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

Part 1:

**Image quality indicators (wire type) —  
Determination of image quality value**

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*Essais non destructifs — Qualité d'image des radiogrammes —*

*Partie 1: Indicateurs de qualité d'image (à fils) — 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 19232-1 was prepared by CEN (as EN 462-1:1994) 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 1: Image quality indicators (wire 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 wire 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 19232-2, *Non-destructive testing — Image quality of radiographs — Part 2: Image quality indicators (step/hole 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

#### 3.2

##### **image quality indicator (IQI)**

a device comprising a series of elements of graded dimensions which enable a measure of the image quality to be obtained. The elements of IQI are commonly wires or steps with holes

#### 3.3

##### **image quality value**

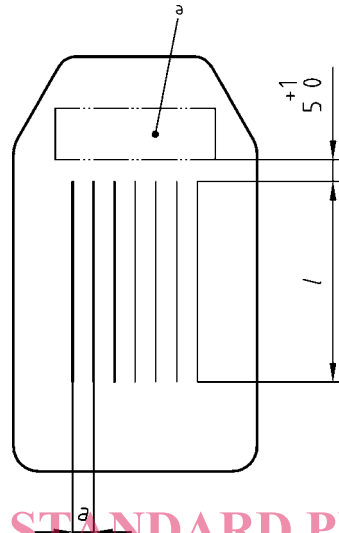
a measure of the image quality required or achieved and is equal to the wire number given in Table 1 for the thinnest wire which can be detected on the radiograph

## 4 Specification for wire type image quality indicators

### 4.1 Dimension, designation

Figure 1 represents a wire-type image quality indicator.

Dimensions in millimetres



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#### Key

<sup>a</sup> space for identification marking

*l* lengths of the wires

*a* wire centreline spacing <https://standards.iteh.ai/catalog/standards/sist/f5091964-173d-48e5-9941-d7fed357006c/iso-19232-1-2004>

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**Figure 1 — Image quality indicator (wire type)**

The IQI system is based on a series of 19 wires of different diameters which are specified in Table 1 together with the relevant tolerances and the wire numbers. This series of wires has been subdivided into four overlapping ranges of 7 consecutive wire numbers, viz. W 1 to W 7, W 6 to W 12, W 10 to W 16 and W 13 to W 19. The 7 wires in an IQI are arranged parallel to each other. The lengths of the wires, *l*, are 10 mm, 25 mm or 50 mm.

The written designation of an image quality indicator shall give the symbol IQI, the number of this standard, the wire number of the thickest wire as specified in Table 1 (e.g. W 10), the symbol denoting the wire material (e.g. FE) and the length (e.g. 25):

EXAMPLE 1 **IQI ISO 19232-1 – W 10 FE-25**

The full designation may be abbreviated to the wire number of the thickest wire of the IQI (e.g. W 10) and the wire material (e.g. FE) where reference to this standard is clear.

EXAMPLE 2 **W 10 FE**

### 4.2 Material

All the wires of an IQI shall consist of the same material and shall be embedded in a protective covering of a material which shall not affect the image quality value. See Table 2 for usual wire materials.

### 4.3 Marking of IQI

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

- The number of the thickest wire (1, 6, 10 or 13); this is located at the side of the thickest wire.
- The symbol identifying the wire material used, e.g. FE.
- The ISO symbol, example: 10 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 wire.

