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INTERTEK ETL SEMKO

ASTM D 2843-99

STANDARD TEST METHOD FOR DENSITY OF
SMOKE FROM THE BURNING OR DECOMPOSITION
OF PLASTICS

DECEMBER 20, 2006

POLYPROPYLENE WEB

STANDARD ICF CORPORATION
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ASTM D 2843-99
Standard Test Method for Density of Smoke from the
Burning or Decomposition of Plastics

Polypropylene Web

Report No. 3111685SAT-004

December 20, 2006

Prepared for:

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ABSTRACT

Specimens submitted for testing by Standard ICF Corporation and identified as "Polypropylene Web" were tested in accordance with the ASTM D 2843-99 Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics with the following results:

| Sample No. | 1 | 2 | 3 | Average |
|---------------------------|------|------|------|---------|
| Max. Light Absorption (%) | 10.5 | 11.1 | 12.7 | 11.4 |
| Smoke Density Rating | 6.5 | 6.8 | 7.6 | 7.0 |
| Exit Sign Obscured (y/n) | no | no | no | |

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This report contains a total of 12 pages.



Servando Romo
Project Manager

December 20, 2006

Reviewed and approved:



C. Anthony Peñaloza
Flammability Testing Team Leader

December 20, 2006

INTRODUCTION

This method provides a laboratory test procedure for measuring and observing the relative amounts of smoke obscuration produced by the burning or decomposition of plastics. It is intended for use in measuring the smoke producing characteristics of plastics under controlled conditions of combustion or decomposition. The measurements are made in terms of the loss of light transmission through a collected volume of smoke produced under controlled, standardized conditions. The test is performed on specimens of small size (1 in. by 1 in. by 0.25 in.) that are representative, to the extent possible, of the material being evaluated.

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 this 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

This test method of measuring the density of smoke from the burning or decomposition of plastics employs a propane burner, which is exposed to the 1 in. by 1 in. by 0.25 in. specimen (or its normal use thickness) for the duration of the test.

Prior to the test, the specimens are conditioned for at least 40 hours at 23 ± 2 °C and $50\% \pm 5\%$ relative humidity. A minimum of three specimens are tested.

The test is conducted within a 300 by 300 by 790 mm test chamber. The test chamber is instrumented with a light source, a photoelectric cell, and a meter to measure the light absorption horizontally across the 300-mm light beam path. The test chamber is closed during the 4-minute test period, except for the 1-in. high x 9-in. long ventilation openings around the base of the chamber.

During the test, the specimen is placed on a 0.9 mm gage 64 mm square stainless steel wire cloth. The openings in the wire cloth are 6 by 6 mm. The wire cloth is supported by a stainless steel bezel. The wire cloth is to be placed 220 mm above the base of the chamber and equidistant from all sides of the chamber. A stainless steel bezel is located 76 mm directly below the specimen and is a cement board, which will catch any particles that may drip from the specimen during the test. The specimen is placed into the test chamber flat on the screen in such a manner that the burner flame will be directly under the specimen when the burner is swung into position.

A removable white plastic plate is attached to the back of the test chamber. There is a 90 by 150 mm clear area centered 480 mm above the bottom of the test chamber. Through this clear area is a white on red illuminated exit sign. The viewing of the exit sign helps to correlate visibility and measured values.

In the case of a material that drips or excessively, a second burner is introduced into the test chamber. The cement board that is used to collect any falling material is replaced with a tapered steel collection pan so that the material that has dripped will collect at the bottom. The second burner is positioned in the test chamber so that the burner flame is directed towards the center of the steel collection tray.

TEST SPECIMEN

The specimen consisted of a 1 in. by 1 in. by 0.19 in. polypropylene plastic sheet. The specimens were conditioned prior to testing for a minimum of 48 hours at 23 ± 2 °C and $50 \pm 5\%$ relative humidity.

Specimens submitted by: Standard ICF Corporation

Date received: December 10, 2006 (This specimen was received in good condition.)

Date tested: December 20, 2006

Specimen I D: Polypropylene Web

Description of specimen

The polypropylene web was removed from the EPS foam system.

Environmental conditions: 72°F and 68% r.h.

