

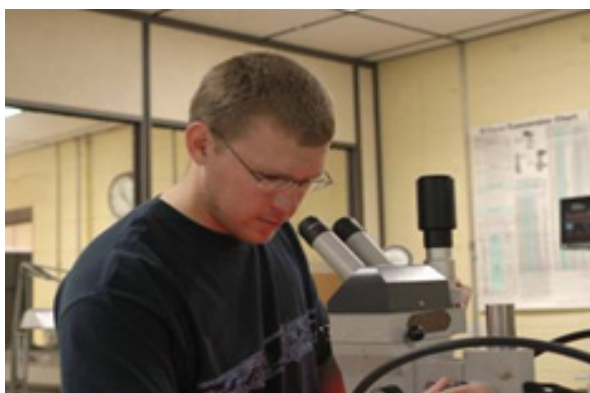
TÜV RHEINLAND'S SCOPE OF METALLURGY SERVICES

Evaluation of Product Quality and Failure Mechanics

TÜV Rheinland has a highly specialized staff experienced in materials engineering, metallurgical, mechanical and non-destructive inspection disciplines. TÜV Rheinland's Omaha Nebraska and Pittsburgh Pennsylvania laboratories are fully equipped to provide all of your metallurgical and material testing needs, in accordance with ASTM, NIST, AREMA, AAR, MIL, Nadcap, API, ASME and SAE standards.



Metallurgical Testing & Failure Analysis



TÜV Rheinland has over 45 years of experience in failure analysis and metallurgical testing including:

- Microstructure analysis
- Grain size Measurements
- Process Evaluations
- Non-destructive testing (Dye penetrant, Magnetic particle, Ultrasonic, Radiographic, and Eddy Current)
- Heat treatment evaluation (Replicas, SEM Services with EDS)

Metallurgical Testing & Chemical Analysis

TÜV Rheinland is also capable of providing both the material properties testing and chemical analysis services you require, including:

- Tensile and compression testing up to 1.2 million pounds
- Fatigue testing up to 55,000 pounds
- Charpy Impact
- Hardness testing (Brinell, Rockwell, Micro-Hardness)
- Rail Testing (Rolling load, dynamic load, slow bend, hardness and etching)
- Wear Resistance
- Accelerated Corrosion
- Chemical analysis of steels, stainless steels, cast irons, and aluminum, copper, and nickel alloys

In addition to laboratory testing and analysis, TÜV Rheinland is able to provide a wide variety of engineering and modeling services to aid in failure analysis, and new product development and evaluation. These services include:

- Mechanical design and fixturing
- Dynamic simulation
- Accident reconstruction and investigation
- Expert witness services
- Strain Gauging
- Derailment prevention training
- Finite element analysis (FEA)
- On-site or over-the-road strain gauge installation and data acquisition

If you would like to learn more about our services or would like to request a quote please contact 1-800-748-0208 or visit us on the web at WWW.TUVRIS.COM.