

AS 1790—1984

Australian Standard[®]

**ELECTROPLATED COATINGS—
CADMIUM ON IRON OR STEEL**

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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 Limited
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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 1790—1976, Electroplated Coatings of Cadmium on Iron and Steel.

In preparing this edition of the standard, the committee considered the latest information contained in ISO/DIS 2082, Metallic Coatings—Electroplated Coatings of Cadmium 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 2082 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—CADMIUM ON IRON OR STEEL

FOREWORD

Cadmium 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.

Cadmium 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 cadmium 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. Cadmium-plated items to be painted may require alternative treatment such as phosphating to provide good adhesion.

Cadmium-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.

Limitations on the use of cadmium coatings are given in Appendix C.

It is essential that the purchaser state the service condition number or the classification number: merely to ask for cadmium electroplating to be carried out in accordance with AS 1790 without this added information is insufficient.

SPECIFICATION

1 SCOPE. This standard specifies requirements for electroplated coatings of cadmium 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:

- Coatings on threaded fasteners or components having screw threads covered by other Australian standards, e.g. AS K132, Electroplated Coatings on Threaded Components, Part 1—Cadmium on Steel.
- Thickness requirements of coatings plated to AS 1897, Electroplated Coatings on Threaded Components.
- 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:

3—Severe corrosive conditions e.g. those encountered by marine parts and those parts exposed to heavy industrial atmospheres

2—Moderate outdoor exposure where parts are exposed to light marine and industrial atmospheres

1—Mild outdoor and indoor exposure conditions.

5.2 CLASSIFICATION. Cadmium 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
CADMIUM ON IRON AND STEEL

Service condition number	Classification code (See Notes 1 and 2)	Minimum thickness μm (See Note 3)
3	Fe/Cd 25c	25
2	Fe/Cd 12c	12
1	Fe/Cd5c	5

NOTES

1. The full classification code comprises—

- (a) the chemical symbol Fe for basis metal iron or steel _____
- (b) the chemical symbol Cd for cadmium _____
- (c) a number indicating the minimum thickness of coating, in micrometres _____
- (d) the letter 'c' indicating chromate treatment is to be applied (unless otherwise agreed) in accordance with AS 1791 _____
- (e) the letter indicating the type of conversion coating (see Clause 6) _____

Example: The classification code for 12 μm of cadmium coating on steel, chromated with Type A conversion coating (see Clause 6) would be—

Fe/Cd 12cA.

2. Classifications other than those listed in Table 1 may be specified by agreement between the purchaser and the electroplater, e.g. Fe/ Cd 8c Type A.
3. Cadmium coatings thicker than 25 μm are not normally used.

6 CHROMATE CONVERSION COATINGS.

6.1 General. Coatings of cadmium 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