This test witnessed by: No witnesses

TEST RESULTS & GENERAL OBSERVATIONS

| Specimen | 1 | 2 | 3 |
|---|----|----|----|
| Ignition Time (Sec.) | 5 | 4 | 5 |
| Melting (Sec.) | 10 | 11 | 10 |
| Flaming Drops (Sec.) | 11 | 12 | 11 |
| Floor Flame (Sec.) | 24 | 28 | 32 |
| Specimen 100% Consumed and Flames Ceased (Sec.) | 52 | 58 | 61 |

SUMMARY OF ASTM D 2843 TEST RESULTS

CLIENT: Standard ICF Corporation
PROJECT NUMBER: 3111685SAT-004
SPECIMEN I.D.: Polypropylene Web

TEST RESULTS

| Sample No. | 1 | 2 | 3 | Average |
|---------------------------|------|------|------|---------|
| Max. Light Absorption (%) | 10.5 | 11.1 | 12.7 | 11.4 |
| Smoke Density Rating | 6.5 | 6.8 | 7.6 | 7.0 |
| Exit Sign Obscured (y/n) | no | no | no | |

Conclusion

| | |
|-------------------------------|-------------|
| MAXIMUM SMOKE DENSITY* | 11.4 |
| SMOKE DENSITY RATING** | 7.0 |

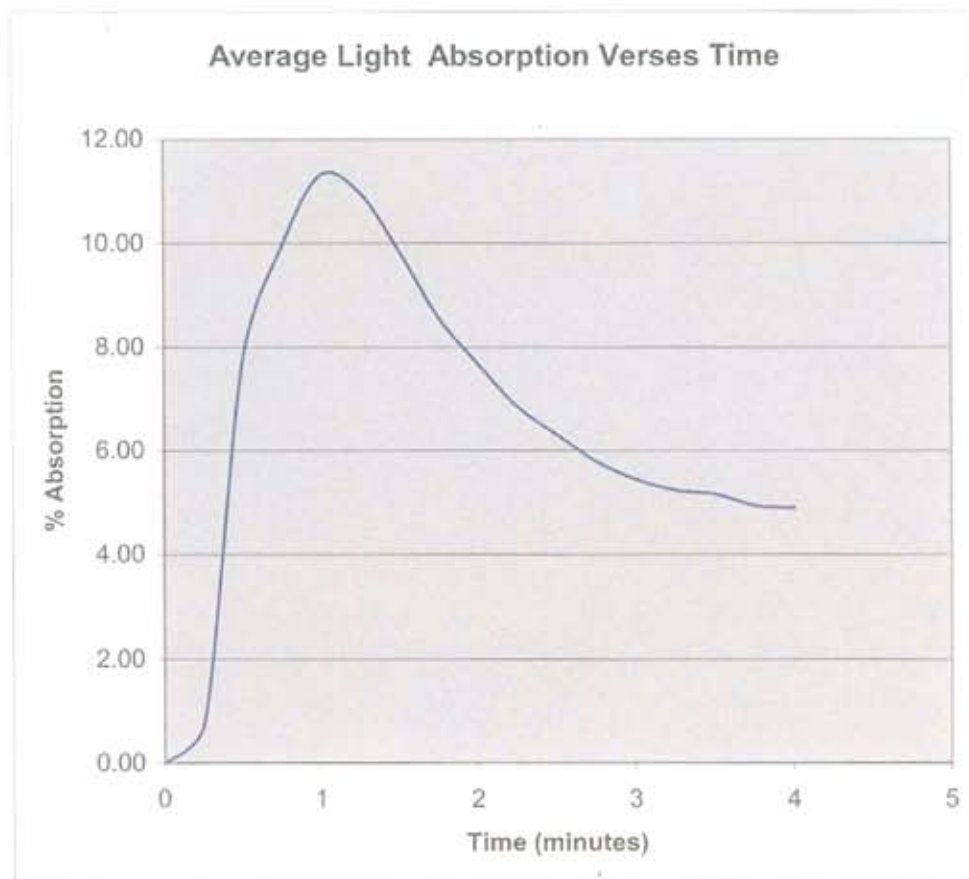
* The maximum smoke density is based on the average result of the maximum percent light absorption.

** The smoke density rating is based on the average area under the curve (percent light absorption curve) of the 3 specimens.

