

LABORATORY TESTING INC.

Putting Tire Rims to the Test

When parts or products fail to perform as expected, Laboratory Testing Inc. can help identify the reason. Our lab's engineers utilize appropriate testing methods to determine material composition, material properties and the existence of defects. Oftentimes, the research and evaluation are used as evidence in legal cases.

One such case involved the safety and performance of tire rims. LTI's client needed a comparison of cast after-market wheels involved in an auto accident with forged factory-standard rims for the same vehicle. The vehicle's after-market wheels shattered upon impact with a concrete curb during the accident, so LTI tested and compared both types of rims to determine the ability of each to withstand similar impact.



Drop-weight test conducted on one of two styles of tire rims.

A Drop-weight Test was used to replicate the force applied to the wheels during the accident. The testing involved allowing a 1,000 lb. weight to free-fall directly onto each rim from increasing heights, which created various ft. lbs. of energy.

The cast after-market style was tested at 3,000 and 5,000 ft. lbs. of energy. The first wheel cracked at 3,000 ft. lbs. of energy and a second one shattered under 5,000 ft. lbs. The forged factory rim was tested at both 5,000 ft. lbs. and 10,000 ft. lbs. and showed no breakage.

Complete details of the testing method and results were provided to our customer in a Certified Test Report.

Videos taken during this Drop-weight Testing can be seen on YouTube at www.youtube.com/labtesting.



The after-market rim shattered at 5,000 ft. lbs. of energy.



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LAB NEWS

Can it Take the Pressure?

Hydrostatic Pressure Testing is a nondestructive (NDT) method of finding leaks or verifying performance and durability in pressure vessels such as pipe, tubing, and coils. Although this is considered a nondestructive test and failures are rare, they can occur when the test piece does not meet performance or durability specifications and may render the piece unusable.



Technician prepares copper coil for Hydrostatic Testing



Hydrostatic Testing performed on copper/nickel tubing

This type of testing usually entails filling the test piece with liquid, bleeding out air, pressurizing the piece, then examining it for leaks or permanent changes in shape. A nearly incompressible (compressible only by weight, not air pressure) liquid, usually water or oil, is used because it will only expand by a very small amount should the test piece fail and not pose a danger to the technician. The test also can be

performed with pressurized air, but is generally done with the vessel under water for safety reasons.

The pressure used in testing is always considerably more than the operating pressure to give the customer a margin for safety. Typically the test is performed at 150 percent of the design or working pressure. For example, if a pipe was rated to a working pressure of 2000 PSI, it would be tested at 3000 PSI.

Inspections at LTI

At LTI, we are equipped to do hydrostatic testing with water, oil, or air under water. Water is our most commonly used test medium because it is less expensive than oil and an easier set up than air, so the cost to our customers is lower. Our technicians can test tubing, pipe and coils to pressures up to 10,000 PSI, in many cases. All testing is performed according to customer requirements and/or industry specifications.

This article is the last in a series for *LabNews* on the array of services offered by our NDT Department.

In the past few issues, we covered X-ray Inspection, Ultrasonic Testing, Liquid Penetrant Inspection and Magnetic Particle Inspection. We also provide SNT-TC-1A certified Visual Inspection, but felt that an article was not warranted. If you missed any of our past articles on nondestructive or destructive testing services, you'll find them on our website at www.labtesting.com/resources-testing-methods.php.

2010 Tradeshows

Meet our sales reps at one of our shows next year. Ask how LTI can help you meet your 2010 goals.

March 14-18, 2010
NACE Corrosion Expo
San Antonio, TX

April 14-15, 2010
Design 2-Part Show
Oaks, PA

May 18-20, 2010
Electric Power 2010
Baltimore, MD

June 8-10, 2010
Medical Design & Manufacturing
New York, NY

November 2-4, 2010
Fabtech Int'l & AWS Show
Atlanta, GA

December 14-16, 2010
Power-Gen International
Orlando, FL

Calibration Terminology

There are many terms used in the field of calibration to explain the methods and systems used to verify the measurement accuracy or operating characteristics of gages, masters, and other measuring instruments within acceptable limits. The following are some of the more commonly used terms.

