

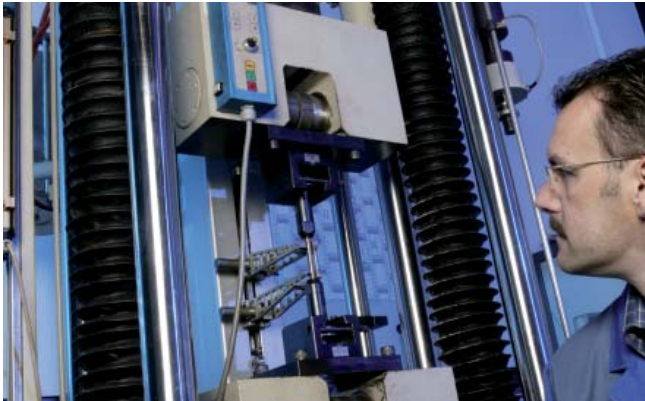


Industrie Service

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## Service Catalogue – Materials Testing Laboratory

**Metals and  
Plastics**



Dear Sir/Madam,

TÜV SÜD Industrie Service GmbH is an integrated service provider, supplying manufacturers and operators of technical plants and components with comprehensive testing services and professional support in various fields including material testing and analysis.

In the fields of metals and plastics, we offer support provided by several testing laboratories across Germany. Applying a wide range of test methods, our experts help you to find quick and reliable answers to all questions related to safety and profitability and to solve even the most complex tasks. We provide our services at national and international level.

This brochure contains an at-a-glance guide to all test methods offered by us. If you have any questions, simply ask one of our local experts or contact us directly. We look forward to hearing from you!

### **The Heads of Testing Laboratory**

Marion Baake, Martin Schindler, Christian Dietz,  
Dr. Otmar Klag, Heiko Knobloch, Dr. Thomas Vogt

## Materials testing – plastics

### **Mechanical and physical tests**

- Tensile, compression, bending and shear tests
- Adhesion testing, peel testing, tear propagation testing
- Adhesive strength tests
- Impact and shock tests
- Hardness tests (Shore A and D / IRHD)
- Viscosity measurements
- Density measurements
- Permeability tests
- Leak tests (Helium leak tests)

### **Thermal tests**

- Warm and cold storage tests
- Melting flow index tests (MFI)
- Determination of Vicat softening temperature (VST)
- Determination of heat deflection temperature (HDT)

### **Deformation tests**

- Stiffness tests
- Load tests
- Fracture and burst tests
- Strain measurements

### **Durability tests**

- Ageing tests
- Resistance to chemicals
- Wear tests

### **Plastics analysis**

- Dynamic differential calorimetry (DSC)
- Thermogravimetric analysis (TGA)
- Infrared spectroscopy (FTIR)
- Energy-dispersive X-ray analysis (EDX)

### **Non-destructive testing**

- Dye penetrant testing
- Electrical tests

### **Macro- and microscopy**

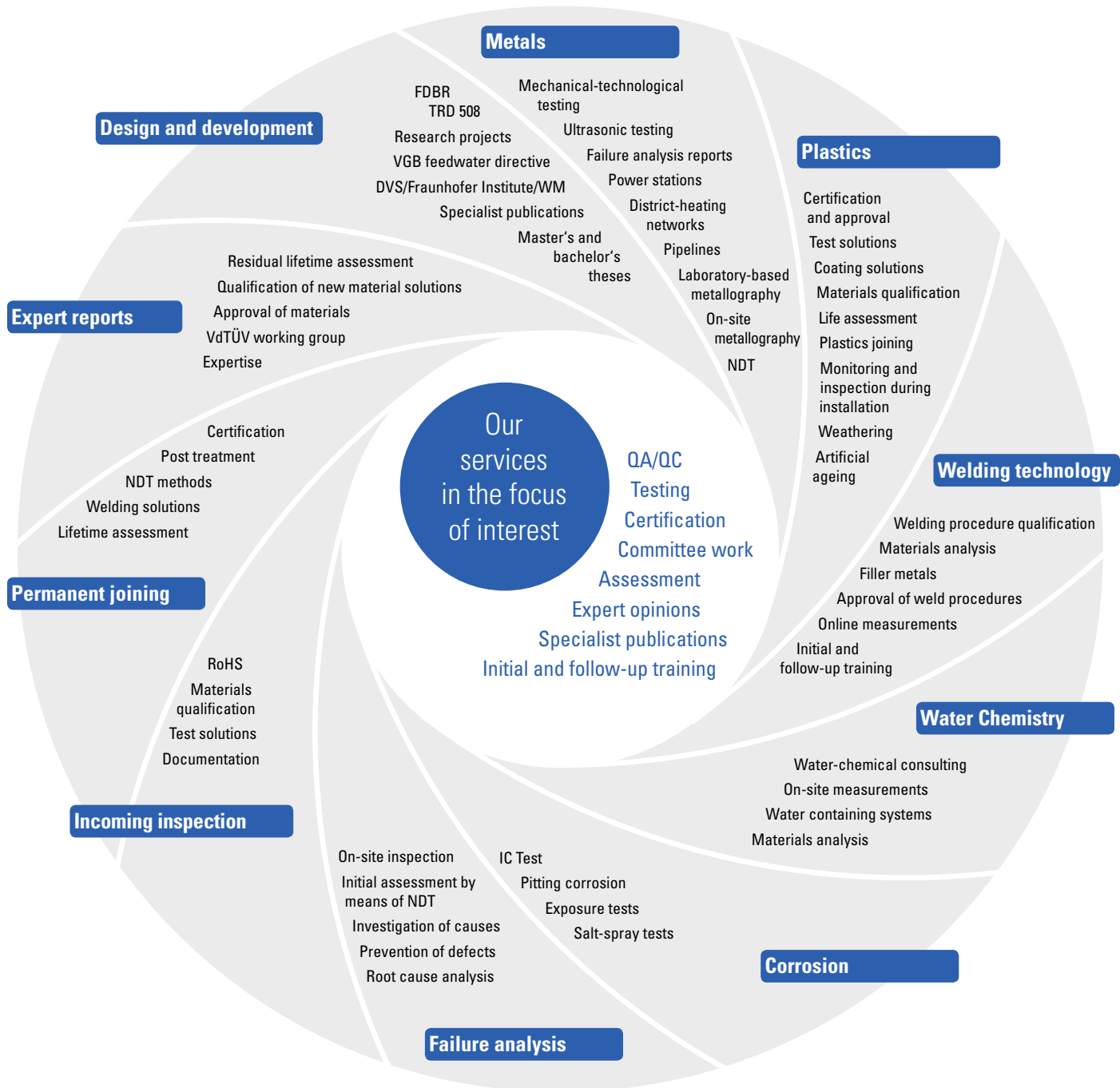
- Reflected and transmitted light microscopy
- Microsections and microtome sections
- Scanning electron microscopy (REM)

