

Design of articles that are to be coated —

Part 2: Recommendations for electroplated and autocatalytic coatings

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The preparation of this British Standard was entrusted by the Surface Coatings (other than Paints) Standards Policy Committee (SRC/-) to Technical Committee SRC/10, upon which the following bodies were represented:

- British Anodising Association
- Institute of Metal Finishing
- Institute of Sheet Metal Engineering
- Institute of Vitreous Enamellers
- International Tin Research Institute
- Metal Finishing Association
- Welding Institute
- Zinc Development Association

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Foreword

This Part of BS 4479 has been prepared under the direction of the Surface Coatings (other than Paints) Standards Policy Committee and is based on a draft prepared by the Institute of Metal Finishing. The BSI Technical Committee acknowledges the contribution to this revision by the Institute¹⁾ and by the Committee for the Promotion of Electroplating. This Part of BS 4479 is one of a series of Parts which together form a revision of BS 4479:1969. On publication of all the Parts, BS 4479:1969 will be withdrawn. This revision of BS 4479 comprises the following Parts:

- *Part 1: General recommendations;*
- *Part 2: Recommendations for electroplated and autocatalytic coatings;*
- *Part 3: Recommendations for conversion coatings;*
- *Part 4: Recommendations for paint coatings and varnish coatings;*
- *Part 5: Recommendations for anodic oxidation coatings;*
- *Part 6: Recommendations for hot-dip metal coatings;*
- *Part 7: Recommendations for thermally sprayed coatings;*
- *Part 8: Recommendations for vitreous enamel coatings;*
- *Part 9: Recommendations for low pressure and vacuum deposited coatings.*

BS 4479 is directed towards helping to maximize the benefit obtained from coating processes. There is a wide variety of coating processes, developed and established industrially, intended to enhance or transform the surfaces of manufactured articles. However, time and money are often wasted because the design of many articles is unsuitable for the coating process to be applied. Coating is only one part of the manufacturing process and should not be ignored, or viewed in isolation, when considering the overall costs and quality.

This revision of BS 4479 has been undertaken to extend the range of coating processes covered. It is not intended to cover every conceivable design detail, type of article or service condition. Adherence to the general principles described will, however, greatly assist in the achievement of the desired results. In any case of doubt or difficulty, specialist advice in the particular type of process being considered should be sought.

This Part of BS 4479 is not a specification and should not be used as such. The recommendations are intended to provide guidance towards good practice.

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⁾ Institute of Metal Finishing.

1 Scope

This Part of BS 4479 gives recommendations for the design of parts that are to be coated by electroplating or autocatalytic plating.

This Part of BS 4479 applies to the various techniques available for vat and barrel electroplating, selective electroplating, autocatalytic plating (commonly referred to as electroless plating, though this term is deprecated), but does not give full details of the various processes available for the plating of either metallic or non-metallic surfaces.

NOTE 1 Many of the basic design recommendations given are equally applicable to both metallic articles and to those manufactured from other materials, e.g. plastics.

NOTE 2 It is recommended that Part 1 of BS 4479 be read in conjunction with this Part. Part 1 includes a list of British Standards relating to processes covered by BS 4479 but not necessarily referred to in each Part.

NOTE 3 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 4479, the following definitions apply.

2.1

electroplated coating

a coating obtained by electrodeposition for the purpose of securing an adherent metallic surface with properties or dimensions different from those of the basis material

2.2

electrodeposition

the process of depositing a substance upon an electrode by electrolysis

2.3

autocatalytic coating

deposition of a metallic coating by a controlled chemical reduction that is catalysed by the metal or alloy being deposited

NOTE Electroless plating is a deprecated term.

2.4

barrel electroplating

a process by which electroplated coatings are applied to articles in bulk in a rotating container

2.5

vat plating

a process in which the articles to be electroplated are independently attached to the cathode

2.6

brush electroplating

a method of electroplating in which the electrolyte is contained in a pad or brush in contact with the anode. The pad or brush is applied to the part to be processed which is given opposite polarity

2.7

linishing

a process whereby flat surfaces are directionally ground by means of an abrasive bonded to an endless flexible belt

2.8

polishing

the smoothing of a metal surface

2.9

electropolishing

the smoothing and brightening of a metal surface by making it anodic in an appropriate solution

2.10

chemical polishing

immersion of a metal surface in a solution to produce improved surface smoothness

2.11

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

3 Design considerations for electroplated articles

3.1 General

Plating is a process of depositing a metal, or alloy, on to the surface of an article, usually made of a different metal. It is also possible to deposit metals on to a non-metallic material. Plating can be effected with the aid of an electric current (electroplating) or by immersion in an appropriate solution (autocatalytic plating).

There are three main reasons for the application of a metallic coating by electrodeposition:

- a) to provide an increased resistance to corrosion;
- b) for decorative purposes;
- c) for engineering applications.

Articles to be plated are normally suspended on wires or jigs in vats, or, in the case of articles that can be handled in bulk, are processed in rotating barrels.