

SAE Inc. Standard No. 108

Water Absorption of Thermoplastic Products

ABSTRACT

This test method is used to evaluate the amount of water absorbed by SAE's thermoplastic products, such as the ConduWire. Samples are submerged in 75°C water until they are fully saturated, at which point percentage weight gain is calculated.

1. EQUIPMENT REQUIRED

- 1.1 Lab scale twin screw extruder or 2-roll mill
- 1.2 Electronic balance accurate to 0.01 g
- 1.3 Programmable water bath
- 1.4 Tongs

2. SAMPLE PREPARATION

- 2.1 Prepare the thermoplastic product for testing by:
 - 2.1.1 Compounding the material using the lab extruder and then extruding the compounded material into a "flatstrap". Once the "flatstrap" has cooled cut it into 20 cm long sections;
 - 2.1.2 Compounding the material using the two-roll mill and forming a plaque of the material in the oven using a steel mould; or
 - 2.1.3 Melting the pre-compounded material using the two-roll mill and forming a plaque of the material in the oven using a steel mould.
- 2.2 Label the samples accordingly.

3. TEST SETUP

- 3.1 Weigh each sample using an electronic balance accurate to +/- 0.01 g.
- 3.2 Record any notes about the physical appearance of the sample.
- 3.3 Fill the programmable water bath with tap water.
- 3.4 Turn on the bath and set to 75 °C.
- 3.5 Once the water bath has reached temperature, place the samples into the water bath and record the time.

4. PROCEDURE

- 4.1 Once a week remove the samples from the water bath, use tongs since the water is hot.
- 4.2 Record the time the samples were tested, then calculate how long the samples have been immersed in the water bath and record.
- 4.3 Dry the surface of each sample to remove excess water.
- 4.4 Weigh each sample on the electronic balance.
- 4.5 Record the weights in grams and calculate the percentage weight gain using the following formula:

$$\text{Weight Gain (\%)} = \frac{[\text{New Weight (g)} - \text{Initial Weight (g)}]}{\text{Initial Weight (g)}} \times 100$$

- 4.6 Top up the water level in the water bath with fresh tap water every week.
- 4.7 Continue to record the weight of the samples every week until the weight of the sample changes by less than 0.1% in one week.

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