ITS Intertek Testing Services
ETL SEMKO

REPORT OF A

PILOT SCALE FIRE TEST PROGRAM

CONDUCTED ON

VINYL ENCOMPASSED CONCRETE WALL SYSTEM

CLIENT

OCTAFORM SYSTEMS INC.
SUTIE 520 - 885 DUNSMUIR STREET
VANCOUVER, B.C.
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REPORTED BY

INTERTEK TESTING SERVICES NA LTD.
WARNOCK HERSEY
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PREFACE

This report describes the tests, standards, and details of the test specimens as installed for this program.

This product has met the performance requirements to be eligible for an ITS/Warnock Hersey Certification Program. The report does not imply product certification. Products must bear WHI labels in order to demonstrate ITS/Warnock Hersey Certification.

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INTRODUCTION

On March 2, 2000, Intertek Testing Services NA Ltd./Warnock Hersey conducted a pilot scale fire endurance and hose stream tests on a vinyl encompassed concrete wall system to determine eligibility for a 2 Hour fire resistance rating. Testing was conducted in accordance with UBC 7-1, ASTM E119-98, NFPA 251, and CAN/ULC S101-M89, *Standard Test Methods for Fire Tests of Building Construction and Materials*.

The objective of the test was to determine if the interconnecting PVC webs would melt out and cause a localized burn-through and hence jeopardize the 2 Hour rating of the concrete wall.

PRE-TEST INSPECTION

A pre-test inspection was conducted on December 6, 1999 by John O'Donnell representing ITS/Warnock Hersey at Celco Plastics Ltd., 7680 Anvil Way, Surrey, B.C. The details of that inspection are on file at ITS/Warnock Hersey and will be used to form the basis for our follow-up factory inspection program.

PRODUCT DESCRIPTION

The Octaform Systems Inc. "vinyl encompassed wall system" consists of interlocking face sheets and transverse connecting webs that assemble to provide a concrete wall forming system. Figure I shows the configuration of the interconnecting webs. A web is located every 3 in. of wall length. The webs are manufactured in differing widths to accommodate various wall thickness. The sample tested provided a 4 in. wall thickness.

