

High-Temperature Materials Testing Solutions

be certain.

TO DEVELOP THE NEXT GENERATION OF ULTRA-EFFICIENT AEROSPACE ENGINES
AND POWER GENERATION SYSTEMS, RESEARCHERS WORLDWIDE TURN TO MTS
FOR HIGH-TEMPERATURE MATERIALS TESTING SOLUTIONS. THE REASON IS CLEAR:
OUR COMBINATION OF ADVANCED TECHNOLOGY, COMPLEX SYSTEMS INTEGRATION
EXPERTISE, AND DEEP INDUSTRY EXPERIENCE REMAINS UNMATCHED.

LET US HELP YOU PURSUE YOUR IDEAS WITH SPEED AND CONFIDENCE.



Enabling breakthroughs in advanced research

Ultra-efficient aerospace engines and power generation systems depend on new materials that withstand higher temperatures for longer periods. To support the pioneering research in this field, MTS offers a full spectrum of high-temperature materials testing solutions backed by incomparable service and support. Designed to empower innovation in your lab, these sophisticated solutions keep pace with the rapidly evolving demands of applied materials science.

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Confidence

High-temperature materials testing labs routinely run tests that have never been performed before. In these situations, it is essential to trust your entire approach, from the equipment to the methodology to the data you collect. As the world's premier test and simulation solutions provider, MTS is uniquely qualified to help you achieve absolute confidence. We deliver high-temperature testing solutions that leverage decades of industry collaboration and field-proven technology. We also bring expertise that comes only from experience, enabling us to perform complex systems integration, suggest alternative configurations and validate setups. We also offer unrivaled service, support and consulting to keep your confidence intact.

Efficiency

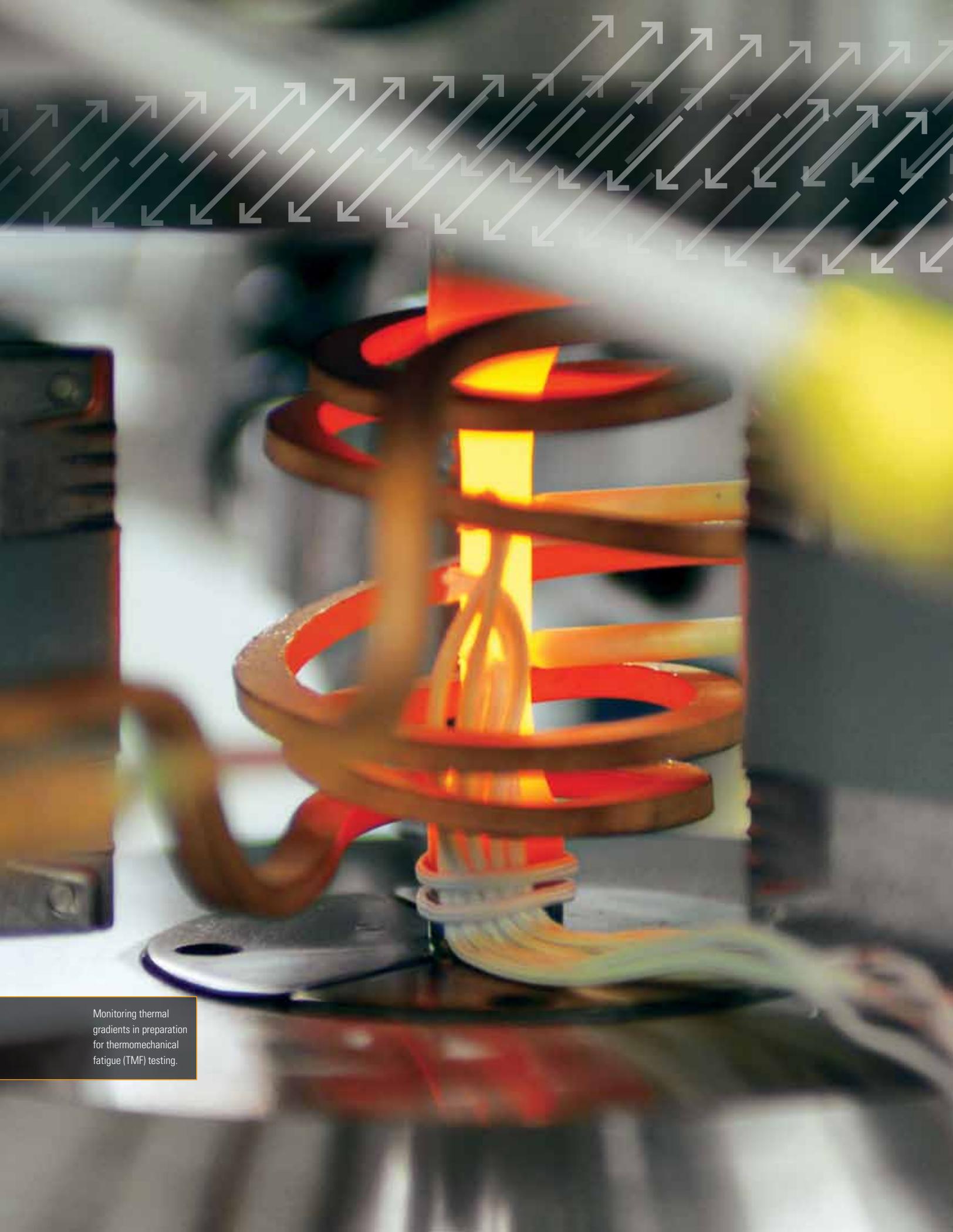
Advanced development programs depend on a highly orchestrated schedule. To fulfill your role, labs must prepare tests quickly, perform studies correctly the first time, and generate meaningful results within a narrow window of opportunity. MTS brings sophisticated technology and expertise to help you maximize efficiency and meet your commitments. Our test equipment is easy to use and ready when you need it. We excel at addressing new challenges, so you can expect accurate, repeatable results for every test you devise. Our global service team can also work with you to consider the implications of new tests, integrate complex solutions, and make room in your schedule for routine maintenance and calibration.

