

**ROLLAC**  
ROLLING SHUTTERS



ADDITIONAL SHUTTER TESTING

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## **1. Fire Testing**

A. Surface Burning Characteristic  
for A 150-H

B. Surface Burning Characteristic  
for A 200-H

C. Ignition Properties



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Celotex Corporation  
Testing Services

10301 Ninth Street North  
St. Petersburg, Florida 33716  
(727) 563-5116  
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### FIRE TESTING LABORATORY REPORT

May 28, 1999

<b>Client:</b>	Rollac Shutter of Texas, Inc. 10800 Blackhawk Blvd. Houston, TX 77089	<b>MTS Job No.:</b>	520274B
		<b>Test Date:</b>	May 28, 1999
		<b>Metro-Dade Notification No.:</b>	CAE 99092

**Project:** Surface Burning Characteristics of ROLLAC A-150-H Slats, with BASF P12041 R/P1001 U Foam Plastic Core

Introduction:

This report presents the results of a fire test conducted on material submitted to our laboratory on April 28, 1999. Testing was completed on May 28, 1999. The test was performed in accordance with the following American Society for Testing and Materials (ASTM) test standard:

ASTM E 84 - 98, "Standard Test Method for Surface Burning Characteristics of Building Materials"

The test method was used to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed index numbers are reported for the tested material.

Specimen Identification:

Thirty-nine (39) nominally 72 inch long by 1.57 inch wide by 3/16 inch thick rigid shutter slats were submitted and identified as "ROLLAC A-150-H" with foam plastic core manufactured by BASF Corporation 1609 Biddle Ave., Wyandotte, MI 48192. Three (3) separate panels were constructed, each consisting of thirteen slats joined together longitudinally by a joint detail. Each completed panel was 72 inches long by 21 inches wide by 3/16 inch thick.

Fire Test Chamber:

The fire test chamber or "Steiner Tunnel" consists of a horizontal 25 foot length furnace duct with a nominal interior width of 17.75 inches and depth of 12 inches. The furnace walls are insulated with refractory firebrick. Observation windows, placed 24 inches on center, are provided the entire length of one side of the tunnel. Specimens are supported on a 1 inch wide ledge along the top of the chamber. A removable insulated, stainless steel cap is used to completely cover the chamber and the test samples. The lid's edges, submerged in a perimeter water tray, prevent air leakage into the test chamber with a complete seal. The chamber was constructed in accordance with Section 5, "Apparatus", of the above standard.

H.G. Miller, #23335  
 Celotex Corporation, #7823  
 10301 9<sup>th</sup> St. N.  
 St. Petersburg, FL 33716  
 Date: 3-29-00

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Client: Rollac Shutter of Texas, Inc.

MTS Job No.: 520274B

Specimen Preparation and Installation:

The three (3) nominally 72 by 21 by 3/16 inch Shutter panels were placed atop of support rods per standard and end to end on the furnace support ledge with the convex/grooved surface towards the chamber floor. The 24 foot length test specimen consisted of the three sections. Three (3) 24 by 96 inch and one (1) 24 by 12 inch flat, inorganic reinforced cement boards were placed end to end on top of the test specimen for furnace lid protection.

The samples were conditioned in a controlled laboratory at 70°F and 50% relative humidity a minimum of 72 hours prior to testing.

Test Procedure:

The flame spread distances, smoke obscuration percentages, and furnace temperatures were transmitted to an automated data acquisition system with a linear voltage transducer, a linear photometer system, and 18 gage, Type K thermocouples, respectively. The average flame front was observed and followed, with the linear voltage transducer, by a trained technician. Measurements were recorded over a 10 minute test time period.

Test Results:

The rounded test results as required by Section 9, "Interpretation of Results", are summarized on the following table. The unrounded test results, test data and graphical plots for flame spread, smoke, and temperature developed data are located in the Appendix.

Specimen Identification	Flame Spread Index (Unitless)	Smoke Index (Unitless)
ROLLAC A-150-H	50	400

Observations:

No afterburn or afterglow of shutter material was visible after the test was completed.

