



Report For: AD Fire Protection Systems
420 Tapscott Road, Unit #5,
SCARBOROUGH, Ontario
M1B 1Y4

Phone: (416) 292-2361

Fax: (416) 298-5887

Attention: Stevo Miljatovich

Specimen: Cementitious Coating

Laboratory #: 366888B-04

Report Date: September 16th, 2004

Received Date: August 13th, 2004

Customer P.O.#: 7688

TEST REPORT

RE: TESTING OF CEMENTITIOUS COATING FOR DENSITY

On August 13th, 2004, CMTL received one (1) set of samples of cementitious coating for determination of density.

The submitted samples were identified as:

Sample #1 - Cementitious Coating

The samples were tested for density (ASTM E605-93 (1996)) in accordance with applicable ASTM standards.

The results of testing are attached hereto.

Page 1 of 2

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Cambridge Materials Testing Limited

Per Andrew Brown QUALITY ASSURANCE

Per Joseph Hill TECHNICIAN



RESULTS OF TESTING

ASTM E605-93: Thickness and Density of 'A/D Type 7HD' Applied to Structural Members

The density of the cementitious coating was determined in accordance with ASTM E605-93, Sections 8.2 and 8.3.

Sample #1 – Cementitious Coating (2 Replicates)

Section 8.2 - Density		Replicate #1	Replicate #2	Average
Weight of Dried Material	(lbs)	0.383	0.396	0.390
Length of Sample	(ft)	0.313	0.343	0.328
Width of Sample	(ft)	0.385	0.386	0.386
Average Thickness of Sample	(ft)	0.080	0.080	0.080
Density of Cementitious Material	(lbs/ft ³)	39.73	37.38	38.56

Sample #1 – Cementitious Coating (2 Replicates)

Section 8.3 - Density by Displacement		Replicate #1	Replicate #2	Average
Weight of Dried Material	(g)	174	179	177
Volume of Sample Dried	(cm ³)	253	244	249
Density of Cementitious Material	(lbs/ft ³)	42.93	45.79	44.36

AD FIRE PROTECTION SYSTEMS

SOUTHWEST FIREPROOFING PRODUCTS

May 1, 2005

Re: ASTM E 136: Combustibility Testing

7 GP vs. 7 HD:

We herewith certify that the attached test for ASTM E 136 listed for 7 GP is also valid for 7 HD.

7 HD is simply a higher density 7 GP cementitious material.

Contact the undersigned should any questions arise regarding this test report.

Very truly yours,



Frank Neuwirth, Div. Mgr.
Southwest Products Group



REPORT
INTERTEK TESTING SERVICES

3933 US ROUTE 11

CORTLAND, NEW YORK 13045

Order No. J99003738

Date: February 12, 1999

Report No.: J99003738

Rendered To:

A D Fire Protection Systems Inc.
320 Tapscott Road, Unit 5
Scarborough, Ontario M1B 1Y4

STANDARD USED: ASTM E136-92**TEST:** Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C**AUTHORIZATION OF TEST:** The test was authorized by Mr. Horace Fletcher of Intertek Testing Services, Mississauga, Ontario, representing the client A D Fire Protection Systems Inc., ITS - Mississauga Purchase Order No. 15518.**DATE OF TEST:** February 8, 1999**SPECIMEN DESCRIPTION:** The test was performed on specimens identified by the client as Southwest Vermiculite Inc. Type 7GP and Southwest Vermiculite Inc. Type 1XR.

An independent organization testing for safety, performance, and certification.

All services undertaken subject to the following general policy: Reports are submitted for exclusive use of the clients to whom they are addressed. Their significance is subject to the adequacy and representative character of the samples and to the comprehensiveness of the tests, examinations or surveys made. No quotations from reports or use of ITS's name is permitted except as expressly authorized by ITS in writing.

INTRODUCTION

This report describes the results of the ASTM E136-82 Standard Test Method for Behavior of Materials In a Vertical Tube Furnace at 750°C, performed on specimens, previously described, submitted by A D Fire Protection Systems Inc.. The specimens were prepared and test evaluations were conducted at Intertek Testing Services, Cortland, NY.

TEST OBJECTIVE AND PROCEDURE

The method covers the performance of elementary building materials when exposed to 1382°F (750°C), to indicate those materials which do not act to aid combustion or add appreciable heat to an ambient fire. It is not intended to apply to laminated or coated materials. It should be used to measure and describe the properties of materials, products or systems in response to heat and flame under controlled laboratory conditions and should not be used for the description or appraisal of the fire hazards of materials, products or systems under actual fire conditions.

Each Specimen (minimum of four) is exposed to a temperature of $1382 \pm 10^\circ\text{F}$ ($750 \pm 5.5^\circ\text{C}$) in the center of an air stream in a furnace tube at an air velocity of 10 ft/minute (3 m/minute) for a 15-minute period. The surface and internal temperature of the specimen was measured. The weight loss is also determined.

TEST REQUIREMENTS

To be reported as passing this test, the following criteria must be met:

1. Specimen interior and surface temperatures do not increase more than 54°F (30°C) above the initial furnace temperature;
2. No flaming from the specimen after 30 seconds;
3. Average specimen weight loss less than 50 percent.

