



LABORATORY TESTING INC.

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The Art of Surface Plate Calibration

Granite surface plates come in a wide-range of sizes and vary in color, density, porosity, stiffness and hardness, depending on their composition. Flatness and repeatability are the key measurements that define the accuracy of a surface plate. Flatness is the difference between the lowest and the highest points on the surface of the plate. Repeatability is determined by taking measurements across the entire surface to identify deviation in the plate's flatness. Federal specification GGG-P-463c states the guidelines for flatness and repeatability in the three standard grades of plates: Laboratory Grade AA, Inspection Grade A and Toolroom Grade B.



Calibration using an Autocollimator

Surface plates are used to set up tooling, to measure workpieces during manufacturing or for final inspections. Their accuracy is critical for quality control, especially when extremely small tolerances are in question.

To retain this accuracy, surface plates must be properly maintained and should be calibrated on an established cycle, depending on frequency of use. The surface should be cleaned regularly and covered when not in use.

During calibration service, plates will be checked for worn or wavy areas using an instrument such as a repeat reading gage. The overall flatness of the plate will be calculated from surface readings taken with equipment such as an Autocollimator. When the accuracy of a surface plate becomes out of tolerance, the plate should be resurfaced to restore its original accuracy. After resurfacing, the plate should have a clean mirror-like finish, and be free of scoring and scratches.

LTI is accredited by A2LA to ISO/IEC 17025 and performs all calibrations with equipment traceable to NIST. You'll receive a *Calibration Certificate* which includes the "as found" and "as left" conditions, reference standards and tolerances, and information on NIST traceability and A2LA accreditation.

Our field technicians can calibrate your surface plates, optical comparators, hardness testers, testing machines, balances and hand tools at your facility. A wide-range of additional calibration services also is available in our lab.

Call LTI at 800-219-9095 for quality workmanship and one-stop convenience.

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LAB NEWS

Q. A. Manager Appointed

Don DiFilippo, our former Q. A. Manager, has retired. He will remain with LTI on a part-time basis as a Quality Assurance Specialist performing vendor audits and other quality-related duties. LTI is fortunate to retain his services after retirement and we wish him the very best.



Frank Peszka has been appointed to the position of Quality Assurance Manager, effective March 1, 2006. Frank joined Laboratory Testing Inc. in October 2004 as Quality Assurance Specialist and has been instrumental in maintaining and enhancing our quality program.

Frank has over 30 years experience as a quality assurance professional. This experience and the time he has been with our Quality Department will ensure a smooth transition and the stability of our quality program.

He will continue to make every effort to ensure that Laboratory Testing meets your quality requirements and expectations. Please feel free to contact him on any quality-related matter at 800-219-9095, ext. 105 or fpeszka@labtesting.com. Information related to our Quality Program can be found on our website, www.labtesting.com.

Holiday Closings

Over the next few months, LTI will close for the following holidays:

Good Friday	Friday, April 14 th
Memorial Day	Monday, May 29 th
Independence Day	Mon. & Tues., July 3 rd & 4 th

If possible, please notify us in advance if you will have rush orders coming to LTI near the holidays.

Approval from Primes & PRI

Pratt & Whitney has qualified Laboratory Testing Inc. as a commercial laboratory for performing Reference MCL Manual Section Appendix 56: Code 3 stress rupture testing. LTI also received approval from G. E. Transportation Aircraft Engines for stress rupture (Code C) and elevated-temperature tensile testing (S400 Code B).

Also, stress rupture testing was added to our scope of Nadcap accreditation with the Performance Review Institute (PRI). Copies of our accreditation certificates are available at www.labtesting.com.



Stress rupture specimen to be tested

Our four stress rupture machines are fully automated and test at temperatures up to 2000°F. Temperatures are controlled during these tests by calibrated thermocouples attached to the test specimens.

Testing complies with ASTM standards E4, E8, E83, E139, E292, and similar requirements. The systems comply with ISO 9000 requirements for documentation and specification control.

Approved in Accordance with Pressure Equipment Directive

Laboratory Testing Inc. is the first laboratory in the United States to be approved by HSB International GmbH in accordance with the European Pressure Equipment Directive (PED) 97/23/EC. The Directive governs construction of certain types of pressure equipment placed on the market in the European Economic Area after May 2002.

