ATC FULDA
ACCREDITED TEST CENTER

Partner to the International Mobility Industry
The EDAG Group, the world's largest independent engineering company, develops production-ready solutions to sustain mobility in the future.

We assist our customers and accept responsibility for the development of products, production facilities and processes. To achieve this, working as quality leaders, we assume responsibility for capacity and flexibility in both product and production engineering.

We attach great importance to ensuring that our results are always in line with current production needs and requirements.

At EDAG, we call this principle "production-optimised solutions".

In conjunction with our sister company FFT, we can also assemble complete production plants, working as your turn-key plant construction partner.
The „Accredited Test Center Fulda“ is a laboratory, accredited by the DAkkS (Deutsche Akkreditierungsstelle GmbH) in accordance with DIN EN ISO 17025.

In some testing fields the laboratory holds the flexible accreditation, which certifies the competence not only to test in accordance with defined standards and specifications, but also to modify them if required.

Customers are mainly the automotive industry, raw material producers, Tier-1-Suppliers and the plastic-processing industry.

Within the EDAG process chain the laboratory acts as a service provider within division spanning projects.
Summary

- **ATC-FULDA**
  - Accredited Test Laboratory according to DIN EN ISO/IEC 17025
  - Experience since 1991
  - Laboratory area approx. 3,000 m²

- **Test topics**
  - Ageing / Weathering simulation
  - Mechanical und elektrical life tests
  - Material characterisation
  - Analytics
  - Coatings / Paintings

- **Contact**
  - Laboratory manager Norbert Kamm
  - Phone +49 661 6000-802
  - atc-fulda@edag.de
Business Activities

- Prototype Testing / Functional Testing
  - Testing in accordance with technical specifications in mounted condition and under changing climate conditions
  - Testing of modules or component parts

- Initial Sample Testing
  - Neutral and independent partner between Tier 1 supplier and OEM
  - Generation of initial sample test reports

- Series Monitoring
  - Batch inspections
  - Monitoring of finished parts
  - Incoming components inspections

- Damage Analysis
  - Analyses of damaged parts.
  - Interpretation of the results.
  - Recommendations.

- Determination of Material Data
  - Identification of material properties for the simulation of crash performance, head impact tests, airbag activations, deep-drawing processes, etc.

- Material card definition by EDAG-CAE

- Development of New Testing Methods
  - Modification, reengineering
  - Validation

- Development and production of test devices
  - SPC control
  - Pneumatics, Mechanics
  - Electrics, Robotics

- Material Consulting
  - Support on material selection and plastic-appropriate styling of components in order to prevent from production, processing and application problems
Fields of activity

- Watertightness
- Extraction
- Elektrics
- Mechanics

- Corrosion
- Burning behavior
- Life tests
- Optics

- Heat ageing
- Sample preparation
- Analytics
- Vibration
Physical-Technological Methods

- **Tensile- / Compression- / Bending Tests**
  - Test force: 0,1 N … 100 kN
  - Test temperature: -40 °C … +130 °C

- **Impact Strength**
  - IZOD – CHARPY – DYNSTAT
  - Impact energy: 0,5 J to 15 J
  - Test temperature: -40 °C … +120 °C

- **Vibration**
  - Frequency range: ≤ 5000 Hz
  - Acceleration: ≤ 300 g
  - Test temperature: -50 °C … +180 °C

- **Tensile- / Puncture Impact Tests**
  - Test force: 100 N … 20 kN
  - Test speed: < 11 m/s
  - Test temperature: -40 °C … +130 °C

- **Hardness**
  - Ball indentation hardness
  - Compression hardness

- **Local stress and strain characteristics**
  - Grey level correlation
  - Up to 120.000 pictures/s
  - Determination of material data for the crash simulation
Physical-Technological Methods

- **Photogrammetry**
  - 3D-measurement and documentation of geometric and dimensional changes during and after ageing tests of mounted component parts over modules up to complete vehicles

- **Burst Pressure Test**
  - Up to 200 bar (20 MPa)
  - Also under temperature

- **Thermal Analysis**
  - DSC -150 °C … +600 °C
  - TGA ≤ 1000 °C

- **Thermography**
  - Evaluation and documentation of thermal processes
  - **Vicat / Heat Deflection Temperature**
    - Temperature range: up to 190 °C
Optical Methods

- Color measurement
  - Color change after ageing tests
  - Color matching
  - Geometries: $d/8^\circ$, $0^\circ/45^\circ$

- Reflectometer
  - „Determination of gloss“
  - Angles: $20^\circ$, $60^\circ$, $85^\circ$

- Visual comparison of colors and surfaces

- Microscopy / Microtomy
  - Magnification: up to 800x
  - Damage analysis
  - Structural examination
Physical-Chemical Methods

- Water content
- Water absorption
- Residue on ignition
- Fiber analysis
- Burning behaviour
- Chemical resistance

- Emission behaviour
  - Emissions of organic components
  - Fogging tests
  - Odor tests
  - Formaldehyde
  - VOC / FOG

