

REPORT OF A

FLAME SPREAD TEST PROGRAM

CONDUCTED ON

EXTRUDED PVC CONCRETE WALL FORMING SYSTEM

CLIENT

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REPORT NUMBER: 493-7931

DATE: FEBRUARY 10, 2000

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## **PREFACE**

This report describes the tests, standards, and details for the sample of extruded PVC concrete wall forming system, submitted by Octaform Pacific Inc.

The report does not automatically imply product certification. Products must bear WHI labels in order to demonstrate Warnock Hersey certification.

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## TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
MATERIAL SPECIFICATIONS	2
SAMPLE MOUNTING	2
TEST PROCEDURE	3
TEST RESULTS	5
FLAME SPREAD CURVES	7
SMOKE DEVELOPED CURVES	11
CONCLUSIONS	15

## INTRODUCTION

On February 10, 2000, Intertek Testing Services NA Ltd./Warnock Hersey conducted a test program to determine the surface burning characteristics of an extruded PVC concrete wall forming system for Octaform Pacific Inc. The material tested was selected by a representative of ITS/Warnock Hersey at the Celco Plastics Ltd. plant, 7680 Anvil Way, Surrey, B.C.

Testing was conducted in accordance with ASTM E84-98 and CAN/ULC S102.2-M88; *Standard for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies*.

Upon receipt of the samples at the ITS/Warnock Hersey laboratory they were placed in the conditioning room where they remained in an atmosphere of  $23 \pm 3^{\circ}\text{C}$  ( $73.4 \pm 5^{\circ}\text{F}$ ) and  $50 \pm 5\%$  relative humidity until they reached a constant weight.

One trial run was conducted in accordance with ASTM E84-98 and three trial runs were conducted in accordance with CAN/ULC S102.2-M88.

## MATERIAL SPECIFICATIONS

The Octaform Pacific Inc. "encompassed wall system" consists of interlocking face sheets and transverse connecting webs that assemble to form a concrete wall forming system. The material tested was selected by a representative of ITS/Warnock Hersey. The sample consisted of several 12 ft. lengths of extruded PVC interlocking strips that form the wall exposed faces. Each piece measured 5.970 in. in width and 0.047 in.  $\pm$  0.007 in. in thickness.

## SAMPLE MOUNTING

### ASTM E84-98

The 12 ft. lengths of material were laid down on 1/4 in. stainless steel rods, which were placed on the upper ledge of the flame spread tunnel, spaced 24 in. on centres. Six 12 ft. by 6 in. (nominal) specimens were used. The material was then covered with a layer of 6 mm reinforced cement board in accordance with ASTM E84-98.

### CAN/ULC S102.2-M88

Since the material is not self-supporting, it is required to be evaluated in accordance with CAN/ULC S102.2-M88 (floor mounting). The samples were placed on the floor of the flame spread tunnel. A layer of 13 mm reinforced cement board was then placed on the upper ledge of the tunnel in accordance with CAN/ULC S102.2-M88.

## TEST PROCEDURE

The results of the tests are expressed by indexes, which compare the characteristics of the sample under tests relative to that of select grade red oak flooring and asbestos-cement board.

### (A) FLAME SPREAD CLASSIFICATION:

This index relates to the rate of progression of a flame along a sample in the 25 foot tunnel.

A natural gas flame is applied to the front of the sample at the start of the test and drawn along the sample by a draft kept constant for the duration of the test.

An observer notes the progression of the flame front relative to time.

The test apparatus is calibrated such that the flame spread classification for red oak flooring is 100, and 0 for asbestos-cement board.

### CALCULATIONS: (CAN/ULC S102.2-M88)

According to the test standard, the flame spread classification is equal to  $\frac{5363}{(195 - A_t)}$  when

$A_t$  is the total area beneath the flame spread curve, if this area exceeds 97.5 minute feet.

If the area beneath the curve is less than or equal to 97.5 minute feet the classification becomes  $0.564 \times A_t$ .

**TEST PROCEDURE (Continued)**

**(B) SMOKE DEVELOPED:**

A photocell is used to measure the amount of light, which is obscured by the smoke passing down the tunnel duct.

When the smoke from a burning sample obscures the light beam, the output from the photocell decreases. This decrease with time is recorded and compared to the results obtained for red oak, which is 100.

