

# DUPLEX IQI

**Duplex Wire Type IQI  
according to ISO 19232-5  
Total Image Unsharpness Gage  
according to ASTM E 2002**



**Evaluation of  
image unsharpness and  
basic spatial resolution  
of digital X-ray images**

# Image Quality Indicator for evaluating Total Images Unsharpness

The Duplex IQI is used in many X-ray applications, especially in digital X-ray. Designed for evaluating total image unsharpness of film and additionally basic spatial resolution of digital images according to EN 13068 (Radioscopy), EN 14784 and ISO 13671 (CR – Computed Radiography with imaging plates), ISO 17636-2 (digital radiology of welds – flat panel detectors) or ASTM E 2597 (characterization of digital detector arrays). A new ISO standard is in preparation, describing possibility of using the Duplex IQI for determination of focal spot size of X-ray tubes.

## Image valuation with Duplex Wire Type IQI

In radiography the wire pair with largest diameter  $d$  has to be identified, which cannot be separated visually. The radiographic film may be magnified up to 4X.

In digital radiology the separation between wires (Dip) is evaluated. The wire pair with largest  $d$ , showing Dip less than 20 percent of the wire pair contrast, identifies total image unsharpness ( $U = 2d$ ) and basic spatial resolution ( $SR_b = d$ ) of digital image.



DD	UT (mm)	SR <sub>b</sub> (mm)	LP (1/mm)	d (mm)
D 1	1,600	0,800	0,625	0,800
D 2	1,260	0,630	0,790	0,630
D 3	1,000	0,500	1,000	0,500
D 4	0,800	0,400	1,250	0,400
D 5	0,640	0,320	1,560	0,320
D 6	0,500	0,250	2,000	0,250
D 7	0,400	0,200	2,500	0,200
D 8	0,320	0,160	3,130	0,160
D 9	0,260	0,130	3,850	0,130
D 10	0,200	0,100	5,000	0,100
D 11	0,160	0,080	6,250	0,080
D 12	0,130	0,063	7,690	0,063
D 13	0,100	0,050	10,000	0,050
D 14	0,080	0,040	12,500	0,040
D 15	0,064	0,032	15,600	0,032

### Specification:

- Duplex IQI consists of 13 or 15 wire pairs from 1D to 13D or 15D
- material for wires 1D to 3D is tungsten and for wires 4D to 15D is platinum
- distance between wires of each wire pair equals exactly diameter of wires
- wires are casted in a transparent, resistant and dimensional stable plastic
- standard and serial number are indelible casted and shown on each image
- design-type test for Duplex IQI is in process at BAM / Berlin

- DD** Duplex Wire Number
- UT** Corresponding Unsharpness
- SR<sub>b</sub>** Corresponding Basic Spatial Resolution
- LP** Corresponding Line Pair Value
- d** Wire Diameter and Spacing

### Scope of supply:

Duplex Wire Type IQI in wooden box with Instructions, Declaration of Conformity according to ISO/IEC 17050-1 and individual Test Certificate according to ASTM E 2002, ISO 19232-5 with all relevant measurements

#### Duplex Wire Type IQI - 13D

with wire pairs from 1D to 13D

**Article no. 11 00155**

#### Duplex Wire Type IQI - 15D HiRes

with wire pairs from 1D to 15D

**Article no. 11 00160**