HSB International GmbH is a Notified Body that approves pressure equipment manufacturers. The German accreditation organization governing Notified Bodies has required that HSB International GmbH audit and approve laboratories performing testing for their PED approved manufacturing clients. LTI has been approved to perform material testing and weld qualification.

Metallographic Examination Terminology

Metallography is the branch of science which relates to the constitution and structure of metals and alloys, and their relationship to the properties of the material. We continue our testing terminology from earlier issues of *LabNews* with some terms commonly used in Metallographic Examination:

Austenite Grain Size is the grain size of a steel sample which exists or existed in the austenite phase at a given temperature. ASTM Test Method E112 discusses methods to determine grain size of steel samples.

Banded Structure is characterized by alternate bands parallel to the direction of rolling or forging that produces elongation of segregated areas. Usually it is shown by alternate layers of light and dark etching regions.

Brightfield Illumination causes surfaces normal to the axis of the microscope to appear bright during reflected light microscopy.

Cold Worked Structure is a microstructure resulting from permanent deformation of a metal or alloy. It is characterized by elongated grains in the material.

Decarburization is the carbon loss from the surface of a steel part due to the reaction with one or more chemical substances during the heat treatment of the part. Partial decarburization is where the carbon content is less than the unaffected interior portion of the piece. Complete decarburization is where the carbon content is less than the solubility limit of carbon in ferrite so that only ferrite is present at the surface of the piece.

Duplex Grain Size is the presence of two grain sizes, in substantial amounts, with one size significantly larger than the other.

Etching is the controlled preferential attack on a metal surface for the purpose of revealing structural details such as grain size or second phases such as carbides.

Ferrite Grain Size is the grain size of the ferrite in predominantly ferritic steel.

Flow Lines are the resulting fiber pattern observed in a hot or cold worked material, showing the manner in which the metal flowed during the forming process.

Inclusions are foreign material in the structure of metals. They are usually referred to as non-metallic particles, such as oxides, sulfides, silicates and aluminates.

Knoop Hardness is a type of diamond hardness measurement that is used to determine the depth of hardened areas and the hardness of small and/or thin samples. The resulting indentation is elongated along one axis.

Macroetch is the controlled surface etching of a metallic sample to reveal a structure that is visible at low magnification, usually no greater than 10 times. It is used to show flow lines and ingot patterns.

McQuaid-Ehn Grain Size is the austenitic grain size in steels from carburizing at 1700°F followed by slow cooling. The method is described in ASTM E 112 and is used to determine if the steel was made to fine grain practice.

Microstructure is revealed by examining a suitably etched metal sample with a microscope.

Photomacrograph is a photograph taken at low magnification to show the macrostructure of a suitably etched sample.

Photomicrograph is a photograph taken at a relatively high magnification (50 times or greater) to show the microstructure of a suitably polished and etched sample.

Polishing is a mechanical, chemical, and/or electrolytic process used to prepare a smooth reflective surface free from artifacts or damage introduced during sectioning or grinding and suitable for microscopic examination.

Recrystallization is the formation of a new grain structure through nucleation and growth that is produced by subjecting a rolled or formed metal to elevated temperature for a time long enough to accomplish the change in the structure.

Segregation is the concentration of alloying elements in specific regions in a metal which causes variations in the etching characteristics of the sample.

Vickers Hardness is a type of diamond hardness measurement similar to Knoop hardness, but with an indenter that has equal length sides and looks diamond shaped.

(Reference: ASTM E7)

2006 Tradeshows

Last month, LTI exhibited at **Corrosion NACEpo** in San Diego. We'll be at four more shows this year throughout the country. We would enjoy seeing you, so please visit our booth if you're in the area.

Take advantage of this opportunity to find out how LTI can simplify your testing and calibration requirements. Also hear about our new capabilities.

For more information on the shows, use the links on our website's News page at www.labtesting.com/news.asp

Job Shop Design2Part

May 17-18, 2006
Fort Washington, PA

Booth: C-12

Medical Design & Mfg. East

June 6-8, 2006
New York, NY

Booth: 1273

Fabtech & AWS Welding

October 31-November 2, 2006
Atlanta, GA

Booth: 11127

PowerGen International

November 28-30, 2006
Orlando, FL

Booth: 1130

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LABORATORY TESTING INC.

The logo for Laboratory Testing Inc. features the company name in a bold, sans-serif font. To the right of the text is a stylized graphic consisting of several vertical red lines of varying heights, creating a bar chart-like appearance.