RESULTS:

**ASTM E136
BEHAVIOR OF MATERIALS IN A VERTICAL TUBE FURNACE AT 750°C**

Client: A D Fire Protection Systems Inc.
 Order No.: J99003738
 Test No.: 1
 Damage (yes/no): No

Date Received: Feb. 4, 1999
 Date Completed: Feb. 8, 1999
 Engineer: JB Clasby
 Technician: JB Clasby

SPECIMEN DESCRIPTION: Southwest Vermiculite Inc. Type 7GP

Specimen Length (in): 2

Wdth (in): 1.5

Thickness (in): 1.5

RESULTS:

EQUILIBRIUM FURNACE TEMP. PRIOR TO TESTING = 750.9 °C

THERMOCOUPLE #1 IS LOCATED IN THE CENTER OF THE TEST SPECIMEN
 THERMOCOUPLE #2 IS LOCATED ON THE SURFACE OF THE TEST SPECIMEN
 THERMOCOUPLE #3 IS THE AIR TEMP. INSIDE THE FURNACE DURING THE TEST

SPECIMEN NUMBER

	A1	A2	A3	A4
INITIAL WEIGHT (g)	25.20	25.39	25.41	25.16
FINAL WEIGHT (g)	21.31	21.51	21.51	21.38
TIME TO FLAMING (min:sec)	-	-	-	-
FLAME OUT (min:sec)	-	-	-	-
MAX. TEMP. THERMOCOUPLE #1 (°C)	666.1	682.8	686.1	682.2
MAX. TEMP. THERMOCOUPLE #2 (°C)	690.8	719.8	727.0	722.7
TEMP. RISE ABOVE INITIAL FURNACE TEMP. #1 (°C)	N/A	N/A	N/A	N/A
TEMP. RISE ABOVE INITIAL FURNACE TEMP. #2 (°C)	N/A	N/A	N/A	N/A
PASS/FAIL	PASS	PASS	PASS	PASS

Calibration summary:

Equipment used
 DATALOGGER
 RULER
 SCALE

Control Number
 T503
 N057
 S117-0698

Calibration Due
 3/16/99
 12/21/99
 6/10/99

**ASTM E136
BEHAVIOR OF MATERIALS IN A VERTICAL TUBE FURNACE AT 750°C**

Client: A D Fire Protection Systems Inc.
Order No.: J99003738
Test No.: 2
Damage (yes/no): No

Date Received: _____
Date Completed: Feb. 8, 1999
Engineer: JB Clasby
Technician: JB Clasby

SPECIMEN DESCRIPTION: Southwest Vermiculite Inc. Type 1XR

Specimen Length (in): 2 Wdth (in): 1.5 Thickness (in): 1.5

RESULTS:

EQUILIBRIUM FURNACE TEMP. PRIOR TO TESTING = 746.8 °C

THERMOCOUPLE #1 IS LOCATED ON THE SURFACE OF THE TEST SPECIMEN
THERMOCOUPLE #2 IS LOCATED IN THE CENTER OF THE TEST SPECIMEN
THERMOCOUPLE #3 IS THE AIR TEMP. INSIDE THE FURNACE DURING THE TEST

SPECIMEN NUMBER

	A1	A2	A3	A4
INITIAL WEIGHT (g)	35.63	34.91	35.18	35.03
FINAL WEIGHT (g)	30.61	29.79	30.01	29.98
TIME TO FLAMING (min:sec)	-	-	-	-
FLAME OUT (min:sec)	-	-	-	-
MAX. TEMP. THERMOCOUPLE #1 (°C)	699.3	697.4	700.1	706.9
MAX. TEMP. THERMOCOUPLE #2 (°C)	683.4	685.2	689.7	683.7
TEMP. RISE ABOVE INITIAL FURNACE TEMP. #1 (°C)	N/A	N/A	N/A	N/A
TEMP. RISE ABOVE INITIAL FURNACE TEMP. #2 (°C)	N/A	N/A	N/A	N/A
PASS/FAIL	PASS	PASS	PASS	PASS

Calibration summary:


<u>Equipment used</u>	<u>Control Number</u>	<u>Calibration Due</u>
DATALOGGER	T503	3/16/99
RULER	N057	12/21/99
SCALE	S117-0698	6/10/99

CONCLUSION

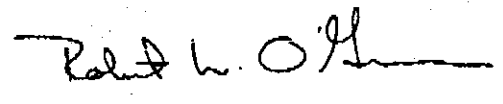
The Southwest Vermiculite Inc. Type 7GP and Type 1XR, previously described, submitted by A D Fire Protection Systems Inc., was evaluated in accordance with ASTM E136-82 Standard Test Method for Behavior of Materials In a Vertical Tube Furnace at 750°C on February 8, 1999.

The specimen was judged to be in compliance with the applicable standard.

Reviewed by:


J Brian Clasby
Project Engineer
Performance Division

Approved by:


Robert W. O'Gorman
Operations Manager
Performance Division

ha



Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5, SCARBOROUGH, Ontario M1B 1Y4	Laboratory #:	375838C-04
	Phone: (416) 292-2361 Fax: (416) 298-5887	Report Date:	December 6 th , 2004
Attention:	Stevo Miljatovich	Received Date:	November 29 th , 2004
Specimen:	A/D Type 7HD "A"	Customer P.O.#:	7688

TEST REPORT

RE: TESTING OF A/D TYPE 7HD "A" FOR COMPRESSIVE PROPERTIES

On November 29th, 2004, CMTL received one (1) sample of A/D Type 7HD for determination of compressive properties.