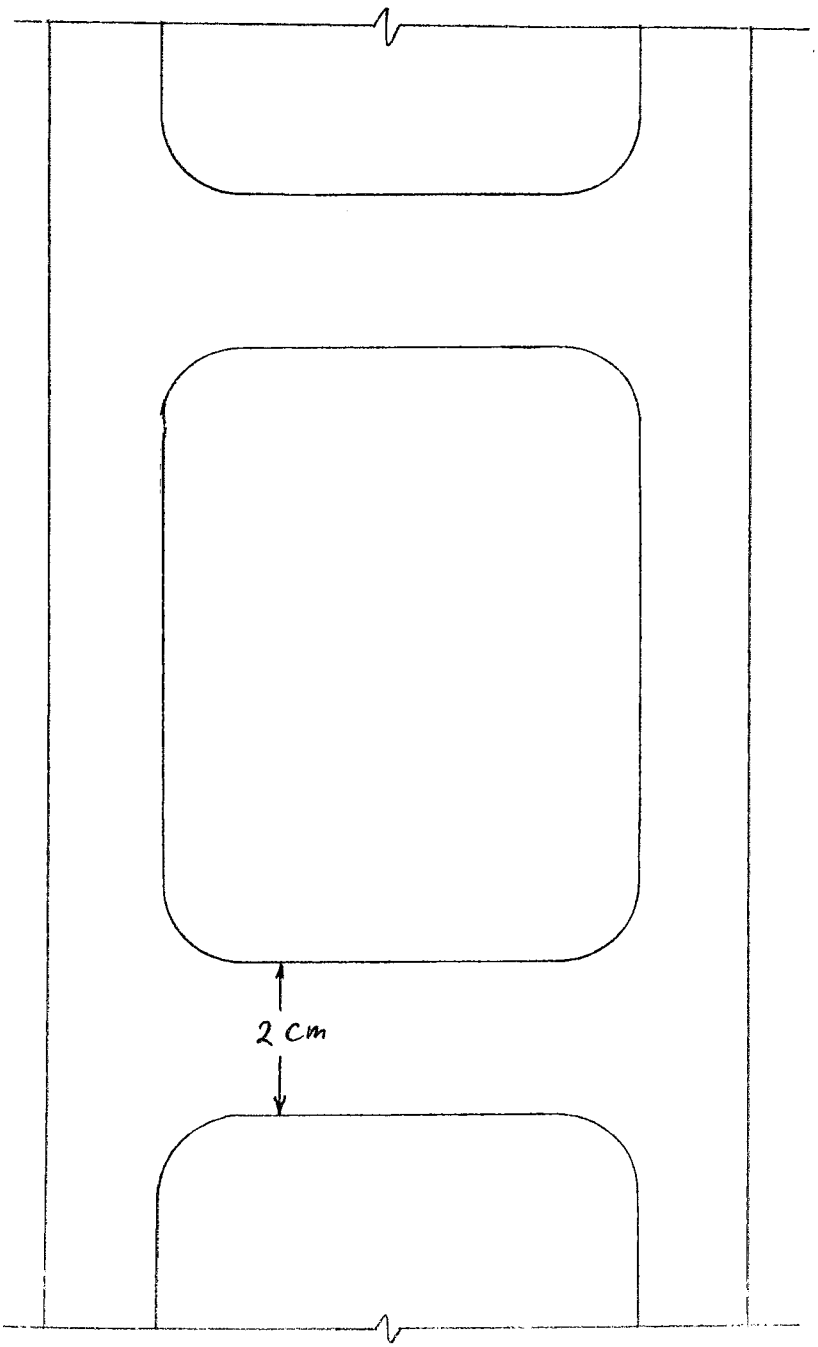
TEST INSTALLATION

The Octaform Systems Inc. PVC components were assembled to construct a form for a wall measuring 6 ft. in width by 5 ft. in height by 4 in. in thickness. A small aggregate, high slump, 3000 psi concrete mix was poured into the form and allowed to cure for 28 days. At that point the wall assembly was moved indoors, into the laboratory.

The PVC face on one side (the fire exposed side) was cut away to allow moisture evaporation from the concrete. Additionally, heat lamps were set up to keep the wall warm to further facilitate drying. These steps were necessary to dry the concrete to prevent the possibility of spalling during fire exposure.

After one month of drying, the wall was mounted to our pilot scale fire test furnace. Five, 24 gauge, Type K thermocouples were mounted to the unexposed surface of the wall; one in the centre of the wall and one in the centre of each of the four quarters. These thermocouples were covered with 6 in. by 6 in. insulating pads, as required by the test standards.

FIGURE I
INTERCONNECTING PVC WEB COMPONENT



Material Thickness:
1.28 mm
0.050 in.

Component for 4 in. wall thickness shown

Scale: Actual Size

THE FIRE TEST

The test wall assembly was secured to the furnace. The pilot burners were ignited and burned until the temperature inside the furnace reached 20 ± 2°C (70 ± 3°F).

All burners were fired and timing was begun immediately upon achieving maximum high fire.

