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Non-destructive testing — Ultrasonic examination —

Part 4: Examination for discontinuities perpendicular to the surface

The European Standard EN 583-4:2002, with the incorporation of amendment A1:2003 has the status of a British Standard

ICS 19.100

National foreword

This British Standard is the official English language version of EN 583-4:2002, including amendment A1:2003.

The UK participation in its preparation was entrusted to Technical Committee WEE/46, Non-destructive testing, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

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Summary of pages

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English version

**Non-destructive testing - Ultrasonic examination - Part 4:
Examination for discontinuities perpendicular to the surface**
(includes amendment A1:2003)

Essais non destructifs - Contrôle ultrasonore - Partie 4:
Contrôle des discontinuités perpendiculaires à la surface
(inclut l'amendement A1:2003)

Zerstörungsfreie Prüfung - Ultraschallprüfung - Teil 4:
Prüfung auf Inhomogenitäten senkrecht zur Oberfläche
(enthält Änderung A1:2003)

This European Standard was approved by CEN on 20 October 2001, and amendment A1 was approved by CEN on 20 November 2003.

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 Management Centre 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 Management Centre has the same status as the official versions.

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Foreword

This document (EN 583-4:2002) has been prepared by Technical Committee CEN /TC 138, "Non-destructive testing", the secretariat of which is held by AFNOR.

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 March 2003, and conflicting national standards shall be withdrawn at the latest by March 2003.

This standard consists of the following parts:

EN 583-1, *Non-destructive testing - Ultrasonic examination - Part 1: General principles*

EN 583-2, *Non-destructive testing - Ultrasonic examination - Part 2: Sensitivity and range setting*

EN 583-3, *Non-destructive testing - Ultrasonic examination - Part 3: Transmission technique*

EN 583-4, *Non-destructive testing - Ultrasonic examination - Part 4: Examination for discontinuities perpendicular to the surface*

EN 583-5, *Non-destructive testing - Ultrasonic examination - Part 5: Characterization and sizing of discontinuities*

ENV 583-6, *Non-destructive testing - Ultrasonic examination - Part 6: Time-of-flight diffraction technique as a method for detection and sizing of discontinuities*

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

Annex A is informative

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

Foreword to amendment A1

This document EN 583-4:2002/A1:2003 has been prepared by Technical Committee CEN/TC 138 "Non-destructive testing", the secretariat of which is held by AFNOR.

This Amendment to the European Standard EN 583-4:2002 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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

1 Scope

This European Standard defines the principles for tandem- and LLT¹-examination for the detection of discontinuities perpendicular to the surface.

The general principles required for the ultrasonic examination of industrial products are described in EN 583-1. A list of symbols and equations is given in EN 583-2.

The tandem- or LLT-examination should be used for the detection of planar discontinuities with distance to the surface greater than 15 mm. This standard has been prepared for the examination of metallic materials with a thickness between 40 mm and 500 mm with parallel or concentric surfaces. It can, however, be used for other materials and smaller thickness provided special measures are taken.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 583-1, *Non-destructive testing - Ultrasonic examination - Part 1: General principles*.

EN 583-2, *Non-destructive testing - Ultrasonic examination - Part 2: Sensitivity and range setting*.

EN 1330-4, *Non-destructive testing - Terminology - Part 4: Terms used in ultrasonic testing*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions of EN 1330-4 apply.

4 Tandem examination

4.1 General

The examination is normally carried out using two similar 45° angle probes, one probe operating as the transmitter and the other probe as receiver. For wall thicknesses greater than approximately 160 mm, probes with different transducer sizes are preferred in order to ensure approximately the same beam diameters in the examination zone.

The use of probe angles other than 45° may be necessary to comply with particular geometrical conditions. Probe angles that give rise to mode conversions shall be avoided.

The probes are located in a line with their acoustic axis in the same direction. In this way the sound beam from the rear probe will, after reflection from the opposite surface, intersect the sound beam from the front probe at the centre of the examination zone.

Figure 1 shows the relationship between the spacing of the probes (y) and the examination depth of the crosspoint (t_m) and the height of the examination zone (t_z).

¹ LLT means longitudinal-longitudinal-transverse wave.