Tested by:

  
William M. Gwynn  
Research Technologist

Approved by:

  
Mark E. Hennis  
Research Chemist

  
R.G. Miller, #23335

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St. Petersburg, FL 33716

Date: 3-23-00

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### FIRE TESTING LABORATORY REPORT

May 28, 1999

<b>Client:</b>	Rollac Shutter of Texas, Inc. 10800 Blackhawk Blvd. Houston, TX 77089	<b>MTS Job No.:</b>	520274A
		<b>Test Date:</b>	May 28, 1999
		<b>Metro-Dade Notification No.:</b>	CAE 99091

**Project:** Surface Burning Characteristics of Rollac A-200-H slats with BASF P12041 R/P1001 U foam plastic core.

Introduction:

This report presents the results of a fire test conducted on material submitted to our laboratory on April 28, 1999. Testing was completed on May 28, 1999. The test was performed in accordance with the following American Society for Testing and Materials (ASTM) test standard:

ASTM E 84 - 98, "Standard Test Method for Surface Burning Characteristics of Building Materials"

The test method was used to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed index numbers are reported for the tested material.

Specimen Identification:

Thirty (30) nominally 72 inch long by 2.17 inch wide by 3/8 inch thick rigid shutter slats were submitted and identified as "ROLLAC A-200-H" with foam plastic core manufactured by BASF Corporation 1609 Biddle Ave., Wyandotte, MI 48192. Three (3) separate panels were constructed, each consisting of ten slats joined together longitudinally by a joint detail. Each completed panel was 72 inches long by 22 inches wide by 3/8 inch thick.

Fire Test Chamber:

The fire test chamber or "Steiner Tunnel" consists of a horizontal 25 foot length furnace duct with a nominal interior width of 17.75 inches and depth of 12 inches. The furnace walls are insulated with refractory firebrick. Observation windows, placed 24 inches on center, are provided the entire length of one side of the tunnel. Specimens are supported on a 1 inch wide ledge along the top of the chamber. A removable insulated, stainless steel cap is used to completely cover the chamber and the test samples. The lid's edges, submerged in a perimeter water tray, prevent air leakage into the test chamber with a complete seal. The chamber was constructed in accordance with Section 9.1.1 of the above standard.

*R.G. Miller #23335*  
*R. Miller*  
Celotex Corporation, #7823

10301 9<sup>th</sup> St. N.  
St. Petersburg, FL 33716

Date: *9-23-00*

*This report is for the information of the client. It may be used in its entirety for the purpose of securing product acceptance from duly constituted approval authorities; however, this report or the name of Celotex Corporation shall not be used in publicity or advertising.*



Client: Rollac Shutter Of Texas, Inc.

MTS Job No.: 520274A

Specimen Preparation and Installation:

The three (3) nominally 72 by 22 by 3/8 inch Shutter panels were placed atop of support rods per standard and end to end on the furnace support ledge with the convex/grooved surface towards the chamber floor. The 24 foot length test specimen consisted of the three sections. Three (3) 24 by 96 inch and one (1) 24 by 12 inch flat, inorganic reinforced cement boards were placed end to end on top of the test specimen for furnace lid protection.

The samples were conditioned in a controlled laboratory at 70°F and 50% relative humidity a minimum of 72 hours prior to testing.

Test Procedure:

The flame spread distances, smoke obscuration percentages, and furnace temperatures were transmitted to an automated data acquisition system with a linear voltage transducer, a linear photometer system, and 18 gage, Type K thermocouples, respectively. The average flame front was observed and followed, with the linear voltage transducer, by a trained technician. Measurements were recorded over a 10 minute test time period.

Test Results:

The rounded test results as required by Section 9, "Interpretation of Results", are summarized on the following table. The unrounded test results, test data and graphical plots for flame spread, smoke, and temperature developed data are located in the Appendix.

Specimen Identification	Flame Spread Index (Unitless)	Smoke Index (Unitless)
ROLLAC A-200-H	25	400

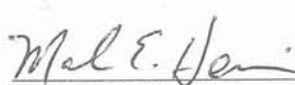
Observations:

The shutter material continued to burn for over one minute after the test was completed.

