Plastic Testing Capabilities

ISO 17025 2005
Accredited

Green Globe Laboratories
We can be your testing laboratory

- Identification of polymers
- Identification of mixture of polymers
- Estimating the percentages of different types of polymers in a molded part
- Failure Analysis of plastic parts
- Melt point of plastics
- Filler percentage and identification
- Quantification and identification of plasticizers
- Crystallinity of semi crystalline polymers.
- Quantifying additives such as Ethyl Vinyl Alcohol, etc.
- Measurement of Lead, Chromium, Mercury and other elements
- Glass fiber filler quantification

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Polymer Identification:

What are our parts made of?

We use FTIR technology to identify polymers (Fig. 1) and in some case even the trade name of the resin. We can determine the extent of UV Curing. We can tell you if the surface of your part has any contaminants.

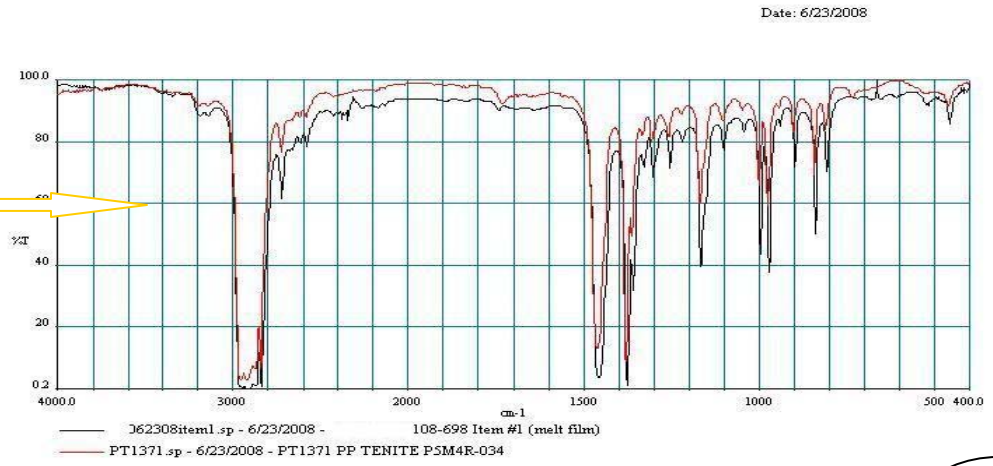

Figure: 1

We can identify additives such as impact modifiers, etc. Overlay of spectra (Fig. 2) from different samples and Zytel 101 and Zytel 801 resins indicates that Zytel 801 was used to mold the parts. Zytel 101 does not have impact modifier.