**CALCULATIONS:**

$$\frac{10,000 - (\text{smoke integrator reading}) \times 100}{3356} = \text{smoke developed}$$

**TEST RESULTS**

**ASTM E84-98**

**FLAME SPREAD**

The resultant flame spread classifications are as follows:  
(classification rounded to nearest 5)

<b>Extruded PVC Concrete Wall Forming System</b>	<b>Flame Spread</b>	<b>Flame Spread Classification</b>
Run 1	37	35

**SMOKE DEVELOPED**

The areas beneath the smoke developed curve and the related classifications are as follows:  
(classification rounded to nearest 5)

<b>Extruded PVC Concrete Wall Forming System</b>	<b>Smoke Developed</b>	<b>Smoke Developed Classification</b>
Run 1	118	120

**TEST RESULTS**  
**CAN/ULC S102.2-M88**

**FLAME SPREAD**

The resultant flame spread classifications are as follows:  
(classification rounded to nearest 5)

<b>Extruded PVC Concrete Wall Forming System</b>	<b>Flame Spread</b>	<b>Flame Spread Classification</b>
Run 1	16	
Run 2	21	20
Run 3	19	

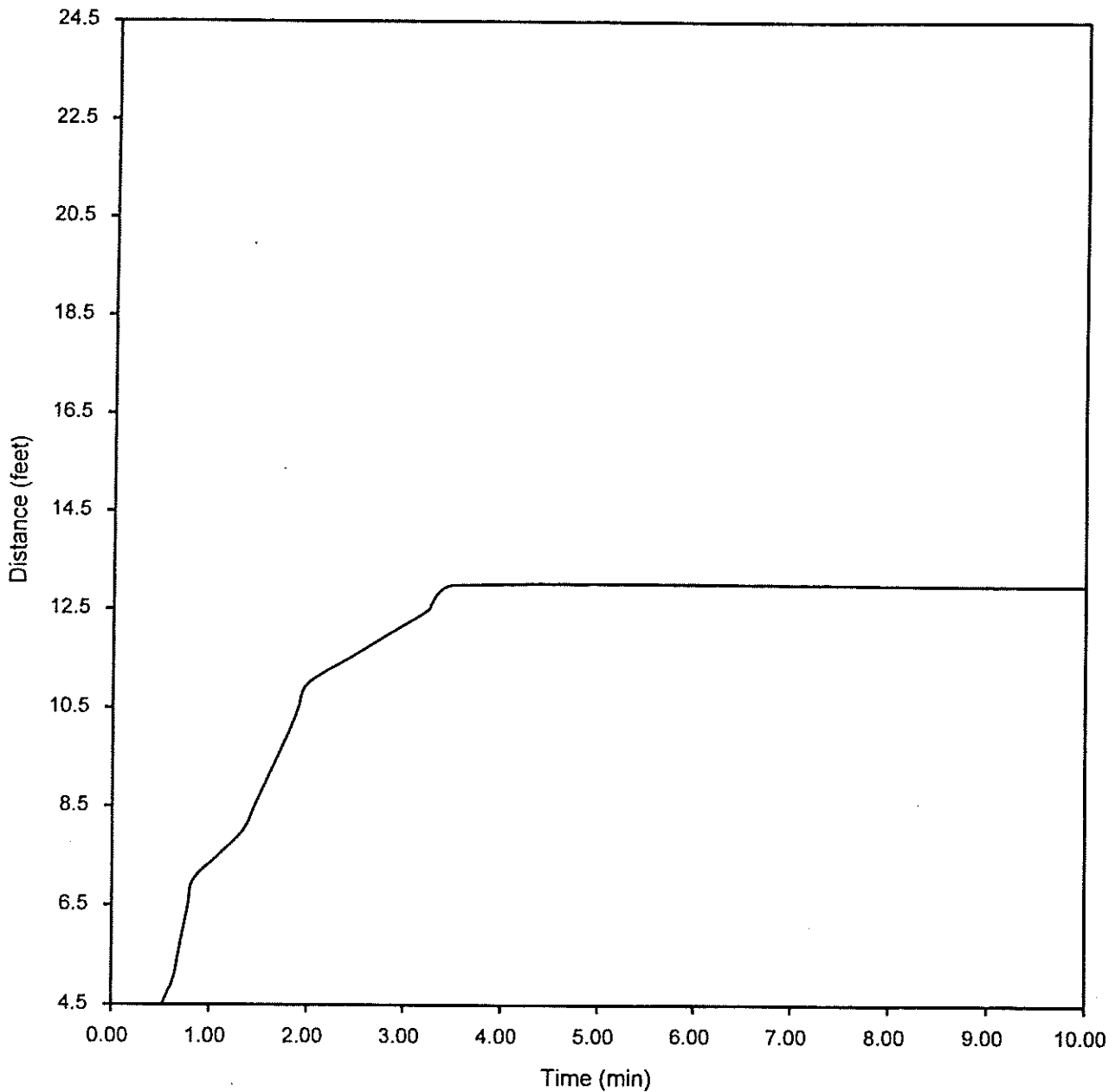
**SMOKE DEVELOPED**

The areas beneath the smoke developed curve and the related classifications are as follows:  
(classification rounded to nearest 5)

<b>Extruded PVC Concrete Wall Forming System</b>	<b>Smoke Developed</b>	<b>Smoke Developed Classification</b>
Run 1	161	
Run 2	194	175
Run 3	172	

