
**Decorative metallic coatings for
radio wave transmissive application
products — Designation and
characterization method**

*Revêtements métalliques décoratifs pour les produits d'application
transmettant les ondes radio — Désignation et méthode de
caractérisation*



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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 document 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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This document was prepared by Technical Committee ISO/TC 107, *Metallic and inorganic coatings*, Subcommittee SC 9, *Physical vapour deposition coatings*.

This second edition cancels and replaces the first edition (ISO 5154:2022), of which it constitutes a minor revision. The changes are as follows:

- updated titles of [Table 4](#) and [Table 5](#);
- updated the position shifts of circles in [Figure B.6](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document was developed to provide the designation of the characteristics of the decorative metallic coatings for radio wave transmissive application products, in response to worldwide demand for the standardization of such products. This document was also developed to specify the standard method to quantitatively characterize the decorative parts with the metallic coatings that both have the low transmission loss of radio wave and the metallic appearance.

One of the typical applications of the radio wave transmissive application products is the metallized plastic emblem and other decorative exterior parts for automobiles. These parts are placed in front of the millimetre wave radar transmitter-receivers of the collision prevention system. A typical example of these parts has the low transmission loss of the specific radio wave lower than 2,5 dB and the bright metallic appearance with lightness of 70 or higher. Low transmission loss is consistent with metallic appearance by forming a discontinuous structure of metallic coatings. An example of the discontinuous coating is the sputter-deposited film of low melting point metals such as indium having island structure.

This document specifies the designation and the characterization methods of the decorative metallic coatings of the products for radio wave transmissive application. The designation consists of the transmission loss of the radio wave, the frequency band of the radio wave under consideration, the lightness and hue of the parts, as well as the main material and manufacturing process of metallic coatings. The characterization methods consist of the determination of the transmission loss of radio wave with specific frequency band and the evaluation of lightness and hue which represent the colour and appearance.

Examples of measurement results of the radio wave transmission loss and the colour characteristics are described in [Annex A](#) and [Annex B](#), respectively. The information in annexes is for the convenience of users and does not constitute an endorsement by ISO.

Decorative metallic coatings for radio wave transmissive application products — Designation and characterization method

1 Scope

This document specifies the designation and the characterization methods of the decorative metallic coatings of the products for radio wave transmissive application. The designation consists of the transmission loss of the radio wave, the frequency band of the radio wave under consideration, the lightness and hue of the parts, as well as the main material and manufacturing process of metallic coatings. The characterization methods consist of the determination of the transmission loss of radio wave with specific frequency band and the evaluation of lightness and hue which represent the colour and appearance.

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 2080, *Metallic and other inorganic coatings — Surface treatment, metallic and other inorganic coatings — Vocabulary*

ISO 4519, *Electrodeposited metallic coatings and related finishes — Sampling procedures for inspection by attributes*

ISO/CIE 11664-4, *Colorimetry — Part 4: CIE 1976 $L^*a^*b^*$ colour space*

ISO 16348, *Metallic and other inorganic coatings — Definitions and conventions concerning appearance*

IEC 60050, *International Electrotechnical Vocabulary (IEV)*

IEC 62431, *Reflectivity of electromagnetic wave absorbers in millimetre wave frequency — Measurement methods*

CIE S 017, *International Lighting Vocabulary*

JIS Z 8721, *Specification of colours according to their three attributes*

ASTM D1535, *Standard Practice for Specifying Color by the Munsell System*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2080, ISO 16348, IEC 60050 and CIE S 017 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>