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Title:	ISO 1182:1990 FIRE TEST/BUILDING/NON-COMBUSTIBILITY TEST PYROGEL XT PROJECT#3148592SAT-001		
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Abstract: THIS REPORT COVERS THE RESULTS OF TESTING OF PYROGEL XT ACCORDING TO ISO 1182 TEST METHOD. THE RESULTS OF THE TEST METHOD MAY BE USED FOR THE DETERMINATION OF THE COMBUSTIBILITY PERFORMANCE OF BUILDING MATERIAL UNDER SPECIFIED CONDITIONS. (750C). THE FURNACE IS BROUGHT TO 750C, THERMOCOUPLES ARE PLACED ON THE SPECIMEN. THE SPECIMEN IS PLACED IN THE FURNACE AND THE TEMPERATURES AND ANY FLAMING ARE NOTED. THE DATA CONTAINED IN THIS REPORT IS INDICATIVE OF THE TEST ONLY AND IS NOT STATISTICALLY SIGNIFICANT.

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NANOTECHNOLOGY AT WORK

ISO 1182:1990
Fire test / Building / Non-combustibility test

Pyrogel XT

Project No. 3148592SAT-001

March 31, 2008

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ABSTRACT

The specimens submitted by Aspen Aerogels and identified as "Pyrogel XT" were tested in accordance with ISO 1182 Non-combustibility test.

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This report contains a total of 5 pages.



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March 31, 2008

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March 31, 2008

I. INTRODUCTION

This report describes the results of the ISO 1182 Non-combustibility test.

It may be important to ascertain whether a material will or will not contribute directly to fire development and this test has been designed to allow this to be done. Its results will provide information from which regulating authorities will be assisted in deciding whether the material in question may be used without undue hazard in certain locations in buildings. From a technical point of view, the test gives no absolute statement concerning "non-combustibility".

The test results relate only to the behavior of the test specimens of a material under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.

II. PURPOSE

The results of the ISO 1182 test method may be used for the determination of the combustibility performance of a building material under specified conditions. (750°C). The method is intended for the testing of building materials but is not applicable to the testing of products which are coated, faced or laminated.

III. TEST SPECIMENS

Five specimens of materials were tested. The specimens were cylindrical with a diameter of 45 mm and a height of 52 mm. The volume of the specimens was 82.6 cm³. The specimens consisted of flexible insulation blanket.

IV. TEST PROCEDURE

Prior to testing, the specimens were conditioned at $60^{\circ} \pm 5^{\circ}\text{C}$ for twenty-four hours, then stored in a desiccator and cooled to ambient temperature. When the power to the furnace is adjusted so that the average furnace temperature is $750 \pm 5^{\circ}\text{C}$ for at least ten minutes, the samples are placed on the specimen holder and instrumented with thermocouples. The thermocouples are placed on the outer surface at mid-height and the geometric center of the specimen. Once the specimen has been instrumented, the holder (with the specimen) is placed in the furnace and the timing device is started. The furnace and specimen temperatures are recorded during the test. The specimen is kept in the furnace until final temperature equilibrium. The mass of the specimens is recorded before and after testing.

V. RESULTS AND OBSERVATIONS

Specimens submitted by: Aspen Aerogels

Date received: March 26, 2008 (This specimen was received in good condition.)

Date tested: March 28, 2008

Specimen ID: Pyrogel XT

Description of specimen: Flexible Insulation Blanket

Environmental Conditions: 70°F and 63% r.h.

This Test Witnessed by: Owen Evans and Chris Abeles

The results of these tests are presented in the following tables:

Specimen Number	1	2	3	4	5
Initial Furnace Temp. (°C)	746	748	755	754	751
Mass Before Test (grams)	14.75	15.18	14.16	13.99	14.42
Sustained Flaming (sec.)	None	None	None	None	None
Mass After Test (grams)	14.14	14.59	13.51	13.43	13.91
Percent Mass Loss	4.14	3.89	4.59	4.00	3.54
Average Percent Mass Loss of Five Specimens			4.03		
Mean Duration of Sustained Flaming (sec.)			None		

FURNACE TEMPERATURES

Specimen Number	1	2	3	4	5
Max. Furnace Temperature (°C)	809.9	811.0	819.0	799.9	808.9
Final Furnace Temperature (°C)	775.8	783.0	792.3	777.0	785.3
Furnace Temperature Rise (°C)	34.1	28.0	26.7	22.9	23.6
Average Furnace Temperature Rise of Five Specimens				27.1	

SPECIMEN SURFACE TEMPERATURES

Specimen Number	1	2	3	4	5
Max. Surface Temperature (°C)	828.8	823.7	832.1	826.2	814.6
Final Surface Temperature (°C)	788.2	796.4	801.6	793.2	787.9
Surface Temperature Rise (°C)	40.6	27.3	30.5	33.0	26.7
Average Surface Temperature Rise of Five Specimens				31.6	

SPECIMEN CENTER TEMPERATURES

Specimen Number	1	2	3	4	5
Max. Center Temperature (°C)	922.7	917.7	903.6	901.8	908.3
Final Center Temperature (°C)	762.7	776.0	770.2	761.6	767.3
Center Temperature Rise (°C)	160.0	141.7	133.4	140.2	141.0
Average Center Temperature Rise of Five Specimens				143.3	

Test Notes: (Time in Min : Sec. Top View Only)

Sample #1 had glowing flash spots at 0:59 (min:sec), no flame ignition visible.
 Sample #2 had glowing flash spots at 0:58 (min:sec), no flame ignition visible.
 Sample #3 had glowing flash spots at 1:01 (min:sec), no flame ignition visible.
 Sample #4 had glowing flash spots at 1:22 (min:sec), no flame ignition visible.
 Sample #5 had glowing flash spots at 1:15 (min:sec), no flame ignition visible.