APPENDIX A

Average Light Absorption Verses Time Graph

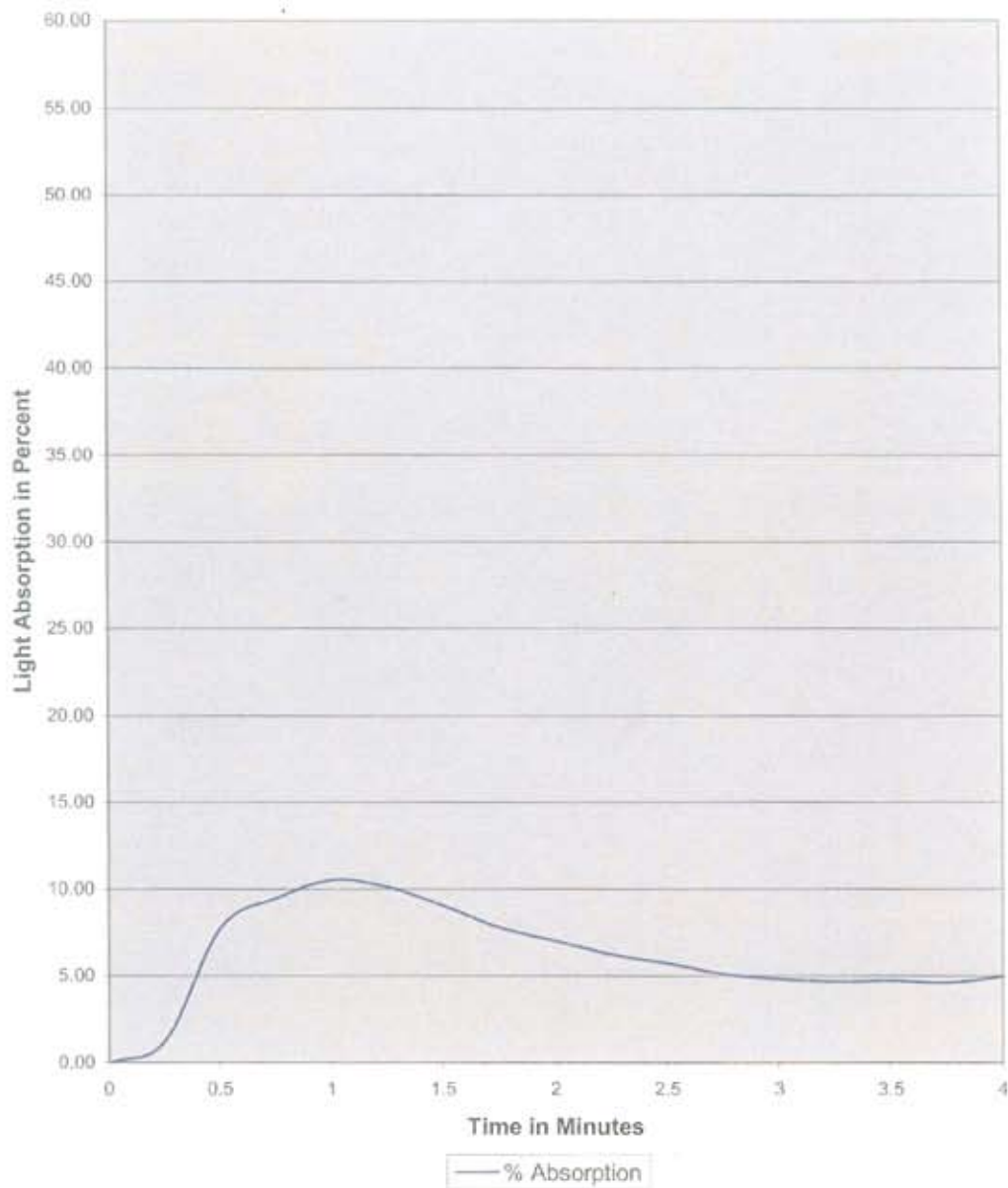
| Time (Min.) | Specimen 1 % Absorption | Specimen 2 % Absorption | Specimen 3 % Absorption | Average % Absorption |
|-------------|----------------------------|----------------------------|----------------------------|-------------------------|
| 0 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.25 | 1.24 | 0.77 | 0.31 | 0.77 |
| 0.5 | 7.74 | 6.86 | 8.63 | 7.74 |
| 0.75 | 9.47 | 8.07 | 12.26 | 9.93 |
| 1 | 10.50 | 10.75 | 12.65 | 11.30 |
| 1.25 | 10.10 | 11.12 | 11.71 | 10.97 |
| 1.5 | 9.02 | 10.02 | 10.51 | 9.85 |
| 1.75 | 7.76 | 8.87 | 9.08 | 8.57 |
| 2 | 6.99 | 7.79 | 8.22 | 7.67 |
| 2.25 | 6.20 | 6.98 | 7.35 | 6.84 |
| 2.5 | 5.69 | 6.35 | 6.87 | 6.30 |
| 2.75 | 5.08 | 5.98 | 6.28 | 5.78 |
| 3 | 4.79 | 5.60 | 5.92 | 5.44 |
| 3.25 | 4.65 | 5.40 | 5.66 | 5.24 |
| 3.5 | 4.69 | 5.30 | 5.49 | 5.16 |
| 3.75 | 4.59 | 5.01 | 5.20 | 4.94 |
| 4 | 4.94 | 4.65 | 5.10 | 4.89 |