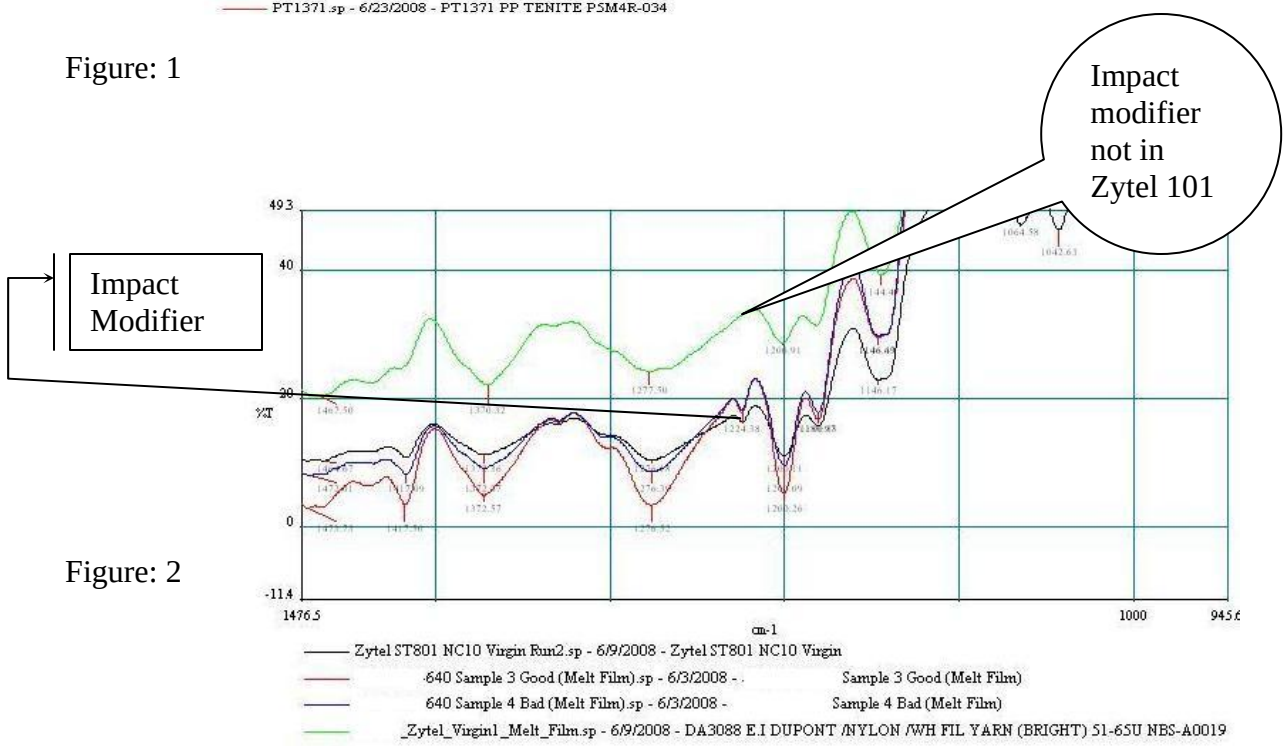

Figure: 2

Failure Analysis:

Did they use the right material to make my parts?

We identify elements in sample using X-Ray fluorescence (XRF) technology. In the example to the right (Fig 3), raw material supplier added a tracer material and sent it abroad. Did they use it? Tracer is missing in the molded part. Molder used different raw material.

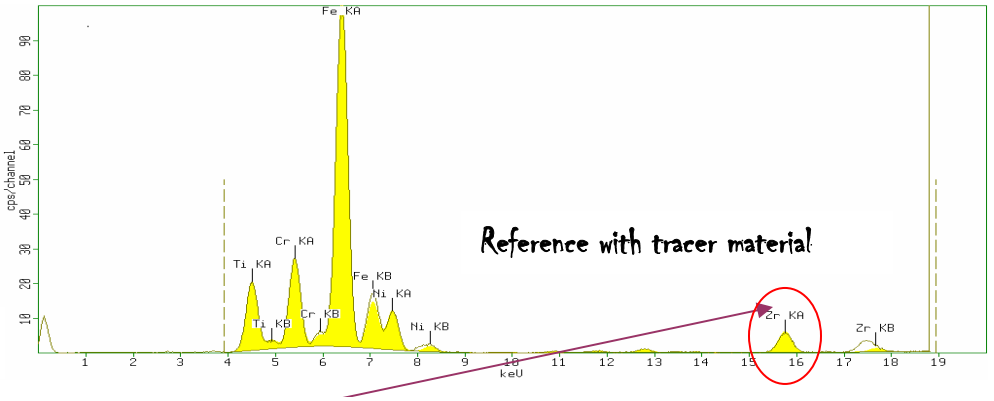

Figure: 3

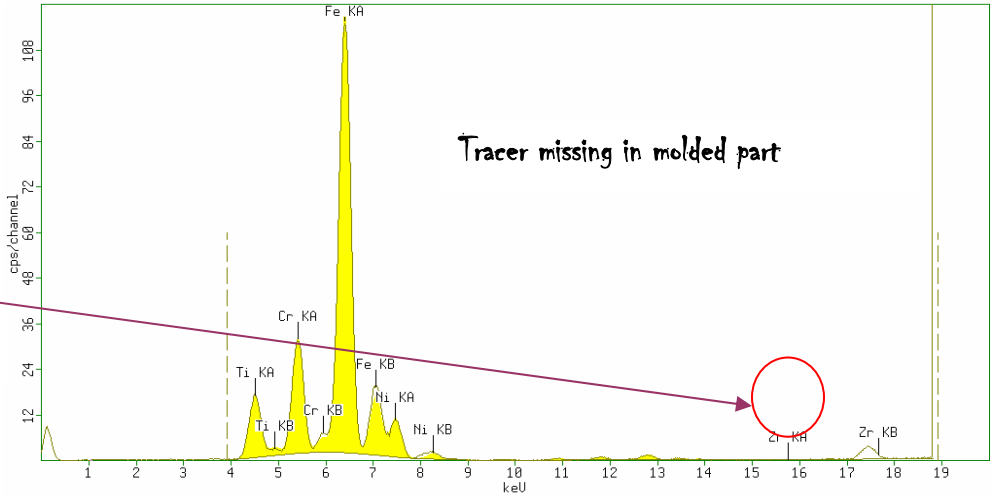

Figure: 4

Why is part cracking?

