
**Non-destructive testing — Image quality
of radiographs —**

Part 2:

**Image quality indicators (step/hole
type) — Determination of image quality
value**

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Essais non destructifs — Qualité d'image des radiogrammes —

Partie 2: Indicateurs de qualité d'image (à trous et à gradins) —

Détermination de l'indice de qualité d'image

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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 19232-2 was prepared by CEN (as EN 462-2:1994) and was adopted, under a special “fast-track procedure”, by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 5, *Radiation methods*, in parallel with its approval by the ISO member bodies.

ISO 19232 consists of the following parts, under the general title *Non-destructive testing — Image quality of radiographs*:

- *Part 1: Image quality indicators (wire type) — Determination of image quality value*
- *Part 2: Image quality indicators (step/hole type) — Determination of image quality value*
- *Part 3: Image quality classes for ferrous metals*
- *Part 4: Experimental evaluation of image quality values and image quality tables*
- *Part 5: Image quality indicators (duplex wire type) — Determination of image unsharpness value*

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Non-destructive testing — Image quality of radiographs —

Part 2: Image quality indicators (step/hole type) — Determination of image quality value

1 Scope

This part of ISO 19232 specifies a device and a method for the determination of the image quality of radiographs using step/hole type image quality indicators.

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 19232-1, *Non-destructive testing — Image quality of radiographs — Part 1: Image quality indicators (wire type) — Determination of image quality value*

ISO 19232-4, *Non-destructive testing — Image quality of radiographs — Part 4: Experimental evaluation of image quality values and image quality tables*

ISO 19232-5, *Non-destructive testing — Image quality of radiographs — Part 5: Image quality indicators (Duplex wire type) — Determination of image unsharpness value*

ISO 5580, *Non-destructive testing — Industrial radiographic illuminators — Minimum requirements*

ISO/IEC Guide 22, *General criteria for supplier's declaration of conformity*

3 Definitions

For the purposes of this document, the following definitions apply.

3.1

image quality

that characteristic of a radiographic image which determines the degree of detail which it shows (ISO 19232-1)

3.2

image quality indicator (IQI)

a device that consists of an arrangement of steps of different thicknesses and holes of different diameters. The hole diameters correspond to the step thicknesses (see Figure 1)

3.3

image quality value

a measure of the image quality required or achieved and is equal to the number given in Table 1 for the smallest hole which can be detected on the radiograph

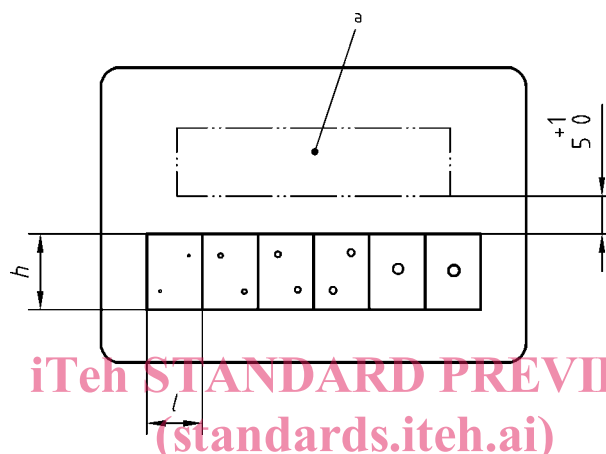
4 Specification for step/hole type image quality indicators

4.1 Dimension, manufacture, designation

4.1.1 Dimension

The IQI system is based on a series of 18 steps and holes of different thicknesses and diameters which are specified in Table 1 along with the relevant tolerances and the hole numbers. These steps and holes have been subdivided into four overlapping ranges of 6 consecutive hole numbers, viz. H 1 to H 6, H 5 to H 10, H 9 to H 14 and H 13 to H 18.

Dimensions in millimetres



Key

- ^a Space for identification marking
- <https://standards.iteh.ai/catalog/standards/sist/b017f2e4-6c56-47ad-adb9-72047c4e5684/iso-19232-2-2004>
- h = 10 mm for IQI number H 1, H 5 and H 9
- h = 15 mm for IQI number H 13
- l = 5 mm for IQI number H 1
- l = 7 mm for IQI number H 5 and H 9
- l = 15 mm for IQI number H 13

Figure 1 — Step/hole type image quality indicator

4.1.2 Manufacture

The steps of thicknesses lower than 0,8 mm shall contain two holes of the same diameter. The steps of thicknesses equal or higher than 0,8 mm shall contain one hole. The minimum distance from the centre of a hole to the edge of the step, or to the edge of the second hole in that step, shall be the hole diameter plus 1 mm. The holes shall be perpendicular to the surface and shall not have a bevelled edge.