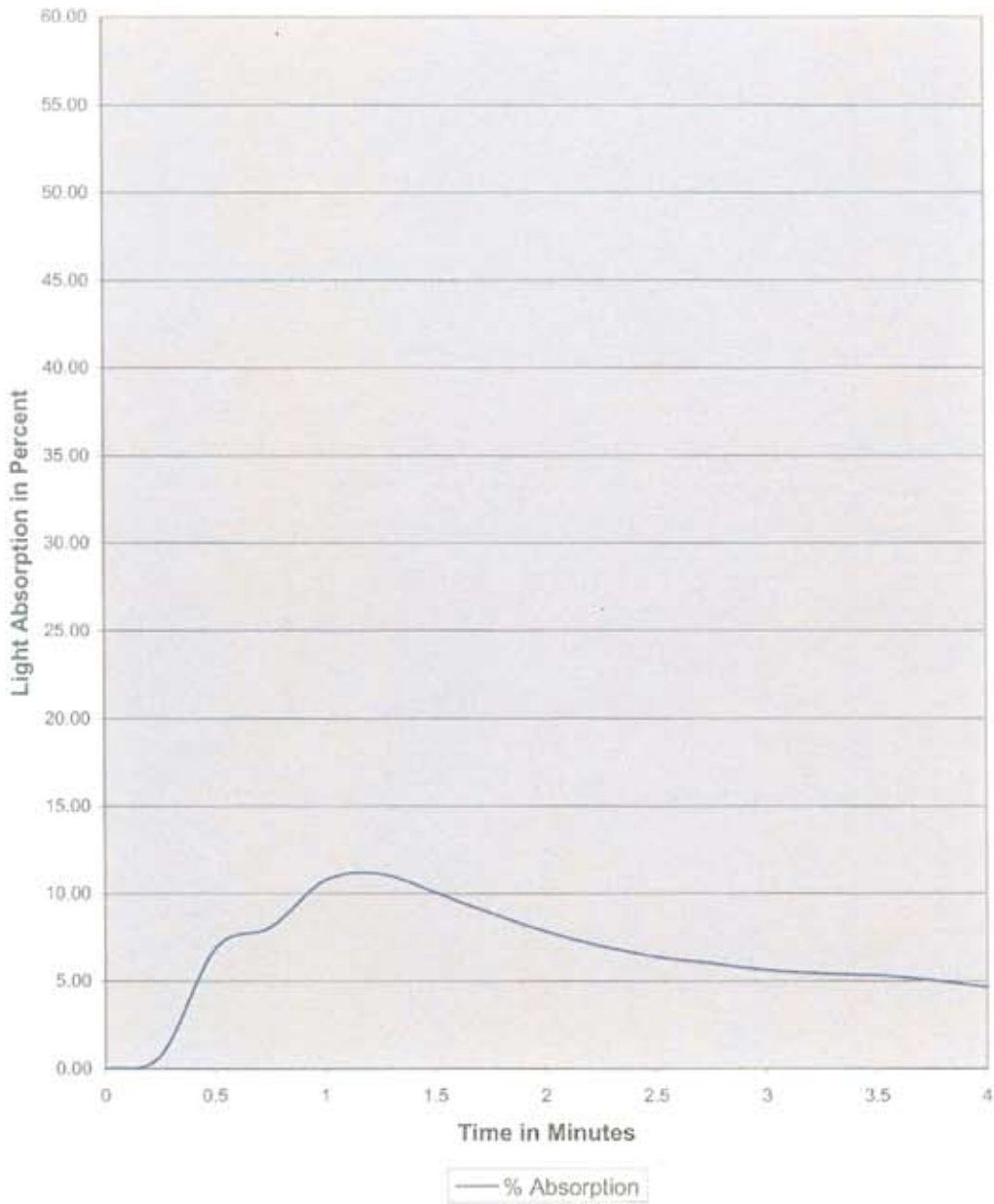
APPENDIX B

Individual Specimen Graphs Light Absorption Verses Time

Light Absorption Verses Time
Specimen #1



Light Absorption Verses Time
Specimen #2



Light Absorption Verses Time
Specimen #3