Thermal analysis (DSC) is used to study the melt points and in some cases, make up of the material. In the thermo gram shown (Fig. 5), "Good" sample has more Low Density Polyethylene than the "Bad" sample. Area under the peak at 94°C for bad sample is less than that of the good sample. Area under the curve at around 260°C for good part is more than that of the bad part. Good sample is more crystalline making it stronger. Too much crystallinity, however, makes it brittle.

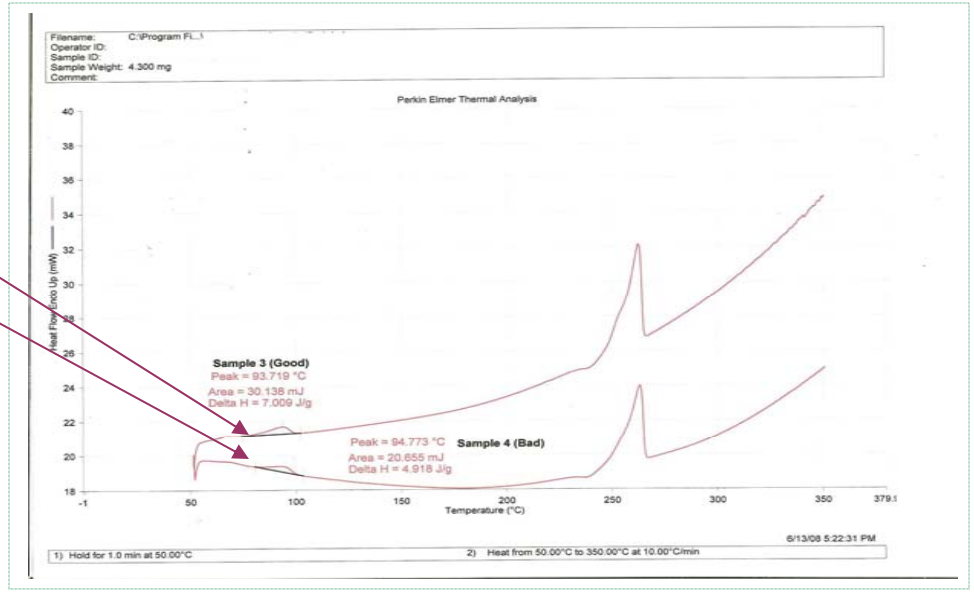

Figure: 5

What Plasticizer did they use in my product and how much of it?

There are several types of plasticizing agents that can be used in plastics. We can extract the plasticizer, quantify it and identify the type of plasticizer using HPLC.

Was regrind material used in molding my parts?

When regrind material is used where the resin glass filled for added strength, we use microscopic pictures as shown in figures 6 and 7 to determine if broken fibers are present in the plastic parts.

