

[www.PES-Testing.com](http://www.PES-Testing.com)

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MATERIALS TESTING AND EVALUATION

**RAPID RESPONSE. DEPENDABLE DELIVERY.**

"Exceptional Turnaround From a Proven Partner in Materials Testing"



# PES SERVICES

MECHANICAL TESTING



METALLURGICAL ANALYSIS



CHEMICAL ANALYSIS



NONDESTRUCTIVE TESTING



FAILURE ANALYSIS



CONSULTING



# ABOUT PES

- Product Evaluation Systems, Inc. (PES) has been proudly serving customers since 1979.
- A fully accredited independent testing laboratory specializing in metals testing located in Latrobe, PA.
- **Accreditations:**
  - ISO/IEC 17025 Certified through ANAB
  - Nadcap (National Aerospace and Defense Contractors Accreditation Program)
- **Customer Approvals:**
  - Aerojet Rocketdyne RC5166 (Material Testing)
  - ATI Nuclear
  - Curtiss-Wright Electro-Mechanical Division (EMD)
  - GE Aviation (S-400)
  - GE E50TF133 (Grain Size)
  - Lockheed Martin: Corporate ID LM0479486
  - Pratt & Whitney MCL (Appendix 56)
  - Rolls Royce (sub-tier)
  - Safran (AMS 2300)
- We pride ourselves on providing our customers with a quick turnaround and open communication with our customers to ensure that we meet, or exceed their needs every time.

# MISSION STATEMENT

Critical to our Mission is ensuring data integrity and ethical decision-making while focusing on the needs of our customers and team members. In doing so, we continue to be an elite, growth-oriented independent testing lab with an adaptive approach to materials analysis.

# CORE VALUES

- Open, Honest, and Effective Communication
- Treating ALL with Respect
- Building Trust and Working Together as a Team
- Empowering Team Members
- Raising the Bar and Achieving Excellence in everything that we do

# VISION

We aspire to partner with our clients to ensure a safer world for all.

# COMMUNITY

# INVOLVEMENT

\*\*Contributions and donations are based on team member suggestions and/or organizations that impact our local communities and neighborhoods



WESTMORELAND  
*children first*



Westmoreland



**AMERICAN  
CANCER  
SOCIETY**



Westmoreland County  
Food Bank, Inc.



***Special Olympics***



# PES STAFF

# AND

# EXPERIENCE

- Expertise in machining, testing, and characterization of a wide variety of materials including, but not limited to:
  - Carbon Steels
  - Stainless Steels
  - Nickel Alloys
  - Titanium and Titanium Alloys
  - Aluminum Alloys
  - Brass and other Copper-Based Alloys
  - Carbide Materials
  - Additive Manufacturing (AM)
- Full failure analysis capabilities and consulting services
- Staff industrial experience in:
  - Steelmaking, Power Generation, Aerospace, Naval Nuclear, Heavy Equipment Manufacturing, Welding/Weld Qualification, and Material Testing

# MACHINING CAPABILITIES

- Saw Cutting and Sectioning
- Specimen Final Preparation
  - Manual Turning
  - Manual Milling
  - CNC Turning
  - CNC Milling
  - Surface Grinding
  - Wire EDM
  - CNC Cylindrical Grinding
  - Longitudinal Polishing
- Capabilities to design and machine custom fixtures to meet unique testing requirements



