



SLOVENSKI STANDARD
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Neporušitveno preskušanje – Penetrantski preskusi – 6. del: Penetrantski preskusi pri temperaturah, nižjih od 10 °C (ISO/DIS 3452-6:2006)

Non-destructive testing - Penetrant testing - Part 6: Penetrant testing at temperatures lower than 10 degrees C (ISO/DIS 3452-6:2006)

Zerstörungsfreie Prüfung - Eindringprüfung - Teil 6: Eindringprüfung bei Temperaturen unter 10 °C (ISO/DIS 3452-6:2006)

Essais non destructifs - Examen par ressuage - Partie 6: Examen par ressuage aux températures au-dessous de 10 degrés C (ISO/DIS 3452-6:2006)

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Non-destructive testing - Penetrant testing - Part 6: Penetrant testing at temperatures lower than 10 degrees C (ISO/DIS 3452-6:2006)

Essais non destructifs - Examen par ressuage - Partie 6:
Examen par ressuage aux températures au-dessous de 10
degrés C (ISO/DIS 3452-6:2006)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 138.

If this draft becomes a European Standard, 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.

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Foreword

This document (prEN ISO 3452-6:2006) 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 document is currently submitted to the parallel Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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DRAFT INTERNATIONAL STANDARD ISO/DIS 3452-6

ISO/TC 135/SC 2

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Non-destructive testing — Penetrant testing —

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

Essais non destructifs — Examen par ressuage —

Partie 6: Examen par ressuage aux températures au-dessous de 10 °C

ICS 19.100

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This draft International Standard is a draft standard developed within the European Committee for Standardization (CEN) and processed under the CEN-lead mode of collaboration as defined in the Vienna Agreement. The document has been transmitted by CEN to ISO for circulation for ISO member body voting in parallel with CEN enquiry. Comments received from ISO member bodies, including those from non-CEN members, will be considered by the appropriate CEN technical body. Should this DIS be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 3452-6:2006 (E) was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 2, and by Technical Committee CEN/TC 138, *Non-destructive testing* in collaboration.

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 6: Penetrant testing at temperatures lower than 10 °C

1 Scope

This document specifies the testing requirements particular to applications at low temperatures (lower than + 10 °C) as well as the method for qualification of suitable testing products.

Only materials qualified for the relevant temperature range shall be used, and always in accordance with the manufacturer's instructions.

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 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*.

3 General principles for low temperature penetrant testing

3.1 Technical principles

Depending on the temperature range, some specific problems may be addressed:

- a) moisture, or even ice, on the test object;
- b) lower evaporation rate of solvents and of non-aqueous wet developers than at higher temperatures;
- c) when spray cans are used, pressure and spray quality may be affected;
- d) some penetrants may give birth to precipitates. In such a case tests shall be carried out within the standard temperature range (10°C to 50°C) if the penetrants are to be used in such conditions.

3.2 Safety concerns

Depending on the temperature range, some specific rules shall be enforced:

- a) When heaters are used (either to warm up the test object, materials or the inspector), precautions shall be taken not to have vapours or spray of materials in contact with flames or hot surfaces.
- b) Ventilation of the area shall be enough to prevent accumulation of flammable and/or harmful vapours.

- c) Users shall wear clothes and gloves able to protect them from contact with very low temperature parts. Nevertheless, gloves shall allow for applying materials without impairing the test.
- d) In very low temperature environment, some pieces of equipment (pens, cameras, etc.) may not properly work. Action shall be taken, either to keep them at an acceptable temperature until use (for instance by keeping them under clothing, close to the people's bodies) or by using adequate equipment.

3.3 Reference blocks/Test panels

Care shall be taken while using reference block/test panels. It could be tempting to put these panels in a freezer, and to take them out when they have reached the targeted temperature for materials testing. Doing so, when cold parts are in contact with warmer atmosphere, moisture will condense to these parts and the temperature of the parts will rise very quickly.

Therefore, tests shall be carried out in "real conditions": parts, users and testing materials are either outside or in a "climatic room" in which the temperature and humidity may duplicate real conditions.

3.4 Viscosity and Penetrant Testing

If this is right that the lower the temperature, the higher liquid or gas viscosity, higher viscosity is not a drawback to penetrant testing.

Capillary effect is far more powerful than the effect of the viscosity - very viscous, even jellified penetrants, may lead to very good crack detection.

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4 Low temperature penetrant testing process

4.1 General rules

The following rules apply: standards.iteh.ai/catalog/standards/sist/a3da8f58-9c45-476b-9707-dd2a48b8cf0b/sist-en-iso-3452-6-2009

- a) Surface and discontinuities shall be free of any contaminant, even those due to surface preparation.
- b) Penetrant is applied on the part as per the most convenient means.
- c) When dwell time has elapsed, excess of penetrant will be wiped from the surface with rags and an adequate solvent (water should be avoided due to low temperatures).
- d) Low temperature penetrant testing generally is not carried out in installations. A non-aqueous wet (solvent-based) developer will then be sprayed on the test object. In low temperature conditions, solvents evaporate far slower than usual. Therefore care shall be taken that the solvent evaporation time be short enough so as to get accurate indications.
- e) Viewing conditions shall comply with the requirements of ISO 3059.

4.2 Special requirements

4.2.1 Surface preparation

Within the + 10 °C to – 5 °C range, the main trouble comes from water, either as liquid (moisture), hair-frost or even ice.

Water is detrimental to the process. To rid of it:

- a) gently warm the surface for several minutes, to make water evaporate from discontinuities, and/or