



# Test Devices Inc.

*Leading with Experience,  
Innovation and Integrity.*

For three decades, Test Devices Inc. has been the premier source for centrifugal stress measurement systems and services. In addition to leading the field in building spin test systems, Test Devices provides advanced technology spin testing services to customers in a wide variety of industries. We are privileged to work with developers and producers of high-speed components of jet engines, medical centrifuges, machine tools, industrial compressors, and high-speed electric motors, among others.

At Test Devices, we focus on a careful understanding of the needs of our customers. We often participate in developing test plans to achieve the maximum benefit from a project. Combining deep experience with continuous improvement and innovation in the development of our test equipment, Test Devices Inc. offers high value in centrifugal stress evaluation testing.

With extensive experience in operating spin test systems, we have had the opportunity to gain a unique understanding of the needs of our spin test system customers. Because we operate spin test systems daily, we are uniquely positioned to understand the needs of the people who use the equipment. Both the machines we sell and the machines we operate here include the most advanced safety, control, and measurement systems available.



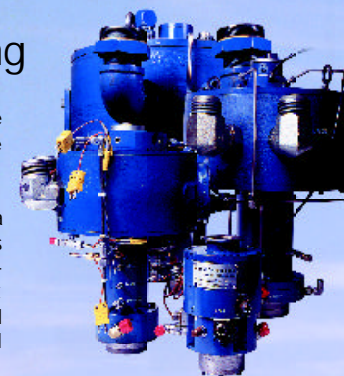
*Loading a Test Article  
into a Spin Pit.*



## Low Cycle Fatigue Testing

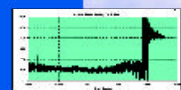
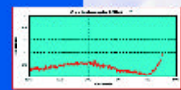
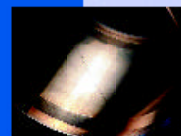
Low Cycle Fatigue (LCF) tests are critical to assure safety and adequacy of economic life (for life management).

Only spin testing gives program managers data needed to validate models and assure nothing is overlooked. Our LCF spin testing provides this critical information early enough in a development program to allow the necessary modifications and improvements to shorten the design cycle and reduce program risk.



*Test Devices' Exclusive Air Turbine Designs.*

Test Devices is uniquely qualified to offer the most economical life management test program possible. High cycle rates and high test security reduce the time to achieve results and the overall cost of life management programs to a minimum, allowing appropriate testing within tight time and cost constraints.



*Real Time Crack  
Detection and  
Monitoring*

- **Powerful Air Driven Turbines** accelerate the cycle time, reducing the time and cost of lengthy LCF test programs. The most powerful drivers in the industry give our customers an extremely valuable tool for cost effective life testing.
- **Real Time Crack Detection (RT-CDS<sup>SM</sup>)** technology, developed by Test Devices<sup>1</sup>, allows the effect of very slight flaws or cracks to be observed while an article is being tested. RT-CDS<sup>SM</sup> provides the essential advantage of observing the effects of crack initiation and growth during testing. This allows for continuous operation and the ability to monitor the integrity of the part. At Test Devices, time consuming, routine shutdowns for inspection are not necessary. Tests are completed with intact crack surfaces rather than a burst and destroyed test part.
- **Continuous Operation.** We are committed to completing a test program in the shortest possible time by running continuously 24 hours/day, 7 days/week.
- **Custom Engineering.** Test Devices engineers each arbor and spindle to operate without pinned joints or other fatigue points. We design and make fixturing that outlives the primary test article.
- **Proprietary Damping System.** Our spindle and damper system has eliminated spindle failures. Customers are assured that their parts will be tested for their full lives.

<sup>1</sup> Patent pending.



## Production Proof Testing

The reliability and accuracy of Test Devices Production Proof Testing has become essential for those who manufacture and repair high-speed components. Whether it is a test for mechanical integrity or radial growth, the results are carefully recorded and documented in accordance with the customer's specifications. Detailed certification and test documentation is provided.

The key to efficient and accurate production testing is to design and fabricate arbors that will accommodate repetitive change-outs with minimum effort. Arbors are analyzed, designed and built to ensure speed, accuracy and safety for each customer's component.



## Burst Testing



*High Speed  
Video of a  
Burst Test*

Over-speed centrifugal stress testing to the point of burst offers valuable information on the ultimate strength of a part or material. However, the energy of high-speed parts poses a unique challenge regarding safety and containment. The practice of bursting at energy levels that have been underestimated or misunderstood can end with disastrous results. Test Devices imposes the highest level of safeguard from damage and personal injury.