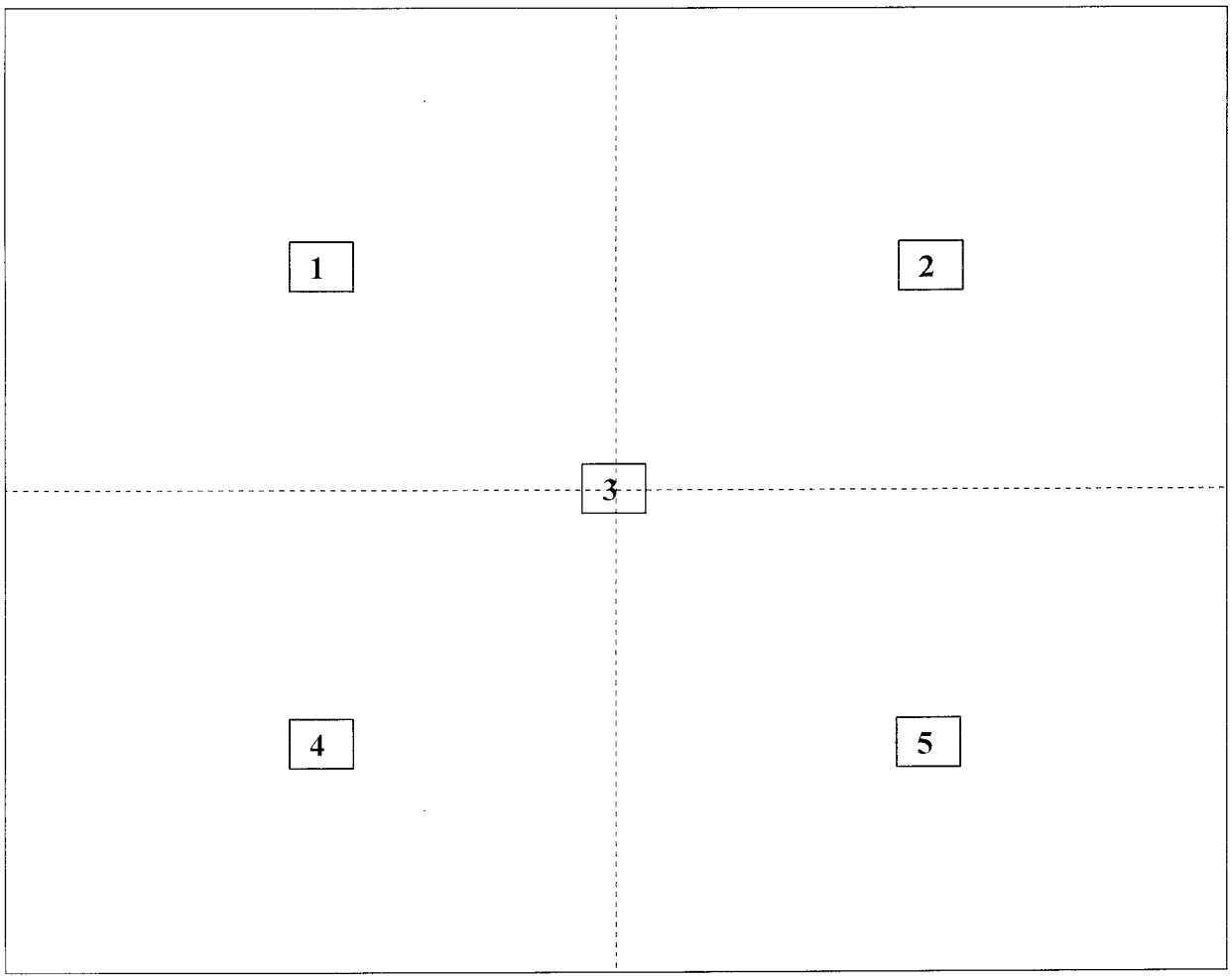
Observations were made throughout the fire exposure period.

The temperatures inside the furnace are monitored by six 7/8 in. diameter inconel sheathed thermocouples. These readings were automatically recorded using a calibrated Fluke "Hydra data bucket" data recorder and were plotted approximately once every 15 seconds.

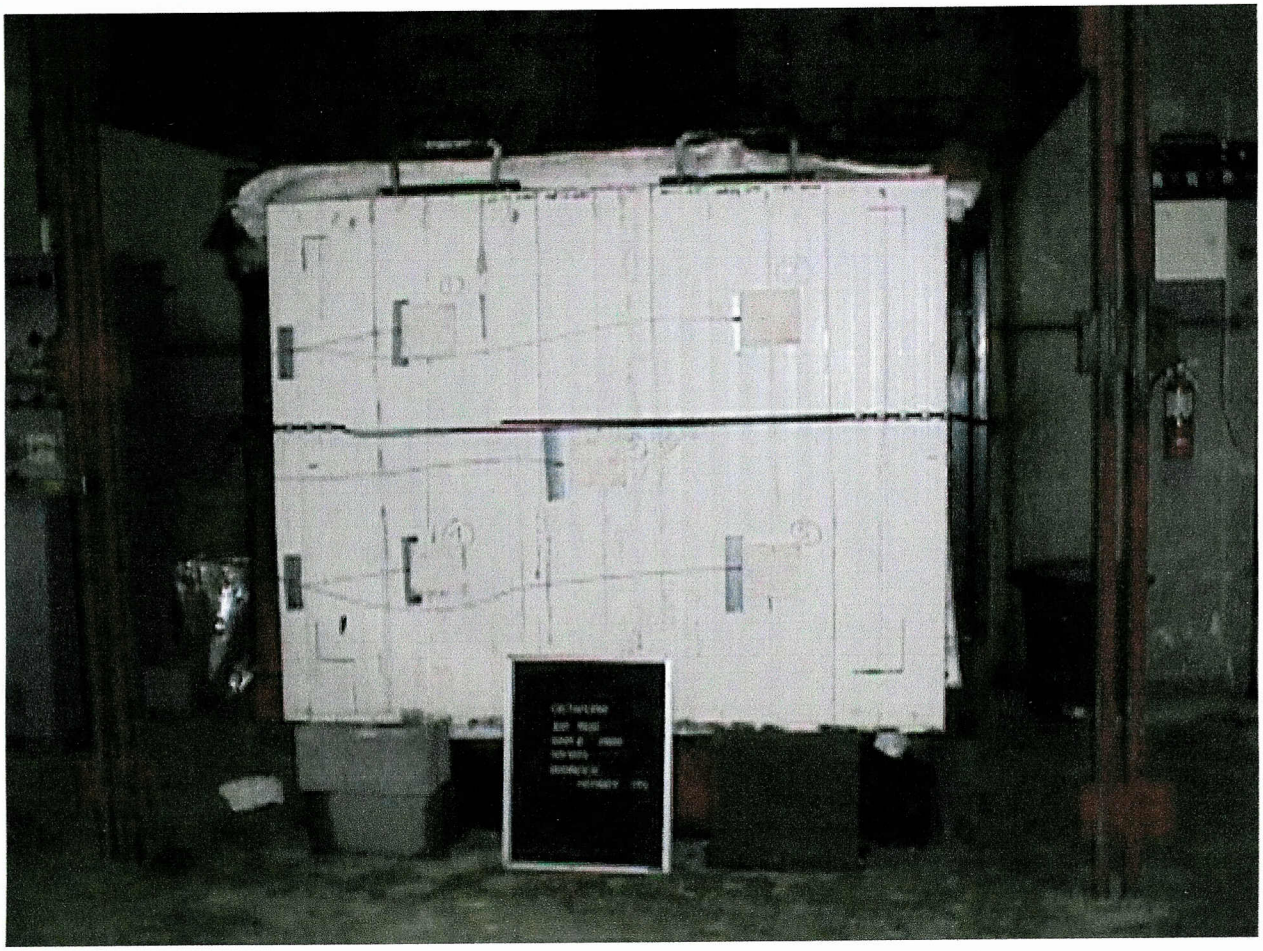
Unexposed surface thermocouples were connected to a second calibrated Fluke "Hydra data bucket" automatic data recorder, programmed to take readings every 15 seconds.

