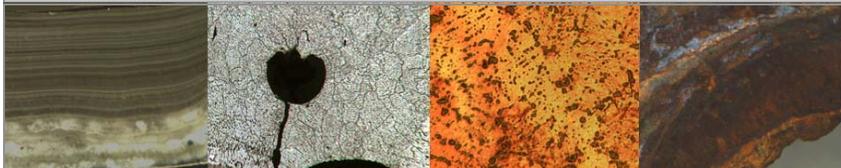


NU S & B L S



New Hampshire
MATERIALS
LABORATORY, INC.
Your Problem Solving Partner

THE USE OF REGRIND MATERIAL & TESTING TECHNIQUES

MARCH 2012 / SUPPLEMENT ISSUE

Welcome to New Hampshire Materials Laboratory

2012 is off to a great start here at NHML. Thank you to all our customers who have been sending us a tremendous amount of work and allowing us to be "Your Problem Solving Partner".

Occasionally, our chemistry department will receive a plastic part that is discolored. The question asked by the customer is this a contamination or is something else causing the discoloration.

Regrind material is used in the production of plastics to help lower cost. What is regrind material and how can it effect the outcome of finished product. Read on to find out more.

Tim Kenney
Laboratory Director

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NHML Customer Survey: What's on Your Mind

Below is a link to a brief survey. This survey will tell us about you our customer and help determine future N&B. Please take a moment to complete this survey. Your input is greatly appreciated.

[NHML Customer Survey: What's On Your Mind](#)

The Use of Regrind Material During Manufacturing

Plastics are everywhere and used in many innovative ways because of their durability and ability to be molded.



Today, we look into the use of regrind used during the production of thermoplastics. Regrind materials are used by manufacturers of thermoplastics parts as a cost saving measure.

Regrind is thermoplastic waste material such as sprues, runners, and non-contaminated rejected parts that are ground, shredded or chopped then used with virgin materials (virgin material that has not been processed yet.) This allows the manufacturers to reuse these non-productive materials back into the manufacturing process.

Our Philosophy

New Hampshire Materials Laboratory has one goal to help you solve your technical problems at a reasonable cost. Tests help, but are not always enough.



Things that should be considered about regrind before determining whether it can or should be used:

- It has a longer history of heat exposure
- Once held a different shape so it processes differently
- May have reduced physical properties
- It can have an altered color, or have been exposed to contaminants
- Bulk density of regrind is less than bulk density of the virgin material

Resin manufacturers state that up to 15% regrind may be included with no significant effect on mechanical properties. In some applications filled materials may include up to 50% regrind and unfilled materials as much as 75% regrind. During the design/developmental stage, it is useful for the manufacturer to produce parts from virgin material, and a mix of virgin and regrind materials for an actual property comparison. Correctly done, the use of regrind is essentially undetectable in terms of mechanical properties and chemical analysis techniques.

To effectively use regrind material, manufacturers need to be aware of several control factors that are often overlooked during the granulating process.

- Contamination: results from mixing different plastics, mold release agents, non-plastic such as cardboard, and metal can occur if not caught.
- Wide variation in granulate particle size can interfere with mixing and processing.
- Fines (small dust like particles of regrind) tend to heat up and degrade quickly because of their size.
- Large pellets can overheat and burn during the melting. This can be visually and mechanically degrading.
- Measuring regrind by volume and not weight can cause variation in the plastic product performance.

Fortunately, thermally degraded material can be detected.

Our team of dedicated and experienced professionals have both the skills and the backup facilities to serve in the following:

- Failure Analysis
- Material certification & compliance
- New product testing
- Mechanical properties
- Tensile & compression testing
- Heat treat problem & verification
- Reverse engineering
- Weld & life testing
- SEM & EDS

Techniques for Testing Virgin/Reground Polymers

Gel Permeation Chromatography (GPC) is a form of Size Exclusion Chromatography (SEC) that separates polymers on the basis of their molecular size. Since size is proportional to molecular weight, this type of Chromatography can measure the molecular weights of polymers. Therefore it is often the method of choice used to determine if a polymer has already been processed or if it is virgin material. Polymer processing often effects the molecular weight by lowering it, therefore running a GPC on a sample and comparing it to a known virgin sample can give you an idea as to whether it has been processed or not.

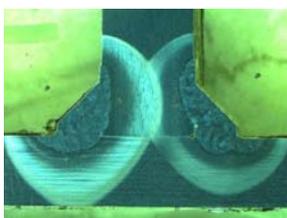
Oxidation Induction Time (OIT) is a technique which utilizes a Differential Scanning Calorimeter (DSC) to determine a relative amount of antioxidant remaining in a polymer. In this technique, a sample is equilibrated at an elevated temperature in a nitrogen atmosphere and then, at time = 0, Oxygen is introduced. The baseline is monitored as a function of time and when an exothermic peak starts, that is the OIT for that polymer. Of course the absolute time in itself is meaningless unless it is compared to a virgin polymer sample. Shortened OIT's can indicate that the polymer has been processed already and has thus used up some of its antioxidant, or that the sample is virgin material that has suffered some degree of oxidation, or that the sample is virgin material and had a lower amount of antioxidant added to it initially.

NHML News

One of our greatest resources is our website. That being said we felt it was time to give it a face lift. With the help of Crystal Vision, our web developer, we are working hard and will soon be launching a new and improved NHML website. Keep your eyes open for the announcement.



Cracking at an insert poly-carbonate piece



Fillet Welds



Leur Connection Cracking

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