



Austroads

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1. Scope

- 1.1 Austroads Technical Specification ATS 5452 sets out the requirements for the hot dip galvanizing of steel articles where the galvanized coating is applied after fabrication. This includes the coating of fabricated structural steel sections, fabricated steel assemblies, castings and miscellaneous steel components.
- 1.2 It does not cover:
- a) threaded fasteners; and
 - b) the galvanized coating produced in continuous, semi-continuous or specialised plants on semi-finished products such as wire, tube or sheet and coil.
- 1.3 The Contractor must ensure that the Galvanizer complies with this Specification.

2. Referenced Documents

2.1 The following documents are referenced in this Specification:

Australian / New Zealand Standards

AS 1627.1	Metal finishing—Preparation and pretreatment of surfaces Part 1: Removal of oil, grease and related contamination
AS 1627.4	Metal finishing—Preparation and pretreatment of surfaces Part 4: Abrasive blast cleaning of steel
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
AS/NZS 3750.9	Paints for steel structures Part 9: Organic zinc-rich primer
AS/NZS 3750.15	Paints for steel structures Part 15: Inorganic zinc silicate paint
AS/NZS 4680	Hot dip Galvanized (zinc) Coatings on Fabricated Ferrous Articles
AS/NZS 5131	Structural steelwork – Fabrication and erection
AS/NZS ISO 9001	Quality management systems - Requirements

Australian Paint Approval Scheme (APAS)

AP-S0014	Zinc Rich Pre-construction Primers (sub-class 0014/2)
AP-S2916	Organic Zinc-Rich Coating for the Long-Term Protection of Steel (sub class 2916/1)
AP-S2908	Inorganic Zinc Silicate Coating for the Long-Term Protection of Steel

ASTM International

ASTM B201	Standard Practice for Testing Chromate Coatings on Zinc and Cadmium Surfaces
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3. Definitions

3.1 The definitions in AS/NZS 4680 and AS/NZS 2312.2 apply to this Specification.

4. Quality System Requirements

4.1 The Contractor must prepare and implement a Quality Plan that includes the documentation in Table 4.1.

Table 4.1: Quality Plan

Clause	Description of Document
5.1	Name of the Galvanizer and general galvanizing requirements
5.2	Name, qualifications and experience of the Coating Inspector
5.5	Sampling procedure and plan for the inspection of identical articles (where applicable)
6.1	Procedures / details for pre-galvanizing
7.1	Procedures / details for post-galvanizing
8.1	Management of passivation where a duplex coating is applied.
9.1	Procedure for repair of damaged or uncoated areas

HOLD POINT 1.	
Process Held	Commencement of galvanizing.
Submission Details	The Quality Plan must be provided to the Principal at least 10 working days prior to the commencement of galvanizing.

5. General

- 5.1 The Quality Plan must include:
- a) name of the Galvanizer and details of the galvanizing facilities; and
 - b) details of the hot dip galvanizing bath size, article size and any requirement for double dipping of the article.
- 5.2 Unless the Contract documents specify that the Principal will appoint the Coating Inspector, the Contractor must ensure that a Coating Inspector is engaged to independently verify that the galvanizing complies with this Specification. The Coatings Inspector must hold a current accreditation which is acceptable to the Principal. The ACA/GAA Hot dip Galvanizing Inspector Program is acceptable to the Principal. The Coating Inspector must independently and impartially monitor the Contractor’s activities to verify that the Contractor has complied with this Specification.
- 5.3 The design of the article must comply with AS/NZS 2312.2.
- 5.4 The galvanizing must comply with AS/NZS 4680.
- 5.5 If the work includes the galvanizing of multiple identical articles (such as bridge barrier posts) which are galvanised under uniform conditions, the Contractor may propose a statistical sampling procedure and sampling plan in accordance with Appendix B of AS/NZS 4680.
- 5.6 The Contractor must provide at least 48 hours of notice prior to the commencement of galvanizing.

WITNESS POINT 1.	
Process	Commencement of galvanizing of the articles
Notification Period	At least 48 hours before the commencement of the work.

6. Pre-Galvanizing

- 6.1 The Quality Plan must include:
- a) a procedure for undertaking the pre-galvanizing inspection;
 - b) details of the location of where the inspection will be conducted; and
 - c) an Inspection and Test Plan for the pre-galvanizing inspection.
- 6.2 After fabrication and before galvanizing, the article must be inspected by the Coatings Inspector to verify the following:
- a) suitability of the surface condition of the steel for hot dip galvanizing;
 - b) the size and location of vent and drain holes comply with the requirements of AS/NZS 2312.2;
 - c) all weld crevices are sealed;
 - d) the welds are clean and the porosity complies with the requirements of AS/NZS 5131; and
 - e) any external faces which have been flame cut, plasma cut or laser cut are ground and edges rounded to a radius of 2 mm.

- 6.3 Unless the item is to be duplex coated or sharp edges that have the potential to cause injury are present, as-formed edges and friction saw-cut faces do not need to be rounded for galvanizing.