The submitted samples were identified as:

Sample #1 - A/D Type 7HD "A"

The sample was tested for compressive properties (ASTM E761-92) in accordance with applicable ASTM standards.

The results of testing are attached hereto.

Page 1 of 2

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Cambridge Materials Testing Limited

Per Steve Brown QUALITY ASSURANCE
Per Joseph Child TECHNICIAN



RESULTS OF TESTING

ASTM E761-92: Compressive Strength of A/D Type 7HD Applied to Structural Members

The panel was conditioned for a minimum of 72 hours at 23±2°C and 50±5% prior to testing.

Sample #1 – A/D Type 7HD "A" (2 Replicates)

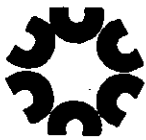
		Replicate #1	Replicate #2	Average
Thickness	(inches)	0.754	0.756	0.755
Compressive Strength	(lbs/in ²)	464	469	467
Load @ 10% Deformation	(lbs)	1,392	1,405	1,399
Mode of Failure		None	None	None

REMARKS

The compressive strength on Replicate #1 was 464 psi and on Replicate #2 was 469 psi with a calculated average of 467 psi.

The load @ 10% deformation on Replicate #1 was 1,392 lbs and on Replicate #2 was 1,405 lbs with a calculated average of 1,399 lbs.

There was no mode of failure for the A/D Type 7 HD samples.



Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5, SCARBOROUGH, Ontario M1B 1Y4	Laboratory #:	375838A-04
	Phone: (416) 292-2361 Fax: (416) 298-5887	Report Date:	December 3 rd , 2004
Attention:	Stevo Milijatovich	Received Date:	November 29 th , 2004
Specimen:	A/D Type 7HD "A"	Customer P.O.#:	7688

TEST REPORT

RE: TESTING OF A/D TYPE 7HD "A" FOR COHESION / ADHESION

On November 29th, 2004, CMTL received one (1) sample of A/D Type 7HD applied to a metal substrate for determination of cohesion / adhesion properties.

The submitted sample was identified as:

Sample #1 - A/D Type 7HD "A"

The sample was tested for cohesive / adhesive strength (ASTM E736-92) in accordance with applicable ASTM standards.

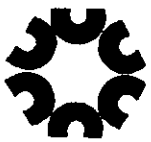
The results of testing are attached hereto.

Page 1 of 2

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Cambridge Materials Testing Limited

Per *Stevo Milijatovich* QUALITY ASSURANCE
Per *David Child* TECHNICIAN



RESULTS OF TESTING

ASTM E736-92: Cohesion / Adhesion of A/D Type 7HD Applied to Structural Members

The panels were conditioned for a minimum of 24 hours at $23 \pm 2^\circ\text{C}$ and $50 \pm 5\%$ prior to testing.

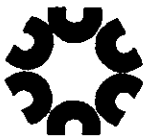
Two (2) two-inch diameter loading fixtures were bonded to the test plate with a two-component rapid curing epoxy adhesive. The coated surfaces were mildly sanded prior to bonding. The coating was not scored around the perimeter of the loading fixtures.

A 2.2-inch diameter opening was inserted over the two (2) loading fixtures and clamped against the test panel and the test machine base. The loading fixture was secured to the crosshead of the testing machine and pulled off at a rate of 5 kg per minute.

To ensure the pull was perpendicular to the adhered surface a long chain and pivot was used.

Sample #1 – A/D Type 7HD "A" Without Scoring (2 Replicates)

	Force (lbs)	Cohesive/Adhesive Force (lbs/ft ²)	Type of Failure
Replicate #1	152	6,974	100% Cohesive
Replicate #2	191	8,749	100% Cohesive
Average	172	7,862	100% Cohesive
Std. Dev.	28	1,255	



Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5, SCARBOROUGH, Ontario M1B 1Y4	Laboratory #:	366888D-04
	Phone: (416) 292-2361 Fax: (416) 298-5887	Report Date:	September 16 th , 2004
Attention:	Stevo Milijatovich	Received Date:	August 13 th , 2004
Specimen:	Cementitious Coating	Customer P.O.#:	7688

TEST REPORT

RE: TESTING OF CEMENTITIOUS COATING FOR AIR EROSION

On August 13th, 2004, CMTL received one (1) set of samples of cementitious coating for determination of air erosion properties.

The submitted samples were identified as:

Sample #1 - Cementitious Coating

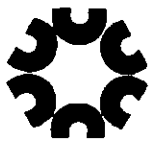
The samples were tested for air erosion (ASTM E859-93) in accordance with applicable ASTM standards.

The results of testing are attached hereto.

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Per And Brown QUALITY ASSURANCE
Per Deeb Hill TECHNICIAN



RESULTS OF TESTING

ASTM E859-93: Air Erosion of 'AD Type 7HD' Applied to Structural Members

The cementitious coatings were applied to two (2) 12 by 12-inch metal plates at an approximate thickness of 3/4 inches.

NOTE: AD Fire Protection Systems supplied the blower and duct system for the air erosion testing.

