



**SLOVENSKI STANDARD**  
**SIST-TS CEN/TS 17100:2017**

**01-december-2017**

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**Neporušitvene preiskave - Pregled s penetranti in magnetnimi delci - Referenčne fotografije in dimenzioniranje označb**

Non-destructive testing - Penetrant and magnetic particle testing - Reference photographs and sizing of indications

Zerstörungsfreie Prüfung - Eindring- und Magnetpulverprüfung - Referenzfotos und Dimensionierung von Indikationen

Essais non destructifs - Contrôle par ressuage et par magnétoscopie - Photographies de référence et dimensionnement des indications

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**Ta slovenski standard je istoveten z: CEN/TS 17100:2017**

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**ICS:**

19.100          Neporušitveno preskušanje          Non-destructive testing

**SIST-TS CEN/TS 17100:2017**

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TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
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**CEN/TS 17100**

September 2017

ICS 19.100

English Version

**Non-destructive testing - Penetrant testing - Reference  
photographs and sizing of indications**

Essais non destructifs - Contrôle par ressuage et par  
magnétoscopie - Photographies de référence et  
dimensionnement des indications

Zerstörungsfreie Prüfung - Eindringprüfung -  
Referenzfotos und Dimensionierung von Anzeigen

This Technical Specification (CEN/TS) was approved by CEN on 2 July 2017 for provisional application.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## European foreword

This document (CEN/TS 17100:2017) has been prepared by Technical Committee CEN/TC 138 “Non-destructive testing”, the secretariat of which is held by AFNOR.

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.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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**CEN/TS 17100:2017 (E)****1 Scope**

This document specifies minimum requirements in order to obtain and reproduce photographs used as reference records relative to PT (penetrant testing) colour contrast and fluorescent indications. It also provides requirements for the monitoring of resolution when measurements are to be indirectly performed by recording.

**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.

CEN/TR 16638:2014, *Non-destructive testing - Penetrant and magnetic particle testing using blue light*

EN ISO 3059, *Non-destructive testing - Penetrant testing and magnetic particle testing - Viewing conditions (ISO 3059)*

EN ISO 12706, *Non-destructive testing - Penetrant testing - Vocabulary (ISO 12706)*

ISO 12233, *Photography — Electronic still picture imaging — Resolution and spatial frequency responses*

ISO 18911, *Imaging materials — Processed safety photographic films — Storage practices*

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**3 Terms and definitions**

SIST-TS CEN/TS 17100:2017

For the purposes of this document, the terms and definitions given in EN ISO 12706, ISO 12233, ISO 18911, CEN/TR 16638 and the following apply:

**3.1****reference photograph**

approved record with sufficient sharpness and details showing all or part of PT indications used as a master document and the visual baseline

**4 Safety precautions**

All relevant international, regional, national and local regulations including health and safety recommendations and particularly photobiological rating for lighting sources shall be taken into account.

**5 General principles****5.1 Purpose of a reference photograph**

A reference photograph is a representative record of an approved indication, obtained after a PT process. It can be used for indirect sizing of the indication. Precautions shall be taken for the monitoring of resolution.

The indication record shall not modify the true indication, shape, sharpness and dimensions.

The record shall reproduce the indication in a proper form.

The used medium shall be relevant to the record and sufficient enough to display with the required quality the record whatever the representation form: printed photograph, display on an active screen or projection via optical equipment.

## 5.2 Lighting equipment

### 5.2.1 General requirement

The sources used to light the scene shall provide an even lighting distribution.

Glare and reflections shall be avoided.

If a flash system is used, precautions shall be taken regarding possible vignetting and probable non-homogeneous light distribution. Accessories like a diffusing shield or an indirect beam may be used.

The uniformity lighting factor is defined as the ratio between the minimum irradiance and the maximum irradiance  $E_{\min}/E_{\max}$ .

$E_{\min}$  and  $E_{\max}$  are the average values of at least four of the lowest measurements and four of the highest measurements, performed at regular intervals in the diagonal of greater dimension perpendicular to the beam axis. For large scenes, this should not be limited to only eight measurements; the maximum spacing between two measurements is set at 3,5 cm.

### 5.2.2 White light sources

For artificial white light, the rendering colour index shall be above 0,7.

Homogeneity of the light distribution shall be better than 0,7.

Colour temperature shall meet the recommendations of the NDT materials supplier, according to EN ISO 3059.

NOTE Usually intermediate or cold white is used for colour contrast PT.

Colour appearance against Correlated colour temperature (Cct):

- warm below 3300 K;
- neutral 3300 to 5300 K;
- cold above 5300 K.

When a white background is present:

- Red dye indications have to be lit with a neutral or a cold light;
- Blue dye indications have to be lit with a neutral or a warm light.

