

Non-destructive testing — Image quality of radiographs —

Part 1: Image quality indicators (wire type) — Determination of image quality value

The European Standard EN 462-1:1994 has the status of a
British Standard

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National foreword

This British Standard has been prepared under the direction of the Welding Standards Policy Committee. It is the English language version of EN 462-1:1994 *Non-destructive testing — Image quality of radiographs — Part 1: Image quality indicators (wire type) — Determination of image quality value*, published by the European Committee for Standardization (CEN).

EN 462-1:1994 was produced as a result of international discussion in which the UK took an active part.

BS EN 462-1:1994 supersedes text in BS 3971:1980 covering type I wire type image quality indicators, which has been deleted by amendment.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 6, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Descriptors: Non-destructive tests, industrial radiography, photographic images, quality, image quality indicators, dimensions, designation, marking, utilization

English version

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

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

Zerstörungsfreie Prüfung — Bildgüte von
Durchstrahlungsaufnahmen —
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Ermittlung der Bildgütezahl

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard was prepared by the Technical Committee CEN/TC 138 “Non-destructive testing” of which the secretariat is held by AFNOR.

EN 462-1 is a part of a series of European Standards; the other parts are the following:

EN 462-2, *Non-destructive testing — Image quality of radiographs — Part 2: Image quality indicators (step/hole type), determination of image quality value.*

EN 462-3, *Non-destructive testing — Image quality of radiographs — Part 3: Image quality classes for ferrous metals.*

EN 462-4, *Non-destructive testing — Image quality of radiographs — Part 4: Experimental evaluation of image quality values and image quality tables.*

EN 462-5, *Non-destructive testing — Image quality of radiographs — Part 5: Image quality indicators (Duplex wire type) — Determination of total image unsharpness value.*

This European Standard has been prepared under a mandate given to CEN by the Commission of the European Communities and the European Free Trade Association, and supports essential requirements of EC Directive(s).

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 July 1994, and conflicting national standards shall be withdrawn at the latest by July 1994.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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1 Scope

This Part of this European Standard specifies a device and a method for the determination of the image quality of radiographs. Other devices are the subject of Parts 2 and 5 of the standard.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 462-2, *Non-destructive testing — Image quality of radiographs — Part 2: Image quality indicators (step/hole type), determination of image quality values*¹⁾.

EN 462-4, *Non-destructive testing — Image quality of radiographs — Part 4: Experimental evaluation of image quality values and image quality tables*¹⁾.

EN 462-5, *Non-destructive testing — Image quality of radiographs — Part 5: Image quality indicators (Duplex wire type) — Determination of image unsharpness value*¹⁾.

EN 25580, *Non-destructive testing — Industrial radiographic illuminators — Minimum requirements (ISO 5580:1985)*.

EN 45014, *General criteria for suppliers, declaration of conformity*.

3 Definitions

For the purposes of this standard, 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.

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. W1 to W7, W6 to W12, W10 to W16 and W13 to W19. The 7 wires in an IQI are arranged parallel to each other. The length 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 EN 462- 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 commercial 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 EN symbol, example: 10 FE EN.

¹⁾ In preparation.

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.

Table 1 — Wire numbers, diameters and limit deviations

Dimensions in millimetres

Image quality indicator including				Wire			Wire centreline spacing, <i>a</i>
W 1	W 6	W 10	W 13	Wire number	Nominal wire diameter	Tolerances	
X				W 1	3,20	± 0,03	9,6 ⁺¹ ₀
X				W 2	2,50		7,5 ⁺¹ ₀
X				W 3	2,00		6 ⁺¹ ₀
X				W 4	1,60	± 0,02	5 ⁺¹ ₀
X				W 5	1,25		
X	X			W 6	1,00		
X	X			W 7	0,80		
	X			W 8	0,63		
	X	X		W 9	0,50	± 0,01	
	X	X		W 10	0,40		
	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	W 16	0,100		
			X	W 17	0,080		
			X	W 18	0,063		
			X	W 19	0,050		

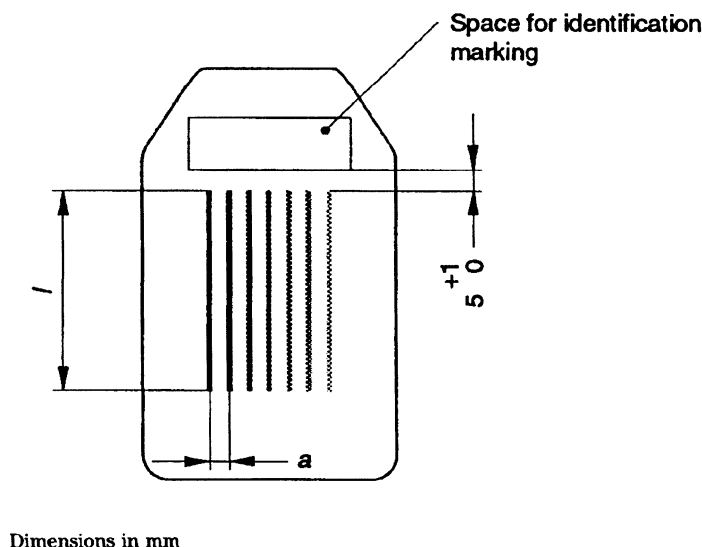


Figure 1 — Image quality indicator (wire type)

4.4 Declaration conformity

Each IQI shall be delivered with a declaration of conformity according to EN 45014 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.

NOTE Existing IQIs which conform to the dimensions in 4.1 may be used until 1995.

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 EN 462-4. 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.

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 EN 25580 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.

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 W 6 CU W 10 CU W 13 CU	W 1 to W 7 W 6 to W 12 W 10 to W 16 W 13 to W 19	Copper	Copper, zinc, tin and their alloys
W 1 FE W 6 FE W 10 FE W 13 FE	W 1 to W 7 W 6 to W 12 W 10 to W 16 W 13 to W 19	Steel (low alloyed)	Ferrous materials
W 1 TI W 6 TI W 10 TI W 13 TI	W 1 to W 7 W 6 to W 12 W 10 to W 16 W 13 to W 19	Titanium	Titanium and their alloys
W 1 AL W 6 AL W 10 AL W 13 AL	W 1 to W 7 W 6 to W 12 W 10 to W 16 W 13 to W 19	Aluminium	Aluminium and their alloys

National annex NA (informative)

Committees responsible

The United Kingdom participation in the preparation of this European Standard was entrusted by the Welding Standards Policy Committee (WEE/-) to Technical Committee WEE/46, upon which the following bodies were represented:

Aluminium Federation
 Associated Offices Technical Committee
 Association of Consulting Engineers
 BNF (Fulmer Materials Centre)
 British Airways
 British Chemical Engineering Contractors' Association
 British Gas plc
 British Institute of Non-destructive Testing
 British Non-Ferrous Metals Federation
 British Photographic Association
 British Steel Industry
 Department of Trade and Industry (Namas Executive)
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 Light Metal Founders' Association
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 Power Generation Contractors' Association (BEAMA Ltd.)
 Royal Society of Chemistry
 Society of British Aerospace Companies Limited
 Society of Motor Manufacturers and Traders Limited
 Steel Casting Research and Trade Association
 The Welding Institute

National annex NB (informative)

Cross-references

Publication referred to	Corresponding British Standard
EN 25580:1992	BS EN 25580:1992 <i>Specification for minimum requirements for industrial radiographic illuminators for non-destructive testing</i>
EN 45014:1989	BS 7514:1989 <i>General criteria for suppliers' declaration of conformity</i>

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