# MECHANICAL TESTING

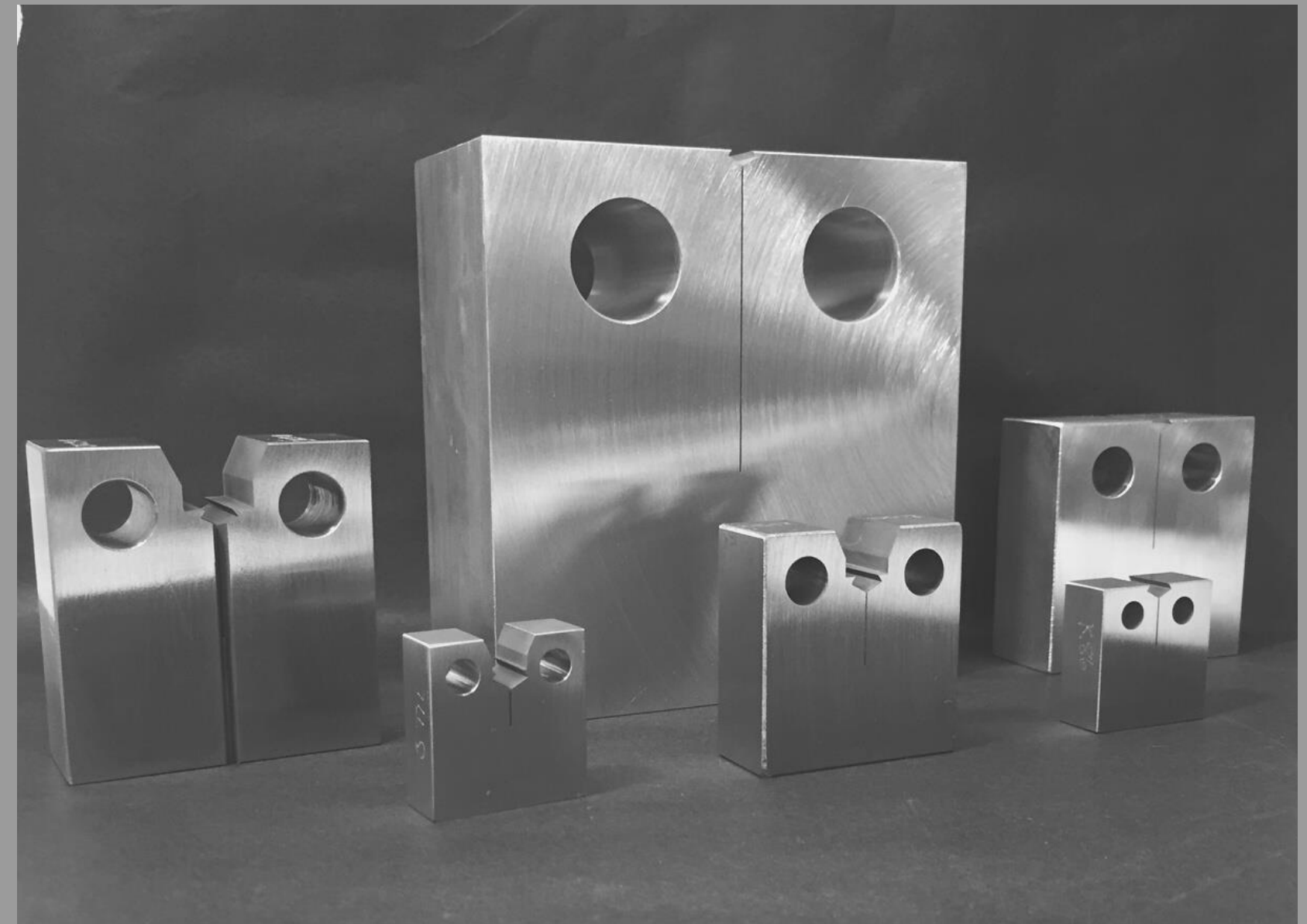
- Tensile (Room and Elevated Temperature)
  - Room Temperature - up to 220,000 lbf
  - Elevated Temperature - up to 90,000 lbf
  - Temperature Ranges: -320°F, -300°F, up to +2000°F
- Charpy Impact
  - Temperature Ranges: -320°F, -250°F up to 575°F
- Bend (Free and Guided) per ASTM and ASME
- Creep and Stress Rupture
  - Up to 6000 lbf capacity
  - Creep up to 1500°F, Stress Rupture up to 2000°F
- Hardness
  - Brinell & Rockwell
- Drop Weight (ASTM E208)
  - Determine Nil-ductility transition temperature of Ferritic steels within 10°F
  - Temperature Ranges: -320°F, -250°F up to 575°F
- Jominy (ASTM A255)
  - Determine the hardenability of various steel alloys using specific heat treatments based upon carbon content