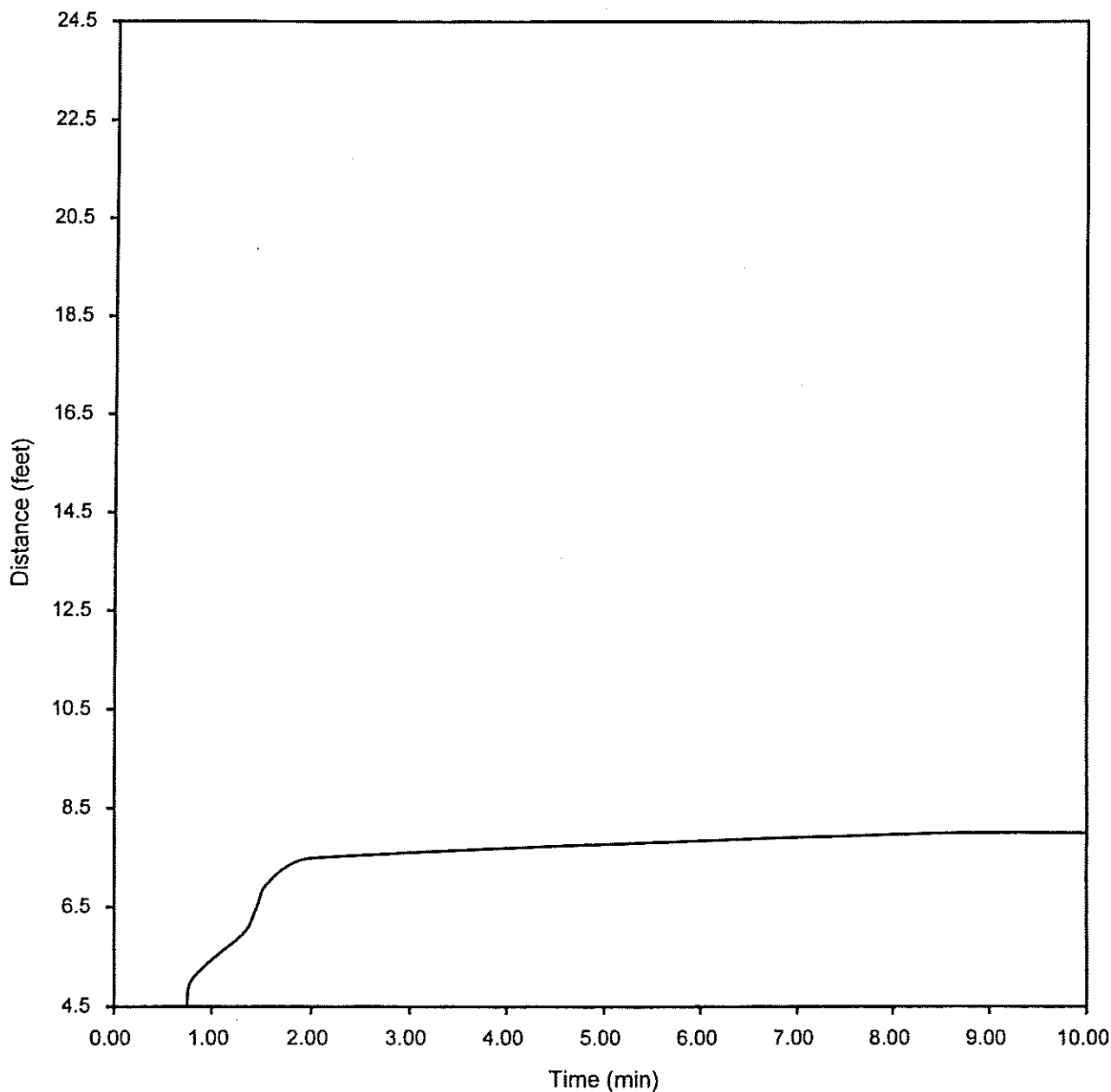
**FLAME SPREAD CURVE  
DISTANCE IN FEET VS. TIME IN MINUTES  
RUN 1 - ASTM E84-98**