The metal plates were positioned in the middle of the duct and a 30-denier nylon filter was placed upstream and downstream of the samples prior to running of the blower unit. The opening in the duct was covered with plastic wooden boards and sealed with tape.

The filter downstream from the samples was weighed before and after 1, 6 and 24 hour intervals to determine the percent weight gain of the filters from the cementitious coatings.

Sample #1 – Cementitious Coating (2 Replicates)

		Replicate #1	Replicate #2	Average
Original Weight of Filter	(g)	17.914	17.914	17.914
Weight Gain After 1 Hour	(%)	< 0.001	< 0.001	< 0.001
Weight Gain After 6 Hours	(%)	< 0.001	< 0.001	< 0.001
Weight Gain After 24 Hours	(%)	< 0.001	< 0.001	< 0.001

Deflection Testing of a SFRM

A Report to: A/D Fire Protection Systems Inc.
420 Tapscott Rd., Unit #5
Scarborough, Ontario
M1B 1Y4

Attention: Jason Bergman

Tel: 416-292-2361
Fax: 416-298-5884

Submitted by: Building Performance
Materials Testing

Report No.: 98-J53-M0196-C1 Revision 2
1 Page

Date: 12 January, 1999

INTRODUCTION

A sample of fire protection coating material, identified as **Southwest Vermiculite Inc. 7HD** was submitted by **A/D Fire Protection Systems Inc.** for physical testing. A/D Fire Protection Systems requested the material to be tested to ASTM E759 Test Method for Effect of Deflection of Sprayed Fire-Resistive Material Applied to Structural Members.

SAMPLE IDENTIFICATION

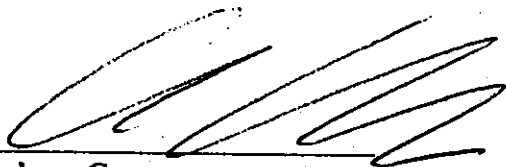
The sample submitted by AD Fire Protection Systems was designated with the **Bodycote** Sample No. 98-J53-M0196-C. The test sample was manufactured and finished by A/D Fire Protection Systems to the required dimensions and / or substrates for the test requested.

TEST PROCEDURES & RESULTS

The testing was performed according to the method of ASTM E759-92 Test Method for Effect of Deflection of Sprayed Fire-Resistive Material Applied to Structural Members. The **Southwest Vermiculite Inc. 7HD** was applied to a steel deck which consisted of a fluted steel roof deck and a steel top sheet. The **7HD** was reported by A/D Fire Protection Systems to be applied to a dried thickness of 19mm.

Instrumentation utilized for this test included Digimatic Indicator MII B02000, Load Cell MII B00355, Conditioner MII 11013, Digital Multimeter.

The specimen required 2.5 kN (419 lbs.) to deflect the centre of the panel 25mm (1 in.). Following deflection of the panel for five minutes, no spalling or cracking of the **Southwest Vermiculite Inc. 7HD** was observed.



Andrew Cameron
Project Technologist
Building Performance



David W. Bailey, P. Eng.
Manager
Building Performance

ACCREDITATION

Canadian General Standards Board #76002, Standards Council of Canada #1 (formerly #101).

REGISTRATION

ISO 9002-1994 registered by QMI, Registration #001109.

Impact Testing of a SFRM

A Report to: A/D Fire Protection Systems Inc.
420 Tapscott Rd., Unit #5
Scarborough, Ontario
M1B 1Y4

Attention: Jason Bergman

Tel: 416-292-2361
Fax: 416-298-5884

Submitted by: Building Performance
Materials Testing

Report No.: 98-J53-M0196-C4 Revision 2
1 Page

Date: 12 January, 1999

INTRODUCTION

A sample of fire protection coating material, identified as **Southwest Vermiculite Inc. 7HD** was submitted by **A/D Fire Protection Systems Inc.** for physical testing. A/D Fire Protection Systems requested the material be tested to ASTM E760 Test Method Standard Test Method for Effect of **Impact** on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members.

SAMPLE IDENTIFICATION

The sample submitted by AD Fire Protection Systems was designated with the **Bodycote** Sample No. 98-J53-M0196-C. The test sample was manufactured and finished by A/D Fire Protection Systems to the required dimensions and / or substrates for the test requested.

TEST PROCEDURES & RESULTS

The testing was performed according to the method of ASTM E760-92 Test Method Standard Test Method for Effect of **Impact** on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members, with the exception that the SFRM material was applied to a decking assembly without 64mm thick concrete. The sample consisted of a corrugated steel deck with a steel top sheet and the **Southwest Vermiculite Inc. Type 7HD**. The **7HD** was reported by A/D Fire Protection Systems to be applied to a dried thickness of 19mm.

The sample utilized for the impact test was previously used for the deflection test, at the request of A/D Fire Protection personnel. Instrumentation utilized for this test included electronic balance MII A07485.

The test specimen cracked (1mm width) the full length of the test sample after the impact with the 27.2 kg bag from a height of 1.2m. No spalling or delaminations of the **Southwest Vermiculite Inc. Type 7HD** were observed after the impact.



Andrew Cameron
Project Technologist
Building Performance



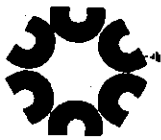
David W. Bailey, P. Eng.
Manager
Building Performance

ACCREDITATION

Canadian General Standards Board #76002, Standards Council of Canada #1 (formerly #101).

