



National Standards Authority of Ireland

IRISH STANDARD

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ICS 17.040.20

**THICKNESS MEASUREMENT OF COATINGS
AND CHARACTERIZATION OF SURFACES
WITH SURFACE WAVES - PART 2: GUIDE TO
THE THICKNESS MEASUREMENT OF
COATINGS BY PHOTOTHERMIC METHOD**

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English Version

Thickness measurement of coatings and characterization of surfaces with surface waves - Part 2: Guide to the thickness measurement of coatings by photothermic method

Mesure de l'épaisseur des revêtements et caractérisation des surfaces à l'aide d'ondes de surface - Partie 2 : Guide pour le mesurage photothermique de l'épaisseur des revêtements

Schichtdickenmessung und Charakterisierung von Oberflächen mittels Oberflächenwellen - Teil 2: Leitfaden zur photothermischen Schichtdickenmessung

This European Standard was approved by CEN on 2 March 2006.

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Foreword

This document (EN 15042-2:2006) has been prepared by Technical Committee CEN/TC 262 "Metallic and other inorganic coatings", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by October 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 15042-2:2006 (E)

1 Scope

This document describes methods for the measurement of the thickness of coatings by means of thermal waves generated by a radiation source.

The method can be used for coatings whose thermal properties (e.g. thermal conductivity) are different from those of the substrates in a range from a few microns to some hundred microns.

2 Normative references

The following referenced documents are indispensable for the application 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/DGuide 99998, *Guide to the expression of uncertainty in measurement (GUM) – Supplement 1: Numerical methods for the propagation of distributions*

3 Terms and definitions

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

3.1

amplitude of the thermal wave

ΔT_0

maximum local temperature variation of the oscillating part for periodic-harmonic heating processes

NOTE See Equation 2.

3.2

penetration depth of thermal waves

depth at which the temperature variation below a modulated heated surface is still measurable.

NOTE In general, the penetration depth is of the order of magnitude of the thermal diffusion length

3.3

modulation frequency

f

frequency at which the intensity of the heating radiation varies periodically

3.4

phase (phase shift) of the thermal wave

$\Delta \Phi$

measure of the temporal delay of the temperature oscillation relative to the excitation for periodic-harmonic heating processes

NOTE See Equation 3.

3.5

photothermal efficiency

η

proportion of the incident radiation intensity that is converted into heat

NOTE In most technical applications it is approximately identical to the absorption.

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