

This is a preview of "ISO 9588:2007". [Click here to purchase the full version from the ANSI store.](#)

Second edition  
2007-12-15

---

---

## **Metallic and other inorganic coatings — Post-coating treatments of iron or steel to reduce the risk of hydrogen embrittlement**

*Revêtements métalliques et autres revêtements inorganiques —  
Traitements après revêtement sur fer ou acier pour diminuer le risque  
de fragilisation par l'hydrogène*



Reference number  
ISO 9588:2007(E)

© ISO 2007

This is a preview of "ISO 9588:2007". [Click here to purchase the full version from the ANSI store.](#)

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

This is a preview of "ISO 9588:2007". [Click here to purchase the full version from the ANSI store.](#)

## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 9588 was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*, Subcommittee SC 3, *Electrodeposited coatings and related finishes*.

This second edition cancels and replaces the first edition (ISO 9588:1999), Table 1 of which has been technically revised and replaced with Tables 1 and 2.

## Introduction

When atomic hydrogen enters steels and certain other metals, for example aluminium and titanium alloys, it can cause loss of ductility or load-carrying ability, or cracking (usually as sub-microscopic cracks), or catastrophic brittle failures at applied stresses well below the yield strength, or even the normal design strength, for the alloys. This phenomenon often occurs in alloys that show no significant loss in ductility, when measured by conventional tensile tests, and is frequently referred to as hydrogen-induced delayed brittle failure, hydrogen stress cracking or hydrogen embrittlement. The hydrogen can be introduced during cleaning, pickling, phosphating, electroplating and autocatalytic processes, as well as in service as a result of cathodic protection or corrosion reactions. Hydrogen can also be introduced during fabrication prior to cleaning, pickling and application of coatings, for example, during roll forming, machining and drilling, due to the breakdown of unsuitable lubricants, as well as during welding or brazing operations.

The susceptibility to hydrogen embrittlement, resulting from the absorption of atomic hydrogen and/or the tensile stresses induced during fabrication, can be reduced by heat treatment. The time-temperature relationship of the heat treatment is dependent on the composition and structure of steels, as well as on the specific coatings being applied and the nature of the coating procedures. For most high-strength steels, the effectiveness of the heat treatment falls off rapidly with reduction of time and temperature.

This International Standard is intended for use by purchasers in specifying requirements to the electroplater, supplier or processor and is to be indicated on the part drawing or purchase order.