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TechNotes

Getting the most up-to-date information on materials testing

Issue 42

In This Issue

Application Article: Grow Your Own Packaging
Technical Tip: Go Automatic
You Asked – We Answered: Q: How Do I Reduce Durometer Hardness Test Variability?

Grow Your Own Packaging

Think back to when you last bought a computer. You opened the box and what did you find? The computer of course, various cables and accessories, a CD, user manuals, and big white chunks of molded Styrofoam. The packaging has done its job; the computer and accessories are safe. But unpacking the computer has given you a disposal problem. You can recycle the cardboard box. You can even recycle the user manuals if you're not going to read them. But the Styrofoam? It's now just landfill fodder, destined to languish in the earth for years.

Until recently, there has been little alternative to Styrofoam, in particular for protecting heavy items such as appliances and furniture from shipment damage. Enter Mycobond™, a new biodegradable biocomposite material developed by Evocative Design LLC of the aptly named Green Island, NY.

Mycobond™ is a composite material that uses sterilized low-grade agricultural waste, such as rice hulls or cotton hulls as a matrix and mycelia hyphae, which are essentially mushroom roots, as the reinforcement material. The mycelia grow through and around the loose agricultural byproducts for four to five days, transforming the whole into an all-natural rigid material with similar material properties and cost as synthetic foams.

This innovative and patented technology is the creation of two Rensselaer Polytechnic Institute graduates, Eben Bayer and Gavin McIntyre. They founded Ecovative Design in 2007 to bring their idea into production. They have developed two commercial products from Mycobond™, namely Greensulate™, a rigid insulation board, and EcoCradle™, a custom-formed packaging material.

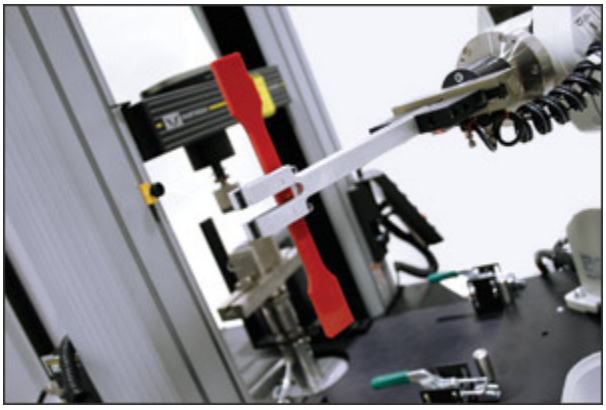
The products have several substantial advantages over more traditional insulation and packaging materials. Their manufacture requires a fraction of the energy and carbon dioxide required for traditional foam products. The mycelia grow contentedly in an environment that requires no light or extremes of temperature. It is completely biodegradable; it decomposes completely in landfills and it makes great compost in the garden. Because the base materials are zero-value waste products, the products are not prone to the price fluctuations common to synthetic materials derived from oil-based sources.

To manufacture the EcoCradle™ product, the company creates a plastic mold, with the shape customized for each application. The mold is packed with the base material and the fungus is left to grow throughout, resulting in a purpose-built, strong, and lightweight product. Once fully formed, each piece is heat-treated to stop further growth. The resulting item offers the same packing protection and thermal properties as Styrofoam. The company carries out extensive testing using their Instron® test frame and Bluehill® software to evaluate and monitor the product properties and ensure its fitness for the customer's requirements.

The company is able to control the properties of the products using different species of fungus and mixtures of aggregates in order to make a composite with an optimal density, strength, appearance, and performance for the specific application.

Ecovative Design is already producing custom-designed protective packaging products for several Fortune 500 companies. Future plans include the production of turnkey systems so that off-site customers and do-it-yourself homeowners will be able to manufacture their own products as required.

Is there any downside to this product? Bayer and McIntyre claim that it's so safe that you can eat it, but they then confess that it doesn't taste too good. That should not be too much of a barrier to its success.



Go Automatic

When your testing needs surpass your testing capability, you face a difficult challenge. Operator overtime will certainly increase daily output, but overtime has costs greater than just high pay rates. Increased work hours increase employee fatigue; reducing morale, reducing the quality of work, and increasing injury-related expenses.

You could purchase more equipment and hire more operators. A good solution but if testing volumes subsequently decrease there could be a lot of equipment downtime and inefficient use of manpower.

Automated specimen handling systems let you set up unattended testing throughout the day and evening shifts. Not only do these systems improve efficiency, they reduce the inaccurate data that often results from human error. Automated specimen handling systems work with a range of sample sizes and geometries, so minimal changes are necessary to accommodate new samples. Automated handling systems can easily be rolled away from a testing frame, allowing the frame to be operated manually, increase the overall flexibility and capability of your testing laboratory.

Q. How Do I Reduce Durometer Hardness Test Variability?

A. Accuracy and efficiency are critical factors when testing samples of rigid thermoplastics, such as polypropylene and Plexiglas, fiberglass reinforced resins, and epoxy curing agents. You must eliminate variables that contribute to erroneous readings wherever possible.

It is imperative to maintain specimen to indenter perpendicularity while sustaining the appropriate force application pressures throughout the entire testing cycle. One of the best ways to achieve this alignment and consistency is to use an automatic operating stand. A durometer mounted in a stand ensures specimen alignment and constant force application. A stand offers increased throughput and improved measurement accuracy and repeatability with a simplified “hands-free” operation.

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