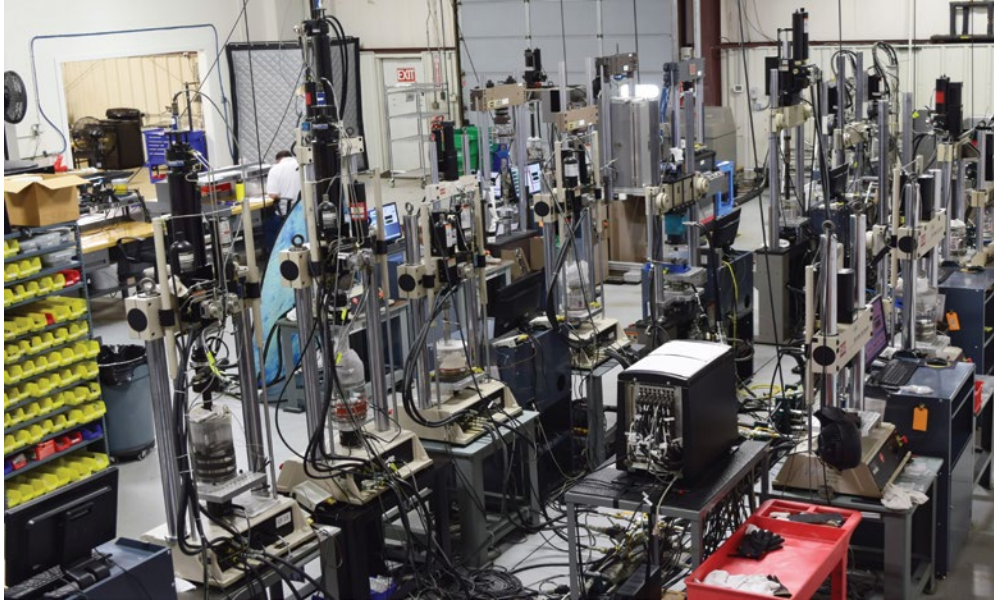


MECHANICAL TESTING



JTL provides static and dynamic testing in tension, compression, and biaxial test configurations. Tests can be run in displacement, strain, or force control, with force capacity ranging from 5N to 250kN. Testing may be conducted in environmental conditions including heated or cooled air, and heated saline bath.

LOAD FRAME SPECIFICATION

Force Capacity: Up to 250 kN

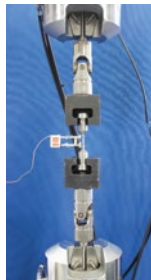
1st Calibrated Point as low as 2N

Dynamic Stroke: Up to 250 mm

Materials: Ranging in strength from plastics to aluminum, composites and steel

Testing capability: tension, compression, bending and fatigue tests

To ensure the accuracy and repeatability of testing data, JTL America uses all MTS load frames, controllers, and software in its laboratory. MTS is a leader in the test equipment industry.



COMMON MECHANICAL TESTING METHODS:

- ASTM E8 – Tensile Testing of Metallic Materials
- ASTM E9 – Compressive Yield Testing of Metallic Materials
- ASTM E399 – Linear-Elastic Plane - Strain Fracture Toughness K_{IC} of Metallic Materials
- ASTM E466 – Axial Fatigue – Constant Stress Amplitude
- ASTM E606 – Axial Fatigue – Constant Strain Amplitude
- ASTM B645 – Linear-Elastic Plane - Strain Fracture Toughness of Aluminum Alloys
- ASTM E1820 – Measurement of Fracture Toughness J_{IC}

*MTS logo used with permission

- Testing services**
- Mechanical Testing
 - Environmental Testing
 - X-ray Scanning
 - 3D Scanning
- Engineering services**
- Test protocol development
 - Predicate test data
 - Failure analysis
- Machine shop services**
- In-house CNC machining (Mastercam/Haas)
 - Fixture design (Solidworks)

JTL America is an ISO 17025 accredited independent testing laboratory focusing on mechanical testing, vibration testing and inspection services with a team of experienced engineers. Drawing on decades of testing experience, JTL offers a wealth of knowledge and world class laboratory facilities. JTL is proud to have provided testing and engineering services to top tier OEMs and suppliers. Our service offering includes:



