ASTM D1929-96 (reapproved 2001) Standard Test Method for Determining Ignition Properties of Plastics

R 1000 Natural 1/4 inch thick

Project No. 16247-121204

October 1, 2004

Prepared for:

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ABSTRACT

Specimens submitted by Rainier Richlite, Co. and identified as "R 1000 Natural 1/4 inch thick" were tested in accordance with the ASTM D 1929 Standard Test Method for Determining Ignition Temperature of Plastics with the following results:

Flash-Ignition Temperature: 350°C (662°F) Flaming

Spontaneous-Ignition Temperature: 430°C (806°F) glowing

This report contains a total of five pages.

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INTRODUCTION

This test standard outlines a laboratory determination of the spontaneous-ignition and flash-ignition temperatures of plastics using a hot air furnace.

This standard should be used solely to measure and describe the properties of materials, products, or systems in response to heat and flame under controlled laboratory conditions and should not be considered or used for the description, appraisal, or regulation of the fire hazard of materials, products, or systems under actual fire conditions.

Test results from this standard method can be of considerable value in comparing the relative ignition characteristics of different materials. Values obtained represent the lowest ambient air temperature that will cause ignition of the material under piloted and non-piloted conditions such as those presented herein. Test values are expected to rank materials according to ignition susceptibility under actual use conditions.

This test however, is not intended to be the sole criterion for fire hazard. In addition to ignition temperatures, fire hazard includes such other factors as burning rate or flame spread, intensity of burning, fuel contribution, products of combustion, and others.

DEFINITIONS

Flash-Ignition Temperature - The lowest initial temperature of air passing around the specimen at which a sufficient amount of combustible gas is evolved to be ignited by a small external pilot flame.

Spontaneous-Ignition Temperature or Self-Ignition - The lowest initial temperature of air passing around the specimen at which, in the absence of an ignition source, the self-heating properties of the specimen lead to ignition or ignition occurs of itself, as indicated by an explosion, flame, or sustained glow.

Glowing Combustion - In some cases slow decomposition and carbonization of the plastic results only in glow of short duration at various points in the specimen without general ignition actually taking place.

TEST PROCEDURE

The test apparatus is a hot air ignition furnace with an inside diameter of 76 m m (3 in), with an adjustable movement of hot air rising up through it. The electrically heated furnace is adjusted so that the air temperature (at a given air velocity rate) is at a preselected and equilibrated temperature, and then the test specimen is lowered to the approximate center of the tube furnace with a specimen holder. A cover is then placed over the top of the furnace, which contains a 25 mm diameter hole in the center, through which excess furnace air and any gases given off by the specimen escape. If that test is to be for flash-ignition, a small pilot flame is placed over the hole in the cover to ignite the gases if an ignitable concentration occurs. Thermocouples located in the center of the test specimen, and slightly below and to one side of the specimen monitor the test. The determination of flash and spontaneous-ignition temperatures is then determined to be the temperatures at which the material will flash or self-ignite at that temperature, but not at 10°C lower.

Thermoplastic materials may be tested in pellet form normally supplied for molding. Where only sheet samples are available for thermosetting materials, 20 by 20 mm (3/4 in. x 3/4 in.) squares of the available sheet or film shall stacked to a height that gives the required mass. A total specimen weight of 3±0.2 grams is required. Materials that have a density of less than 100 kg/m^3 need to be 20mm by 20mm by 50mm (3/4 in. x 3/4 in. x 2 in.) and have no required mass.

TEST SPECIMEN

Specimens submitted by: Rainier Richlite, Co.

Date received: September 9, 2004

Date tested: September 17, 2004

Sample Form: Sheet

Specimen I.D.: R 1000 Natural 1/4 inch thick

Description: R 1000 Natural 1/4 inch thick fiber laminate

Environmental Conditions: 75°F and 49% r.h.

This Test Witnessed by: N/A

The test specimen identification is as provided by the client and Omega Point Laboratories, Inc. accepts no responsibility for any inaccuracies therein. Omega Point did not select the specimen and has not verified the composition, manufacturing techniques or quality assurance procedures.

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Specimen preparation: The glass specimens with the butacite ST material had dimensions of 0.75" x 0.75" and a weight of 3± 0.2 grams. The specimens were tested as received. Test specimens were conditioned at 23 ± 2°C (73.4 ± 3.6°F) and 50 ± 5% relative humidity for not less than 40 hours prior to test.

Test specimens were conditioned as specified and then tested in accordance with ASTM D 1929. The furnace temperature was taken to be that measured by the "furnace air thermocouple" and the specimen temperature was monitored by a thermocouple located within the steel specimen cup. When the furnace temperature was stable at the selected temperature, the specimen was placed into the specimen cup and the test begun. The current to the furnace heating coils was governed by a variable transformer. Once the furnace was equilibrated to the starting temperature, the variac setting was not changed, regardless of the furnace temperature during the test.

TEST RESULTS & OBSERVATIONS

Time in (min:sec)

Spontaneous-Ignition: Smoking at 3:31; Ignition at 9:30
Combustion was by flaming

Flash-Ignition: Smoking at 7:58; Ignition at 8:48
Combustion was by glowing

Air flow through the furnace for all tests was metered at 25 mm/s, in accordance with ASTM D 1929 section 8.

CONCLUSIONS

The spontaneous-ignition temperature of this material was determined to be 430°C (806°F) and the flash-ignition temperature was determined to be 350°C (662°F).
The spontaneous-ignition temperature is as also called the self-ignition temperature. The ASTM D 1929 standard (section 3.2.3.) defines both terms (spontaneous-ignition and self-ignition) the same way.

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