



COMMERCIAL TESTING COMPANY

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Standard Method of Test for
Determining Ignition Temperature of Plastics

ASTM D 1929-96 (2001)

Solar Gard Armocoat Film

Report Number 12-02068

Test Number 4039-4951-A-0212R
November 13, 2008

Solar Gard®
San Diego, California

Commercial Testing Company

(Authorized Signature)

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INTRODUCTION

This report is a presentation of results of a test on a material submitted by Solar Gard®, San Diego, California. The test was conducted in accordance with the American Society for Testing and Materials standard test method D 1929-96 (2001), *Determining Ignition Temperature of Plastics*. This test is a laboratory determination of the flash ignition temperature and spontaneous ignition temperature of plastics using a hot-air furnace. Results of this test can be of considerable value in comparing the relative ignition characteristics of different materials. The value obtained represents the lowest ambient air temperature that will cause ignition of a material under specific conditions and is expected to rank materials according to their ignition susceptibility under actual use conditions. This test method and ISO 871-1996 are identical in all technical details.

This standard should be used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire-hazard or fire-risk of materials, products, or assemblies under actual fire conditions. However, results of the test may be used as elements of a fire-hazard assessment or a fire-risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard or fire risk of a particular end use.

TEST PROCEDURE

The test apparatus consists of a 4-inch diameter furnace tube containing an electrical heating unit surrounded by a mineral fiber insulation blanket 2.50 inches thick. An air supply controlled at a velocity of 25 mm per second moves heated air from the furnace tube into the bottom of an inner ceramic tube, the test chamber, 3 inches in diameter by 9 inches in length. The top of the furnace is covered with a Vycor disc containing a 1-inch diameter hole. A pilot flame is provided by attachment of a 1/16-inch diameter copper tube, fueled with natural gas, 1/4-inch above and centered in the hole in the Vycor disc.

Three thermocouples are used for temperature measurement. One is located within the specimen where practical. Another is located adjacent to the specimen in the inner tube and measures the temperature of the air passing around the specimen. A third thermocouple is located inside the furnace tube and is used in combination with an automatic controller to maintain the furnace temperature.

The test furnace is heated to a beginning point based on probable ignition rate of the material being tested. The test specimen is inserted into the inner tube of the furnace. For flash ignition, the pilot flame is ignited. The test is continued until the specimen ignites, or until 10 minutes have elapsed. The test is repeated with a number of specimens at higher or lower temperatures as required until flash ignition is bracketed. Actual flash ignition temperature is then obtained by making several runs at various temperatures. For measuring the spontaneous or self-ignition temperature, the tests are repeated without the pilot flame.

Test results are presented as the *flash ignition temperature (FIT)* and the *spontaneous ignition temperature or self-ignition temperature (SIT)*. They are defined in D 1929 as:

- The FIT is defined as the minimum temperature at which sufficient flammable gases are emitted to ignite momentarily upon application of a small external pilot flame.
- The SIT is defined as the minimum temperature at which the self-heating properties of the specimen lead to ignition or ignition occurs of itself in the absence of any additional flame ignition source.

Some materials may result in *glowing combustion*, defined as combustion in the solid phase without flame but with emission of light from the combustion zone caused by slow decomposition and carbonization at various points in the specimen, without general ignition occurring.

MATERIAL TESTED

The client submitted a test sample identified as **Solar Gard Armocoat Film**. The film was cut into individual specimens measuring approximately 0.8 by 0.8 inch. The test material was stored in an atmosphere with the temperature maintained at $71 \pm 2^{\circ}\text{F}$ and the relative humidity at 50 ± 5 percent for five days prior to testing. The individual specimens were plied and adjusted to maintain a total weight of 3.0 ± 0.1 grams per specimen.

TEST RESULT

<u>Minimum Flash Ignition Temperature</u>	<u>Minimum Self Ignition Temperature</u>
702°F	834°F