The furnace pressure was neutral at the top of the wall throughout the fire test period.

FIGURE II
UNEXPOSED THERMOCOUPLE LOCATIONS



PHOTOGRAPH



Unexposed Side Prior to Fire Test

FIRE TEST OBSERVATIONS

TIME	EXPOSED SIDE	UNEXPOSED SIDE
1:00	The vinyl is gassing off and charring.	
3:00	The vinyl is fully consumed in flames.	
6:30	The vinyl has flamed away completely.	
8:00		No change.
18:00		Moisture is dripping out of the slab.
30:00		There is a slight deflection of the slab at the centre. 1/2 in. - 3/4 in.
36:00		Steam pockets are forming under the vinyl skin, mostly at the centre.
45:20	No spalling has occurred.	Steam is venting out at the bottom centre of the slab.
60:00	No cracking or spalling has occurred.	Moisture is continuing to drip out.
90:00		1-1/2 in. deflection now (bowing inwards).
95:00		Steam is continuing to vent.
105:00		Very little steam or moisture is venting out now.
116:00		2 in. deflection at the centre. No burn through.
120:00	No change. Test discontinued.	No change.

FIGURE III – TIME TEMPERATURE CURVE
AVERAGE TEMPERATURE OF FURNACE DURING THE FIRE TEST

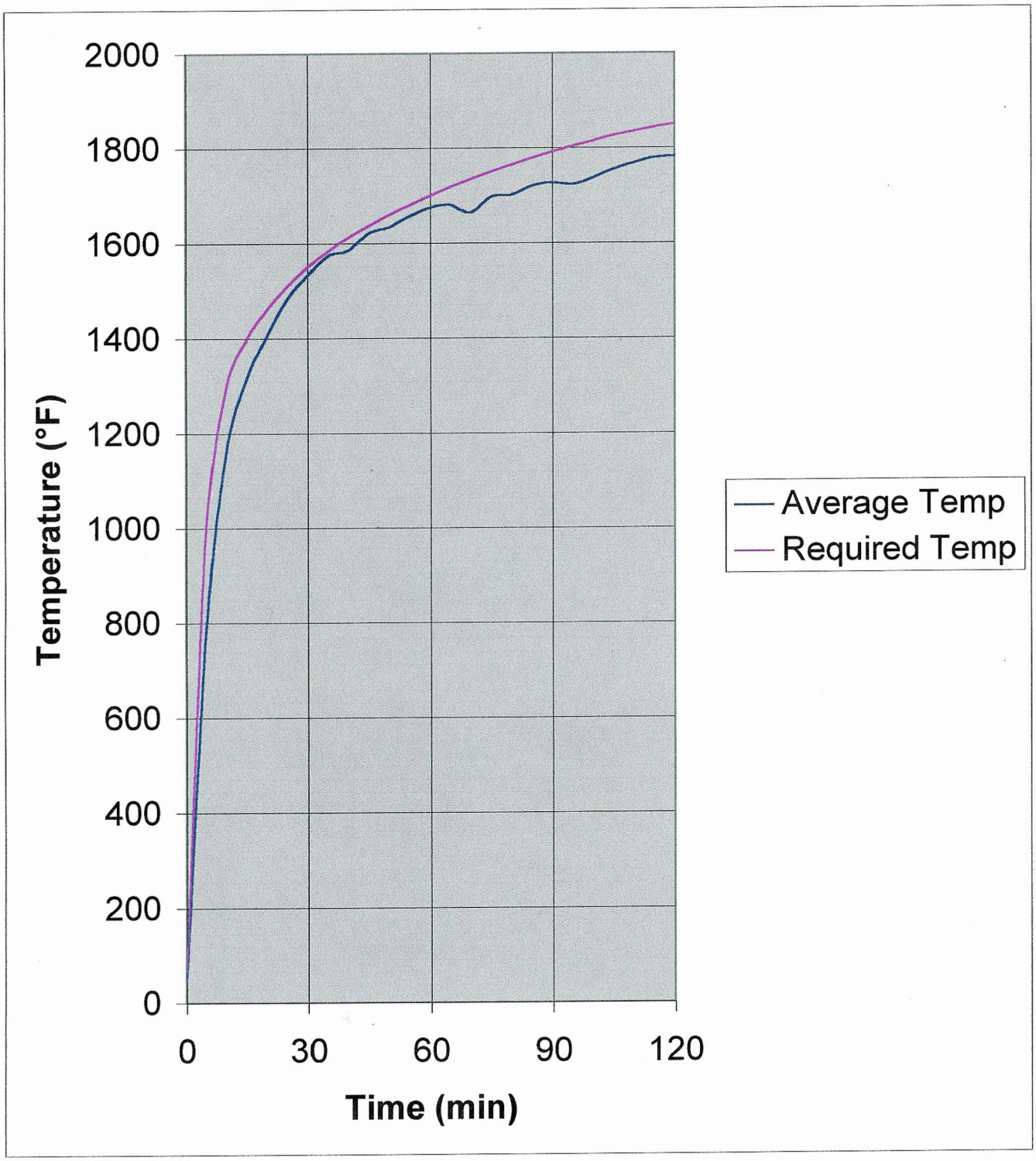
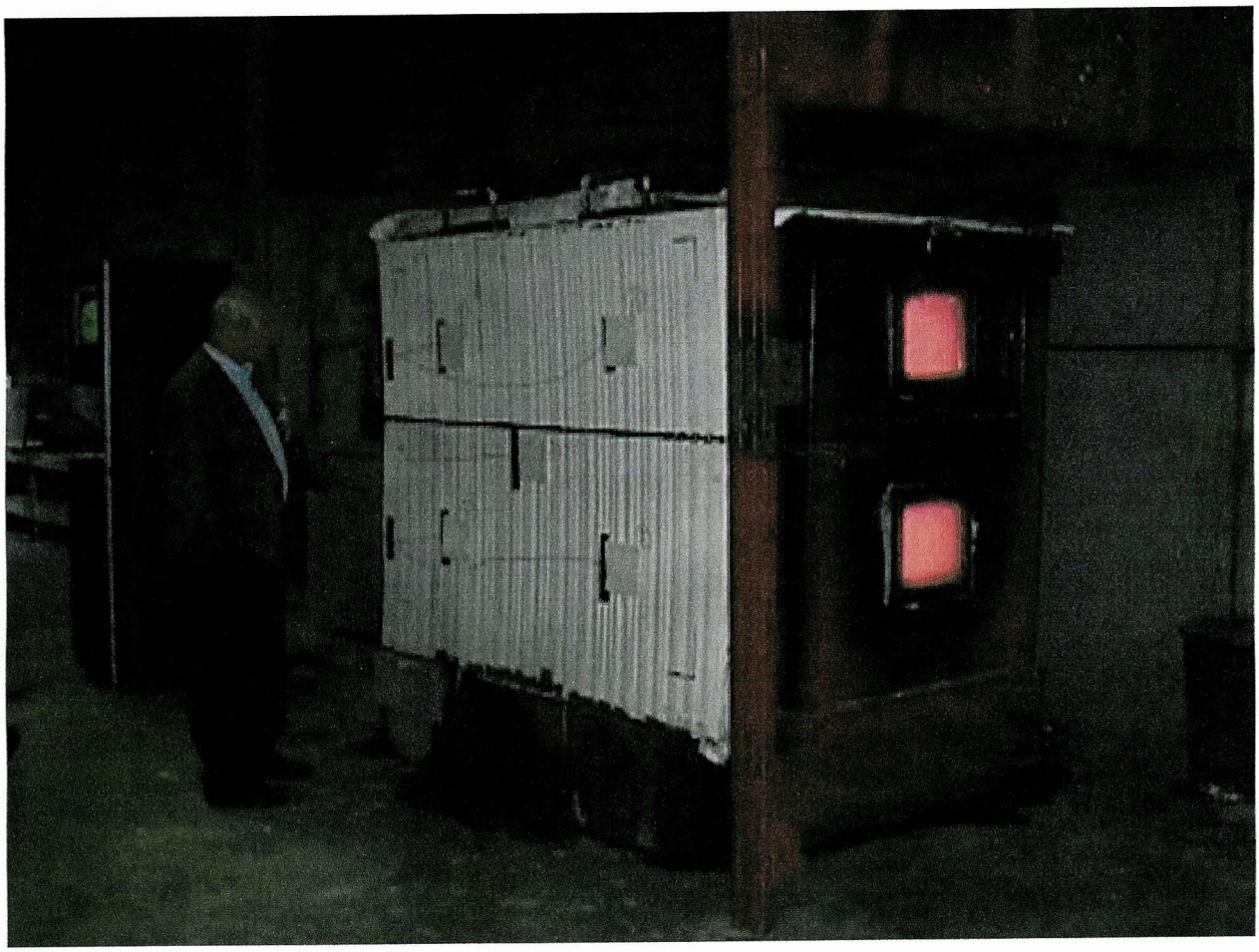


