



# Non-destructive testing — Image quality of radiographs

## Part 5. Image quality indicators (duplex wire type), determination of image unsharpness value

The European Standard EN 462-5 : 1996 has the status of a  
British Standard

ICS 19.100

# Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee WEE/46, Non-destructive testing, upon which the following bodies were represented:

- Aluminium Federation
- 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 Iron and Steel Producers' Association
- British Nuclear Fuels plc
- British Railways Board
- Castings Technology International
- Electricity Association
- Engineering Equipment and Materials Users' Association
- Health and Safety Executive
- Institute of Physics
- Institute of Quality Assurance
- 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
- Safety Assessment Federation Ltd.
- Society of British Aerospace Companies Limited
- Society of Motor Manufacturers and Traders Limited
- United Kingdom Accreditation Service
- Welding Institute

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

- British Photographic Association

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on  
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## Amendments issued since publication

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## Foreword

This British Standard has been prepared by Technical Committee WEE/46 and is the English language version of EN 462-5 : 1996 *Non-destructive testing — Image quality of radiographs — Part 5 : Image quality indicators (duplex wire type), determination of image unsharpness value* published by the European Committee for Standardization (CEN).

EN 462-5 : 1996 was produced as a result of international discussions in which the United Kingdom took an active part.

BS EN 462-5 : 1996, together with BS EN 462-1 : 1994, BS EN 462-2 : 1994, BS EN 462-4 : 1995 and BS EN 462-3 (in preparation) supersedes BS 3971 : 1980, which will be withdrawn when all the relevant Parts of BS EN 462 have been published.

### Cross references

Publication referred to	Corresponding British Standard
EN 444 : 1994	BS EN 444 : 1994 <i>Non-destructive testing — General principles for radiographic examination of metallic materials by X- and gamma rays</i> BS EN 462 <i>Non-destructive testing — Image quality of radiographs</i>
EN 462-1 : 1994	BS EN 462-1 : 1994 <i>Image quality indicators (wire type) — Determination of image quality value</i>
EN 462-2 : 1994	BS EN 462-2 : 1994 <i>Image quality indicators (step/hole type) — Determination of image quality value</i>

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

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ICS 19.100

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

English version

## Non-destructive testing — Image quality of radiographs — Part 5: Image quality indicators (duplex wire type), determination of image unsharpness value

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

Zerstörungsfreie Prüfung — Bildgüte von  
Durchstrahlungsaufnahmen —  
Teil 5: Bildgüteprüfkörper (Doppel-Drahtsteg),  
Ermittlung der Bildunschärfe

This European Standard was approved by CEN on 1996-02-23. 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.

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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 prepared by Technical Committee CEN/TC 138, Non-destructive testing, the secretariat of which is held by AFNOR.

EN 462-5 is a 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*
- 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*

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 September 1996, and conflicting standards shall be withdrawn at the latest by September 1996.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of 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 and the United Kingdom.

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## 1 Scope

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

## 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 444 *Non-destructive testing — General principles for the radiographic examination of metallic materials with X- and gamma-rays*
- EN 462-1 *Non-destructive testing — Image quality of radiographs — Part 1: Image quality indicators (wire type), determination of image quality value*
- EN 462-2 *Non-destructive testing — Image quality of radiographs — Part 2: Image quality indicators (step/hole type), determination of image quality value*

## 3 Definitions

For the purposes of this standard, the following 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 unsharpnesses are shown in table 1.

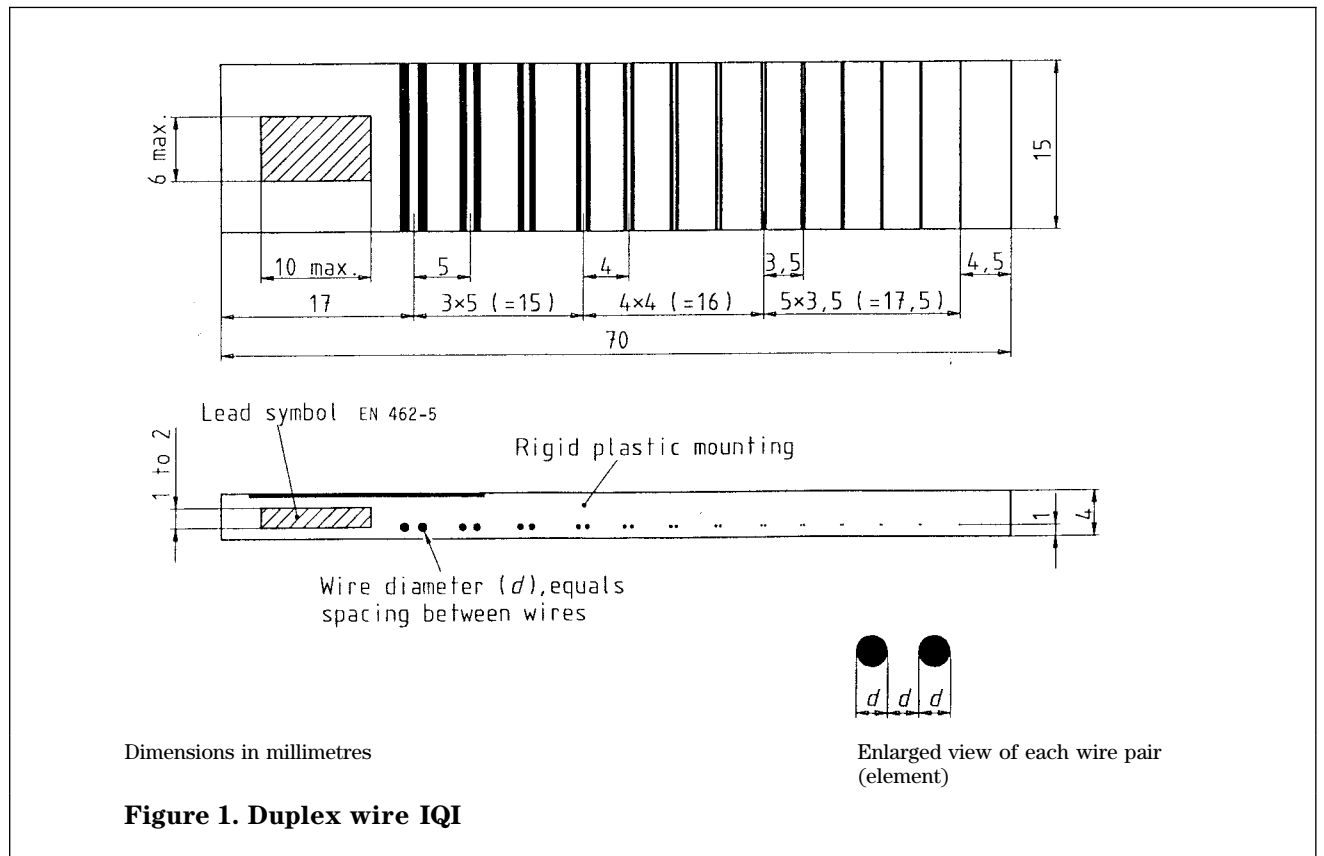
## 4 Specification of duplex wire IQI

### 4.1 Dimension/manufacture/markings

#### 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 1D to 3D are of tungsten, the others of platinum.

The dimensions shall be in accordance with figure 1.





#### 4.1.2 Manufacture

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

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

#### 4.1.3 Marking

The marking of the duplex wire IQI (see figure 1) shall give the following information: EN 462-5.

#### 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 of 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  $\times 4$ . 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 of step/hole type IQI because it relates only to unsharpness.

## List of references (see national foreword)

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