REGISTRATION

ISO 9002-1994 registered by QMI, Registration #001109.



Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5, SCARBOROUGH, Ontario M1B 1Y4	Laboratory #:	366888A-04
	Phone: (416) 292-2361 Fax: (416) 298-5887	Report Date:	September 16 th , 2004
Attention:	Stevo Miljatovich	Received Date:	August 13 th , 2004
Specimen:	Cementitious Coating	Customer P.O.#:	7688

TEST REPORT

RE: TESTING OF CEMENTITIOUS COATING FOR DUROMETER HARDNESS

On August 13th, 2004, CMTL received one (1) sample of cementitious coating for determination of durometer hardness.

The submitted sample was identified as:

Sample #1 - Cementitious Coating

The sample was tested for durometer hardness (ASTM D2240-03) in accordance with applicable ASTM standards.

The results of testing are attached hereto.

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Cambridge Materials Testing Limited

Per Steve Brown QUALITY ASSURANCE

Per Joseph Schild TECHNICIAN



RESULTS OF TESTING

ASTM D2240-03: Durometer Hardness, Shore D of 'AD Type 7HD' Applied to Structural Members

	Durometer Hardness <u>Shore D</u>	<u>Average</u>
Sample #1 – Cementitious Coating	47, 36, 45, 37, 44, 37, 39, 41, 36, 45	41

The Type "D" Durometer, Model #307L was manufactured by ITM Instruments, calibrated on February 14th, 2003 and verified prior to measurements on September 3rd, 2004.

NOTE: The hardness results were determined by hand in a "shocking" movement.

**Corrosion Testing of Steel by SFRM
(7HD)**

A Report to: A/D Fire Protection Systems Inc.
420 Tapscott Road
Scarborough, Ontario
M1B 1Y4

Attention: Mr. Jason Bergman

Tel: 416-292-2361
Fax: 416-298-5887

Submitted by: R. W. Elliott
Project Scientist
Metals Technology
Advanced Verification Systems

Report No. 98-J41-M0416b Revision 1
3 Pages

Date: February 2, 1999

INTRODUCTION

Steel panels (bare steel, galvanized steel and steel coated with iron oxide shop coat primer) coated with SFRM (sprayed fire resistive material), Southwest Vermiculite Inc. Type 7HD, were tested generally according to the method of ASTM E 937, "Standard Test Method for Corrosion of Steel by Fire-Resistive Material (SFRM) Applied to Structural Members" for A/D Fire Protection Systems Inc..

SPECIFICATIONS OF ORDER

This work was authorized by work order number 57297 issued by Bodycote Building Performance Centre.

INVESTIGATION AND RESULTS

Four panels of each material measuring approximately 8 inches square were received for preparation. The three materials were specified to be A36 steel, G60 galvanized steel and A36 steel coated with iron oxide shop primer. The panels of each material were code stamped with the numbers 5 to 8 on the side having the most undesirable features such as scratches. The panels were degreased using acetone (instead of trichloroethylene) and weighed to 0.1 g. The side with the code stamp was coated with wax (a mixture of paraffin and microcrystalline wax was used rather than the ceresin wax suggested in the standard). The panels were returned to the client for coating with the SFRM.

After the panels were returned, panels numbered 6 and 8 were placed in a humidity cabinet operated at 35°C and 95% relative humidity for 240 hours. Panels 5 and 7 were left in the ambient laboratory atmosphere.

Following the conclusion of the humidity exposure, the SFRM was removed from all of the panels by prying it off and scrubbing the panels with a wire brush. The wax was

INVESTIGATION AND RESULTS: (Cont'd)

removed by melting it followed by wiping the metal surface with methylene chloride. The panels were weighed.

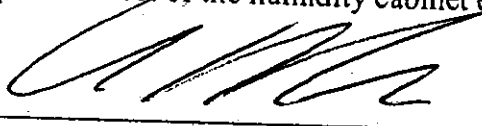
The bare steel panels were visually unaffected. Some panels experienced small weight gains of about 0.1 to 0.3 g due to incomplete removal of insulation, wax and corrosion products formed on the edges.

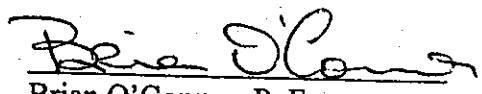
The surface of the galvanized panels in contact with the SFRM appeared etched, however there was no weight loss detected. Some panels experienced small weight gains of about 0.1 to 0.3 g due to incomplete removal of insulation and wax.

The surface of the iron oxide shop primer coated panels in contact with the SFRM appeared paler than the original condition. Panels 5 and 7 lost 0.2 and 0.4 g, and panels 6 and 8 both lost 0.3 g. The pair of panels exposed to humidity experienced the same average weight loss as the pair of panels left in ambient laboratory conditions. The coating did not peel off when the SFRM was removed.

CONCLUSION

Bare steel was unaffected, galvanized steel was etched slightly. None of the bare steel or galvanized panels experienced a weight loss of as much as 0.1 g. There was a small weight loss of approximately 0.3 g of the iron oxide shop primer coated panels, with no apparent effect of the humidity cabinet exposure and no peeling of the coating.