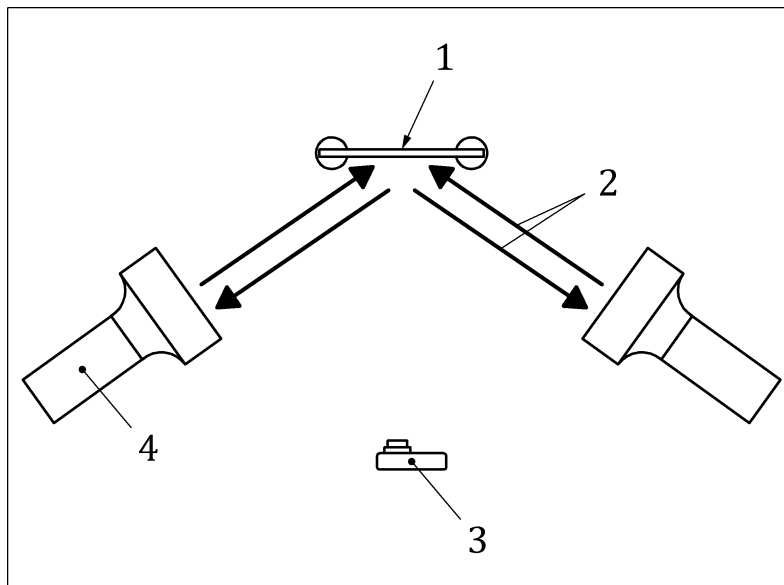
### 5.2.3 UV-A and actinic blue radiation sources

Homogeneity of the light distribution shall be better than 0,7.

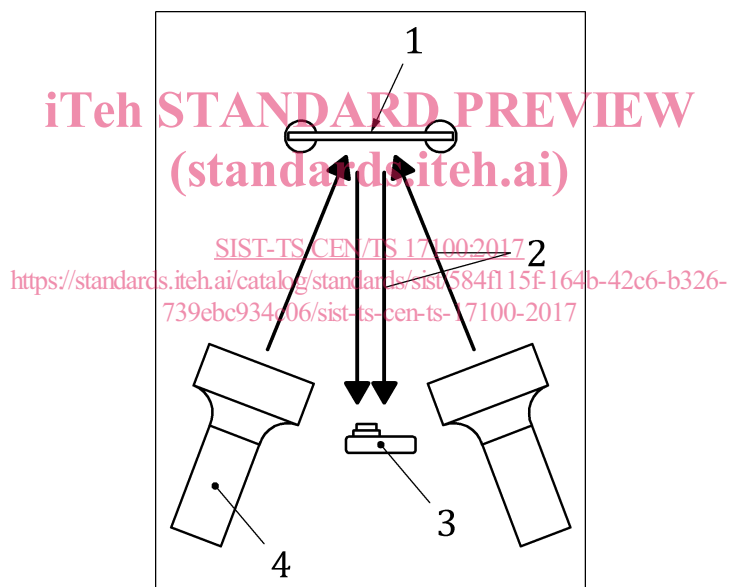
This shall also apply to other exciting lights when relevant (actinic blue as an example).

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## 5.2.4 Layout of lighting devices



a) Example of an accurate layout of lighting devices



b) Examples of a bad layout of lighting devices

**Key**

- 1 part
- 2 beams
- 3 camera
- 4 light source

**Figure 1 — Layout examples of lighting devices**

The angle between two beams shall be equal to or greater than 90°.

The maximum possible irradiance should be used to reduce the exposure time. The usual procedure is to use two radiation sources placed at equal distances on each side of the indication



and to place the camera in the middle. This procedure provides equal irradiance on the area of interest.

The radiation sources should be positioned so that no direct beams or reflections from them enter the camera.

### 5.3 Filtering

#### 5.3.1 General

The use of filters helps to bring the records close to the human eyesight by:

- enhancing the existing contrast;
- deleting unwanted background.

#### 5.3.2 White light, colour contrast technique

Colour filters can enhance indications. They shall be chosen according to the colour of the indication and the white light characteristics.

No cut-off filter is allowed: all the visible wavelength range shall be transmitted.

Polarized filters may be used to delete glare and reflections.

Conversion filters can modify the colour appearance of the source in order to meet the recommendation of NDT material supplier.

Conversion filters depend on the lamp source. When converting daylight to tungsten (5300 to 2900 K), different filters will be used if starting from daylight or an artificial white light source.

#### 5.3.3 UV-A light, fluorescent technique

UV-A filters shall be used especially if the camera lenses are UV-A transparent as this radiation may generate artificial parasitic background.

Note: Bluish, pink or violet background are signs that UV-A blocking is deficient. Some cameras may generate a green parasite background that is less easy to identify as an artificial parasitic background.

Coloured filters are allowed; if so, the filter shall not fluoresce under UV-A radiation in order not to induce an artificial background.

Care shall be taken when choosing the filter transmission in order not to absorb and dim fluorescent indications.

The following transmissions (T) generally provide acceptable results:

- below 420 nm, T is less than 10 %,
- below 450 nm, T is less than 20 %;
- peak transmission is between 500 and 550 nm (similar to the mesopic human vision peak relative response);
- above 600 nm: T is less than 40 %.

#### 5.3.4 Actinic blue filters

The filters described in CEN/TR 16638:2014, 6.4 are recommended.