

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

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 15 November 1996

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

British Photographic Association

© BSI 1996

Amendments issued since publication

Amd. No.	Date	Text affected

The following BSI references relate to the work on this standard:
 Committee reference WEE/46
 Draft for comment 94/703765 DC

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 462-5	3

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.

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.

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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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.

Contents

	Page
Foreword	2
1 Scope	3
2 Normative references	3
3 Definitions	3
4 Specification of duplex wire IQI	3
5 Use of duplex wire	4

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.

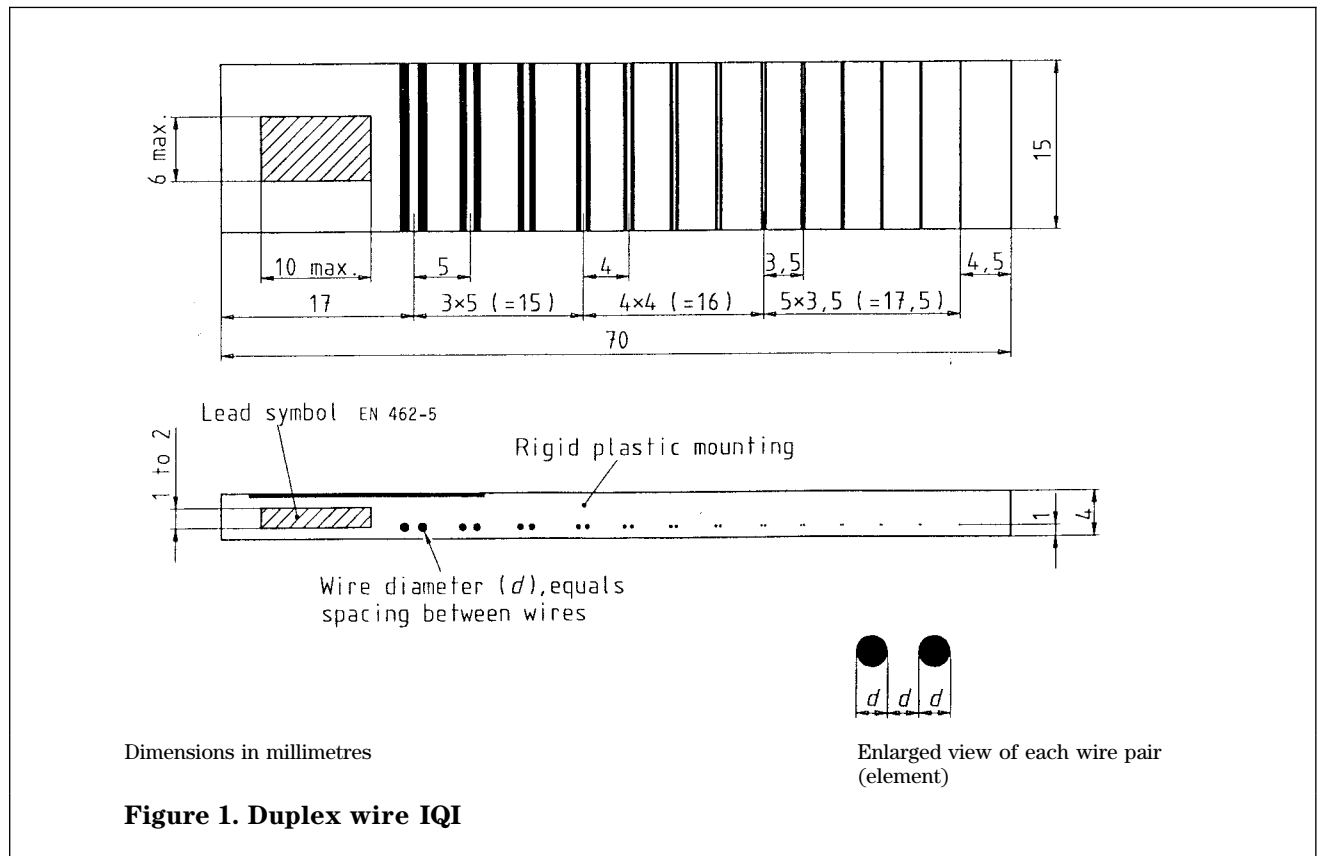
4 Specification of duplex wire IQI

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.

Table 1. Element number, corresponding image unsharpness and wire diameter			
Dimensions in millimetres			
Element no. (D = duplex)	Corresponding unsharpness	Wire diameter and spacing, d	Tolerances of wire diameter and wire spacing
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	
3D	1,00	0,500	± 0,02
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)

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

If permission is granted, the terms may include royalty payments or a licensing agreement. Details and advice can be obtained from the Copyright Manager. Tel: 020 8996 7070.