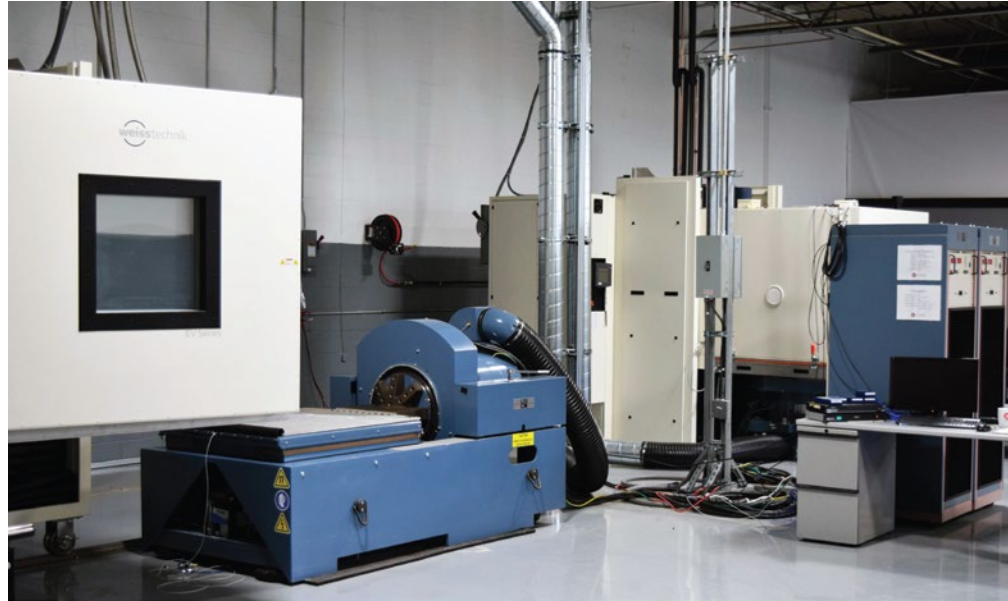
Headquarters & IN Laboratory
3205 Clairmont Ct. Suite B, Fort Wayne, IN 46808
Office: 260.489.1444
Email: sales@jtlamerica.com
www.jtlamerica.com

MI Laboratory
12250 Belden Ct. Livonia, MI 48150
Office: 734.772.1004



Specializing in Testing and Inspection for Automotive and Aerospace

VIBRATION TESTING



JTL specializes in ambient and thermal vibration testing. Sine, random, sine on random, shock, and/or a combination can be performed sequentially. Test can be run in displacement up to 2 inch peak-to-peak. Temperature can be controlled from -50°C up to 150°C with 10% RH to 95% RH. JTL is experienced with proper fixture design.

SHAKER SPECIFICATION

Shaker type: Electrodynamic
 Axis: X, Y, Z
 Sine Force (pk): 8,000 lbf (35.6 kN)
 Random Force (rms): 8,000 lbf (35.6 kN)
 Shock Force: 19,000 lbf (85 kN)
 Frequency Range: 5 Hz to 3,000 Hz
 Stroke: Up to 2 inch pk-pk (50.8 mm)

CHAMBER SPECIFICATION

Temperature: -50°C to +150°C
 Temperature Accuracy: +/- 0.1°C to +/- 0.5°C
 Humidity: 10% RH to 95% RH
 Humidity Accuracy: +/- 1.0% RH to +/- 5.0% RH
 Test Space Dimensions: 44 x 44 x 44 inches
 Temperature Ramp: Heating rate 2.2°C/min
 Cooling rate 1.0°C/min

TESTING CAPABILITIES:

- Sine, random, sine sweep, sine on random
- Shock testing
- Environmental testing
- Custom fixture design and FEA analysis
- Fixture resonance evaluation
- Resonance search and dwells
- Data logging (current, voltage, resistance)

STANDARDS WE TEST TO:

- ASTM
- IEEC
- ICC
- IEC
- ISO
- ISTA
- JIS
- GMW
- Military Standards
- RTCA
- SEA
- ISO
- Major OEM Standards
- R&D Customer Driven

X-RAY SCANNING

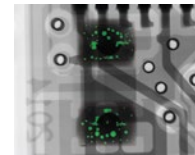


NIKON XT H SPECIFICATION

Operating Voltage: 30 kV to 225 kV
 Power Rating: 225 W high power
 Focal Spot Size: 3 µm
 Beam current: 0 to 1mA
 Maximum Travel: X 185 mm/ Y 280 mm / Z 730 mm
 Maximum Weight: 15 kg
 Filament Type: Tungsten

X-ray scanning is a non-destructive inspection method that allows high precision investigation of an object's interior without compromising structural integrity.

