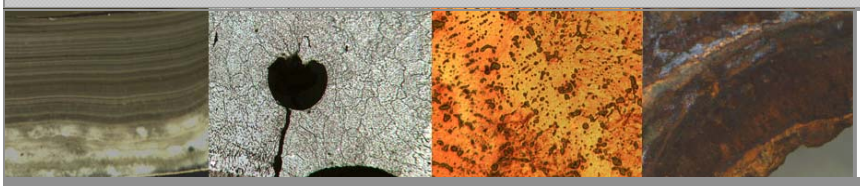
NUTS & BOLTS



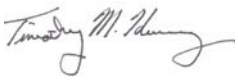
New Hampshire MATERIALS LABORATORY, INC.
Your Problem Solving Partner

SEPTMEBER 2012 **SUPPLEMENT ISSUE**

Welcome to New Hampshire Materials Laboratory

In this Nuts & Bolts supplement, we highlight a case history on a forensic paint analysis, show what a simple material analysis can do for quality assurance, and provide an overview of applications and testing methods of LDPE resin.

Here at New Hampshire Materials Laboratory (NHML), our goal is to help you with all your testing needs. We offer a variety of analysis and tests whether its a failure analysis, a material analysis, tensile strength, load testing and more. To find out more on how we can be "Your Problem Solving Partner" visit our website at www.nhml.com.



Tim Kenney
Laboratory Director

Forensic Paint Analysis-Boom Failure

Paint Analysis

A 17 year old bucket truck experienced a boom failure with personal injury resulting. The failure was linked to a faulty weld repair performed on a portion of the boom at an unidentified time in the truck's history.

To identify the approximate timing of the weld repair, cross sections of the paint layers from the area of the faulty weld were prepared for microscopic examination. These cross sections were compared with cross sections of the paint layers taken from portions of the boom remote from the weld repair.

From examination of the cross sections from remote areas it was learned that the boom had fourteen paint layers applied in nine separate occasions. A comparison of this paint history with the sequence of layers in the repair area allowed identification of the paint layer applied directly over the weld repair. Comparison of the color of this paint layer with dated photographs allowed a determination of the time of repair and the identity of the trucks owner at the time of the faulty repair.

Low-density polyethylene (LDPE)

Low-density polyethylene (LDPE) is a thermoplastic made from the monomer ethylene (*to find out more about ethylene click here*). LDPE was first produced back in 1933 by Imperial Chemical Industries (ICI). It can be identified by number “4” in the world of recycling.

Applications:

LDPE is widely used for manufacturing various containers, dispensing bottles, wash bottles, tubing, plastic bags for computer components, and various molded laboratory equipment. Its most common use is in plastic bags. Other products made from it include:

- Trays and general purpose containers
- Corrosion-resistant work surfaces
- Parts that need to be weldable and machinable
- Parts that require flexibility, for which it serves very well
- Very soft and pliable parts such as snap-on lids
- Six pack rings
- Juice and milk cartons are made of liquid packaging board, a laminate of paperboard and LDPE (as the water-proof inner and outer layer), and often with of a layer of aluminum foild (thus becoming aseptic packaging).
- Parts of computer hardware, such as hard disk drives, screen cards, and optical disc drives
- Playground slides
- Plastic wraps

Testing Methods for Thermoplastics:

Tensile Test: ***ASTM D 638 Method:*** Test methods for tensile properties of plastic

Flexural Test: ***ASTM D 790 Method :*** 3-point or 4-point flexural tests are among the most common and classic methods for semi rigid and rigid plastics

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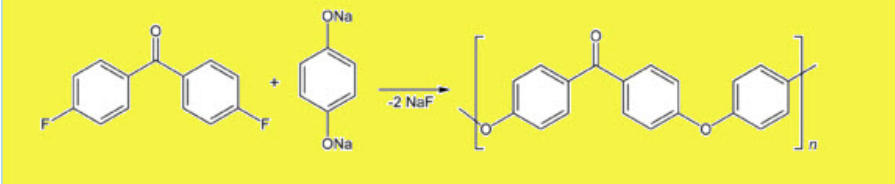
Polyether Ether Ketone (PEEK)

PEEK is a semi-crystalline thermoplastic with excellent chemical resistance and the ability to retain its mechanical properties at extremely high temperatures.

It is used in demanding applications such as the following

- HPLC (High Performance Liquid Chromatography
- Aerospace
- Chemical Processing
- Medical Applications such as implants



PEEK Chemistry

In today's manufacturing world with ISO certification requirements and quality control standards, Polyether Ether Ketone (PEEK) is one of the most often seen resins by our chemistry lab.

They are often asked to perform a simple material verification to ensure the PEEK sample meets quality control standards and material specification needed by the manufacturer.

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