating thickness is critical for corrosion protection, the options to develop a thicker coating with ULR steels include blasting the components made from ULR steels prior to galvanizing or consideration of a duplex coating. The GAA and GANZ websites contain detailed information on this aspect, and both AN 02, Thicker Coatings for Specialised Applications and AN 35, Steel composition and the effect on hot dip galvanized coatings Advisory Notes are recommended reading.

The new range of ULR hot dip galvanized coatings is likely to meet the durability requirements of most applications, with the life to first maintenance averaging above 100 years in C2, 65 years in C3, and 24 years in C4 for steel thicknesses more than 6 mm, with similar results for the > 3 mm to ≤ 6 mm range. Full details of the estimated durability of any nominal coating thickness can be found in Table 6.2 of AS/NZS 2312.2, from all hot dip galvanizers and from the experts at GAA and GANZ.

Table 1: Nominal average coating thickness and mass from a selected range of steel types and thicknesses

Steel type	Steel thickness and Nominal minimum galvanized coating thickness and mass							
	> 6 mm		> 3 mm to ≤ 6 mm		≥ 1.5 mm to ≤ 3 mm		< 1.5 mm	
	Thickness (µm)	Mass (g/m²)	Thickness (µm)	Mass (g/m²)	Thickness (µm)	Mass (g/m²)	Thickness (µm)	Mass (g/m²)
Normal	85	600	70	500	55	390	45	320
Ultra-low Reactive	70	500	55	390	45	320	NA	NA

Appearance of hot dip galvanized coatings

The revision to AS/NZS 4680 has significant changes to the appearance requirements for acceptance inspection, primarily to improve clarity, although several technical changes have also been included. The Standard recognises that corrosion protection of steel is the primary purpose of a galvanized coating, with appearance aspects to take a secondary position unless otherwise specified.

Inspection of the appearance of the coating occurs from no closer than one metre, and this process takes place after any necessary renovation for bare spots, sharp points, and roughness. The size of repairable bare spots is reduced to 10 cm^2 from the 40 cm^2 allowable in the 2006 edition of the Standard, while retaining the requirement that larger bare spots caused through prior contamination, blowouts, or unavoidable air locks can be renovated, recognising that regalvanizing articles that have less than the best practice design for galvanizing will not improve the outcomes.

Wet storage staining is acceptable where the staining does not reduce the coating thickness below the specified minimum in the local affected area, in consideration that the staining is normally aesthetic in nature. This brings the Australian and New Zealand Standard in-line with both ISO 1461 and ASTM A123.

Acceptance inspection

Another major change to the Standard is the inclusion of a complete and mandatory acceptance inspection process, particularly related to the coating thickness and is used when a test report is required. The method used is consistent with ISO 1461 and ASTM A123 and a flow chart is provided in an Appendix to assist both the expert and casual users with the process of assessing conformance. The Appendix for galvanized rebar also provides advice for specialised inspection of these products.

Two major product categories are introduced (large and small), with a minimum of three and one reference areas respectively for each sample inspected from a lot. In this aspect, the revision is more consistent with ASTM A123 than ISO 1461 which retains three major product categories.