Flexibility

During the next decade of research, tests will demand more extreme temperatures, higher forces and simulations with greater fidelity. The question labs must answer is how to approach these needs. Regardless of how testing evolves, your MTS solution will remain a viable platform for today and tomorrow. We design our systems so they can adapt easily to new requirements. Durable and versatile load frames, highly scalable digital controls, and continuously upgraded software create a lasting foundation that protects your investment and eliminates the risk of starting over with new equipment every time your test needs change.



Elevated temperature Low Cycle Fatigue (LCF) test setup. Photo courtesy of University of Central Florida.



Monitoring thermal gradients in preparation for thermomechanical fatigue (TMF) testing.

Push the boundaries of high-temperature testing

MTS high-temperature materials testing solutions are designed to help research and advanced development labs explore new ideas quickly and confidently, driving innovation to unprecedented heights.



MTS is the ideal partner for testing new materials that optimize the efficiency of turbines, boilers and fluid distribution equipment in a wide variety of power plants.

SOLUTIONS FOR NEW AND ESTABLISHED LABS

As a mentor for new labs, MTS can help you quickly acquire the right equipment and establish new capabilities, as well as reduce the learning curve for project teams — all while minimizing risk. Drawing on decades of hands-on experience, we offer a valuable resource for labs that are struggling with turnover, as well as labs in emerging, high-growth markets where ramp-up time is short and margin for error is small.

For well-established labs, MTS helps fine-tune the accuracy, speed and flexibility of current test environments, in addition to supplying high-quality components and providing service and support. We can also serve as a highly qualified partner for exploring new areas of materials testing. We intimately understand the nuances of proven and pioneering test applications, and we welcome the opportunity to investigate new issues with you and engage in discussions about the future of high-temperature testing.

Electrical power generation

For suppliers of electrical power generation equipment and components, energy efficiency is a distinct competitive advantage. Utilities eagerly await the next wave of impulse and reaction turbines, boilers, and fluid distribution systems that will enable them to produce even more power from the same basic footprint while reducing emissions. These products will also be more durable, which means fewer costly inspections. Raising energy efficiency beyond current limits, however, depends on perfecting nickel-based superalloys and other materials that can withstand prolonged exposure to extremely high operating temperatures.

Whether you manufacture gas or steam turbines, boilers for nuclear, coal-fired or oil- and gas-fueled power plants, or the piping, valves and pressure vessels these plants use to control fluid distribution, MTS solutions make it fast and easy to acquire accurate high-temperature material property data. Our testing solutions drive characterization and analysis that will ultimately help you develop materials that allow higher operating temperatures, increasing durability and extending equipment life.