R. W. Elliott
Project Scientist
Metals Technology
Advanced Verification Systems
BPC416B.DOC


Brian O'Connor, P. Eng.
Project Engineer
Metals Technology
Advanced Verification Systems

REGISTRATION

ISO 9002-1994 registered by QMI, Registration #001109

DISPOSAL OF SAMPLES

In accordance with item (4) of our Terms of Agreement (Rev. 08/97), samples will be disposed of or sent to the client at the conclusion of the services. Please note that non-hazardous samples will be disposed of after one month from the issuance of the final report unless otherwise notified and agreed with client. Hazardous samples will be returned to the client (at their expense) for proper disposal.

**ASTM E 84 Surface Burning Characteristics
of "Southwest Vermiculite Inc. Type 7"
Fire Resistance Coating**

A Report To: **A/D Fire Protection Systems Inc.**
420 Tapscott Road, Unit 5
Scarborough, Ontario
M1B 1Y4

Phone: (416) 292-2361
Fax: (416) 298-5887

Attention: Jason Bergman

Submitted by: Fire & Flammability

Report No. 98-J52-78-16-668(C)(Revision 2)
4 Pages

Date: October 6, 2004

ACCREDITATION Standards Council of Canada, Registration #1.

REGISTRATION ISO 9002-1994, registered by QMI, Registration #001109.

SPECIFICATIONS OF ORDER

Determine the Flame Spread and Smoke Developed Indices based upon a single test conducted in conformance with ASTM E 84, as per Building Performance W.O. #57271.

The report was originally issued on January 22, 1999 and was re-issued as Revision 1 on February 5, 1999. It is re-issued herein as Revision 2, based on a data review, and also a request to further reflect a change to the product identification.

SAMPLE IDENTIFICATION

Cementitious fire resistance coating material identified as "Southwest Vermiculite Inc. Type 7".

(Bodycote ORTECH sample identification number 98-J53-M0210-C)

TEST PROCEDURE

The method, designated as ASTM E 84-97a, "Standard Method of Test for Surface Burning Characteristics of Building Materials", is designed to determine the relative surface burning characteristics of materials under specific test conditions. Results are expressed in terms of flame spread index (FSI) and smoke developed (SD).

Although the procedure is applicable to materials, products and assemblies used in building construction for development of comparative surface spread of flame data, the test results may not reflect the relative surface burning characteristics of tested materials under all building fire conditions.

SAMPLE PREPARATION

The sample, which consisted of three sections 8 feet long and 21 inches wide, was conditioned to constant weight at a temperature of 73°F and a relative humidity of 50% prior to testing.

SUMMARY OF TEST PROCEDURE

The tunnel is preheated to 150°F, as measured by the floor-embedded thermocouple located 23.25 ft. downstream of the burner ports, and allowed to cool to 105°F, as measured by the floor-embedded thermocouple located 13 ft. from the burners. At this time the tunnel lid is raised and the test sample is placed along the ledges of the tunnel so as to form a continuous ceiling 24 ft. long, 12 inches above the floor. The lid is then lowered into place.

SUMMARY OF TEST PROCEDURE (continued)

Upon ignition of the gas burners, the flame spread distance is observed and recorded every 15 seconds. Flame spread distance versus time is plotted ignoring any flame front recessions. If the area under the curve (A) is less than or equal to 97.5 min-ft, $FSI = 0.515 \cdot A$; if greater, $FSI = 4900 / (195 - A)$. Smoke developed is determined by comparing the area under the obscuration curve for the test sample to that of inorganic reinforced cement board and red oak, arbitrarily established as 0 and 100, respectively.

TEST RESULTS

<u>SAMPLE</u>	<u>ESI</u>	<u>SD</u>
"Southwest Vermiculite Inc. Type 7" fire resistance coating	0	0

Observations of Burning Characteristics

- The sample did not ignite or propagate flame at any time during the 10 minute test period.
- No measurable increase in smoke developed was recorded during the test period (see accompanying charts).

Authorities having jurisdiction usually refer to these categories:

	<u>Flame-Spread Index</u>	<u>Smoke Development</u>
Class 1 or A	0 - 25	450 Maximum
Class 2 or B	26 - 75	450 Maximum
Class 3 or C	76 - 200	450 Maximum

Note: This is an electronic copy of the report. Signatures are on file with the original report.

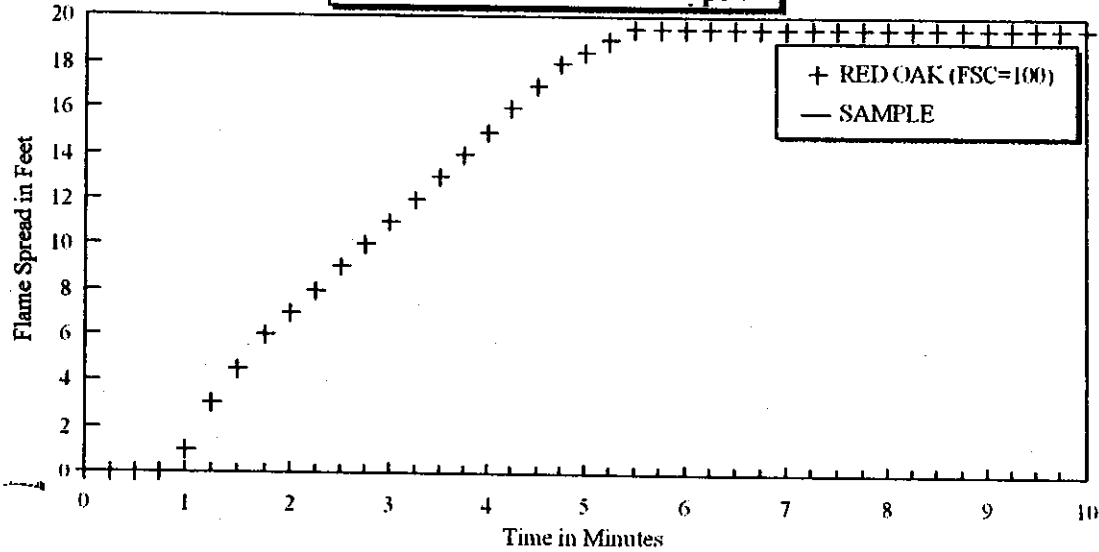
Richard J. Lederle,
Fire & Flammability,
Advanced Verification Systems.

