

Bundesanstalt für  
Materialforschung  
und -prüfung

## Diffuse Optical Densities of the Film Step Tablet BAM - X001 for Industrial Radiography

Step Tablet No. 23-2733

### Results of Measurement:

| Step Number<br>(Stufe) | Optical Density (D)<br>Expanded Uncertainty U (k = 2):<br>$\pm 0,01$ for $D \leq 4,5$ and $\pm 0,02$ for $D > 4,5$ |
|------------------------|--------------------------------------------------------------------------------------------------------------------|
| 1                      | 0,32                                                                                                               |
| 2                      | 0,67                                                                                                               |
| 3                      | 1,03                                                                                                               |
| 4                      | 1,39                                                                                                               |
| 5                      | 1,77                                                                                                               |
| 6                      | 2,16                                                                                                               |
| 7                      | 2,55                                                                                                               |
| 8                      | 2,92                                                                                                               |
| 9                      | 3,29                                                                                                               |
| 10                     | 3,64                                                                                                               |
| 11                     | 3,97                                                                                                               |
| 12                     | 4,30                                                                                                               |
| 13                     | 4,61                                                                                                               |
| 14                     | 4,90                                                                                                               |
| 15                     | >5,1                                                                                                               |

Admissible Tolerance  $\Delta D \leq \pm 0,05$  for  $D \leq 4,5$   
according to DGZfP Guideline D 01  $\Delta D \leq \pm 0,10$  for  $D > 4,5$ 

Date of Measurement: 2023-04-13

Expiration Date of Measurement: 2028-04-12

### Test Procedure:

DGZfP Guideline D 01 „Measuring Optical Densities of Radiographs“, Berlin 2015,  
in conjunction with BAM StAA 8.3/15

### Reference Standards:

NIST 38100C X-Ray Film Step Tablet Transmission Density Standard, Serial-No 1712002  
PTB Standard Reference X-Ray Film Step Tablet, Calibration Mark 3641-02

### Measurement Device:

Reference Densitometer BAMLEDD1, measuring quantity: ISO 5 standard diffuse visual  
transmission density  $D_T(d_i; S_H: 0^\circ, 10^\circ; V_T; s)$  according to ISO 5-2:2009 and ISO 5-3:2009

This test report consists of 2 pages.

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#### Description of Test Item:

This reference material is an AGFA D4 Film (10 x 24 cm<sup>2</sup>), with 15 steps of 1 x 3 cm<sup>2</sup> size having the before mentioned diffuse optical densities (measured according to ISO 5-2:2009) exposed by X-rays.

#### Recommended Application Range:

This reference material is designed for verification of densitometers in industrial radiography in a range of optical densities D within  $0,2 < D < 5,0$ .

#### Handling:

The measurements should be carried out in the centre of each step avoiding any damage to the emulsion layers. Which side of this double emulsion film is in direct contact to the opal diffuser does not matter. The unexposed areas around the steps should be covered if necessary to reduce the dynamic range for the measurement device.

#### Transportation and Storage:

The film step tablet should be stored in a cool, dry and dark place at  $< 25\text{ °C}$ , where it will not be exposed to light, other radiant energy, chemical fumes or to dust in the air. Transportation of the film step tablet should be done in a light tight closed envelope under normal conditions.

#### Bundesanstalt für Materialforschung und -prüfung (BAM)

Unter den Eichen 87

12205 Berlin

2023-04-13

Division 8.3 „Radiological Methods“

By order

Dr. rer. nat. Uwe Zscherpel  
per pro. Head of Division 8.3



By order

Dipl.-Ing. (FH) S. Hohendorf  
Person in charge of the test

BAM Department 8 is a testing laboratory accredited by Deutsche  
Akkreditierungsstelle GmbH (DAkkS) against ISO/IEC 17025.

The accreditation is valid for the testing procedures listed in the certificate  
D-PL-11075-08-00.



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