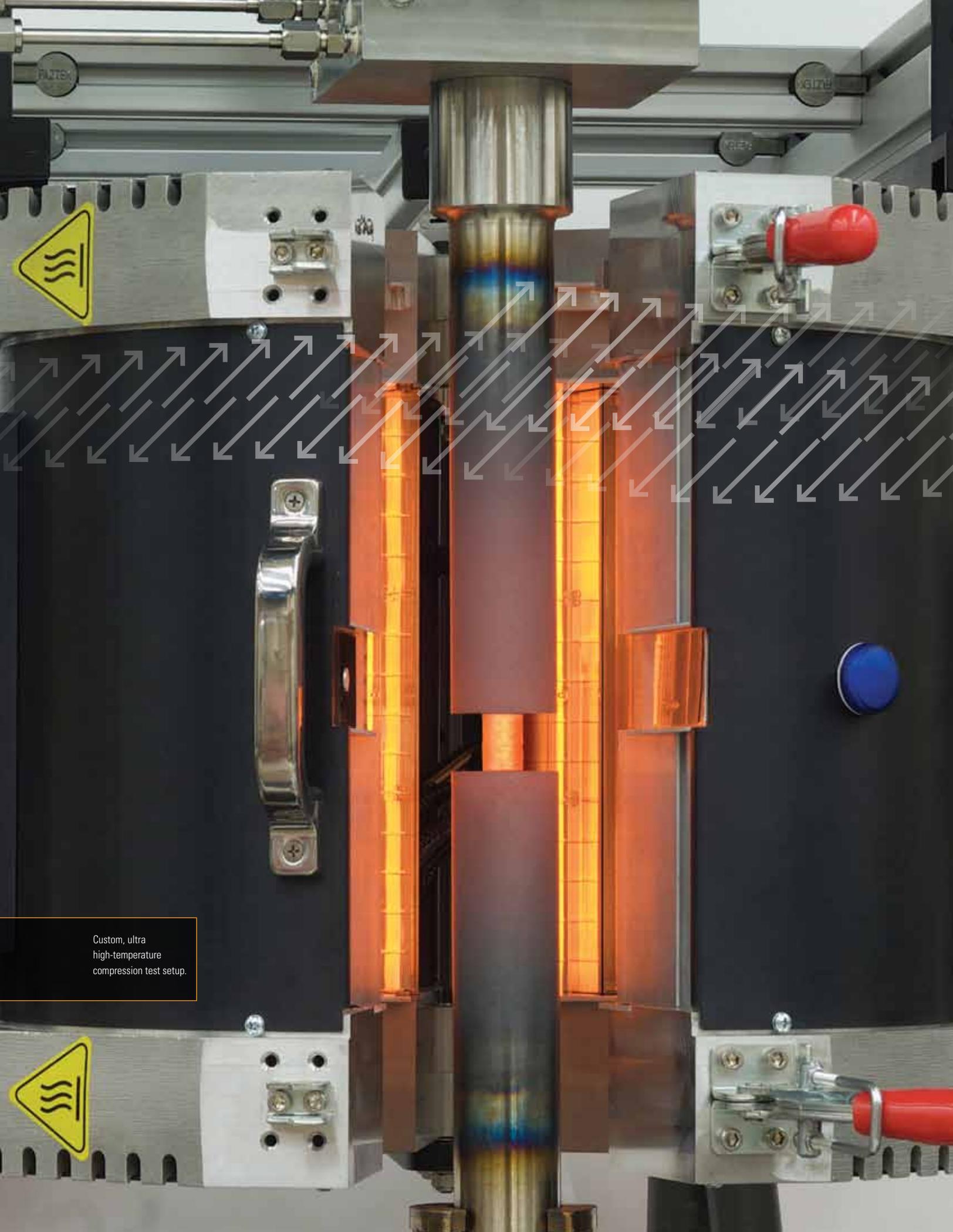


MTS high-temperature materials testing solutions are integral to the development of ceramic matrix composites and other materials that will spur a new generation of high-efficiency jet engine turbines.