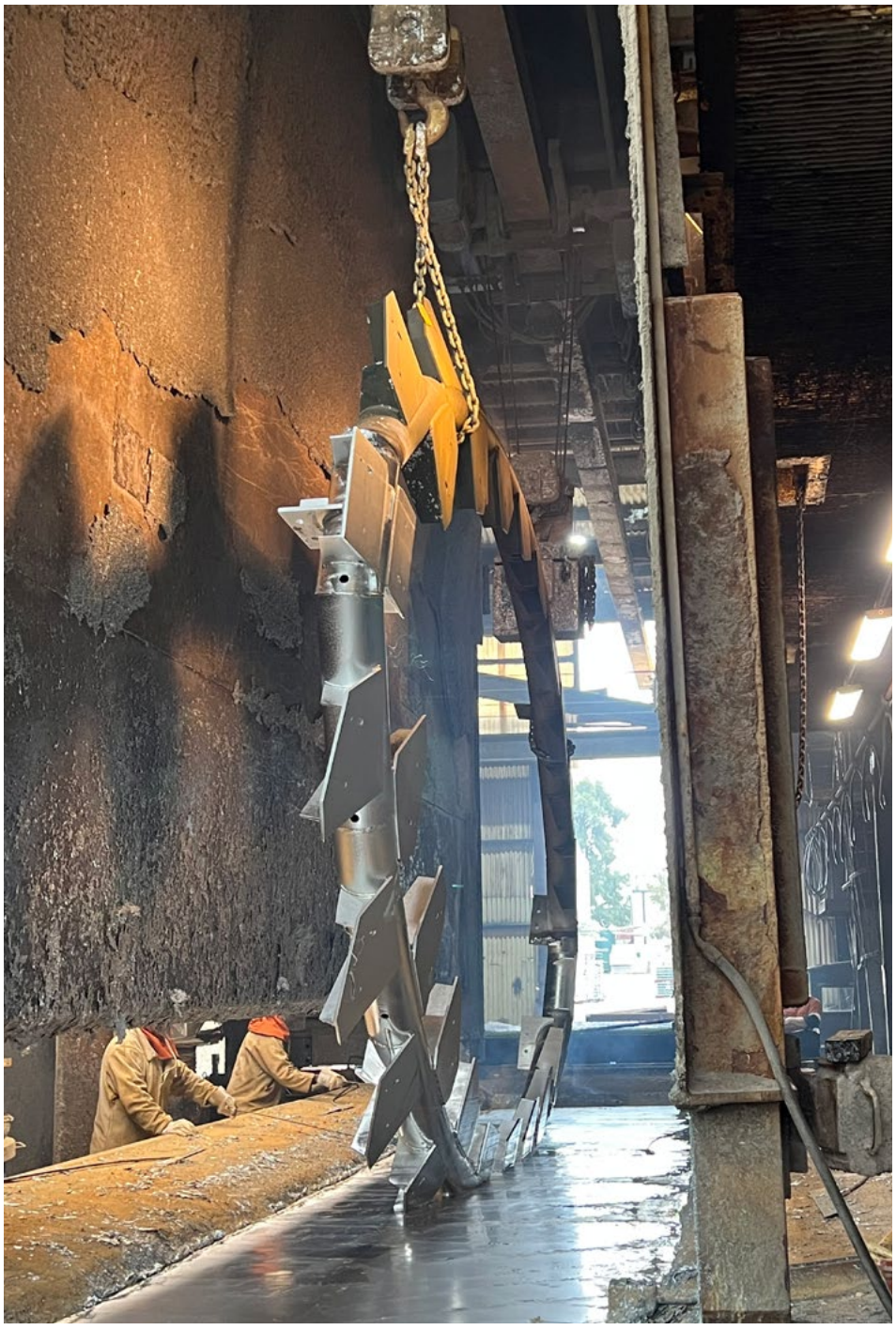
Summary

AS/NZS 4680 provides a major update to users and specifiers of hot dip galvanized steel. It provides clear and mandatory requirements for coating thickness and appearance and has been re-aligned with the key technical requirements of ISO 1461 by the joint Standards committee.

A new range of ULR steel coating thickness requirements is included in the Standard, consistent with the availability of these steels worldwide, while the acceptance inspection methods have been codified to reduce the instances of dispute.

More information and free training on the use of AS/NZS 4680 and hot dip galvanizing in general is available from the GAA and GANZ.

AS/NZS 4680 can be purchased from Standards Australia, New Zealand Standards or their authorised resellers.



References

1. **Standards Australia/Standards New Zealand.** *AS/NZS 4680, Hot dip galvanized coatings on fabricated iron and steel articles - Specification and test methods.* Sydney/Wellington : Standards Australia/Standards New Zealand, 2025.
2. **International Organization for Standardization.** *ISO 1461, Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods.* Geneva : International Organization for Standardization, 2022.
3. **ASTM International.** *ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.* West Conshohocken : ASTM International, 2024.
4. **Standards Australia/Standards New Zealand.** *AS/NZS 2312.2, Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings - Part 2: Hot dip galvanizing.* Sydney/Wellington : Standards Australia/Standards New Zealand, 2014.
5. —. *AS/NZS 1214, Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series) (ISO 10684:2004, MOD).* Sydney/Wellington : Standards Australia/Standards New Zealand, 2016.
6. **Standards New Zealand.** *NZS TS 3404, Durability requirements for steel structures and components.* Wellington : Standards New Zealand, 2018.
7. **Standards Australia/Standards New Zealand.** *AS/NZS 4671, Steel for the reinforcement of concrete.* Sydney/Wellington : Standards Australia/Standards New Zealand, 2019.
8. **BlueScope Steel.** XLERPLATE® steel - Structural Products. [Online] [Cited: 27 March 2025.] https://steel.com.au/products/xlerplate-steel-structural-products.
9. **Galvanizers Association of Australia/Galvanizing Association of New Zealand.** *AN 02 Thicker Coatings for Specialised Applications.* Melbourne : Galvanizers Association of Australia/Galvanizing Association of New Zealand, 2025.
10. —. *AN 35, Steel composition and the effect on hot dip galvanized coatings.* Melbourne : Galvanizers Association of Australia/Galvanizing Association of New Zealand, 2025.

We're here to help

Are you looking for more information or advice on the durability, sustainability, application, design, process, bolting, welding or painting of galvanized steel? Want advice on a specific situation or issue? You're in the right place! We would love to hear from you.

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We provide information, publications and assistance on all aspects of design, performance and applications of hot dip galvanizing.