International Standard 7669

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Anodized aluminium and aluminium alloys — Measurement of total reflectivity using a photoelectric reflectometer

Aluminium et alliages d'aluminium anodisés — Mesurage de la réflectivité totale à l'aide d'un réflectomètre photoélectrique

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7669 was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys.*

It constitutes a partial revision of International Standard ISO 2767-1973.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Anodizing of aluminium and its alloys — Measurement of total reflectivity using a photoelectric reflectometer

0 Introduction

When light is incident on a surface, it can be reflected specularly and/or diffusely. In the case of anodized aluminium, the reflection is often complex, as the reflected light comes partly from the film surface and partly from the underlying metal surface. There are several International Standards to measure these characteristics. There are simple methods for production control (for example this International Standard and ISO 5190) and more accurate methods for laboratory evaluation (for example ISO 7668 and ISO 7759).

1 Scope and field of application

This International Standard specifies a method of measuring the total reflectivity of flat surfaces of anodized aluminium using a photoelectric reflectometer.

The method is applicable to achromatic (non-coloured) surfaces of any texture or lightness. It is regarded as an approximate method and is most suitable for production control purposes. For more accurate measurement, reference should be made to ISO 6719, *Anodizing of aluminium and its alloys — Measurement and calculation of reflectance characteristics using integrating sphere instruments.* [1)]

2 Apparatus

Reflectometer, illustrated in the figure, consisting essentially of an annular photoelectric cell of about 45 mm diameter with a central hole of 8 to 9 mm diameter. The photoelectric cell is held in an electrically insulated black plastics housing so that the sensitive surface is parallel to and about 5 mm above the plane base of the housing, which in turn rests on the surface under test. The surface of the ring separating the cell and test surface is deep black in colour with a very low reflectivity. The circular aperture is covered with a glass diffusing screen and is illuminated by means of a filament lamp (about 3 W), energized by a constant voltage source, and enclosed in a ventilated metal lamphouse.

The photoelectric cell is preferably connected to an operational amplifier and a suitable measuring instrument which is capable of giving a reading, proportional to the light flux falling on the photoelectric cell, within 1 % of the full-scale reading. Alternatively, a galvanometer, fitted with a variable shunt, can be used but this does not give a linear scale relationship.

NOTE — No requirements are specified for the spectral composition of the light source or receptor characteristics, since the method is intended for achromatic surfaces.

In commercial instruments, which are designed to perform additional functions, various colour filters can be interposed between the light and the diffusing screen by means of a rotatable wheel. These are not used for the total reflectivity measurement, which requires no filter, but a neutral grey filter is permissible for very bright surfaces. The instrument may also be provided with a metal cap over the base with a small central hole to reduce the measurement aperture.

3 Standards

3.1 Primary standard

The primary standard shall be a freshly scraped flat surface of a pure barium sulfate block to which is assigned a value of 100 on the meter or galvanometer scale. The block shall be large enough to cover completely the 45 mm diameter aperture.

3.2 Secondary standards or working standards

The working standard may be any flat surface large enough to cover the aperture of the reflectometer, and which has been calibrated against the primary standard. Suitable standards are a white ceramic tile, a white vitreous enamel or an anodized aluminium panel. The working standards shall be uniform and stable, and checked periodically by comparison with the primary standard.

1) At present at the stage of draft.