- Fracture Mechanics

- $K_{Ic}$ ,  $J_{Ic}$ , CTOD, FCGR
- Up to 100,000 lbf
- $-320^{\circ}\text{F}$ ,  $-300^{\circ}\text{F}$ , up to  $400^{\circ}\text{F}$ ; all sizes
  - 0.50" and 0.75" C(T) up to  $1600^{\circ}\text{F}$
- Custom test and analysis programs available
- Large selection of specimen sizes
  - C(T) Specimens (0.50" - 2.00")
  - SE(B) Specimens ( $W = 0.50"$  to 4.00")



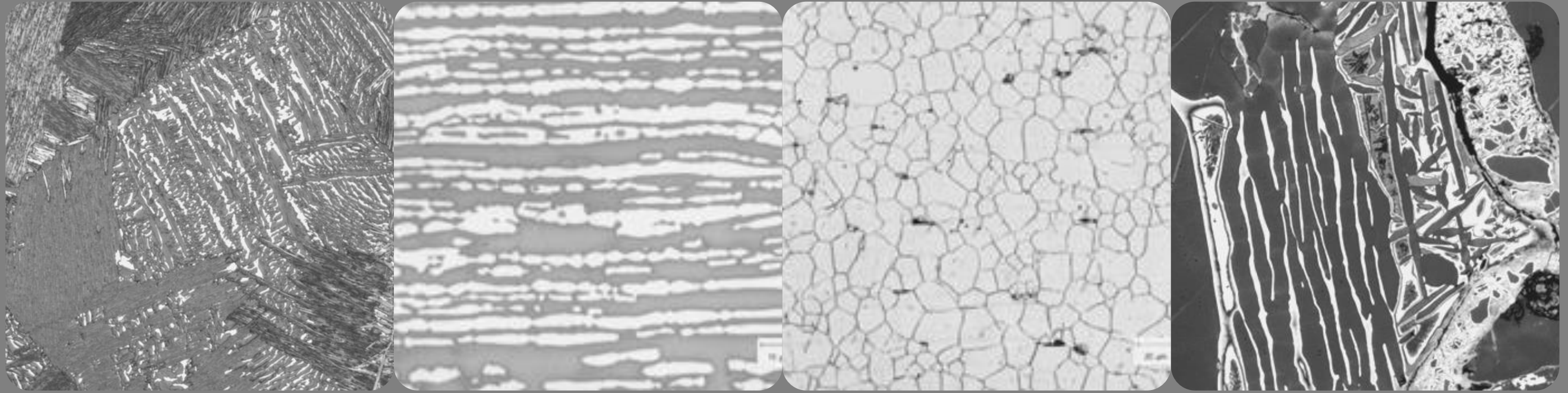
# MECHANICAL

# MECHANICAL TESTING



- High Cycle Fatigue
  - -320°F, -300°F, up to 1800°F
  - All Load Ratios
  - Up to 30Hz
- Low Cycle Fatigue
  - -320°F, -300°F, up to 1800°F
  - All Strain Ratios
  - Strain Control up to 2Hz
  - Stress Control up to 30 Hz
- Cyclic Stress-Strain
  - Room Temperature up to 1800°F
  - Customizable Steps
- Higher Frequencies with Positive R-Ratios

