
**Guidelines for in-service inspections
for primary coolant circuit
components of light water reactors —**

**Part 4:
Visual testing**

*Lignes directrices pour les contrôles périodiques des composants du
circuit primaire des réacteurs à eau légère —*

Partie 4: Examen visuel





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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Inspection technique	4
5 Requirements	4
5.1 Test personnel.....	4
5.1.1 Task of NDT personnel.....	4
5.1.2 Personnel requirements.....	4
5.2 Test area.....	6
5.3 Optical auxiliaries and combined device system.....	6
5.3.1 General.....	6
5.3.2 Image quality and resolution.....	6
5.3.3 Construction.....	7
5.3.4 Lighting equipment for the remote visual testing.....	8
5.3.5 Data storage medium.....	8
5.3.6 Test robots.....	8
6 Testing	8
6.1 Preparation.....	8
6.1.1 General.....	8
6.1.2 Test location.....	9
6.2 Performance.....	9
6.2.1 General.....	9
6.2.2 Direct visual testing.....	10
6.2.3 Remote visual testing.....	10
6.2.4 Mechanized visual testing.....	10
6.3 Evaluation.....	10
6.4 Final measures.....	10
7 Recording	11
Annex A (informative) Examples of a test image	12
Annex B (informative) Test procedures	13
Bibliography	14

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 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 85, *Nuclear energy, nuclear technologies, and radiological protection*, Subcommittee SC 6, *Reactor technology*.

A list of all parts in the ISO 20890 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Guidelines for in-service inspections for primary coolant circuit components of light water reactors —

Part 4: Visual testing

1 Scope

This document gives guidelines for pre-service inspection (PSI) and in-service inspections (ISI) for reactor coolant circuit components of light water reactors and their installations as direct or remote visual testing in the form of a

- general visual testing (overview), or
- selective visual testing (specific properties).

This document is also applicable to other components of nuclear installations. The requirements in this document focuses on remote (mechanized) visual testing, but also specifies global requirements for direct visual testing. For specific requirements for direct visual testing of welds see ISO 17637.

This document is not applicable to tests in respect to the general state that are carried out in conjunction with pressure and leak tests and regular plant inspections.

This document specifies test methods that allow deviations from the expected state to be recognised, requirements for the equipment technology and test personnel, the preparation and performance of the testing as well as the recording.

NOTE Data concerning the test section, test extent, inspection period, inspection interval and evaluation of indications is defined in the applicable national nuclear safety standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 8596, *Ophthalmic optics — Visual acuity testing — Standard and clinical optotypes and their presentation*

ISO 9712:2012, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 18490, *Non-destructive testing — Evaluation of vision acuity of NDT personnel*

EN 1330-10, *Non-destructive testing — Terminology — Part 10: Terms used in visual testing*

EN 13018, *Non-destructive testing — Visual testing — General principles*

EN 13927, *Non-destructive testing — Visual testing — Equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1330-10 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

conspicuous indications

deviations in the actual state recorded during the visual testing from the expected target state

3.2

relevant indication

<visual testing> NDT indication (conspicuous indication) that is caused by condition or type of discontinuity that requires evaluation

[SOURCE: ISO/TS 18173:2005, 2.24]

3.3

colour intensity

difference in a colour from the equally bright achromatic colour

Note 1 to entry: Colours with equally bright achromatic colour create the same grey tone in the black-white appearance.

3.4

hue

chromatic and achromatic type of a colour

Note 1 to entry: Words like red, yellow, green etc. are used to refer to this in daily life.

Note 2 to entry: In this document achromatic colours means black and white and any type of grey.

3.5

data storage medium

<visual testing> storage medium for the storage of image information

3.6

direct visual testing

visual testing where there is an uninterrupted optical path from the observer's eye to the test area

Note 1 to entry: This test can be carried out with or without auxiliaries, e.g. magnifying glass, mirror, binoculars, borescopes, endoscopes or fibre-optics.

[SOURCE: EN 1330-10:2003, 2.12, modified — The examples given in the Note are different.]

3.7

remote visual testing

visual testing where there is an interrupted optical path from the observer's eye to the test area

Note 1 to entry: Remote visual testing may include a device system that records, communicates, visualises and, if necessary, stores image information.

[SOURCE: EN 1330-10:2003, 2.37, modified — Different systems are named in the Note.]

3.8

general visual testing

visual testing over areas of the *component* ([3.10](#)) to observe overall condition, integrity and state of degradation

[SOURCE: EN 1330-10: 2003, 2.18]