4.1.3 Designation

The written designation of an image quality indicator shall give the symbol IQI, the number of this ISO standard, the number of the smallest hole as specified in Table 1 (e.g. H 5) and the symbol denoting the IQI material (e.g. FE).

EXAMPLE **IQI ISO 19232-2-H 5 FE**

Table 1 — Hole numbers, hole diameters, step thicknesses and limit deviations of the range of IQIs

Dimensions in millimetres

Range of image quality indicators				Hole/step		
H 1	H 5	H 9	H 13	Hole number	Nominal hole diameter and step thickness	Tolerances
X				H 1	0,125	+ 0,015 0
X				H 2	0,160	
X				H 3	0,200	
X				H 4	0,250	
X	X			H 5	0,320	
X	X			H 6	0,400	
	X			H 7	0,500	
	X			H 8	0,630	+ 0,020 0
	X	X		H 9	0,800	
	X	X		H 10	1,000	
		X		H 11	1,250	+ 0,025 0
		X		H 12	1,600	
		X	a	H 13	2,000	
		X	a	H 14	2,500	+ 0,030 0
			a	H 15	3,200	
			a	H 16	4,000	
			a	H 17	5,000	
			a	H 18	6,300	+ 0,036 0

^a These values may be used for special applications by agreement between contracting parties.

4.2 Material

All parts of the IQI shall consist of the same material and shall be embedded in a protective covering material which shall not affect the image quality value.

See Table 2 for commercial IQI materials.

4.3 Marking

The marking applied on the IQI (see Figure 1) shall give the following information:

- The number of the smallest hole printed next to the smallest hole.
- The symbol identifying the IQI material used, e.g. FE.
- The ISO symbol.

EXAMPLE H 5 FE ISO.

The radiographic image of the identification shall not cause glare when the film is viewed. It is recommended that the absorption of the marking is not more than twice the absorption of the thickest step.

4.4 Declaration of conformity

Each IQI shall be delivered with a declaration of conformity according to ISO/IEC Guide 22 from an accredited laboratory which confirms that the parameters of this standard are fulfilled. For identification the IQI shall be numbered and marked by the producer.

5 Use of image quality indicators

5.1 Selection

The IQI shall be selected in accordance with the material under test and its thicknesses.

Whenever possible the IQI shall be of the same type of material as the specimen under test. For other cases see ISO 19232-4.

Table 2 — Types of IQI and material used for selected groups of materials

IQI marking	Hole number form Table 1	IQI material	Suitable for test the following materials
H 1 CU H 5 CU H 9 CU H 13 CU	H 1 to H 6 H 5 to H 10 H 9 to H 14 H 13 to H 18	Copper	Copper, zinc, tin and their alloys
H 1 FE H 5 FE H 9 FE H 13 FE	H 1 to H 6 H 5 to H 10 H 9 to H 14 H 13 to H 18	Steel (low alloy)	Ferrous materials
H 1 TI H 5 TI H 9 TI H 13 TI	H 1 to H 6 H 5 to H 10 H 9 to H 14 H 13 to H 18	Titanium	Titanium and their alloys
H 1 AL H 5 AL H 9 AL H 13 AL	H 1 to H 6 H 5 to H 10 H 9 to H 14 H 13 to H 18	Aluminium	Aluminium and their alloys

5.2 Arrangement

When the radiograph is taken, the IQI shall be placed on the side of the section under test facing the source of radiation and remote from the film. If this is not possible, the IQI may be placed adjacent to the side of the section under test nearest the film. In this case, a letter "F" shall be visible next to the IQI marking on the

radiograph. The IQI shall be placed on the object under test, in an area where the thickness is as uniform as possible. Special arrangements are determined by application standards.

6 Determination of image quality value

In determining the image quality value, the conditions for viewing radiographs specified in ISO 5580 shall be observed. The number of the smallest hole which is visible on the radiograph shall be taken as the image quality value. When the step contains two holes, both shall be visible.

In general, the image quality value shall be determined for every radiograph in radiographic examinations for which a verification of image quality is required. If steps have been taken to guarantee that radiographs of similar test objects and regions are produced with identical exposure and processing techniques and no differences in the image quality value are likely, the image quality needs not be verified for every radiograph, the extent of image quality verification being subject to agreement.

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