TABLE I
UNEXPOSED SURFACE TEMPERATURES (°C)

TIME (min.)	THERMOCOUPLE NUMBER					
	1	2	3	4	5	Average
Initial	10	10	10	10	10	10
15 min.	11	11	11	11	11	11
30 min.	27	30	32	27	42	26
45 min.	51	67	79	62	82	68
60 min.	50	93	88	85	86	80
75 min.	83	95	89	85	91	89
90 min.	89	102	95	96	96	96
105 min.	109	118	127	112	124	118
110 min.	123	125	139	122	135	129
115 min.	132	132	150	130	145	138
116 min.	134	133	152	132	147	140
117 min.	136	135	154	134	149	142
118 min.	138	137	156	135	151	143
119 min.	140	139	158	137	153	145
120 min.	142	141	161	138	155	147

Maximum Individual Temperature rise above initial (10°C) temperature – 151°C
Maximum Average Temperature rise above initial (10°C) temperature – 137°C

PHOTOGRAPH



Unexposed Side During Fire Test

THE HOSE STREAM

Immediately following the fire endurance test, the test wall assembly was uncoupled from the furnace and was positioned for a standard hose stream test on the fire exposed face.

In accordance with the test standards, the fire assembly was subjected to the impact, erosion and cooling effects of the hose stream.

The hose stream was delivered through a 2-1/2 in. hose discharging through a National Standard Playpipe of corresponding size equipped with a 1-1/8 in. discharge tip of the standard-taper smooth bore pattern without shoulder at the orifice.

The hose stream was applied for a period of 162 seconds per 10 m^2 of exposed area. The hose stream was directed first at the middle of the wall assembly and then at all parts of the exposed surface, changing direction slowly.

HOSE STREAM OBSERVATIONS

The test assembly met the conditions of acceptance of all standards throughout the hose stream test. No through openings were developed, the unexposed surface showed no change.

PHOTOGRAPH

Exposed Side After Fire and Hose Stream Tests

CONCLUSIONS

The Octaform Systems Inc. vinyl encompassed concrete wall system met the requirements of the test standards UBC 7-1, ASTM E119-98, NFPA 251, and CAN/ULC S101-M89, *Standard Test Methods for Fire Tests of Building Construction and Materials*, when tested on a pilot scale basis for a 2 Hour rating.

The PVC connecting components did not cause a burn-through or breach of the 4 in. concrete wall and the unexposed surface temperatures did not exceed the limits specified in the standards.

INTERTEK TESTING SERVICES NA LTD.
Warnock Hersey

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