**PVC Encompassed Wall System ASTM E84 Flamespread=37, Smoke  
Developed=118**



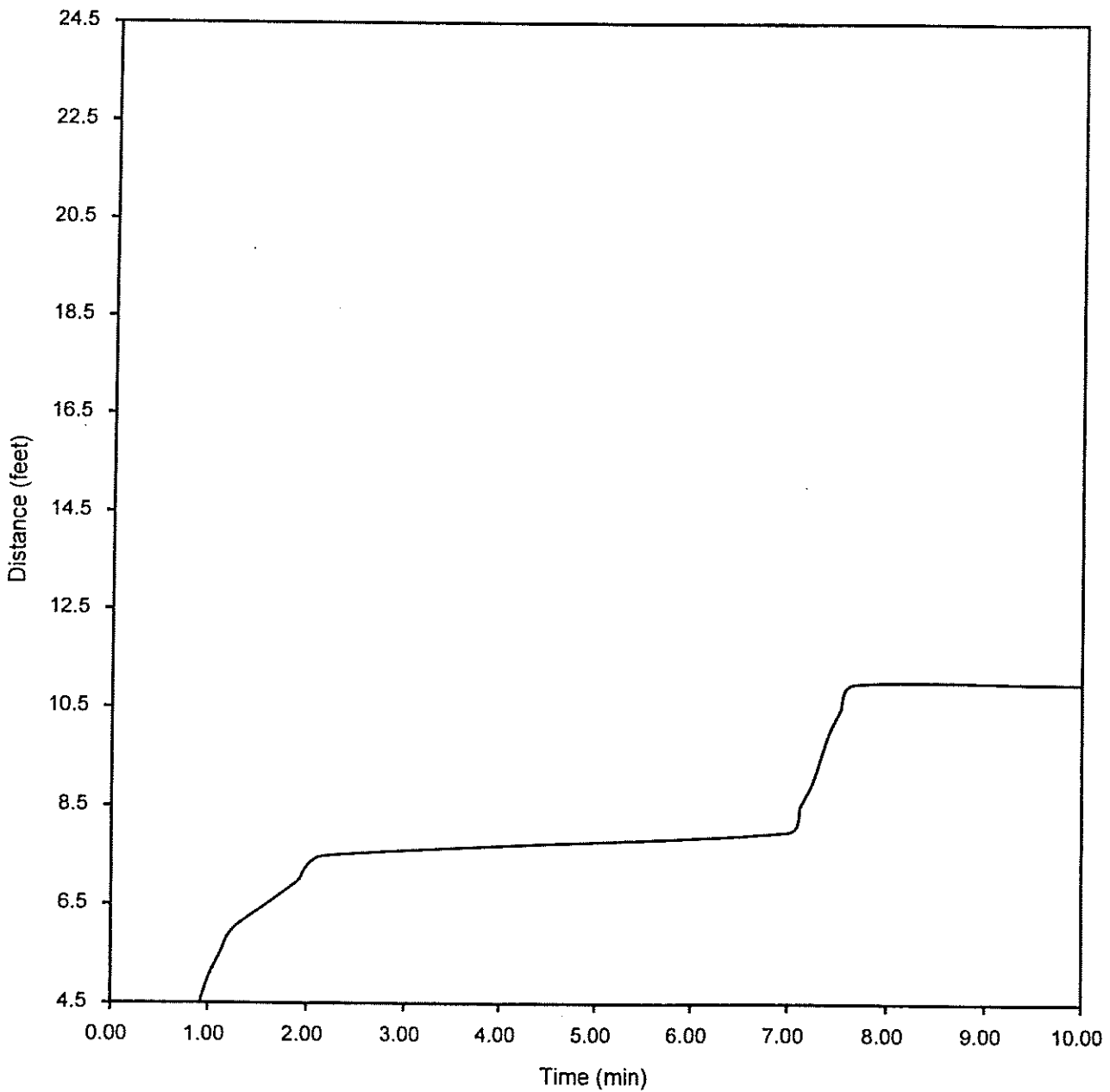
**FLAME SPREAD CURVE**  
**DISTANCE IN FEET VS. TIME IN MINUTES**  
**RUN 1 - CAN/ULC S102.2-M88**

