INTERNATIONAL STANDARD

**ISO 17668**

First edition
2016-02-01

# Zinc diffusion coatings on ferrous products — Sherardizing — Specification

*Revêtements par diffusion de zinc sur les produits ferreux — Shérardisation — Spécification*

Reference number
ISO 17668:2016(E)



ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

# Contents

Page

**Foreword** ... **iv**
**Introduction** ... **v**
**1 Scope** ... **1**
**2 Normative references** ... **1**
**3 Terms and definitions** ... **1**
**4 General requirements** ... **3**
4.1 Surface condition base material ... 3
4.2 Information to be supplied by the purchaser ... 3
**5 Acceptance inspection and sampling** ... **3**
**6 Coating properties** ... **4**
6.1 Appearance ... 4
6.2 Thickness ... 4
6.2.1 General ... 4
6.2.2 Test methods ... 4
6.2.3 Reference areas ... 5
6.2.4 Magnetic method or electro-magnetic method ... 5
6.2.5 Gravimetric method ... 5
6.2.6 Thickness requirements ... 5
6.3 Acceptance criteria ... 6
6.4 Additional clearances for threaded components ... 6
**7 Ceritificate of compliance** ... **6**
**Annex A** (normative) **Information to be supplied by the purchaser to the sherardizer** ... **7**
**Annex B** (informative) **Determination of thickness** ... **8**
**Annex C** (informative) **General information** ... **10**
**Annex D** (informative) **Corrosion resistance of sherardized layers** ... **12**
**Bibliography** ... **13**

# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 107, *Metallic and other inorganic coatings*, Subcommittee SC 4, *Hot dip coatings (galvanized, etc.)*.

# Introduction

Sherardizing is a thermal diffusion coating process in which ferrous articles are heated in the presence of a sherardizing mixture consisting of zinc dust with or without an inert material.

The process is commonly performed in closed, slowly rotating or fixed containers at temperatures ranging from around 300 °C to 500 °C. The normal processing temperature is below the melting point of zinc (419 °C).

During the process, zinc reacts with the surface to form inter-metallic layers on ferrous articles.

A coating thickness of 10 µm to 75 µm (and higher if required) can be achieved. The coating thickness is accurately controlled by the amount of zinc dust, processing time and temperature. The coating closely follows the contours of the base material and uniform coating thicknesses are produced on articles, including those of irregular shape.

After sherardizing, the container load is cooled down. A screening process separates the sherardized articles from the unused sherardizing mixture. The articles, with the zinc-iron inter-metallic layers, are eventually post-treated (by phosphating, chromating or another suitable passivation process) resulting in a clean and passivated surface.

It is common to use articles coated with zinc-iron inter-metallic layers as a primer or base-coat for duplex-systems.

For additional information about the sherardizing process and the application possibilities of sherardized articles, see Reference [12] and Reference [13].

Sherardizing (thermal diffusion coating) is also known as the following:

— diffusion zinc plating (Germany);

— thermal diffusion coating (Russia);

— thermal diffusion galvanizing (Ukraine);

— vapour galvanizing (UK);

— zinc diffusion coating (USA);

— zinc inter-metallic coating (Russia);

— zinc thermo diffusion galvanizing (Israel).

In China, Europe and the USA, the common name for the thermal diffusion coating process is sherardizing.

# Zinc diffusion coatings on ferrous products — Sherardizing — Specification

## 1 Scope

This International Standard specifies minimum thickness requirements for six classes of zinc diffusion layers applied to ferrous products by the sherardizing process for the purpose of protection against corrosion and wear.

This International Standard does not specify any requirements for the surface condition (finish or roughness) of the basis material before sherardizing.

Post-treatments (conversion coatings), after-treatments or organic over-coatings (Duplex) of sherardized articles are not in the scope of this International Standard.

NOTE 1 For general information about post-treatments, see Annex C and Annex D.

This International Standard does not apply to sherardized products (e.g. fasteners, tubes) for which specific standards exist and which might include additional requirements or requirements which are different from those of this International Standard.

NOTE 2 Individual product standards can incorporate this International Standard for the coating by quoting its number, or can incorporate it with modification specific to the product.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1460, *Metallic coatings — Hot dip galvanized coatings on ferrous materials — Gravimetric determination of the mass per unit area*

ISO 2064, *Metallic and other inorganic coatings — Definitions and conventions concerning the measurement of thickness*

ISO 2178, *Non-magnetic coatings on magnetic substrates — Measurement of coating thickness — Magnetic method*

ISO 2808, *Paints and varnishes — Determination of film thickness*

ISO 10474, *Steel and steel products — Inspection documents*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2064 and the following apply.

**3.1**
**sherardizing process**
zinc diffusion coating process in which articles are heated in close contact with a *sherardizing mixture* (3.3), commonly performed in a closed slowly rotating container or a fixed (non-rotating) container, to form *sherardized layers* (3.2)