7. Post-Galvanizing Requirements

- 7.1 The Quality Plan must include:
- a) a procedure for the inspection for compliance with AS/NZS 4680;
 - b) an Inspection and Test Plan and /or details of the process to verify compliance with AS/NZS 4680, including:
 - i) the appearance complies with Clause 7 of AS/NZS 4680;
 - ii) the thickness of the galvanizing complies with Clause 9 of AS/NZS 4680; and
 - c) procedure for the prevention of wet storage staining or handling damage after the completion of galvanizing.
- 7.2 At the completion of galvanizing, the Coating Inspector must carry out an inspection of each galvanized article or control sample inspection of a batch of identical galvanized articles (where a sampling plan is in place) to verify compliance with AS/NZS 4680.
- 7.3 In addition to the requirements of AS/NZS 4680, galvanized coatings must also be free from the following defects:
- a) brittle, uneven and/or loosely adhering coatings on flame cut, plasma cut or laser cut edges;
 - b) pinholes along welds; and
 - c) wet storage staining, rust or other surface contaminants or stains that affect the long-term appearance or performance of the coating.
- 7.4 Unless specified otherwise in the Contract documents, for the purpose of assessing appearance:
- a) the article must be viewed from not less than 1.0 metre by a person with normal vision; and
 - b) touch points from hanging wires, chains or jigs are acceptable, provided that they are not sharp and the galvanizing meets the thickness requirements.
- 7.5 The galvanized coating thickness must meet the requirements of AS/NZS 4680 Table 1 or Table 2, as appropriate. Non-destructive test methods which are consistent with AS/NZS 4680 must be used to determine the coating thickness.
- 7.6 A report of the inspection, including an assessment of the galvanized coating appearance and thickness, must be prepared by the Coatings Inspector and submitted to the Principal.

8. Preparation of Galvanized Members for Painting

- 8.1 Where a duplex coating is applied, the Quality Plan must include:
- a) details of the proposed surface finish;
 - b) details of any specific after-treatment requirements, including verifying that the article will be suitable for sweep or brush blast cleaning as described in AS/NZS 2312.2;
 - c) if a passivation treatment is used to protect freshly galvanized surfaces from early wet storage staining, details of that treatment; and
 - d) if it is proposed to exclude a passivation treatment, the maximum time between galvanizing and painting, any additional surface preparation steps and a description of the risk of wet storage staining or other defect occurring prior to painting.

- 8.2 If a duplex coating is to be applied to the galvanized surface, the surface must be prepared in accordance with Clause 7.5.3 of AS/NZS 2312.2 and treated as follows:
- a) prior to the application of paint, the surface must be free of salts, loose particles, paint overspray, dust or any other surface contaminants;
 - b) any salts must be removed by pressure water washing and re-blast any surface previously cleaned;
 - c) surface contaminants must be removed by blowing down with dry, oil-free compressed air and brushing with a soft bristle brush; and
 - d) any residual dust must be removed by vacuuming.
- 8.3 The absence or presence of chromate passivation may be checked using the lead drop acetate test described in ASTM B201.

9. Repair of Damaged Galvanized Coatings

- 9.1 The Quality Plan must include a procedure for repair of damaged or uncoated areas.
- 9.2 Any damaged galvanized coatings must be repaired in accordance with the following process:
- a) degrease surfaces in accordance with AS 1627.1 using a suitable solvent or emulsion;
 - b) abrade the damaged area by hand, power tool or abrasive blast cleaning, as per paint manufacturer recommendations;
 - c) ensure the prepared steel is clean, dry, and free of rust or other contaminants; and
 - d) within 4 hours of surface preparation, apply a paint conforming to Clause 9.3 with Dry Film Thickness (DFT) at least 30 µm more than the specified local minimum galvanized coating thickness relevant to the steel thickness range.
- 9.3 Repair paint must either:
- a) conform to AS/NZS 3750.9 or AS/NZS 3750.15; or
 - b) comply with APAS 0014/2, APAS 2916/1 and APAS 2908.

However, another paint system may be specified in the Contract documents in some circumstances (for example, where the galvanized coating is to be exposed to a highly corrosive environment).

10. Reporting

- 10.1 The Contractor must submit a report of the galvanizing process to the Principal, which at a minimum includes the following:
- a) Name of the Galvanizer and location of the facilities;
 - b) Description and identifier for each article;
 - c) Results of the Pre-galvanizing inspection (Clause 6.2);
 - d) Results of the Post-galvanizing inspection, including appearance and thickness (Clause 7.2); and
 - e) Details of any repairs, including location of the repair and the paint used (Clause 9).

Annexure A: Summary of Hold Points, Witness Points and Records

The following is a summary of the Witness Points / Hold Points that apply to this Specification and the Records that the Contractor must submit to the Principal to demonstrate compliance with this Specification.

Clause	Hold point	Witness point	Record
4.1	Commencement of galvanizing		Quality Plan
5.6		1. Commencement of galvanizing	
10.1			Report

Amendment Record

Amendment no.	Clauses amended	Action	Date
-	New specification	New	October 2023

Key

Format	Change in format
Substitution	Old clause removed and replaced with new clause
New	Insertion of new clause
Removed	Old clauses removed