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Watch-cases and accessories — Vapour phase deposited coatings

Boîtes de montres et leurs accessoires — Revêtements déposés en phase vapeur

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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

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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).

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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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 114, *Horology*, Subcommittee SC 6, *Precious metal coverings*.

This second edition cancels and replaces the first edition (ISO 16253:2007), which has been technically revised. The main change is the update of normative references.

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Introduction

This document has been developed in order to meet the global need for a definition of the requirements and tests that enable characterization of coatings applied by vapour phase deposition to watch-cases and their accessories.

It defines the terms used in connection with the main vapour phase deposition processes, and presents the requirements relating to the appearance and strength of the deposited coatings, as well as their resistance to physical and chemical attack. On the conclusion of an agreement between the customer and the supplier, some latitude is left as to the choice of standard test methods and determination of acceptable limit values.

This document defines a simple structure, which facilitates identification of the base material, the deposited coatings and their thickness, in order to give information to consumers. It advises manufacturers to provide these indications in the documents supplied with the watch.

To protect the consumer, this document stipulates the conditions for marking watch-cases and their accessories, as well as the required compliance with ISO 3160-1, which specifies the thickness and minimum gold content for gold alloy coatings.

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Watch-cases and accessories — Vapour phase deposited coatings

1 Scope

This document specifies the general requirements and test methods for hard coatings obtained by vapour phase deposition processes intended to improve mainly the surface aspect and wear and corrosion resistance, and/or to offer protection against contact-allergy. It is applicable to watch-cases and accessories.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2819, *Metallic coatings on metallic substrates — Electrodeposited and chemically deposited coatings — Review of methods available for testing adhesion*

ISO 3160-1, *Watch-cases and accessories — Gold alloy coverings — Part 1: General requirements*

ISO 3160-2, *Watch-cases and accessories — Gold alloy coverings — Part 2: Determination of fineness, thickness, corrosion resistance and adhesion*

ISO 8654, *Colours of gold alloys — Definition, range of colours and designation*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 23160, *Watch cases and accessories — Tests of the resistance to wear, scratching and impacts*

ISO 27874, *Metallic and other inorganic coatings — Electrodeposited gold and gold alloy coatings for electrical, electronic and engineering purposes — Specification and test methods*

EN 1811, *Reference test method for release of nickel from all post assemblies which are inserted into pierced parts of the human body and articles intended to come into direct and prolonged contact with the skin*

EN 12472, *Method for the simulation of wear and corrosion for the detection of nickel release from coated items*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
vapour phase deposited coating
coating that is deposited by the transfer of atoms from a source to the substrate through vapour phase

Note 1 to entry: The transfer can be purely physical (PVD: physical vapour deposition) or can be done through chemical reaction (CVD: chemical vapour deposition). The gas phase transfer can be used to form chemical compounds like ceramics, by injecting a reactive gas.

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3.2
ion plating
coating process in which the substrate and the growing layer are continuously receiving impacts of energetic particles, usually ions from the plasma of a glow discharge, accelerated toward the biased substrate

3.3
sputtering
coating process in which atoms ejected from a target (cathode) surface by the impacts of gaseous ions from the plasma of a glow discharge, are deposited on to the substrate

3.4
hard coating
coating with a hard material such as titanium nitride (TiN) or titanium carbide (TiC) having a hardness value of more than 1 000 HV (Vickers hardness)

4 Requirements

4.1 Coating

4.1.1 Appearance of coating

The appearance of the coating shall be tested according to the method and conditions specified in Annex A. The coating on the significant surface of the coated item shall be free from harmful defects or from any sign of a defect which is detrimental to usage, such as coating peel-off, irregular colour tone, roughness, cracks, pits, exposure of base material and any permanent stain.

4.1.2 Thickness of coating

The thickness of the coating is specified according to agreement between the customer and the supplier. The thickness of the coating shall be tested according to one of the methods given in 5.3 and the coating thickness at the significant surface shall comply with the specified thickness.

4.1.3 Adhesion of coating

The adhesion of the coating shall be tested according to one of the methods given in 5.4 and the coating shall be free from such signs of defective adhesion as peeling or blister.

4.1.4 Corrosion resistance of coating

The corrosion resistance of the coating shall be tested according to one of the methods given in 5.5 and shall comply with the specified criteria, when the corrosion resistance is specified.

4.1.5 Hardness of coating

The hardness of the coating shall be tested according to one of the methods given in 5.6 and shall comply with the specified value, when the hardness of coating is specified.

4.1.6 Wear resistance of coating

The wear resistance of the coating shall be tested according to one of the methods given in 5.7.1 and shall comply with the specified criteria, when the wear resistance is specified.

Considering the very small thickness of the coating, a certain degree of wear of the edges can be considered as acceptable; whereas wear, change of colour or of appearance of the flat or rounded sides (with a large radius), is not acceptable.

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