

The **mass per unit area standards** are available from Helmut Fischer GmbH of Sindelfingen, Germany. These can be traced to the International System of Units; the international prototype meter and the international prototype kilogram.



Do you plan on calibrating or verifying your XRFA coating thickness measuring instrument?



Do you require verification of the traceability of the measured coating thickness values?

DIN EN ISO/IECV 17025
 accredited

Fischer supplies suitable calibration standards.

Traceable Mass per Unit Area Standards with DKD* Calibration Certificate.

Why Calibrate?

"Where necessary to ensure valid results, measuring equipment shall be calibrated [...] against measurement standards traceable to international or national measurement standards." (DIN ISO 9001:2000 7.6 a).

Why DKD Calibration Certificates?

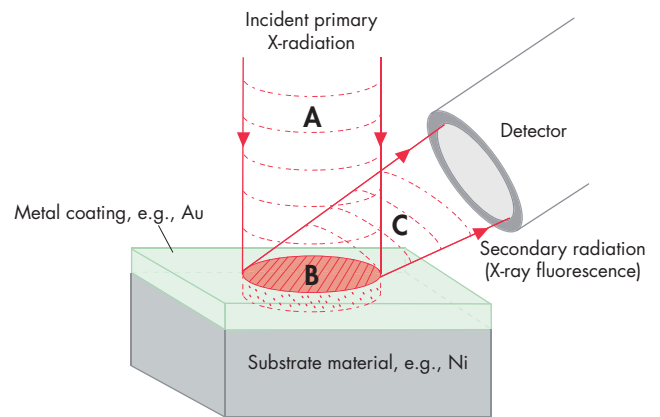
The purpose of monitoring the measurement devices is to secure the correct instrument functions in the context of a QM system (ISO 9001). A Fischer calibration standard with a DKD calibration certificate secures the trueness of the instrument calibration with the certainty of being able to ensure traceability to the International System of Units in international trade.

What Exactly Is Contained In The DKD Calibration Certificate?

- 1 The national emblem identifies the DKD calibration certificate as an official document. Calibration laboratories are subject to strict conditions and the Accreditation Body of the German Calibration Service verifies their adherence regularly.
- 2 The calibration mark shows the accreditation number of our laboratory, the number of the calibration certificate and the year and month of issue. It is also included on the standards case.
- 3 At this location, one finds information about the object of calibration and the calibration order.
- 4 Calibration stamp, date and signature confirm the validity of the measurement data.
- 5 Here, the object of calibration is described in greater detail. In our case, these are always metallic foils or coatings.

- 6 Tracing your standards is done via a reference measurement using X-ray fluorescence analysis against gravimetrically measured reference standards.
- 7 The table is the core segment of the calibration certificate. It contains the readings. The first three columns are used for identifying the individual calibration standards. The same letter code, material and nominal value that can be found on the standard are stated here.
- 8 The readings obtained during calibration according to the accredited method with the associated uncertainty are found in the following two columns. They are stated in the unit of mass per unit area [mg/cm^2] and constitute the actual calibration quantity. The mass per unit area is the quantity that is determined by the X-ray fluorescence instrument. The incident X-ray beam (A) on the sample excites the atoms of a certain sectional area (B) to fluorescence. The intensity of the fluorescence radiation (C) received by the detector is a measure for the number of excited atoms, i.e., its mass on the respective element of area.

*DKD = Deutscher Kalibrierdienst [German Calibration Service]; Accreditation Body in Germany



How Is Traceability Ensured?

The image sequence shows how the coating thicknesses are traced to nationally and internationally recognized measurement standards using X-ray fluorescence analysis and gravimetric analysis.



