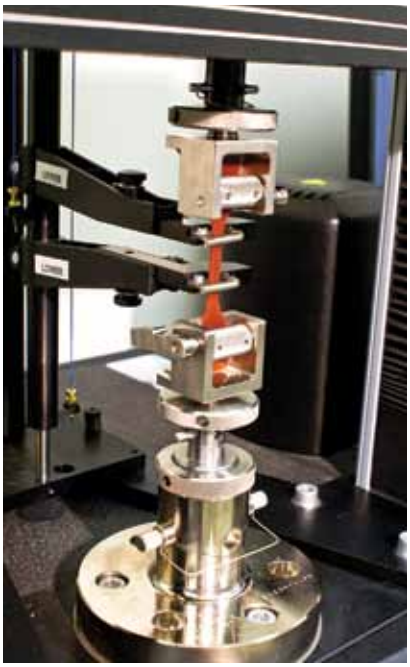
CENTER FOR INNOVATION

Martin Engineering's Center for Innovation, located at the Global Headquarters Campus in Neponset, Illinois, USA, provides industry-leading capabilities in its four independent laboratories for the sophisticated testing and analysis of bulk materials, systems and components.



POLYURETHANE-POLYMER LAB

The polymer lab is used for all "soft" material development. The type of materials under investigation in this lab include rubber, polyurethane, plastics, polymers and other materials.

The types of tests done include extreme temperature (-150°C to 600°C), static, dynamic, fatigue, creep and "to failure" mechanical type tests. These results are combined with the results of a number of different wear tests that can be done depending on the material and the application or conditions it is to be put in. Physical testing is done to evaluate the performance of a given material under a number of different load and deflection conditions.

The physical properties determined in this lab correlate directly to the performance of the products made from these materials through theoretical and empirical relationships obtained through years of testing and material development.

A number of simple tests are done which can also give significant information on the chemical composition of the materials being investigated. New formulations of materials can be processed in this room, in batch quantities, to ensure that the materials used in Martin products are the best available.

BULK MATERIAL LAB

The flow (or not) of bulk materials is an issue in all material handling facilities. This lab is used to determine the flow properties of bulk materials. Materials are analyzed to determine particle size distribution (as received), moisture content (as received), particle density and flow behavior over a range of conditions and environmental factors.

The sample material is prepared at a number of moisture contents (up to saturation) to determine the internal and boundary flow characteristics of the material at a number of prescribed material densities or applied pressures.

The determination of these parameters and behaviors is critical in the design of any/all bulk material handling equipment and accessories. These parameters can be used in traditional engineering models as well as for behavioral inputs into sophisticated numeric computer modeling techniques to evaluate the flow or no flow of a bulk material in a material handling facility.

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METALS LAB

The metals lab is used for “hard” material development. The type of materials under investigation in this lab include tungsten carbide, ceramics, steels, composites, alloys and other materials.

Each material is evaluated using modified traditional tests to evaluate the performance of the material under various loading and deflection conditions.

This lab is the also the home of the wear tests—arguably one of the most significant tests done at Martin. We currently have 3 different types of wear tests, from two-body to three-body abrasion, with the capability of varying speed, load and abrasive material on each of the different tests. The tests, combined with the results of the other physical property tests, are combined with theoretical and empirical derivations to extrapolate the wear life and performance of a “hard” part in use.

In addition to “standard” tests this lab is also equipped to investigate the corrosion and impact resistance of a given material. The effects of corrosion are accelerated in the “Salt/Fog Chamber” and the impact of corrosion on materials can be determined in by running the exposed materials to the same battery of tests done on the original samples.

Impact can also be investigated using an accelerated test machine, capable of simulating thousands of hours of use in a matter of hours.

Using the equipment in this lab, the wear life, impact resistance, corrosion resistance and load bearing performance of “hard” materials can be evaluated to improve existing materials or to develop new ones, suitable for use in a number of different applications and conditions.

ENVIRONMENTAL LAB

The environmental lab is used to investigate the temperature and humidity response of materials from all the other labs. Samples can be conditioned for any amount of time, under settings ranging from 73°C to 190°C (-100°F to 375°F) and from 10-98% humidity in a 16 cubic feet chamber.

Samples conditioned under various settings can be evaluated for high temperature and high humidity behavior, low temperature behavior, as well as to determine any long term affects on materials placed under these extreme conditions.

The samples are conditioned under the prescribed environment and then tested in the other laboratories, or conversely testing can be done inside of the chamber using peripheral electronics and data acquisition equipment.

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