

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
 - 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°F , -300°F , up to 400°F ; all sizes
 - 0.50" and 0.75" C(T) up to 1600°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")



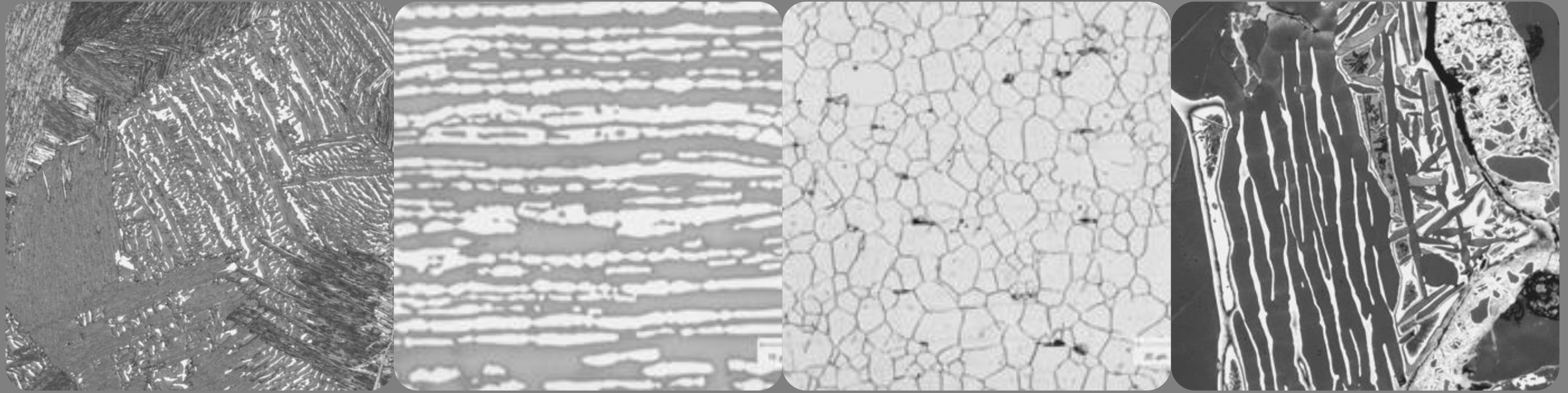
MECHANICAL

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

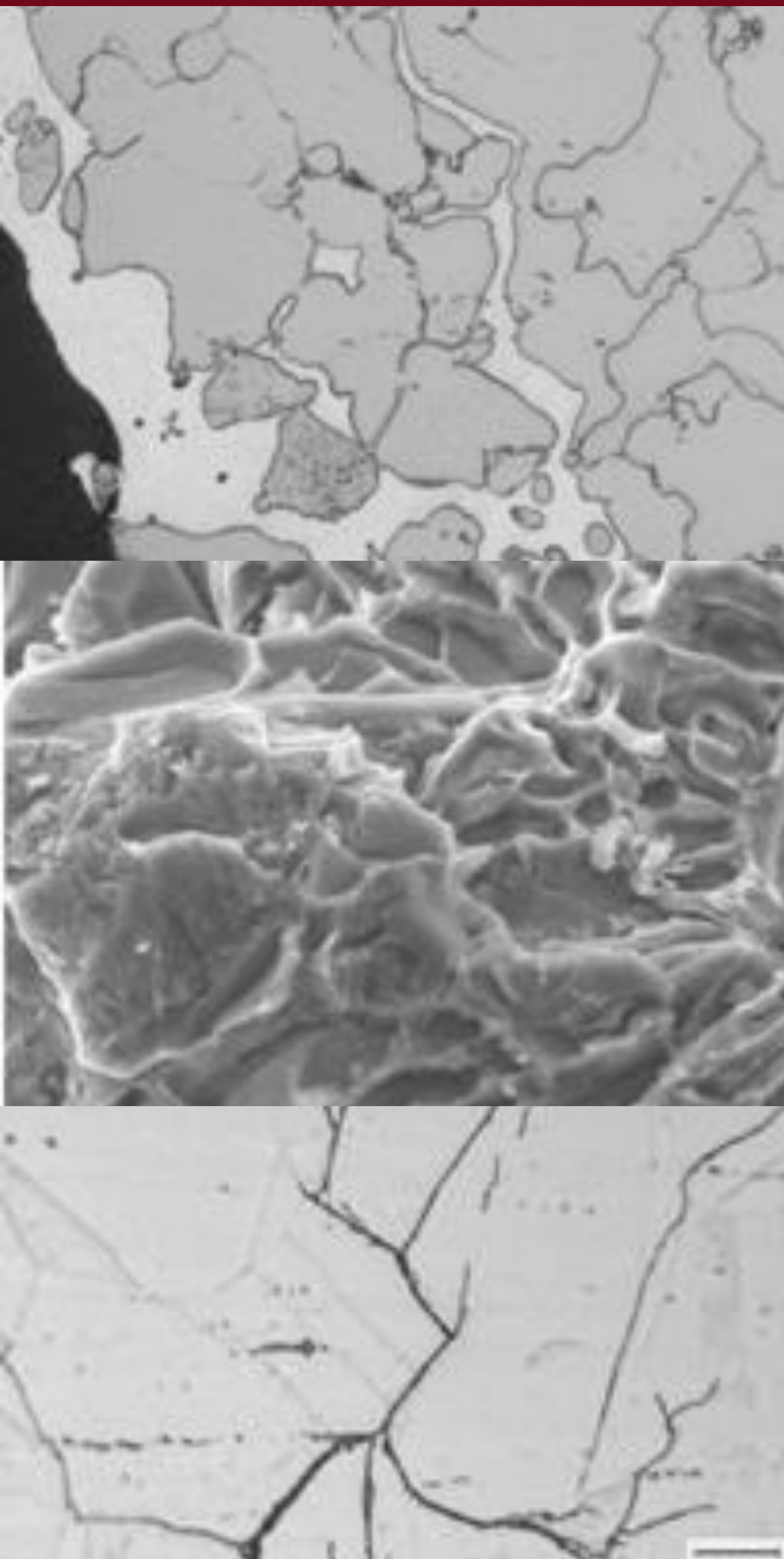
METALLOGRAPHIC ANALYSIS



- 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
- Palmqvist Toughness Test (ISO 28079)