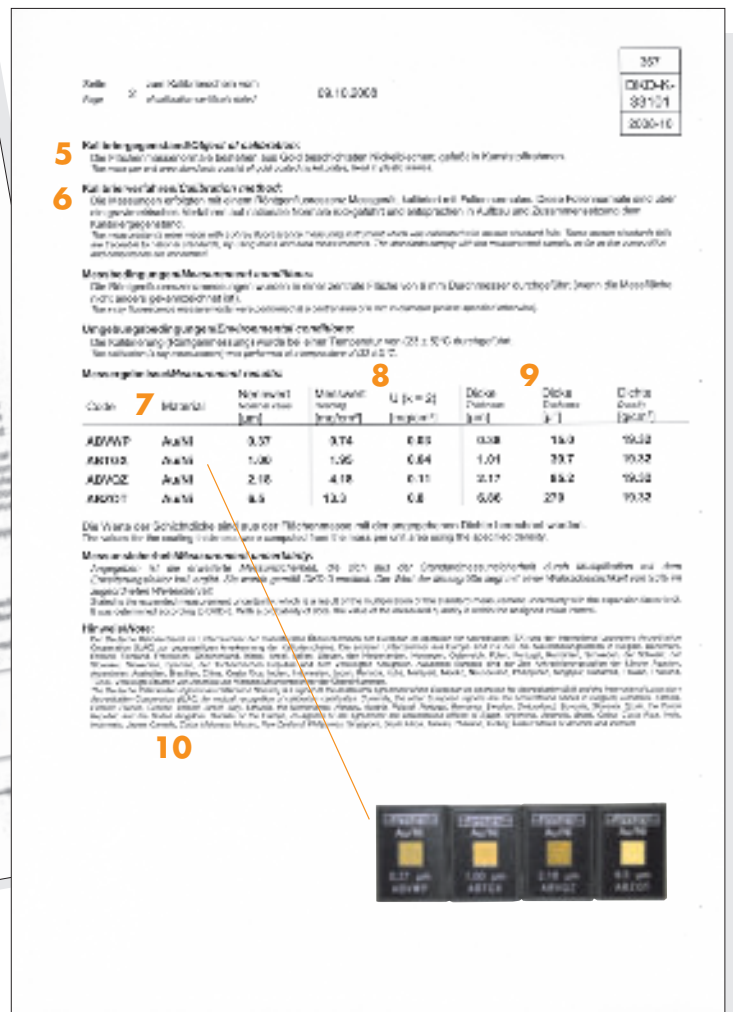
Measurement objects



X-ray fluorescence measuring instrument



Calibration standards



9 If the material density is known, the thickness can be deduced easily from the mass per unit area. A certain number of atoms per area indicates a small thickness if packed densely and a greater thickness if packed less densely.

The correlation is:

$$\text{thickness } [\mu\text{m}] = \frac{10 \cdot \text{mass per unit area } [\text{mg}/\text{cm}^2]}{\text{density } [\text{g}/\text{cm}^3]}$$

The coating thicknesses that result from the measured mass per unit area based on the stated material density are listed in the last three table columns in µm and µ" [1 µm = 39.37 µ"]. Because the thickness is always computed from the readings, it may differ from the nominal value. The computed thickness as stated in the columns Dicke/Thickness applies.

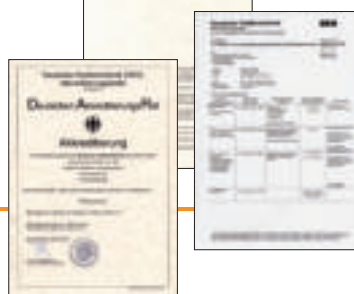
10 Listed here are the countries that have signed the agreements of the European co-operation for Accreditation (EA) and/or of the International Laboratory Accreditation Cooperation (ILAC) and where, therefore, the DKD calibration certificate is recognized without problems.



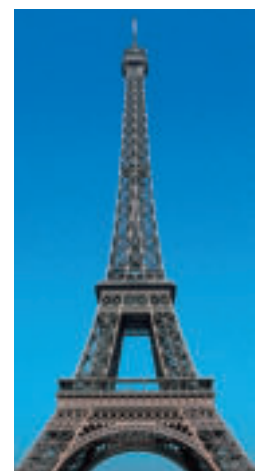
Mass per unit area



Micro-balance



Accreditation certificate



International kilogram prototype



International meter prototype in Paris

The information in this brochure contains general descriptions or performance features, which may not apply in the described form for all concrete applications, or which may change due to product advancements. The desired performance features are binding only if they have been agreed upon expressly in the contract.

Interesting Facts About The Accredited Helmut Fischer GmbH Calibration Laboratory:

The DKD calibration laboratory, accredited since July 2003 as the first institute in Germany for the measured quantity "mass per unit area". Accredited according to DIN EN ISO/IEC 17025, accreditation number DKD-K-33101. This accreditation entitles the bearer to issue DKD calibration certificates for mass per unit area calibration standards that are used for calibrating X-ray fluorescence instruments for coating thickness measurements in the name of the Deutsche Kalibrierdienst (German Calibration Service).

Which Calibration Intervals Should Be Observed?

For measuring instruments

According to DIN ISO 9001 7.6, the user is required to verify the correct instrument functions at regular intervals. This can be done through a repeatability measurement using the Fischer calibration standards in a control chart. The determination of the intervals for this test is the user's responsibility.

For measure standards

Dependent on the frequency of use, the environmental conditions and the accuracy, it is up to the user to determine suitable intervals. We consider re-calibration intervals of 12 to 24 months to be reasonable for our calibration standards.

Who Needs DKD Calibration Certificates?

All companies that work with a QM system in an international environment – e.g., ISO 9001. This will apply to the automotive industry and its suppliers, the aeronautics, telecommunications and information technology.

Which Of Our Standards Are Available With A DKD Calibration?

Pure element foils as well as pure element single and dual coating standards as well as sets of standards. A detailed list of all standards and standards sets available with a DKD calibration certificate can be found at: www.fischer-kalibriernormale.de

International acceptance of the DKD calibration certificates through the Accreditation Bodies of the following countries:

Argentina
Brazil
Costa Rica
Canada
Cuba
Mexico
USA
Germany

Egypt
Belgium
Denmark
Great Britain
Estonia
Finland
France
Greece
Ireland
Israel
Italy
Lithuania
The Netherlands

Norway
Austria
Poland
Portugal
Rumania
Sweden
Switzerland
Slovakia
Slovenia
Spain
Czech Republic
Turkey
South Africa

Australia
China
India
Indonesia
Japan
Malaysia
New Zealand
Philippines
Singapore
Taiwan
Thailand
Vietnam

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Nantong Fischer Instrumentation Ltd., Shanghai 200333, **P.R. China**, Tel. +86 21 32 51 31 31, china@helmutfischer.com

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