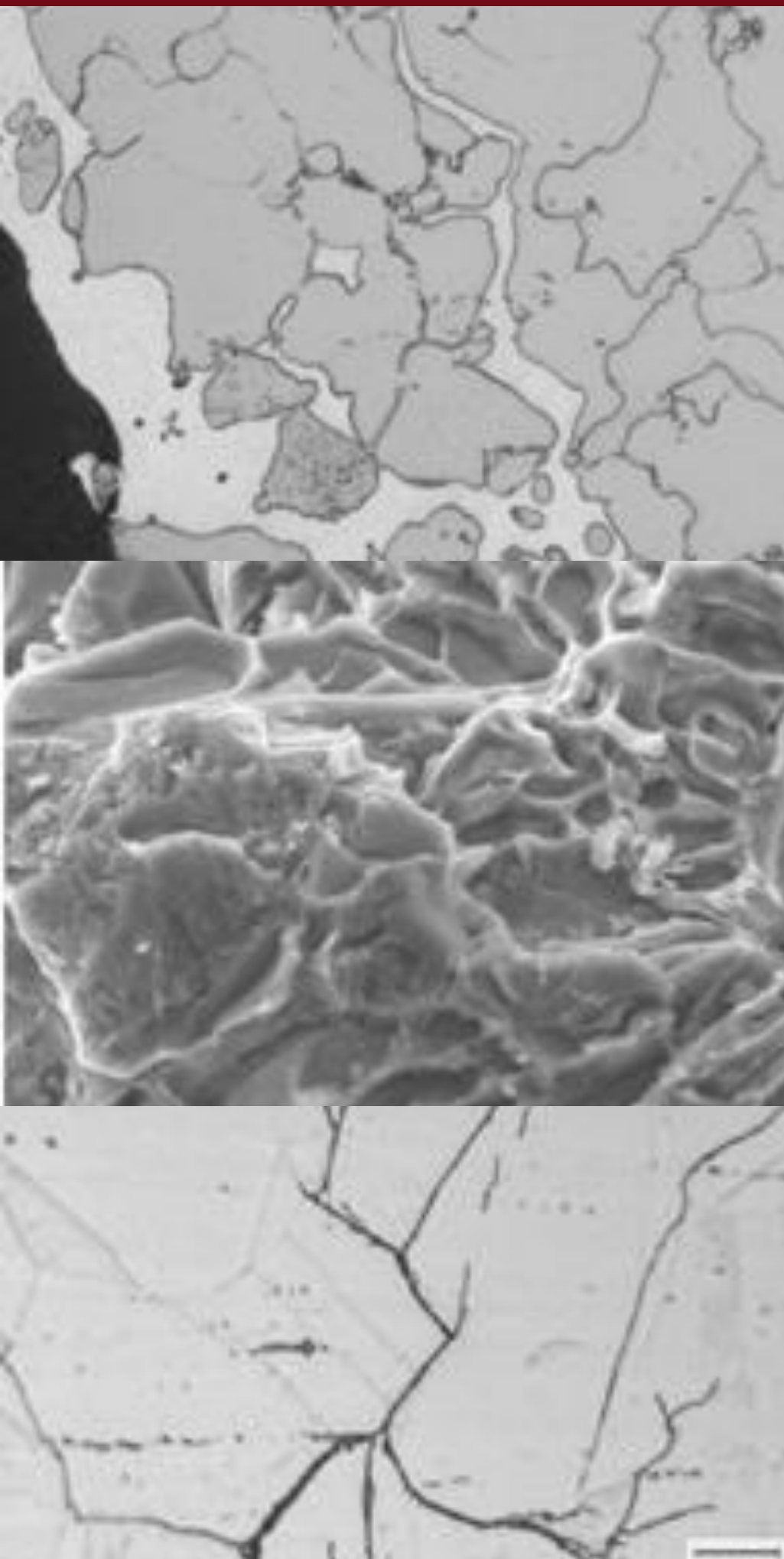
# METALLOGRAPHIC ANALYSIS



- Microstructural Evaluation
  - Inclusion Ratings
  - Porosity Phase or Percentage
  - Case & Decarburization Depth
  - IGA/IGO
  - Coating Characteristics
  - Surface Contamination
    - Alpha Case/Alloy Depletion
- Grain Size
  - Per ASTM E112, E1181, & GE E50TF133
- Microindentation Hardness
  - ∞ Vickers (Macro/Micro), Knoop
- Macroetch Examination
- Etch - Anodize Inspection of Titanium
  - ∞ Per AMS 2642 (Blue Etch)
- Corrosion Analysis
- Scanning Electron Microscopy (SEM)
  - SE and BSE Detectors
  - EDS Chemical Analysis
- Microprobe Availability

# FAILURE ANALYSIS & CONSULTING

- **Variety of Failure Investigations:**
  - Field Failures
  - Processing Defects
  - Root Cause Investigations
  - Heat Treatment Issues
  - Improvements in Material/Design
- **Range of Metallurgical Consulting:**
  - R&D Projects
  - Process Optimization
  - Alternate Alloy Selection or Design Changes
- **Project Management:**
  - Manage any outsourcing needs