E.W. Simmons,
Fire & Flammability,
Advanced Verification Systems.

Note: This report consists of 4 pages, including the cover page, that comprise the report "body". It should be considered incomplete if all pages are not present.

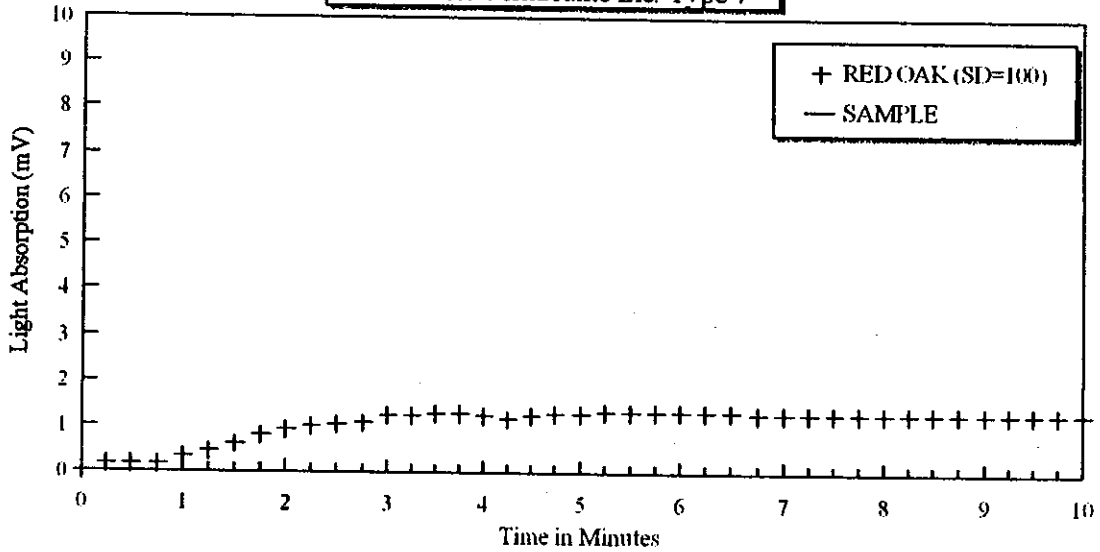
FLAME SPREAD CLASSIFICATION

"Southwest Vermiculite Inc. Type 7"



SMOKE DEVELOPED

"Southwest Vermiculite Inc. Type 7"



ESC1
0

SD
0



Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5, SCARBOROUGH, Ontario M1B 1Y4	Laboratory #:	366888G-04
	Phone: (416) 292-2361 Fax: (416) 298-5887	Report Date:	October 20 th , 2004
		Received Date:	August 13 th , 2004
Attention:	Stevo Milijatovich	Customer P.O.#:	7688
Specimen:	A/D Type 7 HD		

TEST REPORT

RE: TESTING OF A/D TYPE 7 HD FOR FUNGI RESISTANCE

On August 13th, 2004, CMTL received one (1) set of samples of A/D Type 7 HD for determination of fungi resistance.

The submitted samples were identified as:

Sample #1 - A/D Type 7 HD

The samples were tested for fungi resistance (ASTM G21) in accordance with applicable ASTM standards.

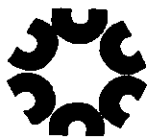
Testing was subcontracted to a testing laboratory within the City of Toronto.

The results of testing are attached hereto.

This report is subject to the following terms and conditions: 1. This report relates only to the specimen provided and there is no representation or warranty that it applies to similar substances or materials or the bulk of which the specimen is a part. 2. The content of this report is for the information of the customer identified above only and it shall not be reprinted, published or disclosed to any other party except in full. Prior written consent from Cambridge Materials Testing Limited is required. 3. The name Cambridge Materials Testing Limited shall not be used in connection with the specimen reported on or any substance or materials similar to that specimen without the prior written consent of Cambridge Materials Testing Limited. 4. Neither Cambridge Materials Testing Limited nor any of its employees shall be responsible or held liable for any claims, loss or damages arising in consequence of reliance on this report or any default, error or omission in its preparation or the tests conducted. 5. Specimens are retained 3 months, test reports and test data are retained 10 years from date of final test report and then disposed of, unless instructed otherwise in writing.