**PVC Encompassed Wall System S102.2, run 1, Flamespread=16,  
Smoke Developed=161**



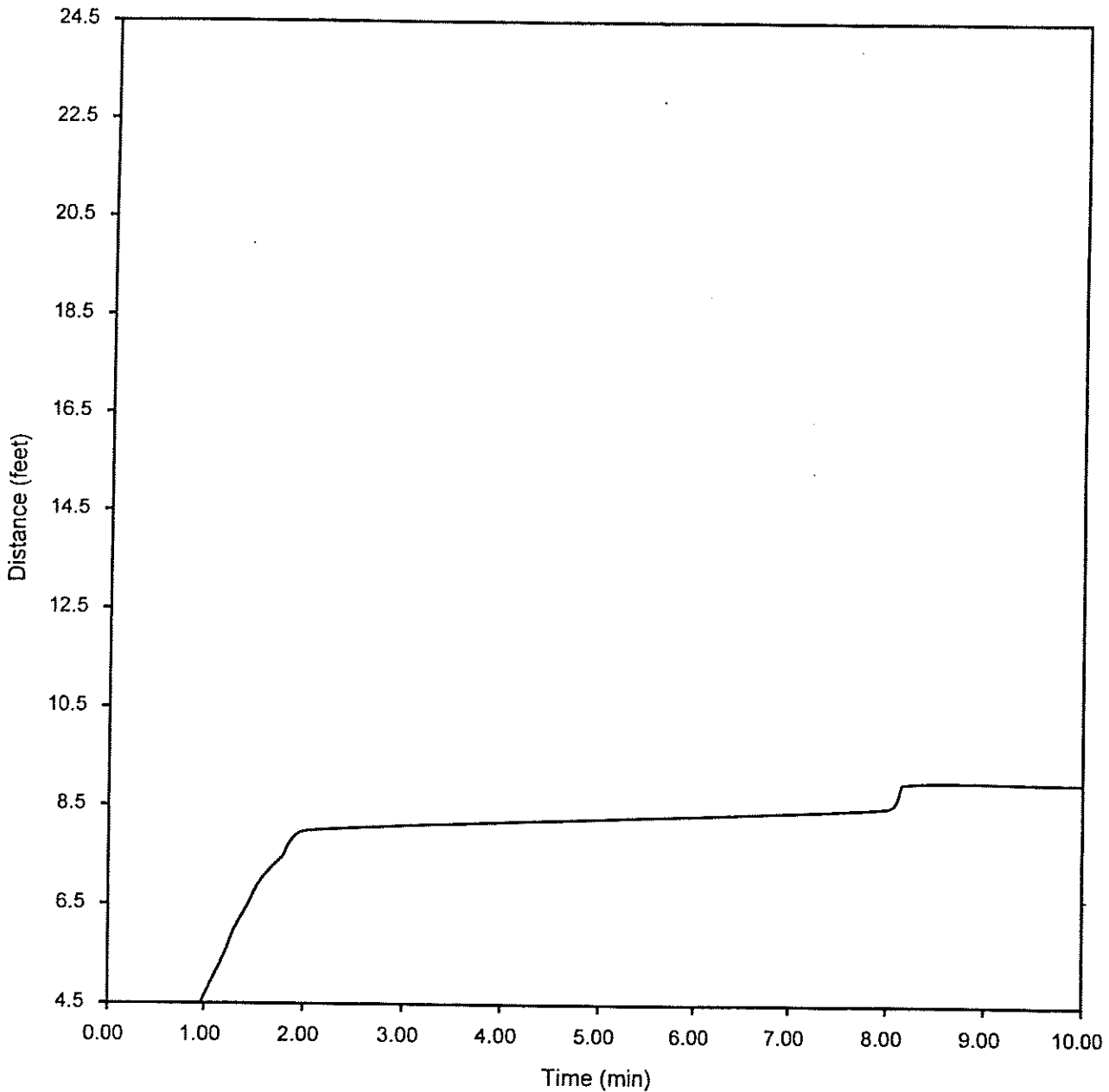
**FLAME SPREAD CURVE**  
**DISTANCE IN FEET VS. TIME IN MINUTES**  
**RUN 2 - CAN/ULC S102.2-M88**