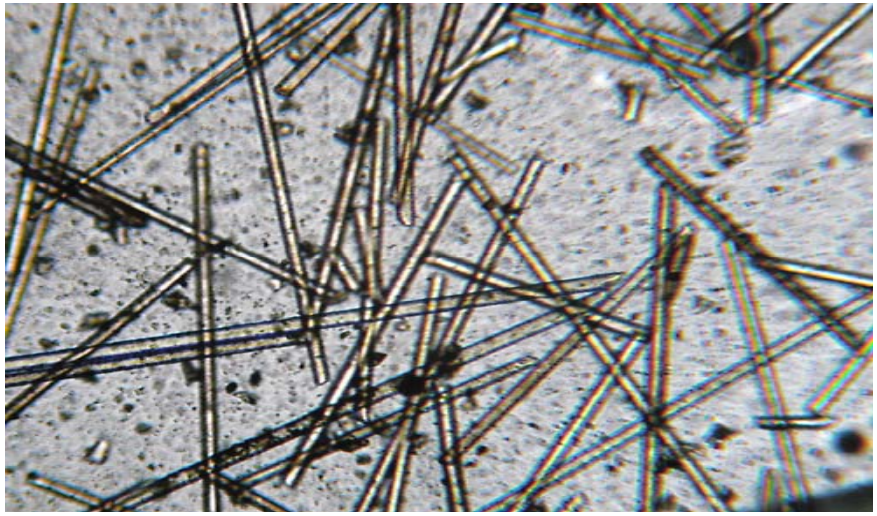

Figure: 6

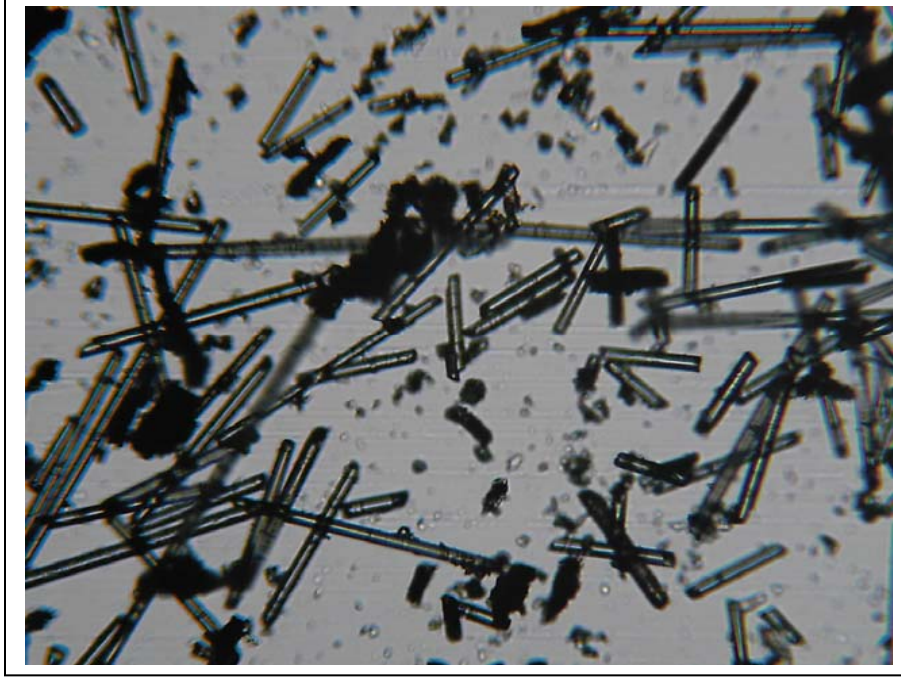

Figure: 7

REPORT:

How will you report results when the tests are complete?

Part A (Discolored Area): DSC studies were performed on the samples retrieved from the discolored surface of Part A sample. Based on the data, the sample appears to be cured completely. The ΔH value we obtained was 1.938j/g (See attached DSC results Sample ID:PartA10092007). Based on the cure results of the sample mixed in the lab, the ΔH value was 150.427j/g. This gives a percent cure of 98.7% for the Part A discolored area sample.

However, we noticed a shift in the Tg of the material when it is reheated. During the first run of DSC, Tg was 79.2°C. (See attached DSC results Sample ID:PartA10092007) When the sample was reheated to ensure the first study's cure results, the Tg value shifted from 79.2°C to 121.5°C (See attached DSC results Sample ID:PartA10092007_Run2). This may be a sign of the material becoming more and more brittle when subjected to heat.

Part B:

1. Uncured Sample (Mixed in the lab)
   a. ΔH value was 53.159j/g. (See attached DSC results Sample ID: PartB10092007_uncured)
2. Sample cured at 24°C (See attached DSC results Sample ID: PartB10092007)
   a. The results indicate a cure of about 89.96%
3. Sample cured at 80°C (See attached DSC results Sample ID: PartB10092007_80Deg)
   a. This sample appears to have completely cured.

Relay Housing:

Based on the DSC results(see attachment. Sample ID: Relay Housing RHS 10102007) ("RHS" in the sample ID indicates that the sample was taken from right hand side of the housing with the probe facing you), a Tg was observed at 51.7°C and melt temperature of 225.93°C. While this data led us to believe that the material is PBT (Polybutelene Terephthalate), to confirm our findings, we performed an FTIR study and confirmed our results. (See attachment eas_relay_housing_1.002)