  - Coordinate sub-tier schedules and deliverables



# CHEMICAL ANALYSIS

- Inductively Coupled Plasma (ICP)
- Optical Emission Spectroscopy (OES-Spark)
- LECO Combustion Analysis:
  - Carbon
  - Sulfur
  - Oxygen
  - Hydrogen
  - Nitrogen
- Analysis of recycled / reclaimed materials
- Standards for: Carbon Steel, Stainless, Nickel, Titanium, Aluminum, Cobalt, and Copper Alloys
  - Custom standards produced as needed





- Density (ASTM B311)
- Apparent Grain Size (ASTM B390)
- Apparent Porosity (ASTM B276)
- Microstructural Evaluation (ASTM B657)
- Transverse Rupture Strength (ASTM B406)
- Chemistry

# CARBIDE ANALYSIS

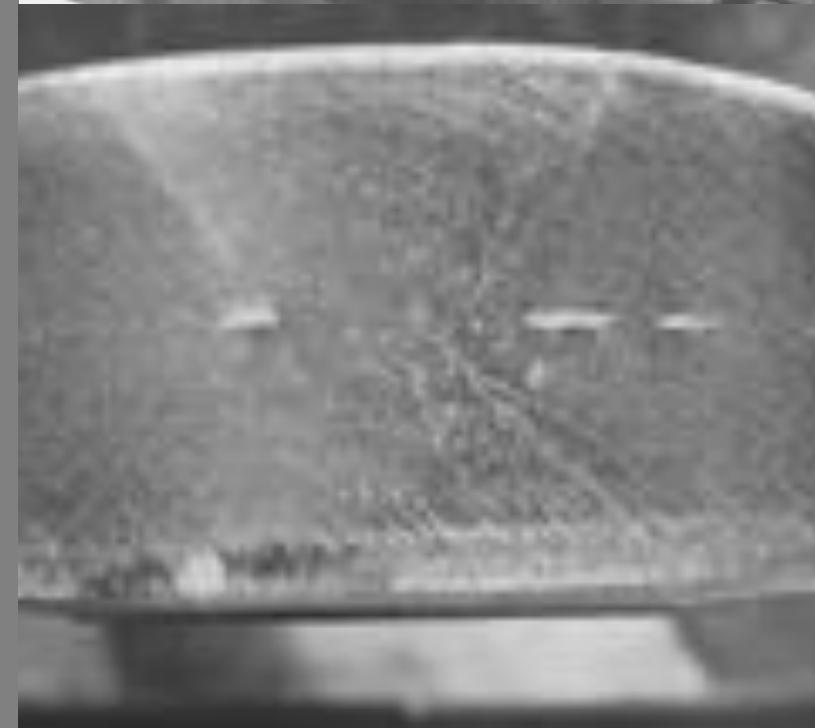
# CORROSION TESTING

- **Variety of corrosion tests for stainless steels**
  - Ferric Chloride (ASTM A923 & G48)
  - Sulfuric Acid and Copper Sulfate (ASTM A262 Method E)
  - Nitric Acid (ASTM A262 Method C)
  - Ferric Sulfate-Sulfuric Acid Test (ASTM G28)
- **Multiple Test Stations:**
  - Quick Turnaround
  - Short and long exposure tests



