



# Non-destructive testing — Image quality of radiographs —

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

The European Standard EN 462-2:1994 has the status of a  
British Standard

UDC 620.179.152:771.537:001.4

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This British Standard, having been prepared under the direction of the Technical Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on 15 August 1994

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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 462-2:1994 *Non-destructive testing — Image quality of radiographs — Part 2: Image quality indicators (step/hole type) — Determination of image quality value*, published by the European Committee for Standardization (CEN).

EN 462-2:1994 was produced as a result of international discussion in which the UK took an active part.

BS EN 462-2:1994 supersedes text covering step/hole type image quality indicators in BS 3971:1980.

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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 8 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, manufacturing, utilization, marking

English version

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

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

Zerstörungsfreie Prüfung — Bildgüte von  
Durchstrahlungsaufnahmen —  
Teil 2: Bildgüteprüfkörper (Stufe/Loche Typ) —  
Ermittlung der Bildgütezahl

This European Standard was approved by CEN on 1994-04-01. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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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 has been produced by CEN/TC 138, Non-destructive testing, the secretariat of which is held by the French Association for Standardization (AFNOR).

EN 462-2 is Part of a series of European Standards; the other Parts are the following:

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

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

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

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

CEN/TC 138 has decided to submit the final draft for formal vote by its resolution 19/1992. The result was positive.

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

According to the CEN/CENELEC Internal Regulations the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

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## 1 Scope

This standard specifies a device and a method for the determination of the image quality of radiographs. Other devices are the subject of Parts 1 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 of 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 462-1, *Non-destructive testing — Image quality of radiographs — Part 1: Image quality indicators (wire type) — Determination of image quality values.*

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

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

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 [ES 462-1]

### 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. H1 to H6, H5 to H10, H9 to H14 and H13 to H18.

Figure 1 represents a 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 EN standard, the number of the smallest hole as specified in Table 1 (e.g. H5) and the symbol denoting the IQI material (e.g. FE).

*Example:* IQI EN 462-H5 FE

#### 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 EN symbol

*Example:* H5 FE EN.

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 EN 45014 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.

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

### 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 EN 462-4.

#### 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

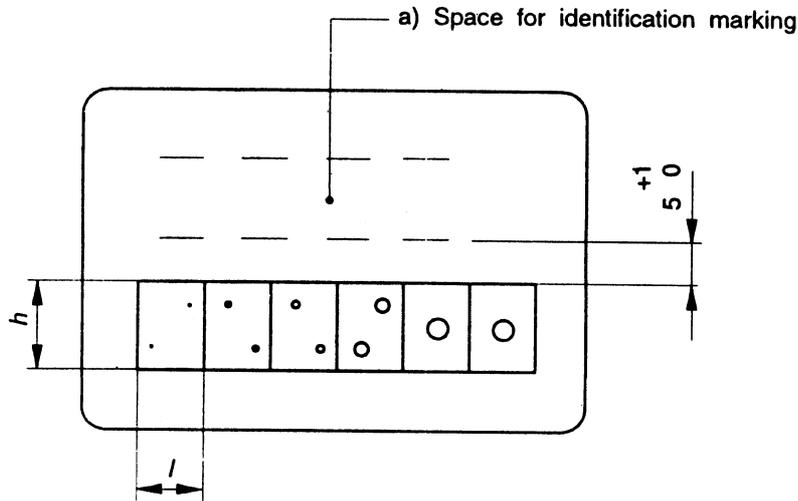
In determining the image quality value, the conditions for viewing radiographs specified in EN 25580 shall be observed. The number of the smallest hole which is visible on the radiograph shall be taken as the image quality value. When the step contains two holes, both shall be visible.

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 need not be verified for every radiograph, the extent of image quality verification being subject to agreement.

**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		
H1	H5	H9	H13	Hole number	Nominal hole diameter and step thickness	Tolerances
X				H1	0,125	+0,015 0
X				H2	0,160	
X				H3	0,200	
X				H4	0,250	
X	X			H5	0,320	
X	X			H6	0,400	
	X			H7	0,500	
	X			H8	0,630	+0,020 0
	X	X		H9	0,800	
	X	X		H10	1,000	
		X		H11	1,250	+0,025 0
		X		H12	1,600	
		X	a	H13	2,000	
		X	a	H14	2,500	
			a	H15	3,200	+0,030 0
			a	H16	4,000	
			a	H17	5,000	
			a	H18	6,300	+0,036 0

<sup>a</sup>These values may be used for special applications by agreement between contracting parties.



$h =$  10 mm for IQI number H1, H5 and H9  
 15 mm for IQI number H13  
 $l =$  5 mm for IQI number H1  
 7 mm for IQI number H5 and H9  
 15 mm for IQI number H13  
 Dimensions in millimetres

Figure 1 — Step/hole type image quality indicator

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

IQI marking	Hole number from Table 1	IQI material	Suitable for testing the following materials
H1 CU H5 CU H9 CU H13 CU	H1 to H6 H5 to H10 H9 to H14 H13 to H18	Copper	Copper, zinc, tin and their alloys
H1 FE H5 FE H9 FE H13 FE	H1 to H6 H5 to H10 H9 to H14 H13 to H18	Steel (low alloy)	Ferrous materials
H1 TI H5 TI H9 TI H13 TI	H1 to H6 H5 to H10 H9 to H14 H13 to H18	Titanium	Titanium and their alloys
H1 AL H5 AL H9 AL H13 AL	H1 to H6 H5 to H10 H9 to H14 H13 to H18	Aluminium	Aluminium and their alloys

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## 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 Office Technical Committee  
Association of Consulting Engineers  
BNF (Fulmer Materials Centre)  
British Airways  
British Chemical Engineering Contractors' Association  
British Coal Corporation  
British Gas plc  
British Institute of Non-destructive Testing  
British Non-Ferrous Metals Federation  
British Nuclear Fuels plc  
British Railways Board  
British Steel Industry  
Department of Trade and Industry (Namas Executive)  
Electricity Association  
Engineering Equipment and Materials Users' Association  
Health and Safety Executive  
Institute of Physics  
Institute of Quality Assurance  
Light Metal Founders' Association  
Lloyd's Register of Shipping  
Ministry of Defence  
National Radiological Protection Board  
Power Generation Contractors' Association (PGCA (BEAMA Ltd.))  
Railway Industry Association of Great Britain  
Royal Society of Chemistry  
Society of British Aerospace Companies Limited  
Society of Motor Manufacturers and Traders Limited  
Steel Casting Research and Trade Association  
Welding Institute

The following body was also represented in the drafting of the standard, through subcommittees and panels:

British Photographic Association

## 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>
EN 462-1:1994	BS EN 462-1:1994 <i>Non-destructive testing — Image quality of radiographs — Part 1: Image quality indicators (wire type) — Determination of image quality value</i>



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