- Coatings / Paintings
  - Chemical resistance
  - Abrasion, scratching, adhesion

- Viscosity number
  - Temperature range: up to +50 °C
  - K-value

- Infrared spectroscopy

- MFI (MFR) / MVI (MVR)
  - Temperature range: up to +400 °C
  - Mass: up to 21,6 kg
Ageing / Weathering simulation

- **Heat ageing / Climate change tests**
  - Temperature range: -70 °C ... +300 °C
  - Humidity range: 10 %r.H ... 98 %r.H
  - Temperature gradient: max. 15 K/min
  - Volume: 0.05 m³ ... 180 m³

- **Temperature shock**
  - Warm chamber: +50 °C ... +200 °C
  - Cold chamber: -80 °C ... +100 °C
  - Volume: 0.13 m³ ... 1 m³

- **Salt spray tests**
  - SS – ESS – CASS
  - Volume: approx. 1 m³
  - DIN 50021, DIN EN ISO 9227

- **Corrosion-change tests**
  - Temperature range: +20 °C ... +60 °C
  - Humidity: 20 %r.H. ... 98 %r.H.
  - Volume: approx. 1 m³
  - PV 1210, VDA 621 415, DIN 50958

- **Condensed water constant climate**
  - Volume: approx. 1 m³
  - DIN 50017, DIN EN ISO 6270-2
Ageing / Weathering simulation

- Protection grade: Foreign objects and dust
  - IP1X, IP2X, IP3X, IP4X, IP5KX, IP6KX
  - Volume: 1 m³
  - ISO 20653, DIN 40050-9, DIN EN 60529

- Protection grade: Water
  - IPX1, IPX2, IPX3, IPX4, IPX4K, IPX5, IPX6, IPX6K, IPX7, IPX8, IPX9K
  - Volume: 1 m³ … 50 m³
  - ISO 20653, DIN 40050-9, DIN EN 60529

- Protection grade: Contact
  - ISO 20653, DIN 40050-9, DIN EN 60529

- Swell tests
  - Ambient temperature: +50 °C … +160 °C
  - Water temperature: 0 °C … +10 °C
  - Volume: 1 m³

- Dew tests
  - Volume: 0,18 m³ … 0,8 m³
Ageing / Weathering simulation

- **Sun simulation**
  - Effective test area: 5.3 m² (2.3 m x 2.3 m)
    1 m² (1 m x 1 m)
  - Irradiation: 1000 W/m²
  - Temperature range: -10 °C … +100 °C
  - Humidity range: 10 % r.H. … 85 % r.H.

  without irradiation:
  - Temperature range: -40 °C … +180 °C
  - Humidity range: 10 % r.H. … 95 % r.H.

- **Xenontest**
  - Xenotest ALPHA 10 specimen holder
  - irradiated area 480 cm² total
  - Xenotest BETA 54 specimen holder
  - irradiated area 2600 cm² total

- **Suntest**
  - Suntest XXL+ 8 specimen holder
  - bestrahlte Fläche 3000 cm² total
Electrical / Electronical Methods

- Electric strength
  - ≤ 7 kV AC
  - ≤ 9 kV DC

- Insulation resistance
  - ≤ $10^{12}$ Ω (Tera Ohm)

- Surface- and Volume resistivity
  - ≤ $10^{12}$ Ω (Tera Ohm)

- Data logging
  - ≤ 2,5 GS/s
  - Short interruption with 40 MS/s

- Power Supply
  - 5 V 3000 A
  - 15 V 40 A, 100 A, 200 A
  - 30 V 200 A
  - 1000 V 1.2A

- Electrical resistance
  - ≥ 10-6 Ω (Mikro Ohm)
  - Measurement current 1 mA … 10 A
  - LoVolt 20 mV
Electrical / Electronical Components

- Low-voltage cables, Flat cables
  - Single lead cables (twisted cables)
  - Aluminium cables
  - Sheathed cables (special cables)
  - HF-cables
  - Flat cables FFC and FPC

- Connector systems
  - Single- Multiple spring and Multi-pole connectors/connection
  - Inline connections and connectors on electrical device
  - Fuse holders and high current contact systems

- Switches
  - Switch module, Control and light switch
  - Pressure switch

- Control units
  - Engine, Transmission, ABS
  - Central Vehicle control systems
  - Control units, Relays

- Fuses
  - Plug-in fuses up to 80 A
  - Screw-type fuses up to 500 A

- Electrical components
  - Combi-instrument
  - Radio-CD-Player
  - Sensors

- Vehicle cable assambly
  - Complete vehicle wiring harness, as well as single wiring harness

- Cabel protection systems
  - Adhesive tapes
  - Insulating hoses and shrinkable plastic tubings
  - Corrugated hoses
  - Expandable braided
  - Longitudinal wrapping
Strategy of Initial Sample Testing

- **Advantages**
  - Time saving
  - Higher stage of maturation due to the later production of initial samples
  - Cost reduction for all parties
  - Independent expertise
  - Prevention of different results / interpretations due to different test labs

![Diagram showing the process of initial sample testing](image)