Tested by:

  
William M. Gwynn  
Research Technologist

Approved by:

  
Mark E. Hennis  
Research Chemist

  
R.G. Miller, #23335

Celotex Corporation, #7823

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St. Petersburg, FL 33716

Date: 3-23-00

**Panel (ii)**

**Exterior Rolling Shutter Type A 200  
Horizontal position**

test point	hot air	hot surface	cold surface	cold air
1	83.9	68.1	53.5	36.9
2	83.2	67.5	53.2	37.1
3	84.0	67.4	53.6	36.6
4	84.5	66.8	52.9	36.2
5	83.9	65.7	53.2	35.8
6	83.9	65.9	52.8	36.1
7	84.9	66.0	53.0	36.3
8	82.3	66.2	53.5	35.9
9	83.2	67.0	53.1	36.0
Average temp.	83.7	66.7	53.2	36.3
Total power input (heater + fan), W			345	

$$r = 0.0399 \text{ Km}^2/\text{W} = 0.227 \text{ F ft}^2/(\text{Btu/h})$$

$$r_h = 0.0397 \text{ Km}^2/\text{W} = 0.225 \text{ F ft}^2/(\text{Btu/h})$$

$$R_c = 0.0317 \text{ Km}^2/\text{W} = 0.180 \text{ F ft}^2/(\text{Btu/h})$$

$$R_u = 0.111 \text{ Km}^2/\text{W} = 0.632 \text{ F ft}^2/(\text{Btu/h})$$

$$U = 8.99 \text{ W/Km}^2 = 1.58 (\text{Btu/h})/\text{F ft}^2$$



**Exterior Rolling Shutter Type A 200**  
**Vertical Position**

test point	hot air	hot surface	cold surface	cold air
1	76.2	61.0	48.1	32.8
2	76.5	61.3	48.3	32.4
3	76.0	60.5	47.7	32.7
4	75.9	61.0	47.6	31.9
5	76.3	61.4	48.3	31.8
6	76.7	60.6	47.8	32.3
7	74.5	59.0	46.3	32.6
8	75.0	58.7	46.1	32.0
9	74.9	58.5	46.6	31.9
Average temp.	75.8	60.2	47.4	32.3
Total power input (heater + fan), W			313	

$$r = 0.0405 \text{ Km}^2/\text{W} = 0.230 \text{ F ft}^2/(\text{Btu/h})$$

$$r_h = 0.0391 \text{ Km}^2/\text{W} = 0.222 \text{ F ft}^2/(\text{Btu/h})$$

$$R_c = 0.0330 \text{ Km}^2/\text{W} = 0.187 \text{ F ft}^2/(\text{Btu/h})$$

$$R_u = 0.113 \text{ Km}^2/\text{W} = 0.639 \text{ F ft}^2/(\text{Btu/h})$$

$$U = 8.85 \text{ W/Km}^2 = 1.56 \text{ (Btu/h)/F ft}^2$$

**Panel (iii):**

**Exterior Rolling Shutter Type GULF  
Horizontal Position**

test point	hot air	hot surface	cold surface	cold air
1	82.8	67.9	46.2	31.0
2	81.7	68.7	46.8	31.3
3	83.0	68.4	46.2	31.1
4	82.2	67.9	45.9	30.8
5	81.0	68.0	45.7	30.8
6	82.4	67.8	46.3	30.3
7	82.1	67.5	46.1	31.1
8	81.7	68.0	46.8	31.8
9	82.0	67.7	46.4	31.1
Average temp.	82.1	68.0	46.3	31.0
Total power input (heater + fan), W			258	