### 4.4 Declaration of conformity

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

**Table 1 — Wire numbers, diameters and limit deviations**

Dimensions in millimetres

| Image quality indicator including |     |      |      | Wire<br>nominal wire<br>diameter | Tolerances | Wire<br>centreline<br>spacing<br><i>a</i> |                                |
|-----------------------------------|-----|------|------|----------------------------------|------------|---|--------------------------------|
| W 1                               | W 6 | W 10 | W 13 |                                  |            |   |                                |
| X                                 |     |      |      | W 1                              | 3,20       | ± 0,03                                    | 9,6 <sup>+1</sup> <sub>0</sub> |
| X                                 |     |      |      | W 2                              | 2,50       |   | 7,5 <sup>+1</sup> <sub>0</sub> |
| X                                 |     |      |      | W 3                              | 2,00       |   | 6 <sup>+1</sup> <sub>0</sub>   |
| X                                 |     |      |      | W 4                              | 1,60       | ± 0,02                                    | 5 <sup>+1</sup> <sub>0</sub>   |
| X                                 |     |      |      | W 5                              | 1,25       |   |                                |
| X                                 | X   |      |      | W 6                              | 1,00       |   |                                |
| X                                 | X   |      |      | W 7                              | 0,80       |   |                                |
|                                   | X   |      |      | W 8                              | 0,63       |   |                                |
|                                   | X   |      |      | W 9                              | 0,50       |   |                                |
|                                   | X   | X    |      | W 10                             | 0,40       | ± 0,01                                    |                                |
|                                   | X   | X    |      | W 11                             | 0,32       |   |                                |
|                                   | X   | X    |      | W 12                             | 0,25       |   |                                |
|                                   |     | X    | X    | W 13                             | 0,20       |   |                                |
|                                   |     | X    | X    | W 14                             | 0,16       |   |                                |
|                                   |     | X    | X    | W 15                             | 0,125      |   |                                |
|                                   |     | X    | X    | W 16                             | 0,100      | ± 0,005                                   |                                |
|                                   |     |      | X    | W 17                             | 0,080      |   |                                |
|                                   |     |      | X    | W 18                             | 0,063      |   |                                |
|                                   |     |      | X    | W 19                             | 0,050      |   |                                |

## 5 Use of image quality indicators

### 5.1 Selection

The criteria for selecting the IQI to be used shall be the material under test and the image quality value expected or required.

The wire material shall have a coefficient of absorption as close as possible to that of the material under test. Where IQIs as listed in Table 2 are used for materials other than those listed in this table refer to ISO 19232-4. In such cases, the wire material shall have the next lowest coefficient of absorption to that of the object under test. If this is not feasible because the differences in absorption are too great, IQIs made of the same type of material as the object under test shall be used.

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

| Image quality indicator                | Wire number   | Wire material                     | Suitable for test- the following materials |
|--|---|-----------------------------------|--|
| W 1 CU<br>W 6 CU<br>W 10 CU<br>W 13 CU | W 1 to W 7<br>W 6 to W 12<br>W 10 to W 16<br>W 13 to W 19 | Copper                            | Copper, zinc, tin and their alloys         |
| W 1 FE<br>W 6 FE<br>W 10 FE<br>W 13 FE | W 1 to W 7<br>W 6 to W 12<br>W 10 to W 16<br>W 13 to W 19 | ISO Steel-1:2004<br>(low alloyed) | Ferrous materials                          |
| W 1 TI<br>W 6 TI<br>W 10 TI<br>W 13 TI | W 1 to W 7<br>W 6 to W 12<br>W 10 to W 16<br>W 13 to W 19 | Titanium                          | Titanium and their alloys                  |
| W 1 AL<br>W 6 AL<br>W 10 AL<br>W 13 AL | W 1 to W 7<br>W 6 to W 12<br>W 10 to W 16<br>W 13 to W 19 | 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. To indicate that this arrangement has been used, the image of a lead letter F shall be visible on the radiograph near to the IQI marking.

The IQI shall be placed on the object in an area where the thickness is as uniform as possible.



Other special arrangements may be specified in 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 thinnest wire which is visible on the radiograph shall be taken as the image quality value. The image of a wire is accepted if a continuous length of at least 10 mm is clearly visible in a region of uniform optical density.

In general, the image quality value shall be determined for every radiograph 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 need not be verified for every radiograph, the extent of image quality verification being subject to agreement between the contracting parties.

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