International Standard ISO 3160/2

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Watch cases and accessories — Gold alloy coverings — Part 2: Determination of fineness, thickness and corrosion resistance

Boîtes de montres et leurs accessoires — Revêtements d'alliage d'or — Partie 2: Détermination du titre, de l'épaisseur et de la résistance à la corrosion

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Watch cases and accessories — Gold alloy coverings — Part 2: Determination of fineness, thickness and corrosion resistance

0 Introduction

ISO 3160 consists of three parts:

Part 1: General requirements.

Part 2: Determination of fineness, thickness and corrosion resistance.

Part 3: Mechanical properties.[1)]

1 Scope

This part of ISO 3160 specifies methods to determine fineness, thickness and corrosion resistance for gold alloy coverings on watch cases and horological components.

The tests apply only to significant surfaces.

2 Field of application

This part of ISO 3160 applies to all gold alloy coverings specified in ISO 3160/1.

In this context the term "corrosion" includes tarnishing and oxidation, as well as surface penetration and the effects of the penetration of corrosive agents into gaps in the surface protection.

It is generally required that, except where specified to the contrary, gold alloy covered surfaces should not have suffered any damage after each of the proposed tests. In practice, however, this condition is never strictly fulfilled and certain minute changes are observed especially at the edges of the gold-covered parts. Consequently, interpretation of the results requires a certain amount of common sense and, if necessary, an agreement between supplier and customer. The presence of such almost inevitable faults makes it impossible to sell the tested item as new. In this respect, the tests are therefore to be considered as destructive.

The test methods apply to all gold alloy coverings specified in ISO 3160/1.

3 References

ISO 1463, *Metal and oxide coatings — Measurement of thickness by microscopical examination of cross-section.*

ISO 2177, *Metallic coatings — Measurement of coating thickness — Coulometric method by anodic dissolution.*[2)]

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

ISO 3497, *Metallic coatings — Measurement of coating thickness — X-ray spectrometric methods.*

ISO 3543, *Metallic and non-metallic coatings — Measurement of thickness — Beta backscatter method.*

ISO 3868, *Metallic and other non-organic coatings — Measurement of coating thicknesses — Fizeau multiple-beam interferometry method.*

ISO 4524, *Metallic coatings — Test methods for electroplated coatings of gold and gold alloy.*[3)]

ISO 4538, *Metallic coatings — Thioacetamide corrosion test (TAA test).*

4 Definition

significant surface: That part of the surface which is to receive the gold alloy covering and which is essential to the appearance and serviceability of the component.

In case of no agreement between supplier and customer, significant surface will be any surface which can be touched by a 5 mm diameter ball.

1) In preparation.

2) At present at the stage of draft. (Revision of ISO 2177-1972.)

3) At present at the stage of draft. (Parts 1 to 7.)

7.2.3 Non-significant surfaces

The non-significant surfaces of the object shall be coated with a lacquer or a covering which is sufficiently resistant to prevent any attack on the protected metal throughout the duration of the test.

7.3 Continuity of the covering (porosity test)

7.3.1 Test for a cuprous base-metal with or without nickel, and die-cast zinc based alloy.

7.3.1.1 Test vessel

Use a suitable closed vessel, made of glass or acid-resistant plastic, and expose the sample to the corrosive atmosphere on all sides.

7.3.1.2 Test solution

The solution shall be of the following composition:

- Pure concentrated acetic acid: 25 % (m/m)
- Water: 75 % (m/m)

The vessel shall be filled with this solution to a depth of about 10 mm. The walls of the vessel shall be lined with thick white blotting paper which dips into the liquid.

7.3.1.3 Position of the sample

The sample shall be suspended on a glass hook at a distance of at least 30 mm from the liquid and the walls of the vessel.

7.3.1.4 Test temperature

The test temperature shall be 23 ± 2 °C.

7.3.1.5 Duration of the test

The duration of the test shall be 24 h.

7.3.1.6 Criteria

When observed, the sample shall not reveal to the naked eye either green droplets or accumulations of green deposits anywhere on the significant surface. On zinc die-cast alloys, no white deposit shall appear.

7.3.2 Test for a ferrous base-metal

7.3.2.1 Test vessel

The test shall be carried out in a suitable closed vessel made of glass or acid-resistant plastic, in which the sample is exposed to the corrosive atmosphere on all sides.

7.3.2.2 Test mixture

The supersaturated mixture shall have the following composition:

- Crystallized sodium disulphite $Na_2S_2O_5$: 45 % (m/m)
- Water: 55 % (m/m)

The vessel shall be filled with this solution to a depth of about 10 mm. Its walls shall be lined with thick white blotting paper which dips into the liquid.

7.3.2.3 Position of the sample

The sample shall be suspended on a glass hook at a distance of at least 30 mm from the liquid and the walls of the vessel.

7.3.2.4 Test temperature

The test temperature shall be 23 ± 2 °C.

7.3.2.5 Duration of the test

The duration of the test shall be 24 h.

7.3.2.6 Criteria

When observed, the sample shall not reveal to the naked eye any traces of corrosion anywhere on the significant surface. Slight general tarnishing of low-carat coatings is admissible.

7.3.3 Non-determination of base metal

Where the base metal cannot be determined, use the test described in 7.3.1.

7.4 Testing with saline and acid agents (synthetic perspiration test)

7.4.1 Test vessel

The test shall be carried out in a closed Pyrex glass (or equivalent) vessel, which can be heated in an oven to 40 °C.

7.4.2 Test solution

The solution used shall have the following composition:

- Sodium chloride: 20 g/l
- Ammonium chloride: 17,5 g/l
- Urea: 5 g/l
- Acetic acid: 2,5 g/l
- Lactic acid: 15 g/l
- Sodium hydroxide: quantity required to bring the pH to 4,7.

The vessel shall be filled with the solution to a depth of about 10 mm.