Aerospace

Around the world, manufacturers of sophisticated aircraft and space vehicles are focused on improving the fuel efficiency of turbine-powered jet engines. Total cost of ownership is the driving factor. Increasing the fuel efficiency of its fleet by even a small percentage, for example, would help an airline save billions of dollars in operating costs over time. To surpass existing fuel-efficiency limitations, new turbines must run hotter and require less cooling. All of which means the individual components — disks, housings, blades and nozzles — must be fabricated from or coated with materials that perform reliably at high temperatures for extended periods.

MTS solutions help researchers characterize these innovative superalloys, ceramic matrix composites and ceramic coatings with extreme precision and repeatability. Most important, we understand the complexities of these tests, which typically require analysis of material behavior under exacting mechanical loads in high-temperature environments, and incorporate multiple methods of correlated data acquisition.



Custom, ultra high-temperature compression test setup.

Advanced solutions for high-temperature testing

Only MTS delivers the products, service and industry-specific expertise you need to perform the full spectrum of common and uncommon high-temperature materials tests.



ACCESSORIES OPTIMIZED FOR HIGH TEMPERATURES

Accessories specifically designed for high-temperature materials testing complete our portfolio, allowing you to configure the ideal system for any test application, from the ordinary to the highly experimental.

High-temperature furnaces. Ideal for tension, compression, bend, cyclic fatigue and fracture testing, these furnaces feature a center-split design for simple fixture and specimen access. We also offer compact induction systems for quick, controlled heating and cooling in TMF and related applications.

High-temperature extensometers. Made to withstand high-temperature testing with induction heaters or furnaces, best-in-class MTS extensometers offer unmatched quality. They deliver exceptional accuracy that meets or exceeds ASTM requirements.

High-temperature grips. Choose from a variety of grips for different tests, specimen types and budgets. Hot grips are constructed of high-temperature superalloys to extend into the heated zone of the furnace. We also offer cold (water-cooled) and warm grips.

Load Frames

MTS load frames handle the full array of high-temperature materials testing demands. Our servohydraulic systems include standard MTS Landmark™ test systems and high-force Model 311 load frames, allowing you to perform monotonic and fatigue testing across a wide range of forces. For highly complex multiaxial loading conditions that realistically simulate actual operating environments, we offer the Model 819 Axial/Torsional System and MTS Planar Biaxial Testing Systems. All of these are powered by clean, quiet SilentFlo™ hydraulic power units (HPUs) that can be located right in the lab. For lower-force monotonic testing, MTS Insight™ solutions integrate frame hardware, software and a range of accessories.

Controllers

Versatile FlexTest® controllers deliver the flexibility and scalability required to meet your current and long-term testing requirements. These digital controllers deliver high-speed closed-loop control, data acquisition, function generation and transducer conditioning, and can be expanded to include up to 40 channels and eight test stations. Any hardware resource can be used for any test station, and hardware resources can be easily reallocated to reconfigure the controller for different test arrangements. Regardless of the configuration you select, FlexTest controllers act as a central hub for integrating load frames, high-temperature environments and data acquisition systems.

Software

MTS TestSuite™ is a powerful family of modular software built on a common platform that lets you easily create, run, report and analyze according to your needs. It features a visually intuitive user

interface to streamline the development of calculations and test workflows. It also offers optional modules with test, analysis and report templates and calculations for specific types of tests, including the High-Temperature, Low-Cycle Fatigue (LCF) Module and the Thermomechanical Fatigue (TMF) Module.

Integration expertise

Generating precise temperatures at the correct time for a specific test profile requires complex integration of load frames, extensometers, furnaces, heating elements and other components. Turn to MTS to reduce risk and increase confidence in new testing applications. With extensive experience implementing these configurations, MTS ensures everything works in sync, enabling accurate control and measurement of thermal gradients. We understand the critical issues related to system integration, and we can ensure MTS equipment works with your existing test systems.

Outstanding service and support

The MTS global team of service, support and consulting professionals is the largest and most experienced of its kind. We offer complete lifecycle management services for all your high-temperature materials testing systems, enabling you to achieve maximum productivity and uptime, as well as develop and deploy new test programs rapidly. Our complete service offering includes:

- » Professional services and consulting
- » Maintenance services and spare parts
- » Accessories and upgrades
- » Lifetime system protection

Learn more today

Contact us for more information about how MTS can help you optimize your high-temperature materials testing capabilities.



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