



National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 15042-1:2006

ICS 17.040.20

**THICKNESS MEASUREMENT OF COATINGS
AND CHARACTERIZATION OF SURFACES
WITH SURFACE WAVES - PART 1: GUIDE TO
THE DETERMINATION OF ELASTIC
CONSTANTS, DENSITY AND THICKNESS OF
FILMS BY LASER
INDUCED SURFACE ACOUSTIC WAVES**

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*This Irish Standard was
published under the
authority of the National
Standards Authority of
Ireland and comes into
effect on:
5 July 2006*

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EUROPEAN STANDARD

EN 15042-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2006

ICS 17.040.20

English Version

Thickness measurement of coatings and characterization of surfaces with surface waves - Part 1: Guide to the determination of elastic constants, density and thickness of films by laser induced surface acoustic waves

Mesure de l'épaisseur des revêtements et caractérisation des surfaces à l'aide d'ondes de surface - Partie 1 : Guide pour la détermination des constantes élastiques, de la masse volumique et de l'épaisseur des films à l'aide d'ondes acoustiques de surface générées par laser

Schichtdickenmessung und Charakterisierung von Oberflächen mittels Oberflächenwellen - Teil 1: Leitfaden zur Bestimmung von elastischen Konstanten, Dichte und Dicke von Schichten mittels laserinduzierten Ultraschall-Oberflächenwellen

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

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Foreword

This document (EN 15042-1:2006) 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 15042-1:2006 (E)

1 Scope

This document gives guidance on methods of determining the elastic constants, density and thickness of thin films by laser-induced surface acoustic waves.

It defines terms and described procedures.

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.

EN ISO 11145:2001, *Optics and optical instruments — Laser and laser-related equipment — Vocabulary and symbols* (ISO 11145:2001)

International Vocabulary of Basic and General Terms in Metrology, 2nd Edition 1994, Beuth Verlag GmbH Berlin Wien Zürich

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the International Dictionary of Metrology (VIM), EN ISO 11145:2001 and the following apply.

3.1

surface acoustic waves

ultrasonic wave propagating along the surface of the material

NOTE An important property of this wave is the penetration depth into the material, which depends on frequency.

3.2

phase velocity

velocity at which the phase of the wave propagates

3.3

group velocity

velocity at which the surface acoustic wave impulse induced by the laser propagates

3.4

dispersion

dependence of the phase velocity on the frequency of the wave

3.5

dispersion relation

ratio of angular frequency to the amount of the wave vector (wave number)

3.6

dispersion degree

difference between phase and group velocity

NOTE The dispersion degree is expressed as a percentage.

3.7

bandwidth

frequency range of the amplitude spectrum

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