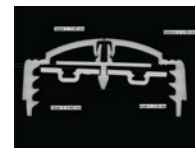
With high resolution X-ray technology, inside structure, dimension, failure roots, fit and function can be inspected in a simple process. Penetrating materials to image out internal features can be the most cost effective and accurate method for many stages of manufacturing process. For example, it is the solution for welding quality analysis, assembly verification, product quality screening, research and development and more. Customized reports are created along with high quality images.



VOID ANALYSIS

2D

The analysis result is quantified by volume and location for each void or pore. The area of interest such as solder, the area of void and the percentages of voids are calculated and reported.



INTERNAL DIMENSIONAL INSPECTION

2D

3D

Geometries, such as length, angles, roundness, wall thickness, shape profiles that are only visible through X-ray scanning can be measured to ensure that the dimensions fall within the required tolerance levels.



FAILURE ANALYSIS

2D

3D

This is an analysis performed by X-ray 2D scanning or CT scanning data's cross sectional slice images. Fit and function issues for mating components, threads, clips and seals can be pinpointed with comprehensive visual inspection.

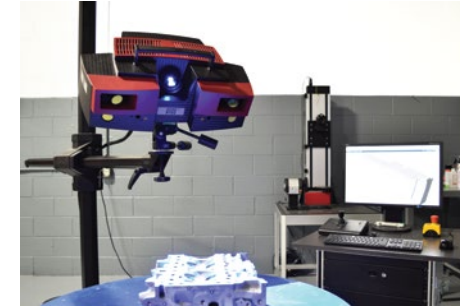


REAL-TIME X-RAY

2D

Real time X-ray allows intuitively navigate a test component while it is in motion to find defects quickly. Result can be saved as either slice images or video for your review.

3D SCANNING



ATOS III SCAN SPECIFICATION

Camera Pixels: 8 000 000 × 2
 Scanning Points: 8 000 000
 Point Spacing: 0.01 mm - 0.61 mm

Lens Type	Accuracy	Scanning Area per Scan
MV 100	5 µm	100 × 75 × 70 mm
MV 320	16 µm	320 × 240 × 240 mm
MV 700	28 µm	700 × 530 × 520 mm

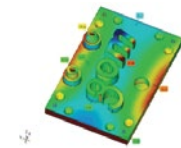
Blue light 3D scanning enables high quality data for full-object dimensional analysis in a variety of outputs such as 3D colormaps and cross sectional inspection reports.

Scanning objects can be various sizes, surfaces, finishes and geometries. JTL has scanned parts from 10 mm to 2000 mm ranges. Non-contact measurement allows scanning soft materials to metals such as silicon to die casting. Object sizes and desired accuracy determine lens types to meet your needs. 3D scanning can play an important role in first article inspection, quality assurance, defect analysis and research and development. JTL can inspect large volume of samples timely and cost effectively.



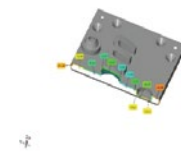
3D SCANNING DATA IN STL FORMAT

The point-cloud represented in STL file format can be used for CAD creation, rapid prototyping, reverse engineering and more. With accurate, clean and high resolution scan data, it minimizes CAD creation time.



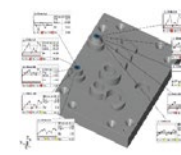
PART/CAD COMPARISON COLORMAP

CAD model or other scanned data is imported to overlay the scanned data to create colormaps in order to confirm tolerance requirements. Deviation labels can be placed on any location on 3D scanned data.



DIMENSIONAL INSPECTION

One of the advantages of 3D scanning data is having most of shape profiles necessary for measurement. With millions of data points, 3D scanning data can assist accurate dimensional inspection.



TREND ANALYSIS

Statistical process control and deformation analysis are available by several parts or stages within a single project. Statistical analysis values such as Cp, Cpk, Pp, Ppk, Min, Max, Avg and Sigma can be determined.