

Mechanical Testing Services

Pushing materials to their limits so mission-critical components won't reach theirs.



Mechanical Testing Services

Navigating Mission-Critical Performance Challenges

With decades of experience supporting the Aerospace, Defence, and Energy sectors, Element is well placed to understand the testing rigour needed in applications where failure is not an option. As a trusted partner to leading Aerospace Primes and defence contractors, we specialise in guiding organizations through the challenges of their mechanical testing strategies. From material qualification and research to certification and failure analysis, to testing, characterising & qualifying materials for the most demanding applications, we ensure safety, efficiency & compliance -- to engineer confidence in critical components where performance is paramount.

Tailored Testing Approaches

Specifically for mechanical testing in aerospace, defence, and energy applications, Element delivers precisely accurate, on-time, on-budget results for both high-volume and custom programs. Our state-of-the-art labs handle diverse material testing requirements with advanced techniques that subject your materials to the stresses they might encounter during service – from extreme temperatures and pressures to complex loading conditions and environmental factors.

Our comprehensive capabilities include tensile strength testing of advanced alloys and composites, fracture toughness testing, fatigue testing, impact testing, hardness testing, creep testing, stress rupture testing, and specialized applications such as spin testing for rotating components and multi-axial loading simulation. We offer extreme environment testing, including high temperature testing up to 1400°C and cryogenic conditions, to simulate the demanding conditions faced in aerospace, defence, and energy applications. We combine cutting-edge equipment with extensive material expertise to deliver reliable data that empowers you to meet stringent requirements and make informed decisions around product development and safety.

Specialized Testing for Critical Applications

For aerospace applications, we provide comprehensive mechanical testing for flight-critical components, including airframe structures, engine components, fastening systems, and landing gear, ensuring materials meet stringent airworthiness requirements. Our defence sector services include ballistic material evaluation, armor testing, and mission-critical component qualification where material performance directly impacts operational success. In the energy sector, we specialize in testing materials for extreme environments, including high-pressure, high-temperature applications, and corrosive service conditions for both traditional and renewable energy systems.

Our specialized testing methods include:

- Multi-axial loading (static and dynamic, coupon level and component level)
- Spin testing for rotating components
- Fatigue testing under simulated service conditions
- Oversized component testing with high displacement (up to 48”) and high load (up to 300,000 lbs.)
- Environmental testing (temperature, humidity, corrosion)
- Cryogenic and high temperature testing up to 1400°C
- Custom test fixture design and implementation

Associations/Affiliations

Element’s mechanical testing services maintain ISO 17025, ISO 9001, and NADCAP accreditations—credentials essential for aerospace, defence, and energy sectors. We test to international standards including ASTM, ISO, EN, BS, and military specifications, as well as industry-specific requirements from organizations like NASA, ESA, and leading OEMs. Our highly trained personnel ensure every test meets stringent quality requirements, providing you with globally recognized compliance assurance for your most critical applications.

Real Results

Our state-of-the-art laboratories deliver comprehensive mechanical testing capabilities with equipment specifically designed for aerospace, defence, and energy applications. Our global network spans key industry hubs worldwide, providing convenient access to world-class testing capabilities. We cover the complete range of critical materials—from high-performance metals and superalloys to advanced composites used in extreme environments. Using precision equipment and rigorous methodologies, we deliver reliable data that helps you design, manufacture, and operate with confidence in applications where failure is not an option. applications where failure is not an option.

Key Benefits

- **Zero Tolerance for Failure**
Our comprehensive mechanical testing ensures your materials and products meet critical end-use properties for applications where safety is paramount.
- **Fast Results for Critical Timelines**
Receive precisely accurate, on-time results to achieve your project milestones with our full suite of mechanical testing services.
- **Complex Testing Requirements Solved**
Access a complete range of testing methods from a single, trusted partner, with capabilities spanning from standard protocols to custom testing programs.
- **High Volume and Custom Testing**
Leverage our proven experience in delivering both high-volume routine testing and specialized custom programs for leading industry partners.
- **Ensuring Regulatory Compliance**
Our work aligns with stringent aerospace, defence, and energy standards, so you stay compliant with evolving requirements.

Our Purpose

We're committed to advancing material performance through rigorous testing and proactive solutions. Our goal is to help you develop safer, more efficient systems through comprehensive mechanical evaluation. When failure is not an option, trust Element's state-of-the-art laboratories to deliver precisely accurate, on-time, on-budget results for both high-volume and custom programs. Our global reach, industry leadership, comprehensive capabilities, and technical excellence ensure you receive direct access to highly experienced experts delivering reliable results every time, across all testing methods.

Connect With Us

Ready to strengthen your mechanical testing program for aerospace, defence, or energy applications? Get in touch today:

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