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

**Part 5:  
Image quality indicators (duplex wire  
type) — Determination of image  
unsharpness value**

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

*Partie 5: Indicateurs de qualité d'image (duplex à fils) — Détermination  
de l'indice de flou de l'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 19232-5 was prepared by CEN (as EN 462-5:1996) 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 5: Image quality indicators (duplex wire type) — Determination of image unsharpness value

### 1 Scope

This part of ISO 19232 specifies a method of determining the image unsharpness of radiographs and real-time radiosopic systems.

### 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 5579, *Non-destructive testing — Radiographic examination of metallic materials by X- and gamma rays — Basic rules*

[ISO 19232-5:2004](https://standards.iteh.ai/catalog/standards/sist/57646cf3-90ba-4b10-a48c-459106d13c2/iso-19232-5-2004)

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

ISO 19232-2, *Non-destructive testing — Image quality of radiographs — Part 2: Image quality indicators (step/hole type) — Determination of image quality value*

### 3 Terms and definitions

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

#### 3.1

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

an arrangement of pairs of wires as shown in Figure 1

#### 3.2

##### **image unsharpness value**

the number of the largest discernible element (see clause 5)

The corresponding unsharpness is shown in Table 1.

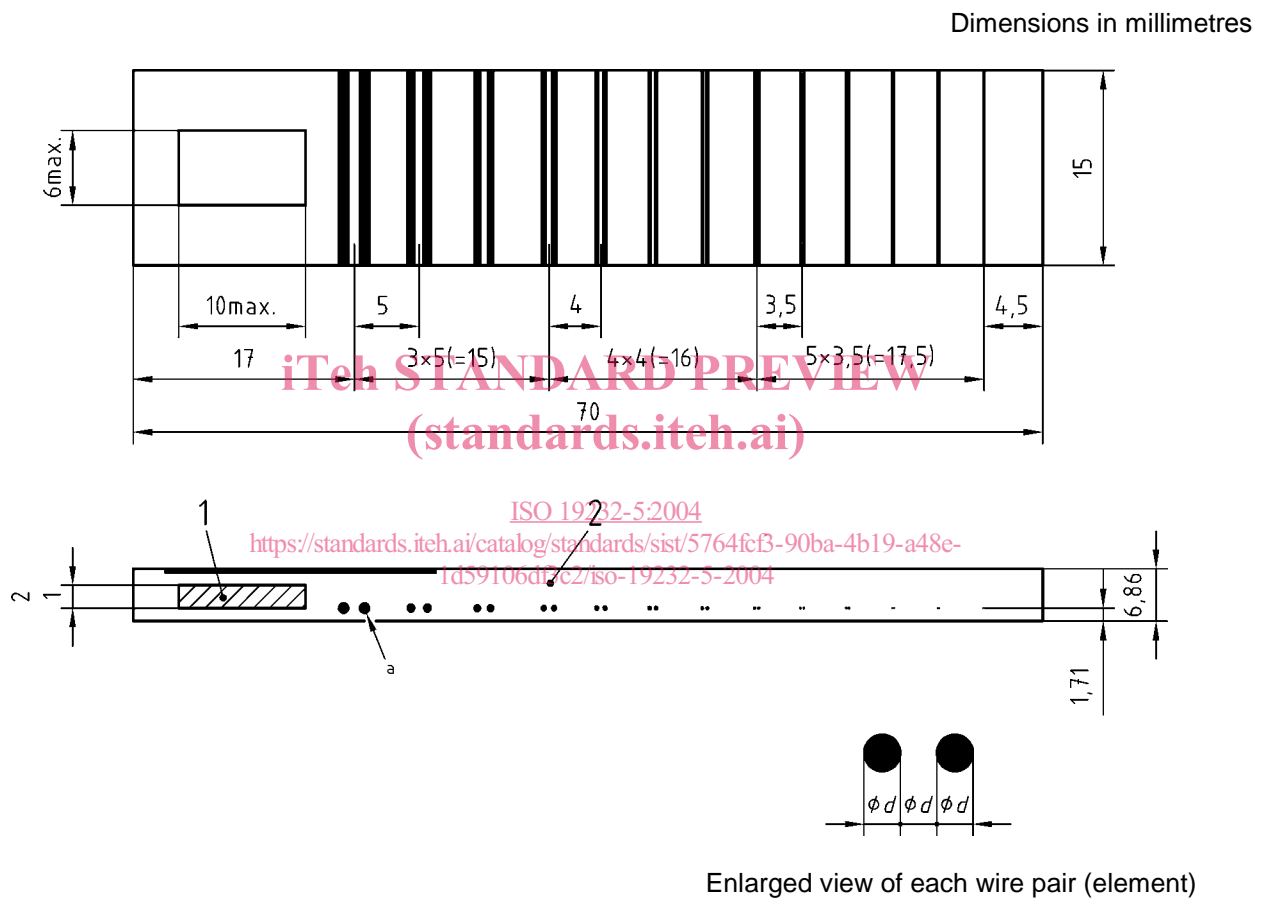
## 4 Specification of duplex wire IQI

### 4.1 Dimension/Manufacture/Marking

#### 4.1.1 Design/Material

The duplex wire IQI shall consist of a series of 13 elements placed in a transparent rigid plastic holder, each element shall consist of a pair of wires of circular section. The elements 1 D to 3 D are of tungsten, the others of platinum.

The dimensions shall be in accordance with Figure 1.



#### Key

- 1 lead symbol ISO 19232-5
- 2 rigid plastic mounting
- a wire diameter ( $d$ ), equals spacing between

Figure 1 — Duplex wire IQI

#### 4.1.2 Manufacture

The wire diameters and spacing of the wires are shown in Table 1.

Table 1 — Element number, corresponding image unsharpness and wire diameter

Dimensions in millimetres

Element no. (D = duplex)	Corresponding unsharpness	Wire diameter and spacing, <i>d</i>	Tolerances of wire diameter and wire spacing
13 D	0,10	0,050	± 0,005
12 D	0,13	0,063	
11 D	0,16	0,080	
10 D	0,20	0,100	
9 D	0,26	0,130	
8 D	0,32	0,160	± 0,01
7 D	0,40	0,200	
6 D	0,50	0,250	
5 D	0,64	0,320	
4 D	0,80	0,400	
3 D	1,00	0,500	± 0,02
2 D	1,26	0,630	
1 D	1,60	0,800	

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#### 4.1.3 Marking

The marking of the duplex wire IQI (see Figure 1) shall give the following information: ISO 19232-5.

#### 4.2 Declaration of conformity

The manufacturer of this IQI shall provide a certificate of conformity with each duplex wire IQI.

### 5 Use of duplex wire

The duplex wire IQI should be used in conjunction with a wire or step/hole type IQI. It shall be placed on the source side of the object being examined and be aligned as closely as possible normal to the axis of the radiation beam.

The image of the duplex wire IQI shall be examined with the aid of a magnifying glass up to x4. The largest element (i.e. pair of wires), the image of which has just merged from that of two separate wires into the single form without an identifiable space between the image of the two wires, is taken as the limit of discernibility. The image unsharpness  $U$  is given by  $2d$  where  $d$  is the width of the wire and the wire spacing distance (see Figure 1 and Table 1

NOTE The duplex wire IQI is no alternative for the wire or step/hole type IQI because it relates only to unsharpness.

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