SLOVENSKI STANDARD
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Non-destructive testing - Penetrant testing - Part 1: General principles (ISO 3452-1:2013) (ISO 3452-1:2013, Corrected version 2014-05-01)

Zerstörungsfreie Prüfung - Eindringprüfung - Teil 1: Allgemeine Grundlagen (ISO 3452-1:2013) (ISO 3452-1:2013, korrigierte Fassung 2014-05-01)

Essais non destructifs - Essai par ressuage - Partie 1: principes généraux (ISO 3452-1:2013)(ISO 3452-1:2013, Version corrigée 2014-05-01)

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Zerstörungsfreie Prüfung - Eindringprüfung - Teil 1: Allgemeine Grundlagen (ISO 3452-1:2013, korrigierte Fassung 2014-05-01)

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN ISO 3452-1:2013) has been prepared by Technical Committee CEN/TC 138 “Non-destructive testing", the secretariat of which is held by AFNOR, in collaboration with Technical Committee ISO/TC 135 "Non-destructive testing".

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of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 3452-1:2013, Corrected version 2014-05-01 has been approved by CEN as EN ISO 3452-1:2013 without any modification.

INTERNATIONAL STANDARD

ISO 3452-1

Second edition
2013-06-01

Corrected version
2014-05-01

Non-destructive testing — Penetrant testing —

Part 1: General principles

Essais non destructifs — Examen par ressuage —

Partie 1: Principes généraux

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC ISO 3452-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 138, *Non-destructive testing*, in collaboration with ISO Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 2, *Surface methods*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 3452-1:2008) which has been technically revised. Changes from the first edition include a table referring to the testing products.

This corrected version of ISO 3452:2013 incorporates the following corrections: a footnote has been added to Table 1; the flowchart of Annex A has been modified.

ISO 3452 consists of the following parts, under the general title *Non-destructive testing — Penetrant testing*:

— *Part 1: General principles*

— *Part 2: Testing of penetrant materials*

— *Part 3: Reference test blocks*

— *Part 4: Equipment*

— *Part 5: Penetrant testing at temperatures higher than 50 °C*

— *Part 6: Penetrant testing at temperatures lower than 10 °C*

Non-destructive testing — Penetrant testing —

Part 1:
General principles

1 Scope

This part of ISO 3452 specifies a method of penetrant testing used to detect discontinuities, e.g. cracks, laps, folds, porosity and lack of fusion, which are open to the surface of the material to be tested. It is mainly applied to metallic materials, but can also be performed on other materials, provided that they are inert to the test media and not excessively porous (castings, forgings, welds, ceramics, etc.)

It also includes requirements for process and control testing, but is not intended to be used for acceptance criteria and gives neither information relating to the suitability of individual test systems for specific applications nor requirements for test equipment.

NOTE 1 Methods for determining and monitoring the essential properties of penetrant testing products to be used are specified in ISO 3452-2 and ISO 3452-3.

NOTE 2 The term *discontinuity* is used in this part of ISO 3452 in the sense that no evaluation concerning acceptability or non-acceptability is included.

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.

ISO 3059, *Non-destructive testing — Penetrant testing and magnetic particle testing - Viewing conditions*

ISO 3452-2, *Non-destructive testing — Penetrant testing — Part 2: Testing of penetrant materials*

ISO 3452-3, *Non-destructive testing — Penetrant testing — Part 3: Reference test blocks*

ISO 3452-4, *Non-destructive testing — Penetrant testing — Part 4: Equipment*

ISO 3452-5, *Non-destructive testing — Penetrant testing — Part 5: Penetrant testing at temperatures higher than 50 degrees C*

ISO 3452-6, *Non-destructive testing — Penetrant testing — Part 6: Penetrant testing at temperatures lower than 10 degrees C*

ISO 12706, *Non-destructive testing — Penetrant testing — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12706 apply.

4 Safety precautions

As penetrant inspection techniques often require the use of harmful, flammable and/or volatile materials, certain precautions shall be taken.

Prolonged or repeated contact of these materials with the skin or any mucous membrane should be avoided. Working areas shall be adequately ventilated and sited away from sources of heat, sparks or naked flames in accordance with local regulations.

The penetrant testing products and equipment shall be used with care and always in compliance with the instructions supplied by the manufacturer.

When using filtered UV-A sources, care shall be taken to ensure that unfiltered radiation from the UV-A source does not directly reach the eyes of the operators. Whether it forms an integral part of the lamp or is a separate component, the UV-A filter shall always be maintained in good condition.

In addition to the need to follow legislation (e.g. Directive 2006/25/EC), care shall be taken to ensure the safe implementation of the method.

5 General principles

5.1 Personnel

Testing shall be carried out by proficient, suitably trained and qualified personnel and, where applicable, shall be supervised by competent personnel nominated by the employer or, by delegation of the employer, the inspection company in charge of testing. To demonstrate appropriate qualification it is recommended that personnel be certified according to ISO 9712 or an equivalent formalized system. Operating authorization for qualified persons shall be issued by the employer in accordance with a written procedure. Non-destructive testing (NDT) operations, unless otherwise agreed, shall be authorized by a competent and qualified NDT supervisory individual (Level 3 or equivalent) approved by the employer.

5.2 Description of the method

Prior to penetrant testing the surface to be inspected shall be cleaned and dried. Suitable penetrants are then applied to the test area and enter into discontinuities open to the surface. After the appropriate penetration time has elapsed the excess penetrant is removed from the surface and the developer applied. The developer absorbs the penetrant that has entered and remains in the discontinuities and may give a clearly visible enhanced indication of the discontinuity.

Should complementary NDT be required, the penetrant inspection shall be performed first, unless otherwise agreed upon between the contracting parties, so as not to introduce contaminants into open discontinuities. If penetrant inspection is used following another NDT technique, the surface shall be cleaned carefully to remove contaminants before application.

5.3 Process sequence

Testing generally proceeds through the following stages:

a) preparation and precleaning (see 8.2);

b) application of penetrant (see 8.4);

c) excess penetrant removal (see 8.5);

d) application of developer (see 8.6);

e) inspection (see 8.7);

f) recording (see 8.7.4);

g) postcleaning (see 8.8.1).

See Annex A.

