AS 1789—1984

Australian Standard®

Electroplated coatings—Zinc on iron or steel

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ZINC COATING, ELECTRODEPOSITED (on Iron and Steel)]

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The following interests are represented on Committee MT/9:

Aluminium Development Council
Australasian Institute of Metal Finishing
Australian Zinc Development Association
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Copper Development Association of Australia Ltd
Department of Defence
Electricity Supply Association of Australia
Metal Finishing Supply Houses
Metal Trades Industry Association of Australia
Royal Australian Chemical Institute
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University of Queensland

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PREFACE

This edition of this standard was prepared under the direction of the Association's Committee on Metal Finishing by its subcommittee on zinc and cadmium coatings to supersede AS 1789—1976, Electroplated Coatings of Zinc on Iron and Steel.

In preparing this edition of the standard, the committee considered the latest information contained in ISO/DIS 2081, Metallic Coatings—Electroplated Coatings of Zinc on Iron or Steel.

This standard essentially conforms to the ISO standard but differs in the heat treatment times for the relief of hydrogen embrittlement. The committee believes that the heating times specified in ISO/DIS 2081 are too long when compared with the requirements of AS CK13. The times given in AS CK13 are based on Australian experience. They are considered to be adequate and have been retained in this standard.

No changes have been made to the thickness requirements but service conditions and typical applications have been included.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
ELECTROPLATED COATINGS—ZINC ON IRON OR STEEL

FOREWORD

Zinc coatings are applied to iron and steel items as protection against corrosion. The choice of the correct coating thickness is related to the severity of the environment and the life required.

Zinc coatings are chromate treated to retard the formation of corrosion products on the surface of coatings exposed to corrosive atmospheres. The type of coating to be applied should be appropriate for the expected exposure environment.

Although this standard specifies a range of thicknesses of zinc coatings to be used on iron and steel as protection against corrosion, it does not specify the surface condition of the basis metal.

Chromate conversion coatings give additional protection against corrosion and may only be omitted at the specific request of the purchaser. Zinc-plated items to be painted may require alternative treatment such as phosphating to provide good adhesion.

Zinc-plated items are subject to attack by certain organic materials, such as cardboard, wood or certain electrical insulating materials, which emit reactive vapours. Cognizance should be taken of this when items are packed, stored or transported.

It is essential that the purchaser state the service condition number or the classification number: merely to ask for zinc electroplating to be carried out in accordance with AS 1789 without this added information is insufficient.

SPECIFICATION

1 SCOPE. This standard specifies requirements for electroplated coatings of zinc on iron or steel for protection against corrosion.

NOTE: Guidelines to purchasers on requirements that must be specified by the purchaser and those that must be agreed at the time of enquiry and/or order are given in Appendix A.

2 APPLICATION. This standard does not cover the following:

(a) Coatings on threaded fasteners or components having screw threads covered by other Australian standards, e.g. AS K132, Electroplated Coatings on Threaded Components, Part 2—Zinc on Steel.
(b) Thickness requirements of coatings plated to AS 1897, Electroplated Coatings on Threaded Components.
(c) Coatings on sheet, strip or wire in the unfabricated form, or on close coiled springs.

3 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1214 Hot-dip Galvanized Coatings on Threaded Fasteners (ISO Metric Coarse Thread Series)

AS 1650 Galvanized Coatings

AS 1791 Chromate Conversion Coatings on Zinc and Cadmium Electrodeposits

AS 2331 Methods of Test for Metallic and Related Coatings
- 2331.1.1 Part 1—Local Thickness Tests—Micrographic Examination of Cross-sections
- 2331.2.1 Part 2—Average Thickness Tests—Dissolution Methods—Strip and Weigh, and Analytical
- 2331.4.1 Part 4—Physical Tests—Qualitative Adhesion Tests

AS 2483 Metal Finishing—Recommended Sampling Plans for the Inspection and Testing of Coatings

AS B193 Hot-dip Galvanized Coating on Fasteners (BSW and UNC threads)

AS K178 Glossary of Terms Used in Electroplating

AS CK13 Code of Recommended Practice for Preparation of Metal Surfaces for Electroplating*.

4 DEFINITIONS. For the purpose of this standard, the definitions given in AS K178 and the following apply:

Significant surface—that part of the surface of an item which is required to be covered by the coating and which is essential to the appearance and serviceability of the item and can be touched with a ball 20 mm in diameter.

5 SERVICE CONDITION AND CLASSIFICATION NUMBERS.

5.1 Service condition number. Service condition numbers are used to indicate the service condition in accordance with the following scale:

4—Exceptionally severe corrosive conditions; e.g. those encountered by marine parts and some exterior motor car, and motor cycle components, and those exposed to industrial atmospheres.

3—Severe, corrosive conditions; e.g. perambulator parts and washing machine components. Moderate outdoor exposures; e.g. bicycle parts and some exterior motor car components.

2—Moderate corrosive conditions; indoor conditions where condensation may occur.

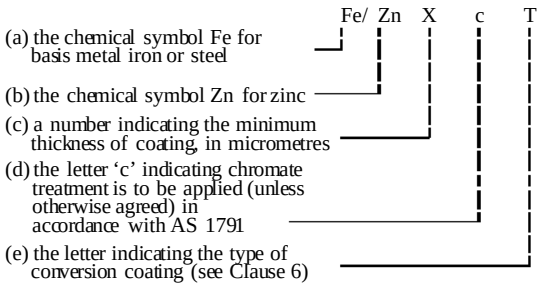
1—Mild, dry indoor conditions.

5.2 Classification. Zinc coatings are classified according to the minimum thickness values set out in Table 1 and are designated by an appropriate service condition number.

TABLE 1
CLASSIFICATION OF COATINGS OF ZINC ON IRON OR STEEL

Service condition number	Classification code (see Notes 2 and 3)	Minimum thickness μm
4	Fe/Zn 25c	25
3	Fe/Zn 12c	12
2	Fe/Zn 8c	8
1	Fe/Zn 5c	5

NOTES:
1. In any particular environment, the protective value of a zinc coating is directly proportional to its thickness. When very long service life is desired, as for example on structural steel components, thicker coatings are required. These are usually applied by hot-dip galvanizing in accordance with AS 1650. Threaded fasteners (ISO metric coarse thread series) are galvanized in accordance with AS 1214, while BSW and UNC threaded fasteners are galvanized in accordance with AS 1214, while BSW and UNC threaded fasteners are galvanized in accordance with AS B193.
2. The full classification code comprised—



Example. The classification code for 12 μm of zinc coating on steel, chromated with Type A conversion coating (see Clause 6) would be—
Fe/Zn 12cA.

3. Classifications other than those listed in Table 1 may be specified by agreement between the purchaser and the electroplater, e.g. Fe/Zn 3C Type A.

6 CHROMATE CONVERSION COATINGS.

6.1 General. Coatings of zinc are chromate treated to produce a chromate conversion coating to retard the formation of corrosion products that form on exposed surfaces of coatings in the atmosphere. The treatment improves corrosion resistance under conditions of high humidity or in the presence of certain vapours from organic substances.

6.2 Types. Typical appearance and coating type designation of chromate coatings are given in Table 2. Unless otherwise agreed, one of these types shall be applied, and shall comply with the requirements of Clause 8.6.

NOTE: The purchaser should specify the coating type required.

*In course of revision.