### **Assessment of service life**

- Internal pressure tests
- Creep tests
- Thermal ageing tests
- Photo oxidation testing (weathering) (UV, XENON)
- Ozone tests

### **Failure analysis**

- On-site inspection
- Application of the above testing and inspection methods
- Interdisciplinary problem solution
- Expert opinion on cause of failure
- Expert opinion on refurbishment and repair
- Expert opinion on failure prevention



# Materials testing – metals

## **Mechanical-technological tests**

- Tensile testing
  - Temperatures between RT and max. 850 °C
  - Tensile force up to 600 kN
- Notch impact test
  - Temperature of –196 °C to 250 °C
  - Energy capacity of 4 J to 450 J
  - Identification of fracture structures
  - Evaluation of the quality of welded joints
- Bending test
  - Bending force up to max. 1000 kN
- Hardness test
  - Brinell
  - Vickers
  - Rockwell
  - Low load hardness testing
  - Micro hardness testing
- Ring flattening test
- Ring tensile test
- Widening test
- Ring expanding test
- Burst test

## **Analytics**

- Scanning electron microscopy (REM)
  - Fracture surface analysis (Fractography)
  - Surface analysis
  - Analysis of coatings, linings and surface deposits
  - Chemical surface and spot analyses (microanalysis) using the EDX method (energy dispersive X-ray analysis)

- Analysis of components for fibrous substances, such as asbestos, glass and mineral fibres
- Emissions spectrometer
  - Quantitative check analysis of metals

## **Corrosion testing**

- Pitting and stress corrosion cracking test according to ASTM
- Testing for intercrystalline corrosion (IC test) according to DIN EN, ASTM
- Huey test according to DIN EN, ASTM

## **Metallography**

- Sample preparation
  - Cutting/separation (wet, dry)
  - Embedding
  - Polishing
  - Etching
- Microstructural analysis
  - Macroscopic and microscopic examination of microsections
  - Identification of material separations, corrosion, weld defects
  - Identification of hardening areas
  - Determination of grain size and degree of purity
  - Analysis of surface coatings and linings

## **On-site component metallography**

- On-site metallography (replica method)
- On-site hardness testing

## **Non-destructive testing**

- Dye penetrant test (PT)
- Magnetic particle testing (MT)
- Radiographic testing (RT) (film technology, digital technology)
- Ultrasonic testing (UT)
- Eddy current testing (ET)
- Testing of heat exchangers using the multiple frequency eddy current method
- Layer thickness measurement
- Acoustic emission testing

## **Failure analysis**

- On-site inspection
- Application of the above testing and inspection methods
- Interdisciplinary problem solution from a single source, supported by other professional specialist TÜV SÜD departments
- Expert opinion on cause of failure (mechanical, corrosion, thermal, metallurgical failure)
- Expert opinion on refurbishment and repair
- Expert opinion on prevention of future failures

## **Water-chemical and corrosion-related investigations**

- Chemical analysis and assessment of water quality and corrosion behaviour in water containing systems (steam and hot-water systems, cooling water plants, district heating systems, heating systems)
- Reliable determination of chemical and chemico-physical data on site, by means of spot samples and online measurement systems
- Root cause analysis of corrosion and deposits
- Media-related material assessments



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# We will be happy to provide information. Contact us!

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Our testing laboratories are accredited according to EN ISO/IEC 17025.

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