

Method for specifying

Electroplated coatings of chromium for engineering purposes

UDC 669.268.7:621.357.7

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Surface Coatings (other than Paints) Standards Committee (SRC/-) to Technical Committee SRC/2 upon which the following bodies were represented:

- Bicycle Association of Great Britain
- BNF Metals Technology Centre
- British Lock Manufacturers Association
- British Metal Finishing Suppliers Association
- British Telecommunications plc
- Chemical Industries Association
- Electronic Engineering Association
- Institute of Metal Finishing
- Institution of Chemical Engineers
- Metal Finishing Association
- Ministry of Defence
- National Brassfoundry Association
- National Building and Allied Hardware Manufacturers Federation
- Society of Motor Manufacturers and Traders Limited
- Spring Research and Manufacturers Association
- Telecommunication Engineering and Manufacturing Association (TEMA)
- Zinc Alloy Die Casters Association
- Zinc Development Association

This British Standard, having been prepared under the direction of the Surface Coatings (other than Paints) Standards Committee, was published under the authority of the Board of BSI and comes into effect on 31 January 1986

© BSI 03-1999

First published October 1970
First revision January 1986

The following BSI references relate to the work on this standard:
Committee reference SRC/2
Draft for comment 84/51383 DC

ISBN 0 580 14757 6

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Definitions	1
3 Exchange of information	1
4 Sampling	2
5 Treatment of basis metals before electroplating	2
6 Coatings	3
7 Heat treatment after electroplating	4
Appendix A Guidance on types and uses of chromium coatings	5
Appendix B Heat treatment	7
Appendix C Method for establishing peening conditions	8
Appendix D Determination of coating thickness	8
Appendix E Test for porosity of coatings on ferrous articles	9
Appendix F Visual examination for cracks	10
Figure 1 — Test specimen mount	9
Table 1 — Summary of information required	2
Table 2 — Peening intensities	3
Table 3 — Categories of steels and maximum tensile strengths corresponding to specified minimum tensile strengths	7
Table 4 — Recommendations for heat treatment, for stress relief, before electroplating (excluding surface-hardened parts)	7
Table 5 — Heat treatment after electroplating (excluding surface-hardened parts)	8
Publications referred to	Inside back cover

Foreword

This British Standard has been prepared under the direction of the Surface Coatings (other than Paints) Standards Committee. It gives a method for specifying requirements for electroplated coatings of chromium on both ferrous and non-ferrous metals for engineering purposes. It revises and supersedes BS 4641:1970, which is withdrawn.

As this standard is based on requirements to be agreed between the interested parties, this revision has, in accordance with current BSI practice, been published as a method of specifying and not as a specification. **For this reason, it is no longer appropriate for any claim to be made that a coating complies with BS 4641.**

In addition, the clauses relating to the treatment of parts before, during and after electroplating have been technically updated and the clauses relating to the information to be supplied by the purchaser to the electroplater have been considerably expanded and clarified. Clause 4 invokes the sampling procedures given in BS 6001.

The revision also takes into account work carried out, with the active participation of the United Kingdom, by Subcommittee 3 “*Electrodeposited coatings and related finishes*”, of Technical Committee 107 “*Metallic and other non-organic coatings*”, of the International Organization for Standardization (ISO), which led to publication of the related standard, ISO 6158 “*Metallic coatings — Electroplated coatings of chromium for engineering purposes*.”

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard describes a method for specifying requirements for electroplated coatings of chromium on ferrous and non-ferrous metals for engineering purposes.

Coatings intended for decorative purposes are excluded; these are covered by BS 1224.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this standard, the definitions given in BS 5411-1 apply together with the following.

2.1

significant surface

the part of the article covered or to be covered by the coating and for which the coating is essential for serviceability and/or appearance

2.2

shot peening

a controlled bombardment by spherical particles on the surface to be electroplated, to induce compressive stresses in the surface of the basis metal

2.3

chromium coating

an electroplated coating of substantially pure chromium

3 Exchange of information

3.1 Information to be supplied by the purchaser to the electroplater

NOTE A summary of clause references appertaining to this information is given in Table 1.

3.1.1 Essential information. The information listed in a) to l) shall be supplied by the purchaser to the electroplater.

- a) The number of this British Standard, i.e. BS 4641.
- b) The nominal composition or specification and metallurgical condition of the basis material, if new articles are to be coated.
- c) The hardness or maximum tensile strength of the basis metal, if steel.
- d) Any stress relieving treatment required before electroplating (see 5.1).
- e) Any treatment required to induce compressive stress; for example, shot peening before electroplating (see 5.2).

f) The significant surface of the article to be electroplated indicated, for example, by drawings or by the provision of suitably marked samples;

g) Any special requirements for, or restrictions on, pre-treatment; for example, if it is essential to use vapour blasting rather than acid pre-treatment.

h) Details of any undercoats required including:

- 1) the metal to be used, and
- 2) the thickness(es) of the undercoat(s) (see 6.1.3).

i) The minimum local thickness of chromium coating required or the final dimensions of the finished article (see 6.1.3 or 6.1.4).

NOTE The final dimensions of the finished article are particularly likely to be needed where worn or overmachined parts are to be built up.

j) The type of chromium coating required if not regular, i.e. porous, crack-free, micro-cracked or duplex (see 6.2.1).

NOTE Guidance is given in Appendix A.

k) The final surface finish of the chromium coating; for example, as-plated, ground or honed (see 6.1.2).

l) Details of any heat treatment required after electroplating (see clause 7) and how soon after electroplating this is to be done (see also B.4.2).

3.1.2 Additional information. The additional information listed in a) to i), as applicable, shall be supplied by the purchaser, if necessary in consultation with the electroplater.

- a) For reclaimed articles, the nominal composition, or specification and metallurgical condition of the basis material, or as much relevant information as is available.
 - b) Whether any defects in the coating in its final condition can be tolerated and, if so, the type, size, location and number permitted (see 6.1.1).
 - c) If applicable, the required surface roughness (see 6.1.2).
 - d) If applicable, the required coating hardness (see 6.1.5).
- NOTE Guidance is given in Appendix A.
- e) if applicable, the maximum porosity (see 6.1.7).
 - f) Whether a sampling procedure is required (see clause 4).
 - g) The method, as agreed between the purchaser and the electroplater, to be used to determine:
 - 1) the required undercoat thickness(es);
 - 2) the required coating thickness (see 6.1.3).