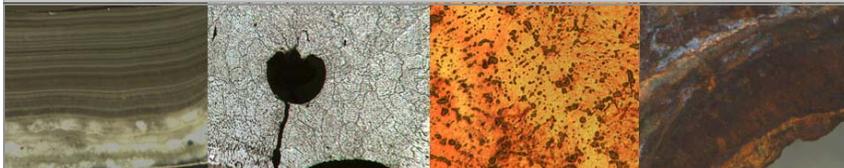


NU S & B L S



New Hampshire
MATERIALS
LABORATORY, INC.
Your Problem Solving Partner

MECHANICAL TESTING 101

JULY 2013 SUPPLEMENT ISSUE

Welcome to New Hampshire Materials Laboratory

New Hampshire Materials Laboratory offers Mechanical Testing as one of our many services. In this supplement of the Nuts & Bolts, we review types of mechanical testing with a brief explanation and benefit of the test.

We hope with this article and The "ABC's" of Material Analysis will give you a better understanding of our capabilities and how we can help you solve your dilemma.

To find out more on how we can be "Your Problem Solving Partner" visit our website at www.nhml.com.

Tim Kenney
Laboratory Director

Mechanical Testing 101

The testing of mechanical properties is used to verify a material's conformance to a specification and to determine its suitability for load-bearing applications. Mechanical testing includes:

Creep: Measures the amount of deformation incurred under sustained loads. This is especially important in application of plastic parts or metal parts in high temperature environments.

Elongation: *% elongation provides insight on how well components of a machine will share the load. This is especially valuable in the design of multi-component structures.

Fatigue Testing: Used to assess how well a part will sustain cyclic (dynamic) loading. This testing is recommended for many vehicle components and moving machine parts.

Hardness: Material hardness correlates to wear resistance and is helpful in evaluating surface finish and coatings. Hardness testing is often performed as a QA step to check material strength and heat treatment.

Continued on page 2



Mechanical Testing 101 - Continued

Modules of Elasticity: Quantifies the stiffness of the material. This information helps in assessing the component's ability to share the load and resist deflection.

Tensile Strength:* Determines how well a part resists breakage; it's the ultimate strength.

Toughness: Indicates how well a part resists breakage; it's the ultimate strength

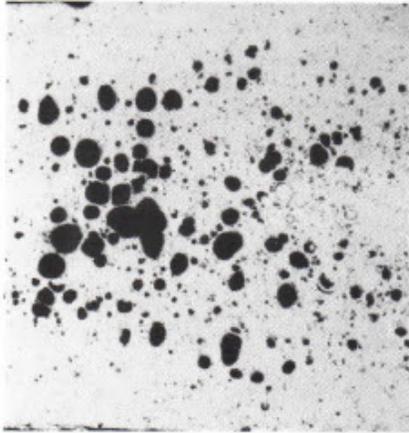
-

Yield Strength: Indicates the level of stress required to produce permanent distortion.

*These three data points are useful in checking conformance to design specifications. They are supplied from one test and results are often available in as little as 24 hours (when no machining is required). Call us for a quote or to explore how this testing can help you.



Uniformed Specialized Load Testing:
Left side photo: 3 shelf system as assembled
Right side photo: 3 shelf system as loaded



Swiss cheese? Not exactly.

Case History — It was a “Snap”

A major auto maker was having trouble with glove box emblems which were breaking during installation. The metal met specification, however, the casting itself was found to be extremely porous (see photo). The porosity explained the “snapping” problem. However, there was another wrinkle.

The problem only occurred in parts which were cast on Mondays.

Here’s what we found: On Friday afternoons, the unused molten metal was left in a crucible. Over the weekend, it absorbed gas from the air. This made the casting porous.

The solution: We suggested that a protective chemical cover be applied to the molten metal for the weekend. This eliminated the absorption of gas, without impacting the metal.

Join Our Mailing List

New Hampshire Materials Lab
www.nhml.com • lab@nhml.com • info@nhml.com
Tel: 800-334-5432 or 603-692-4110 • Fax: 603-692-4008