$$r = 0.0443 \text{ Km}^2/\text{W} = 0.251 \text{ F ft}^2/(\text{Btu/h})$$

$$r_h = 0.0480 \text{ Km}^2/\text{W} = 0.273 \text{ F ft}^2/(\text{Btu/h})$$

$$R_c = 0.0681 \text{ Km}^2/\text{W} = 0.387 \text{ F ft}^2/(\text{Btu/h})$$

$$R = 0.160 \text{ Km}^2/\text{W} = 0.911 \text{ F ft}^2/(\text{Btu/h})$$

$$\dot{U} = 6.25 \text{ W/Km}^2 = 1.10 (\text{Btu/h})/\text{F ft}^2$$

**Exterior Rolling Shutter type GULF**  
**Vertical position**

test point	hot air	hot surface	cold surface	cold air
1	79.9	66.4	45.8	31.4
2	79.5	66.0	46.0	30.9
3	79.6	66.3	46.1	31.1
4	79.3	65.9	45.7	31.5
5	78.9	66.2	46.0	31.2
6	79.0	65.9	45.2	30.9
7	78.1	64.6	44.1	31.2
8	77.9	64.5	44.0	31.4
9	78.2	64.7	44.2	30.9
Average temp.	78.9	65.6	45.2	31.2
Total power input (heater + fan), W			239	

$$r = 0.0452 \text{ Km}^2/\text{W} = 0.257 \text{ F ft}^2/(\text{Btu/h})$$

$$r_h = 0.0475 \text{ Km}^2/\text{W} = 0.270 \text{ F ft}^2/(\text{Btu/h})$$

$$R_c = 0.0690 \text{ Km}^2/\text{W} = 0.392 \text{ F ft}^2/(\text{Btu/h})$$

$$R = 0.162 \text{ Km}^2/\text{W} = 0.920 \text{ F ft}^2/(\text{Btu/h})$$

$$U = 6.17 \text{ W/Km}^2 = 1.09 \text{ (Btu/h)/F ft}^2$$

**Panel (iv):**

**Exterior Rolling Shutter type ELITE  
Horizontal position**

test point	hot air	hot surface	cold surface	cold air
1	79.0	65.6	38.2	23.2
2	78.4	65.5	37.8	23.6
3	78.6	65.9	38.0	22.9
4	78.9	64.9	37.6	23.2
5	78.4	64.7	37.9	23.2
6	79.0	65.1	37.7	22.8
7	79.1	64.8	38.1	23.0
8	78.3	65.6	37.7	22.7
9	78.5	65.5	37.6	23.0
Average temp.	78.7	65.3	37.8	23.1
Total power input (heater + fan), W			229	

$$r = 0.0474 \text{ Km}^2/\text{W} = 0.269 \text{ F ft}^2/(\text{Btu/h})$$

$$r_h = 0.0520 \text{ Km}^2/\text{W} = 0.295 \text{ F ft}^2/(\text{Btu/h})$$

$$R_c = 0.0973 \text{ Km}^2/\text{W} = 0.552 \text{ F ft}^2/(\text{Btu/h})$$

$$R = 0.197 \text{ Km}^2/\text{W} = 1.12 \text{ F ft}^2/(\text{Btu/h})$$

$$U = 5.08 \text{ W/Km}^2 = 0.895 (\text{Btu/h})/\text{F ft}^2$$

**Exterior Rolling Shutter type ELITE**  
**Vertical position**

test point	hot air	hot surface	cold surface	cold air
1	80.9	67.4	40.2	26.3
2	81.2	67.6	39.8	26.2
3	81.3	67.3	40.1	25.9
4	81.0	67.2	39.9	26.2
5	80.7	66.9	39.7	25.9
6	80.2	67.3	40.1	26.0
7	78.8	66.0	38.9	24.7
8	78.3	65.7	38.6	24.2
9	78.6	65.8	38.8	23.9
Average temp.	80.1	66.8	39.6	25.5
Total power input (heater + fan), W			224	

$$r = 0.0482 \text{ Km}^2/\text{W} = 0.274 \text{ F ft}^2/(\text{Btu/h})$$

$$r_h = 0.0511 \text{ Km}^2/\text{W} = 0.290 \text{ F ft}^2/(\text{Btu/h})$$

$$R_c = 0.0985 \text{ Km}^2/\text{W} = 0.559 \text{ F ft}^2/(\text{Btu/h})$$

$$R = 0.198 \text{ Km}^2/\text{W} = 1.12 \text{ F ft}^2/(\text{Btu/h})$$

$$U = 5.06 \text{ W/Km}^2 = 0.889 \text{ (Btu/h)/F ft}^2$$