

Laboratory Services

MATERIALS TESTING & ANALYSIS



**A HIGHER LEVEL
OF RELIABILITY®**



ACUREN

Reduce Risk & Failure

LONGER LIFECYCLES & SAFER PROCESSES

Materials testing allows Acuren to make proactive recommendations to reduce risk and failure, and help to identify manufacturing materials for longer lifecycles and safer processes. At Acuren, we have designated centers of expertise for conducting specialized testing. Our technical libraries contain an extensive collection of materials standards, both current and historical, for evaluating test results. Our extensive professional engineering experience is supported by our **NADCAP** and **ISO/IEC 17025** accreditations.

WHY ACUREN?

- Designated centers of expertise for conducting specialized testing rather than just general testing facilities as is found elsewhere in the industry
- In-house machine shops provide quick and accurate specimen preparation for all lab tests
- Extensive network of experts and facilities, eliminating the need to outsource
- NADCAP and accredited ISO 17025 across various locations and scopes, which include mechanical and chemical testing, failure analysis, nondestructive testing and calibration
- Consistency of accreditations and services available to customers regardless of geographic location

CHEMICAL ANALYSIS

Chemical analysis can be performed on samples to determine the material composition and then identify the grade of an unknown material and/or determine compliance with known specifications using a variety of techniques including:

- Inductively coupled plasma spectroscopy (ICP)
- Direct current plasma emission spectrometry (DCP)
- Optical emission spectrometry (OES)
- LECO combustion testing (for carbon and sulphur only)

X-RAY DIFFRACTION (XRD)

Analysis can be performed on unknown solid samples to identify and determine the amount of crystalline compounds present. Useful for characterizing unknown foulants and corrosion scales.

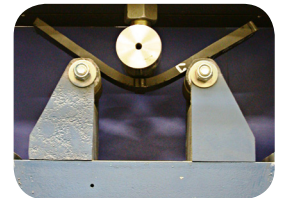
MECHANICAL TESTING – METALS

- Tensile testing (-40°F to +1,500°F)
- Crack tip opening displacement (CTOD) testing
- Charpy V-Notch Impact Testing
- Nick-break and bend testing
- Proof load, pull testing
- Burst testing
- Stress rupture testing
- Hardness testing



POLYMERS & PLASTICS TESTING

- Differential scanning calorimetry (DSC)
- Thermogravimetric analysis (TGA)
- Durometer and barcol hardness
- Izod impact testing
- Specific gravity
- Flexural strength test
- Flammability testing
- Chemical testing
- Microstructure and failure analysis



REFRACTORY INSPECTION & TESTING

Acuren has in-house refractory specialists certified to API 936 and conduct a variety of refractory tests including:

- Visual inspection of refractory
- Determine the physical, mechanical, chemical properties of refractory, testing to various ASTM standards
- Evaluate the microstructure and perform failure analysis

COATING INSPECTION & TESTING

Acuren employs certified NACE Coating Inspectors and administer a variety of coating tests including:

- Adhesion testing
- Bond strength testing
- Coating weight
- Coating thickness



CORROSION TESTING

- Bacterial testing
- Accelerated corrosion testing as per NACE and ASTM standards
- Autoclaves for pressure vessel simulation, Avesta cells for acidic environments and standard NACE cells

MACHINE SHOP SERVICES

- Preparation of mechanical test samples
- Heat treating
- UT calibration block manufacturing

LASER SCANNING

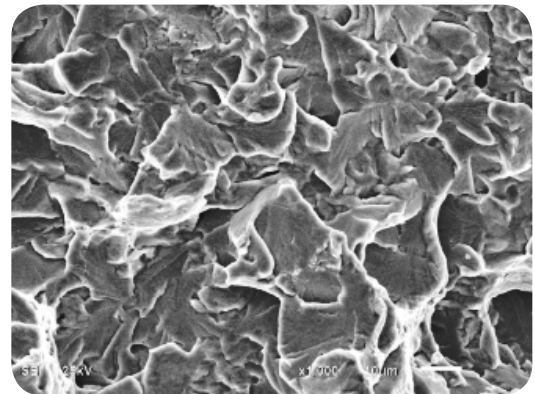
Laser scanning is used in both the laboratory setting and field to aid in gathering information about the condition of a component:

- Assessment of corrosion features
- Assessment of dents, bulges and deflections
- 3D mapping and CAD drawing generation
- Dimensional analysis and geometric profiling
- Aid for fitness for service applications