**At Test Devices you can expect:**

- Unparalleled spin pit ballistic containment
- Steel reinforced concrete test cells
- High-speed digital video, up to 40,000 frames/sec
- Special capture systems to preserve fracture surfaces



## High Cycle Fatigue Testing



Recreating the elusive phenomenon of High Cycle Fatigue (HCF) on bladed rotors has become a signature testing technology at Test Devices. We can generate sufficient excitation to study all engine order frequencies to provide data to support corrective designs by the OEM. Our technical staff can advise on selection from among several forms of excitation developed by our engineering staff for the specific purpose of replicating engine order frequencies and amplitudes.

Choosing the method of excitation is only part of performing a successful HCF test program. In addition, Test Devices provides high quality data acquisition, recording, data reduction and formal reporting. Our engineering, technical and production staff are equipped to perform to the level necessary for the most sophisticated HCF testing.

*In summation, Test Devices is leading the testing community with innovative methods for High Cycle Fatigue testing with...*

- Complete Strain Gauging capabilities
- High speed Slip Rings of various capacities and numbers of channels
- High capacity and broad bandwidth recorders and data collection
- Wide array of forcing functions



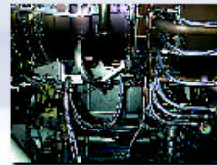
*Spin Pit Control System and  
Data Acquisition Center*





## Full Service Rotational Test Facility

Test Devices provides both equipment and testing services to industry with a variety of products. Over 200 customers, ranging from Argonne National Labs, Beckman Instruments, Boeing, Bosch, Cummins, Delphi, Gardner Denver, GE, Gillette, Honda, Honeywell, Ingersoll-Rand, Komatsu, US Navy & Air Force, Pratt & Whitney, Textron, Torrington, & York have used us in developing world class products. Listed below are a few of the services and information we can provide to aid you in developing your world class products.



Field Instrumented Engine

## Testing Services

- Balancing up to 100,000 rpm to G0.4 (ANSI S2.19)
- Proof Testing (a.k.a. Over-Speed Testing – see inside)
- Burst Testing (see inside)
- Instrumented Testing (strain, temperature, pressure, etc.)
- High Speed Video (see inside)
- Low Cycle Fatigue (LCF – see inside)
- High Cycle Fatigue (HCF – see inside)
- Crack Detection – New product that halts a test prior to burst
- Radial Growth Measurement Testing (a.k.a. Dynamic Deflection) – Empirical data on designs to optimize performance, such as electric motors where rotor / stator gap distance is critical
- Bore Pre-Stress Processing – Provides extra life to high speed rotating parts
- Pressure Vessel Testing – Evaluate failure mode of ruptures



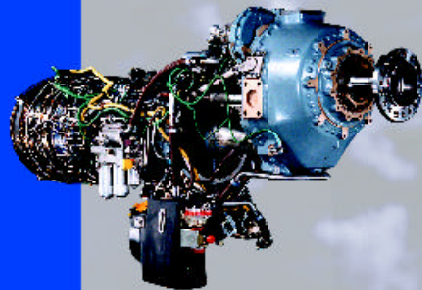
3D Modeling / CAD

## Equipment

- Centrifugal Test Systems
- Drive Turbines
- Control Systems
- Advanced Measurements
- Tooling
- Slip Ring Devices (up to 90,000 rpm and 400 channels)
- Maintenance & Repair
- Service Contracts & Upgrades

## Consulting and R&D

We can act as your technical department or as a backup to your in-house capability. Expertise can be provided from the design of simple test fixtures to complete research test programs.



## Test Devices Inc.

Test Devices is a full services company. In addition to providing centrifugal stress testing and field testing, we offer a full complement of services in direct support of testing.

- Precision Balancing
- Component and System Design
- Inspection Services
- Critical Speed Analysis
- Moment of Inertia Analysis
- Solid Works Modeling



Precision Balancing

How can we help you?  
Please contact us to discuss  
your testing needs or visit us on line at  
[www.testdevices.com](http://www.testdevices.com)



Dimensional Inspection

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Top cover photo courtesy of Lockheed Martin

 **Test Devices Inc.**



Advancing the  
Power of  
Testing  
Technology



ROTATION IS OUR VOCATION