**PVC Encompassed Wall System S102.2, run 2, Flamespread=21,  
Smoke Developed=194**



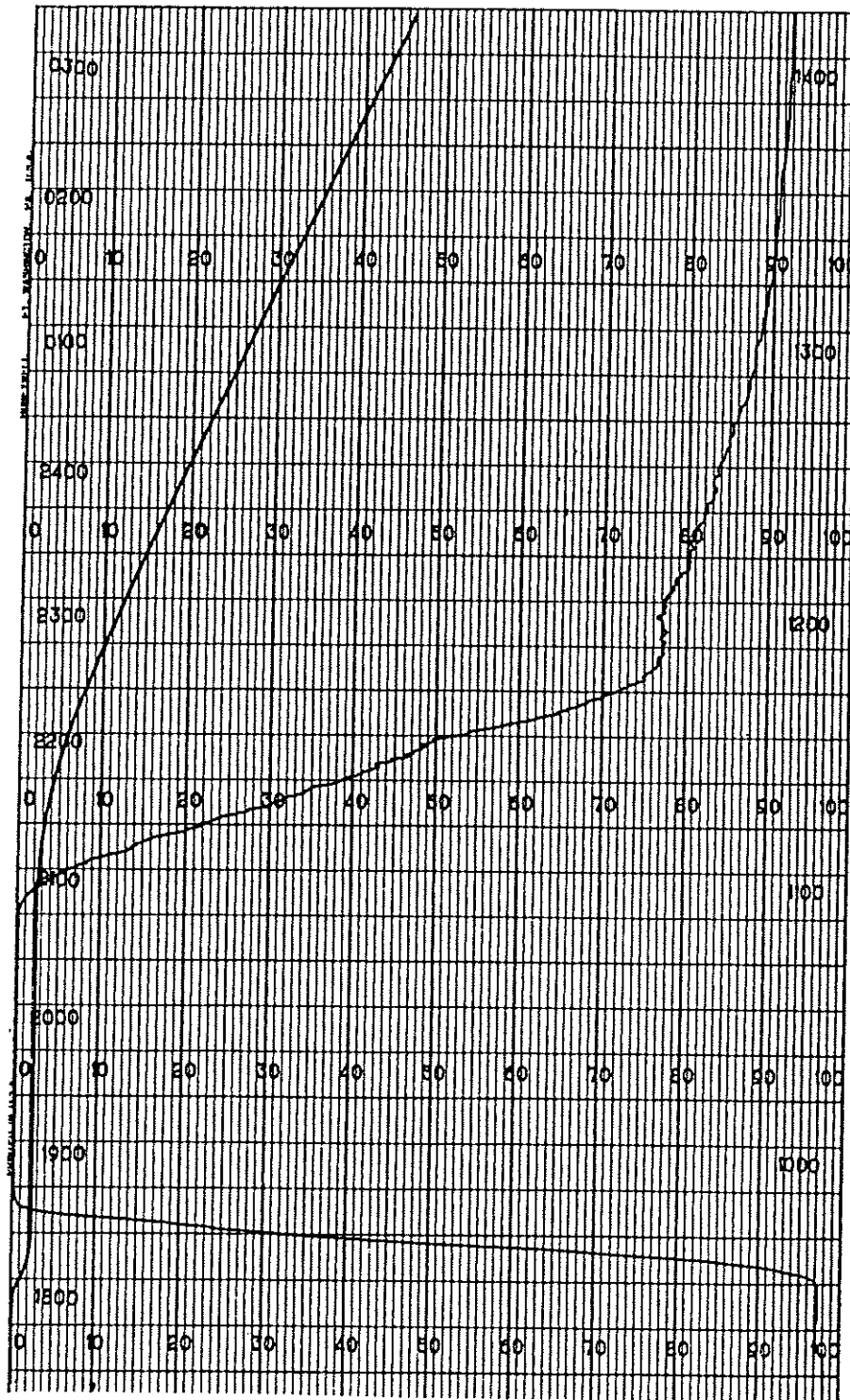
**FLAME SPREAD CURVE  
DISTANCE IN FEET VS. TIME IN MINUTES  
RUN 3 - CAN/ULC S102.2-M88**