# NONDESTRUCTIVE TESTING

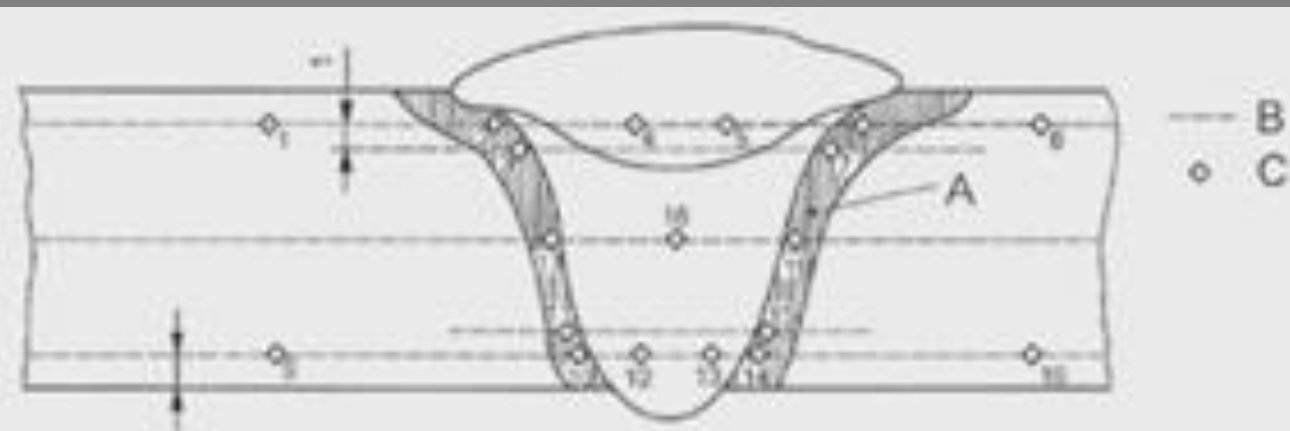
- **Nadcap Capabilities:**
  - Magnetic Particle Testing (MT)
  - Liquid Penetrant Testing (PT)
  - Subcontracted:
    - X-Ray Testing (RT)
    - Ultrasonic Testing (UT)
- **Personnel Certifications:**
  - ASNT-TC-1A
  - NAS 410