CARBIDE ANALYSIS

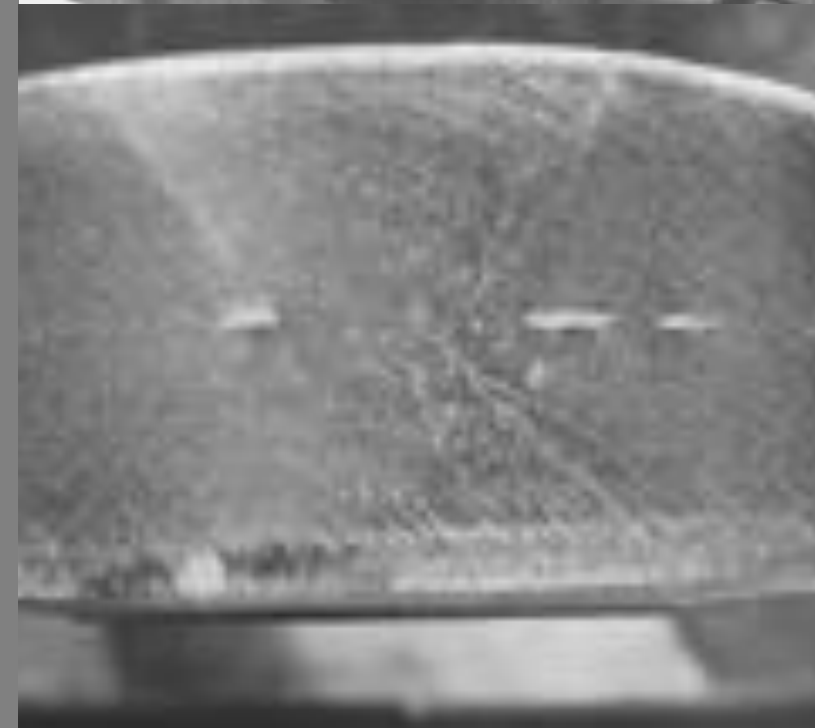
CORROSION TESTING

- **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



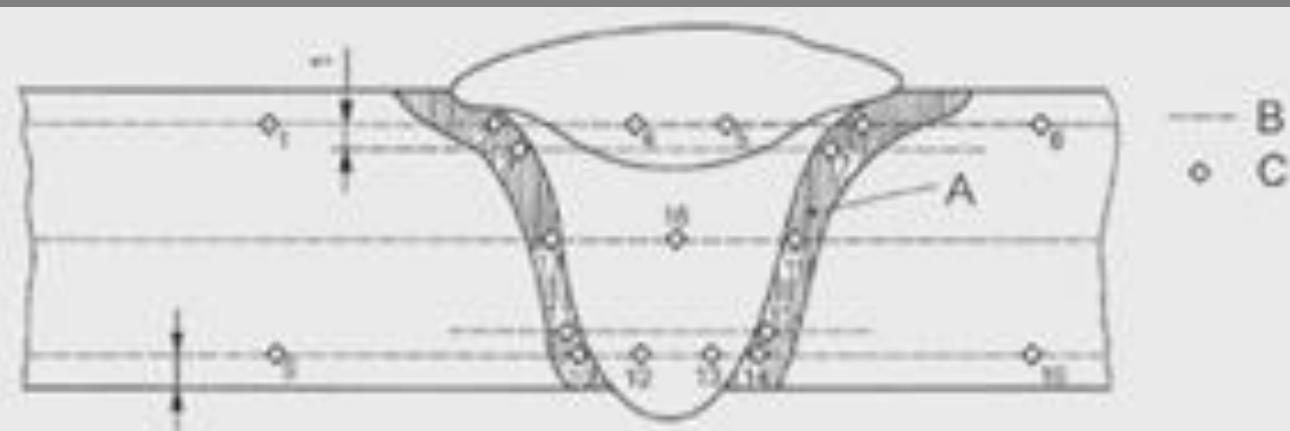
NONDESTRUCTIVE TESTING

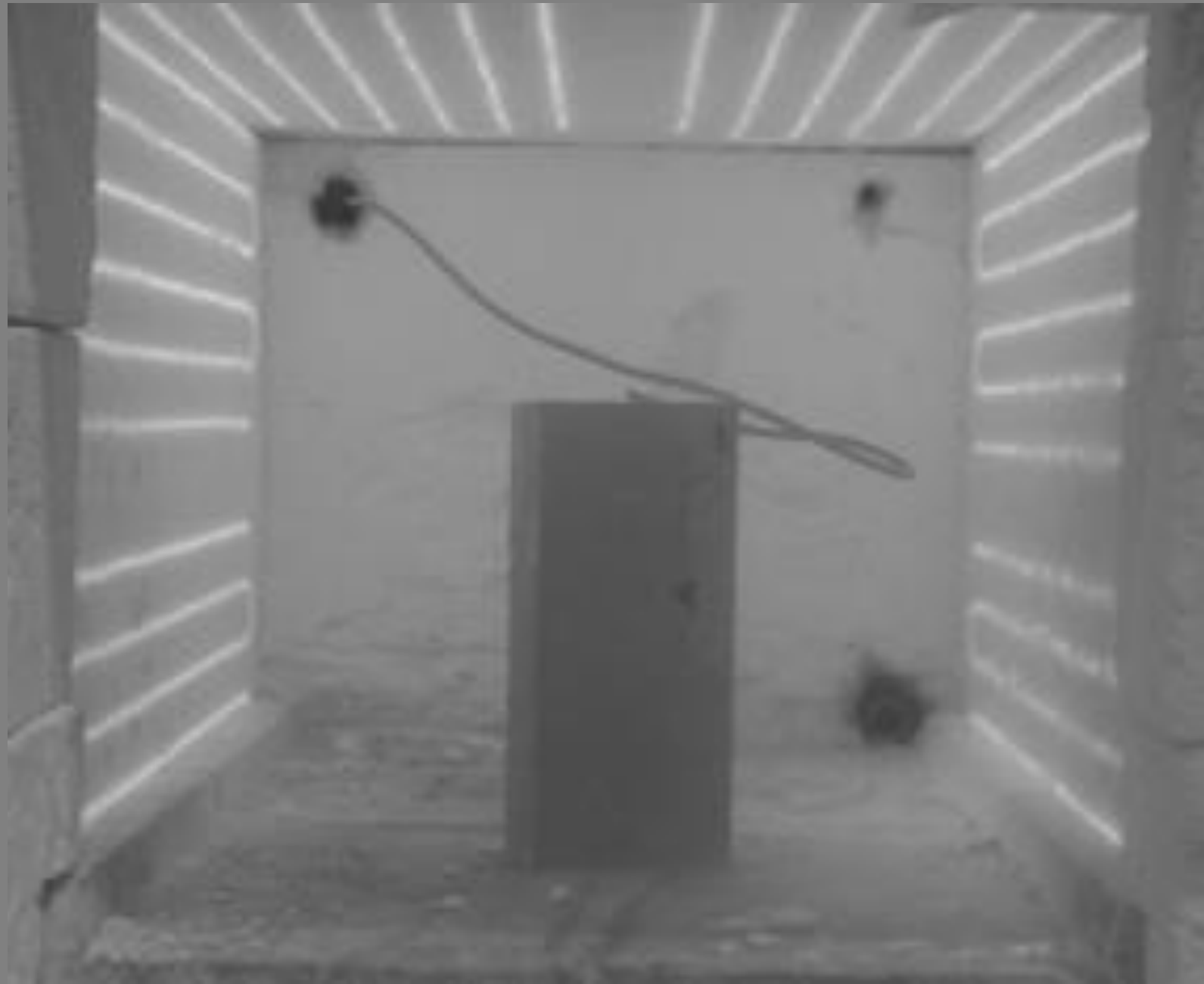
- **Nadcap Capabilities:**
 - Magnetic Particle Testing (MT)
 - Liquid Penetrant Testing (PT)
 - Subcontracted:
 - X-Ray Testing (RT)
 - Ultrasonic Testing (UT)
- **Personnel Certifications:**
 - ASNT-TC-1A
 - NAS 410



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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