

## METROLOGY

### Calibration

- ♦ Force
  - ♦ Torque
  - ♦ Pressure
  - ♦ Electrical
  - ♦ Dimensional
  - ♦ Mass
  - ♦ Vacuum
  - ♦ Temperature
  - ♦ Humidity\*
  - ♦ Flow\*
- \*Subcontracted

**Field Service** - Surface Plates, Hardness Testers, Optical Comparators, Balances, Force, Tools ...

### New Instruments & Parts, Repairs

## MACHINING

### Specimen Machining

- ♦ Test Specimens to ASTM & MIL specifications
  - Jominy
  - Tensile
  - Fatigue
  - Izod impact
  - Stress rupture
  - Stress corrosion
  - Compact tension
  - Fracture toughness
  - Round Compression
  - Charpy V-notch impact
  - Hydrogen embrittlement
  - Face, root, side bend ...
- ♦ EDM & Specialty Machining

## MATERIALS TESTING

### Chemical Analysis

- ♦ Inductively-Coupled Plasma AES (ICP-AES)
- ♦ Inductively-Coupled Plasma Mass (ICP-MS)
- ♦ Energy Dispersive X-ray Spectrometry (EDS)
- ♦ Atomic Emissions Spectroscopy (AES)
- ♦ Fourier Transform Infrared Spectroscopy (FTIR)
- ♦ Salt Spray {Salt Fog (ASTM B-117)}
- ♦ Accelerated Intergranular Corrosion
- ♦ Passivation Testing
- ♦ Humidity Testing
- ♦ Positive Material Identification (PMI)
- ♦ Carbon/Sulfur/Nitrogen/Oxygen/Hydrogen
- ♦ Sieve Analysis
- ♦ Soxhlet Extraction
- ♦ Plating Identification
- ♦ Classical Wet Chemical Analysis
- ♦ Density, Porosity & Oil Content

### Metallography

- ♦ Scanning Electron Microscopy (SEM)
- ♦ Decarburization/Carburization
- ♦ Microhardness (Knoop & Vickers Indenters)
- ♦ Grain Size & Grain Flow
- ♦ Plating/Coating Thickness
- ♦ Corrosion Practice A (ASTM A-262)
- ♦ Eutectic Melting
- ♦ Macroetch (ASTM E-381)
- ♦ Micro Examination
- ♦ Case Depth
- ♦ Delta Ferrite (ASTM E-562)
- ♦ Surface Contamination & Condition
- ♦ Microstructural Features
- ♦ Surface Finish
- ♦ Alpha Case
- ♦ High Temperature Oxidation
- ♦ Accelerated Intergranular Attack
- ♦ Digital Imaging
- ♦ Metallurgical Mounting & Polishing
- ♦ Serial Sectioning
- ♦ Inclusion/Cleanliness Rating (ASTM E-45)
- ♦ Recast Layer Determinations

### Mechanical Testing

- ♦ Yield Strength
- ♦ Stress Rupture
- ♦ Tensile/Ductility
- ♦ Flaring/Expansion
- ♦ Conductivity
- ♦ Magnetic Permeability
- ♦ Wedge & Axial Tensile
- ♦ Elevated Temperature Tensile
- ♦ Charpy V-Notch Impact
- ♦ Hydrogen Embrittlement/Stress Durability
- ♦ Hardness Test - Rockwell, Brinell & Superficial
- ♦ Welder & Procedure Qualifications  
(per ASME, ASTM, AWS & MIL Specs)
- ♦ Bend
- ♦ Flattening
- ♦ Cone Strip
- ♦ Proof Load

### Nondestructive Testing

- ♦ Ultrasonic - high-speed immersion or contact
- ♦ Magnetic Particle - fluorescent wet or visible dry
- ♦ Liquid Penetrant - fluorescent or visible dye
- ♦ X-Ray/Radiography
- ♦ Hydrostatic Pressure - tubing, pipe or fittings
- ♦ Visual Examination

### Dimensional Inspection/CMM

- ♦ Fasteners including threads
- ♦ Surface Finish
- ♦ First-article & Third-party inspections

### Failure Analysis - SEM/EDS

### Materials Engineering



# LABORATORY TESTING INC.