A2LA are the initials of American Association for Laboratory Accreditation, a non-profit accrediting agency for calibration and testing laboratories.

Accreditation is a process used by a qualified independent agency to verify the quality system and technical capability of a calibration laboratory to a recognized standard such as ISO 17025.

NDT MIL-STD-2132 Examiner

Steve Walmsley, Ultrasonic Testing (UT) Supervisor at LTI, has been approved as an NDT MIL-STD-2132 Examiner for both contact and immersion ultrasonic testing. Steve completed written and operational exams on general theory, specifications and standards, and ultrasonic testing methods and equipment. The examinations were administered by the Naval Sea Systems Command in Pittsburgh, PA.



Steve is an 18-year employee of LTI and an NDT Level II in Ultrasonic Testing. He directs the lab's high-speed immersion inspection for round material as narrow as 1/8 in. and as long as 75 ft., immersion UT of oversized material up to 20 ft. long and a weight of 5000 lbs., and contact inspection for other materials.

Testing for Lead with Lemonade

Most testing at LTI is relatively standard, but we are equipped to meet special requests in many departments, especially our Chemistry Lab. We frequently test items for lead content, but a recent order using organic lemonade as the leachant was out of the ordinary.

The standard test method includes a 24-hour extraction with 4% by volume acetic acid in darkness. Our customer wanted to more closely imitate a real-life use of his apothecary jar, so he chose organic lemonade as the leachant with no requirement for darkness. A 50 ml sample of lemonade was held aside; the remainder was added to the jar. Three samples were removed at 30 min., 2 hrs. and 24 hrs. All four were analyzed for lead content via ICP Atomic Emission Spectroscopy.



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Accuracy defines how close a measured value is to the true value of the dimension.

Calibration is the set of operations which establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or system, or values represented by a material measure or a reference material and the corresponding values realized by standards.

Calibration Certificate or Report is the document that presents calibration results and other information relevant to a calibration.

Calibration Frequency - the time interval at which instruments, gages and masters are calibrated.

Calibration Limits is a tolerance applied to gages and instruments beyond which they are not considered suitable for use.

Limits of Permissible Error are the extreme values of an error permitted by specifications, regulations, etc. for a given measuring instrument.

Measuring and Test Equipment includes all of the measuring instruments, measurement standards, reference materials, and auxiliary apparatus that are necessary to perform a measurement in the course of testing, inspection or calibration.

Quality System is the organizational structure, responsibilities, procedures, processes and resources for implementing quality management.

Resolution represents the smallest reading unit provided by an instrument.

Traceability is the path by which a measurement can be traced back to the source from which it is derived, such as NIST in the USA. Direct traceability implies that the laboratory has its primary masters calibrated directly by such an agency for reduced measurement uncertainty.

Uncertainty of Measurement is a parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurand.

See Our HD Fully-narrated Videos



You know Laboratory Testing Inc. - we've been around for 25 years and are one of the largest testing and calibration labs in the USA. But, do you know all the ways we can save you time, money and stress? Our six new videos will let you see why working with LTI is a good choice.

- ◆ See how we efficiently and safely handle materials and products in all quantities, shapes and sizes at our 66,000 sq. ft. facility.
- ◆ Watch our highly skilled chemists, engineers and technicians perform a wide-array of testing, specimen machining and calibration services on computerized, high-tech equipment.

Find our videos at www.labtesting.com or www.YouTube.com/labtesting.



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Holiday Closings

LTI will be closed for the following upcoming holidays:

Christmas Eve - Thurs., Dec. 24

Christmas Day - Fri., Dec. 25

New Year's Day - Fri., Jan. 1

Have a safe & enjoyable holiday season!

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