**PVC Encompassed Wall System S102.2, run 3, Flamespread=19,  
Smoke Developed=172**



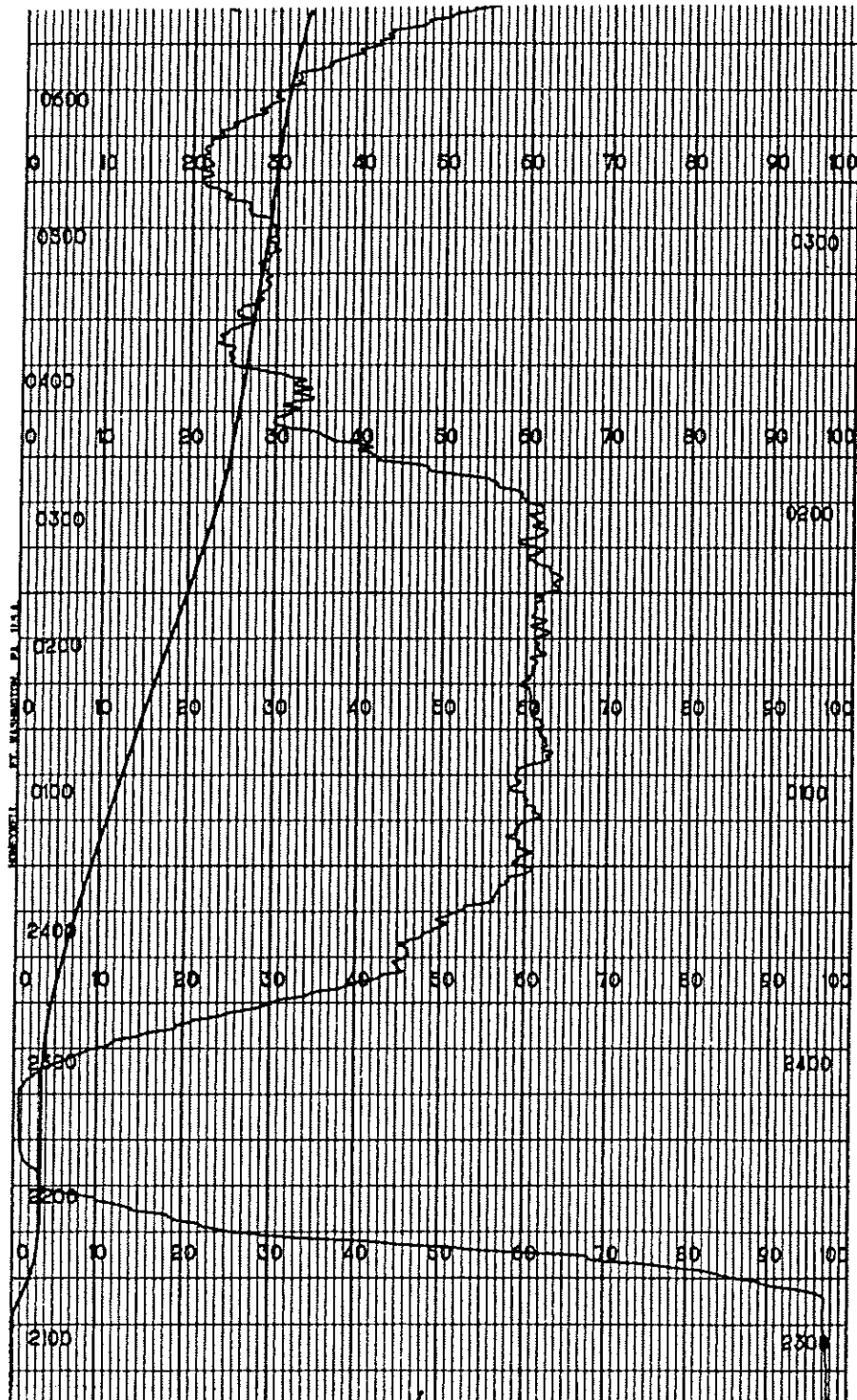
**SMOKE DEVELOPED CURVE**

**RUN 1 - ASTM E84-98**



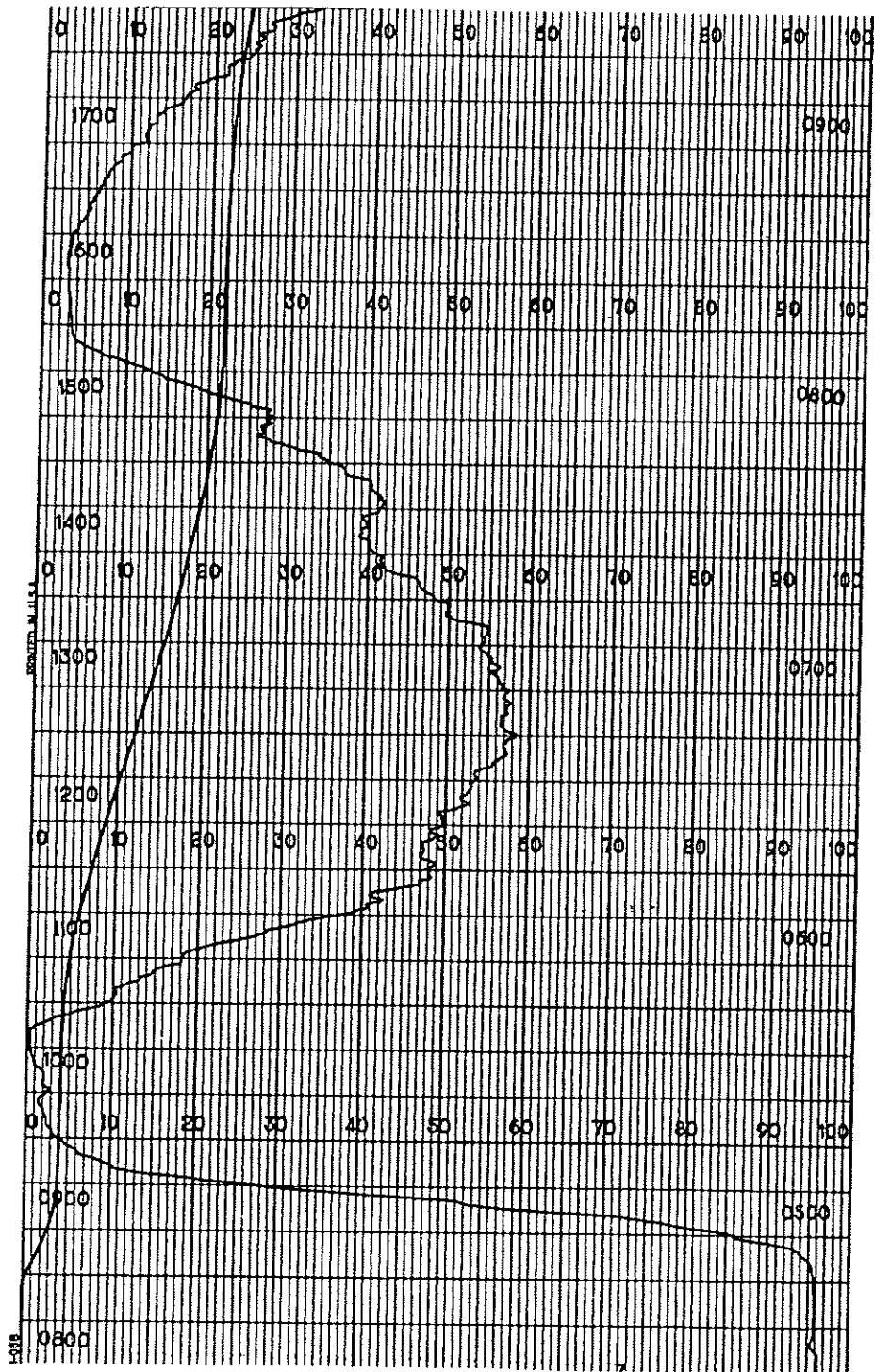
SMOKE DEVELOPED CURVE

RUN 1 - CAN/ULC S102.2-M88



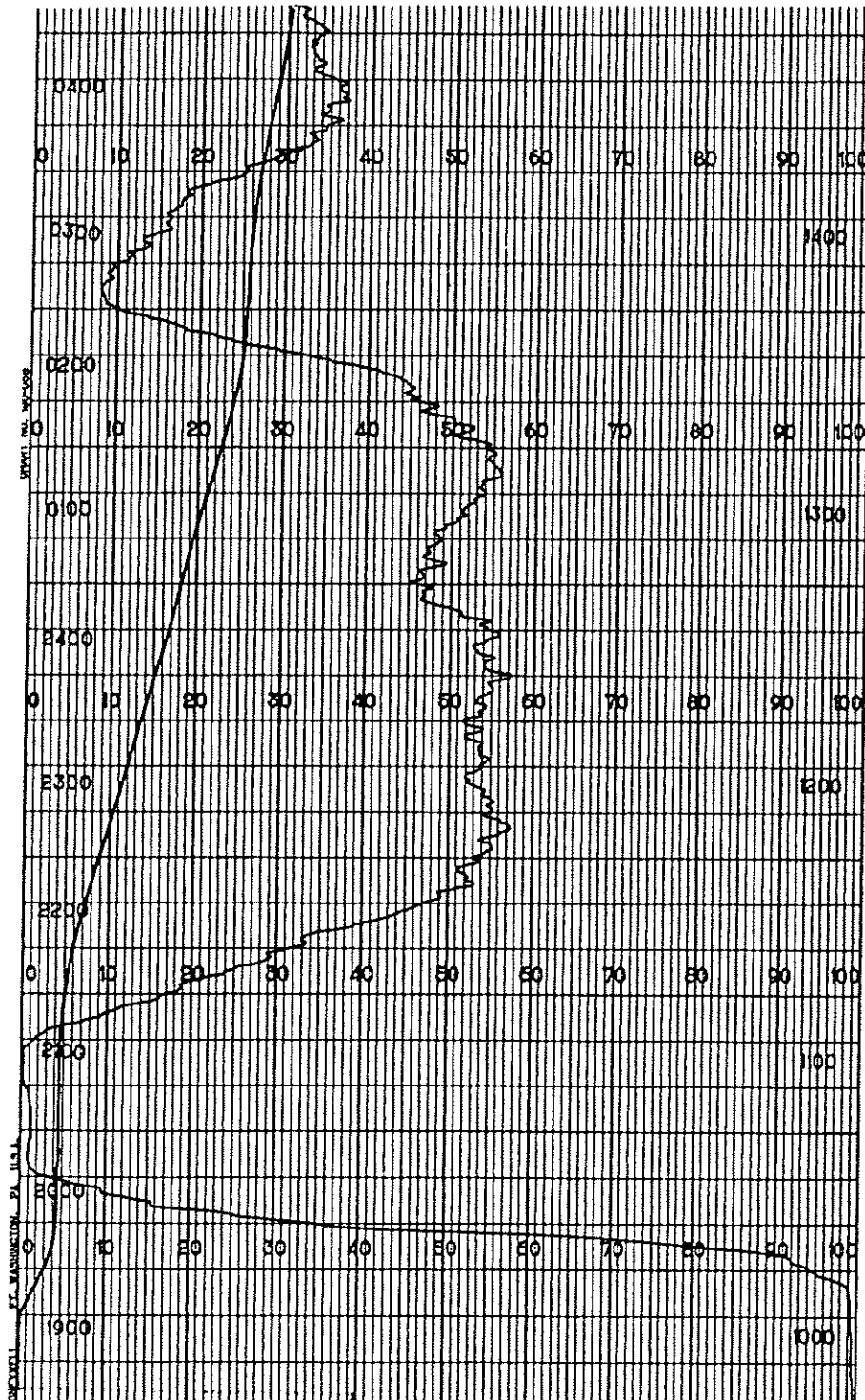
**SMOKE DEVELOPED CURVE**

**RUN 2 - CAN/ULC S102.2-M88**



**SMOKE DEVELOPED CURVE**

**RUN 3 - CAN/ULC S102.2-M88**



**CONCLUSIONS**

The sample of extruded PVC concrete wall system submitted by Octaform Pacific Inc. exhibited the following flame spread characteristics, when tested in accordance with ASTM E84-98 and CAN/ULC S102.2-M88; *Standard for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.*


ASTM E84-98

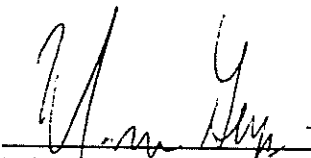
Material	Flame Spread Classification	Smoke Developed Classification
Extruded PVC Concrete Wall Forming System	35	120

CAN/ULC S102.2-M88

Material	Flame Spread Classification	Smoke Developed Classification
Extruded PVC Concrete Wall Forming System	20	175

**INTERTEK TESTING SERVICES NA LTD.**  
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