SLOVENSKI STANDARD
SIST EN 12679:2000

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Neporušitveno preskušanje - Ugotavljanje velikosti radiografskih izvorov, uporabljenih v industriji - Radiografska metoda

Non-destructive testing - Determination of the size of industrial radiographic sources - Radiographic method

Zerstörungsfreie Prüfung - Bestimmung der Strahlergrößen von industriell genutzten Radio-Nukliden - Durchstrahlungsverfahren

Essais non destructifs - Détermination des dimensions des sources de radiographie industrielle - Méthode par radiographie

Ta slovenski standard je istoveten z: **EN 12679:1999**

ICS:

19.100	Neporušitveno preskušanje	Non-destructive testing

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English version

Non-destructive testing - Determination of the size of industrial radiographic sources - Radiographic method

Essais non destructifs - Détermination des dimensions des sources de radiographie industrielle - Méthode par radiographie

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This European Standard was approved by CEN on 3 September 1999.

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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 Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by April 2000, and conflicting national standards shall be withdrawn at the latest by April 2000.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

In the framework of its scope, Technical Committee CEN/TC 138 entrusted CEN/ TC 138/WG 1 "Ionizing radiations" with preparing the following standard:

EN 12679, *Non-destructive testing - Determination of the size of industrial radiographic sources - Radiographic method.*

1 Scope

This standard specifies the determination of the size of gamma radiographic sources of 0,5 mm or greater, made from the radionuclides Iridium 192, Ytterbium 169, Selenium 75 or Cobalt 60, by a method of radiography with X-rays. The source size of a gamma radiography source is an important factor which affects the image quality of gamma ray images.

The source size is determined with an accuracy of ± 10 % or 0,1 mm max.

This standard can be used for other radionuclides after validation.

Warning - Exposure of any part of the human body to X-rays or gamma-rays can be highly injurious to health. Wherever X-ray equipment or radioactive sources are in use, it is essential to apply the appropriate legal requirements.

2 Definitions

For the purposes of this standard, the following definition applies:

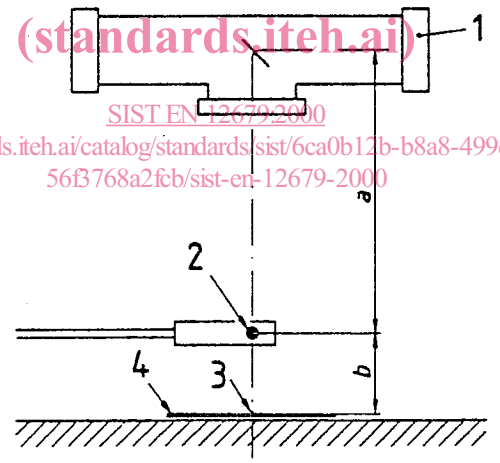
2.1
Source size *d*
size of the source of radiation

3 Test equipment (film technique)

3.1 Test alignment

The X-ray equipment has to be placed at a minimum film-focus-distance of 700 mm.

The film shall be placed perpendicular to the axis of the X-ray beam, the gamma source shall be placed on the axis between the X-ray source and the film, the gamma source to film distance b shall be 10 % to 20 % of the X-ray source to film distance a + b, see figure 1.



magnifying factor: $m = \frac{d'}{d} = \frac{a+b}{a}$

Key

1 X-ray tube
2 gamma source: size d
3 image of gamma source: projected size d'
4 film

Figure 1 – Test alignment

3.2 Test parameters

An image of radiation source that has sufficient contrast to be easily measured shall be obtained.

3.3 Test application

The X-rays should be switched on immediately after the arrival of the gamma source in the exposure position and switched off again simultaneously with the gamma source leaving the exposure position. The source movement time should be minimized to reduce fogging of the film.

4 Test equipment (real time technique)

The test should be performed with a real time radioscopic equipment including X-ray source, image detector and an image processing computer which is at least able to perform image integration and analysis of source dimensions.

4.1 Test alignment

The image detector shall be placed perpendicular to the axis of the X-ray beam. For the test the gamma source shall be placed at a position where it is in the centre of the beam during the exposure. The geometric magnification factor given by the alignment of X-ray source, gamma source and detector shall be high enough to assure that a spatial resolution of 0,1 mm is obtained. The X-ray source shall have a focus which is small enough to fulfil these conditions.

4.2 Test parameters

The gamma source is brought into the test position and shall not be moved during the measurement. Image integration for noise reduction is recommended. The scale of the inspection system shall be so adjusted that 1 mm of the object is represented by at least 20 pixels. A control object with well defined dimensions (e. g. a tungsten cylinder) shall be depicted in the vicinity of the gamma source for calibration purposes. Calibration and analysis of source dimensions shall be performed using the corresponding functions of the image processing computer.

5 Measurement and determination of source size *d*

5.1 Measurement

The radiograph (see clause 3) shall be examined visually on a film illuminator using a magnifying lens with a built-in graticule with divisions of 0,1 mm and a magnification between 5 and 10. The magnifying factor m according to figure 1 has to be taken into account for calculation of the actual dimension from the measured values.

The video print (see clause 4) shows the source size of the radiographic source with a certain magnifying factor. The visual examination shall consider a reference dimension as the diameter of the control object (e. g. a tungsten cylinder) to determine the overall magnifying factor and the real dimensions of the source.

5.2 Determination

Each source size is described by its dimension *l* (length) in the direction of the axis of the source holder and the dimension *w* (width) in the perpendicular direction.

The larger of these size values *l* or *w* shall be used as the "source size *d*".

6 Test report

A test report shall contain at least the following information:

a) reference to this standard;

b) identification of source and holder, activity;

c) focal spot size of the X-ray equipment, in millimeter;

d) magnification factor used (see figure 1);

e) technique used;

f) parameters of X-ray equipment;

g) film-screen-system or radioscopic system, respectively;

h) distances *a*, *b* and exposure time *t*;
i) source size *d*, in millimetres;

j) date of the measurement;

k) name of test organization;

l) signature of tester.