Irish Standard
I.S. EN 16813:2016

Thermal spraying - Measurement of the electrical conductivity of thermal sprayed non-iron metal coatings by means of eddy current method

I.S. EN 16813:2016

Incorporating amendments/corrigenda/National Annexes issued since publication:

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National Foreword

I.S. EN 16813:2016 is the adopted Irish version of the European Document EN 16813:2016, Thermal spraying - Measurement of the electrical conductivity of thermal sprayed non-iron metal coatings by means of eddy current method

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16813

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English Version

Thermal spraying - Measurement of the electrical conductivity of thermal sprayed non-iron metal coatings by means of eddy current method

Projection thermique - Mesurage de la conductivité électrique des revêtements métalliques non ferreux obtenus par projection thermique, à l'aide de la méthode par courants de Foucault

Thermisches Spritzen - Messung der elektrischen Leitfähigkeit thermisch gespritzter Nichteisenmetall-Schichten mittels Wirbelstromverfahren

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European foreword

This document (EN 16813:2016) has been prepared by Technical Committee CEN/TC 240 “Thermal spraying and thermally sprayed coatings”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2017, and conflicting national standards shall be withdrawn at the latest by May 2017.

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Introduction

In many applications, the electrical conductivity is a relevant technical parameter. For testing of imperfections in components or technological material properties the eddy current method can be very well applied. It can be detected or determined, for example:

— defects in welds;

— imperfections or change in the structure of a component, for example, due to aging processes in structures made out of aluminium;

— change in structure caused by temperature effects;

— thickness;

— physical material properties such as the electrical conductivity.

Due to an interaction between high frequency magnetic fields, emitted from a measuring probe, and the eddy currents induced in the object to be measured the electrical conductivity can be determined, e.g. according to ASTM E 1004 or can be used for fast and contact less measurements of a coating thickness according to EN ISO 21968.

Due to the manufacturing process thermal sprayed coatings contain a layer orientated structure. Dependent on the material used, it can also contain oxides and/or inclusions as well as porosity created due to splat boundary effects during spraying.

Besides the structure with its grain boundaries, dislocations, internal stresses and impurities, e.g. oxide skins, the specific gravity of a material plays an important role for the level of the electrical conductivity. In order to produce the highest possible level of electrical conductivity in the coating, the influencing factors for the thermal spraying process should be minimized.

1 Scope

This European standard specifies the procedure of the measurement of the electrical conductivity of non-Ferro-magnetic thermal sprayed coatings. By this measurement the absolute value of the electrical conductivity in the coating sprayed on component can be determined as well as also deviations from the agreed rated value can be used to control a running production. With that, a remarkable contribution can be applied to process and quality assurance measures of a manufacture process.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 21968, *Non-magnetic metallic coatings on metallic and non-metallic basis materials - Measurement of coating thickness - Phase-sensitive eddy-current method (ISO 21968)*

3 Terms and definitions

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

3.1
electrical conductivity
σ
physical value, which shows the ability of a material – in this case of a thermal sprayed coating – to conduct the current

Note 1 to entry: It is defined to be the constant of proportionality between the current density and the electrical field intensity within the general Formula (1) of the ohmic law. σ is measured in S/m.

$$J = \sigma \times E \tag{1}$$

where

J is the current density;

σ is the electrical conductivity;

E is the field intensity.

3.2
electrical resistance
R
value, which defines the electrical voltage, which is needed that a certain current can flow through an electrical conductor

Note 1 to entry: The unit is ohm (Ω).