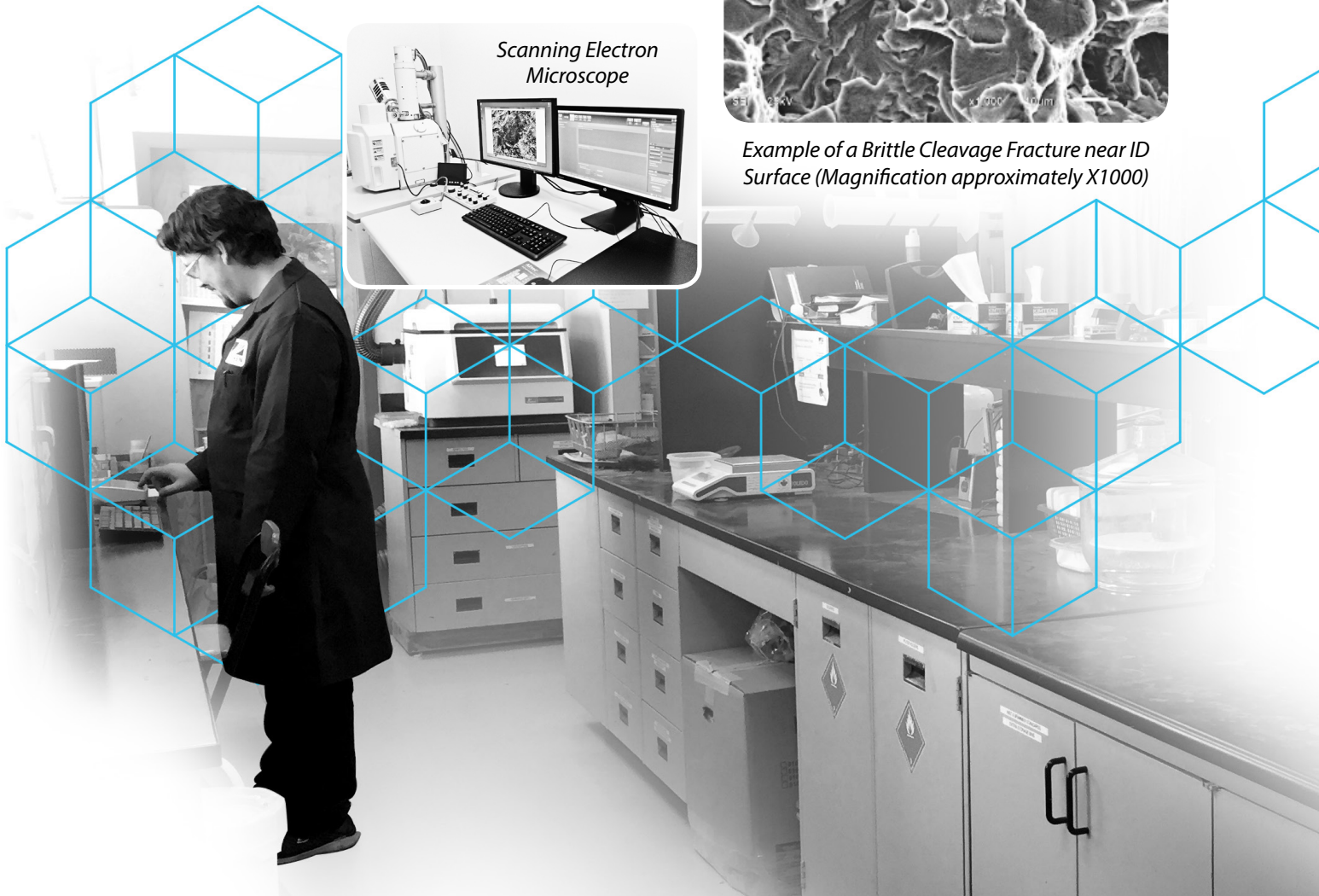
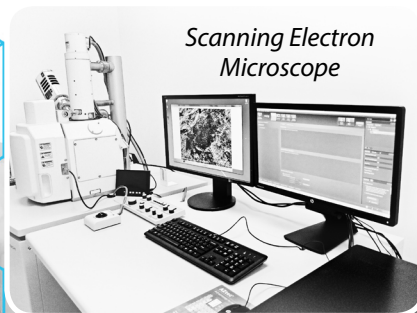
OPTICAL & SCANNING ELECTRON MICROSCOPY

Samples are prepared with precision for engineering examination in both the optical and scanning electron microscope (SEM). Our SEM's are capable of magnifications up to 200 000X with incredible resolution and depth. They are equipped with energy dispersive x-ray (EDX) detectors which can chemically identify microscopic features. An SEM is used in the analysis of such items:

- Fracture surface examination
- Failure mode determination (brittle, ductile, mixed-mode)
- Identify metal wear and airborne particulate in filters
- Corrosion deposits in water, steam and chemical lines
- Air filter samples to identify health hazards
- Analysis of metal flaws and defects



Example of a Brittle Cleavage Fracture near ID Surface (Magnification approximately X1000)





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BEYOND INSPECTION