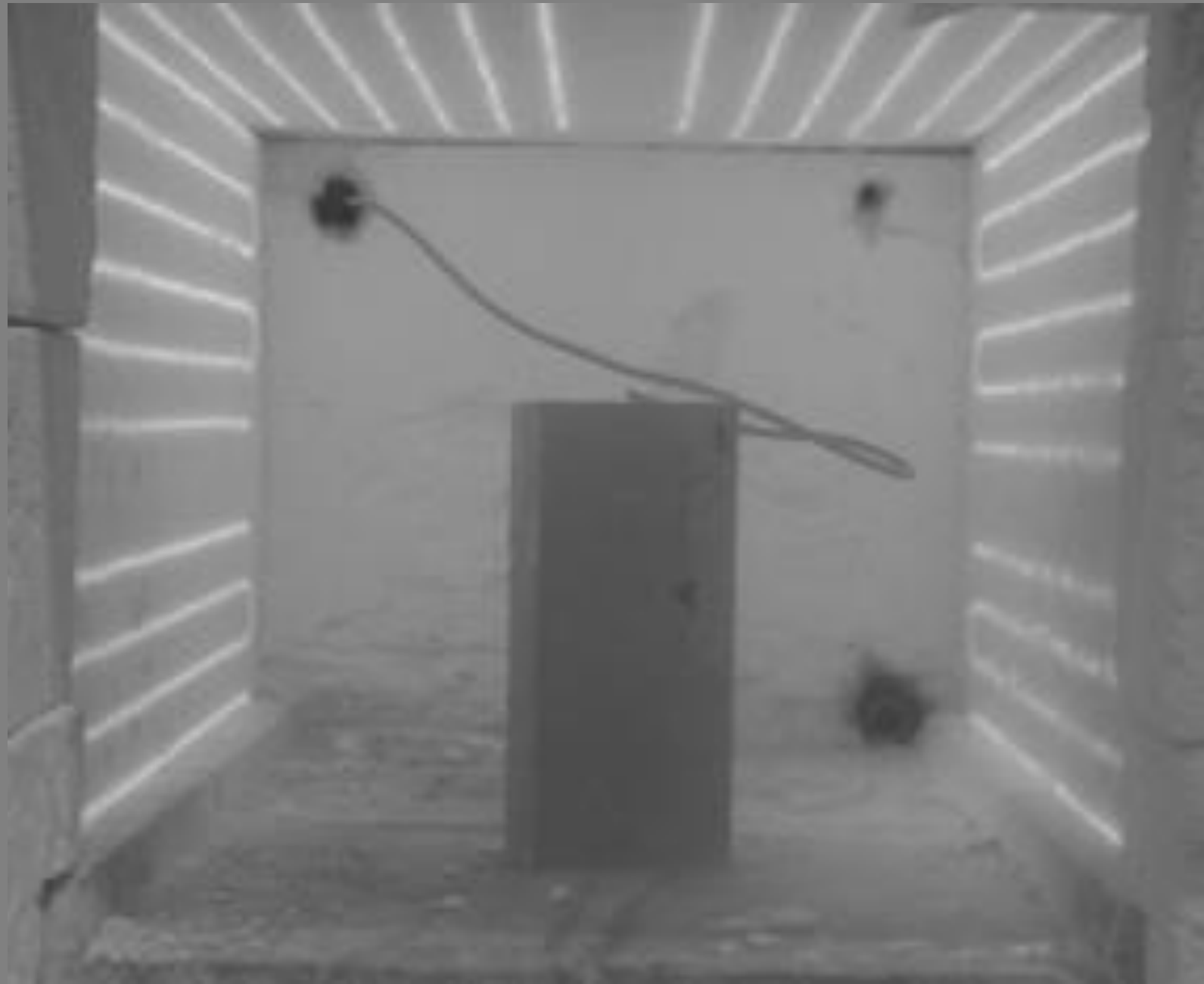




# WELD QUALIFICATION SERVICES

- Weld Procedure Qualification
- Welder Performance Qualification
- Weld/HAZ/Base Metal Characterization
  - Mechanical and Metallurgical Testing
  - NDT Inspections
  - Filler Metal Chemical Analysis
  - Macroetching
  - Microindentation Hardness Traverses
  - PWHT





# HEAT TREATMENT

- Nadcap Furnaces ( $\pm 15^{\circ}\text{F}$ )
- Max Working Zone: 13.5" W x 14" H x 27" D
- Temperature Range: 200 $^{\circ}\text{F}$  to 2200 $^{\circ}\text{F}$
- Programmable Heating and Cooling Rates
- Exportable Time-Temperature Data
- Cooling Methods
  - Air Cool
  - Fan Cool
  - Oil Quench
  - Water Quench
- Specimen Prep, R&D, PWHT (Weld Qualification)

Send all **Purchase Orders** to:  
PurchaseOrders@PES-Testing.com



# Contact List

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CONTACT LIST

# CONNECT WITH US



**PRODUCT EVALUATION SYSTEMS**



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