Cambridge Materials Testing Limited

Per Steve Brown QUALITY ASSURANCE
Per Josh Hill TECHNICIAN



RESULTS OF TESTING

ASTM G21-92: Fungi Resistance of A/D Type 7 HD Applied to Structural Members

TEST FUNGI

Two brown-rot wood decayed fungi namely Gloeophyllum Trabeum and Poria Placenta and a single white-rot Polyporus Versicolor fungus were chosen as three-selected test fungal species. They were sub-cultures from the laboratory.

MATERIALS

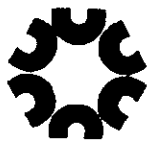
Twelve 2" x 2" test composite specimens were provided. As control, twelve red pine wood blocks about 2" x 2" x 1/2" were prepared by the machine shop. Four test specimens and four wood blocks were exposed to each fungi.

METHODOLOGY

Fungal resistance testing was carried out following ASTM G21 standard with modifications. The method consists of the following steps.

1. Soak test specimens and wood blocks in water for 5 days to ensure sufficient moisture inside the test specimens and wood blocks.
2. Autoclave test specimens and wood blocks at 250°F for 20 minutes.
3. Place the specimens and wood blocks in sterile jars containing solidified malt agar.
4. Inoculate the surface of the specimens and wood blocks with fungal cultures.
5. Expose inoculated specimens and wood blocks under the condition of favourable growth.
6. Examine and visually rate the growth of the fungi according to ASTM G21 as follows after the 4th week of exposure:

0	=	None	
1	=	Traces of Growth	(Less than 10%)
2	=	Light Growth	(10 to 30%)
3	=	Medium Growth	(30 to 60%)
4	=	Heavy Growth	(60% to Complete Coverage)



RESULTS OF TESTING

After the 4th week of fungal exposure the test specimens and wood block surfaces were visually rated for growth and are shown in Table #1.

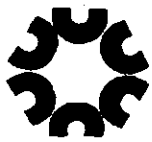
There is a visible sign of fungal sprouting from the inoculates and spreading from the wood block surfaces to the agar beds as shown in Photographs #1 and #2.

The test specimens did not sustain growth and proliferation of selected fungi on the surface as shown in Photographs #3 and #4.

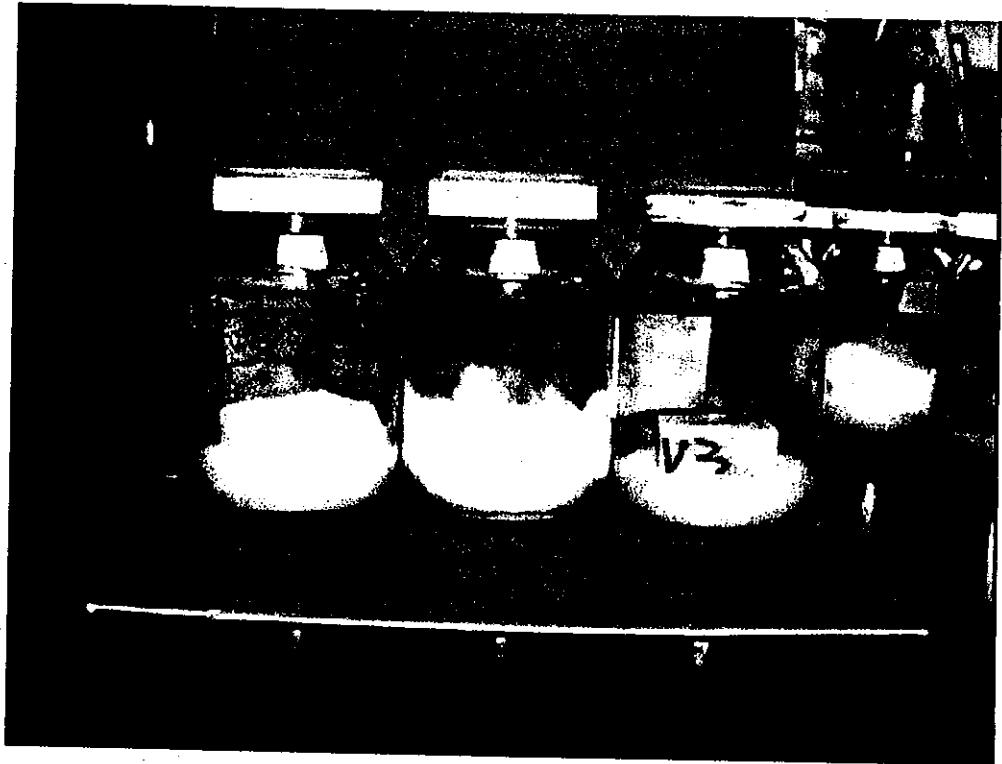
TABLE #1: Visual Rating Growth 4th Week After Fungal Exposure

Fungus	Trabeum	Placenta	Versicolor
Wood 1	4	4	4
Wood 2	4	4	4
Wood 3	4	4	4
Wood 4	4	4	4
Test specimen			
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0

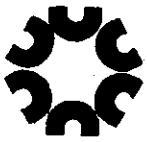
NOTE: The rating of observed growth of the three (3) selected test fungi namely Gloeophyllum Trabeum, Poria Placenta and Polyporus Versicolor on the surface of test specimen is zero (0) under controlled conditions.



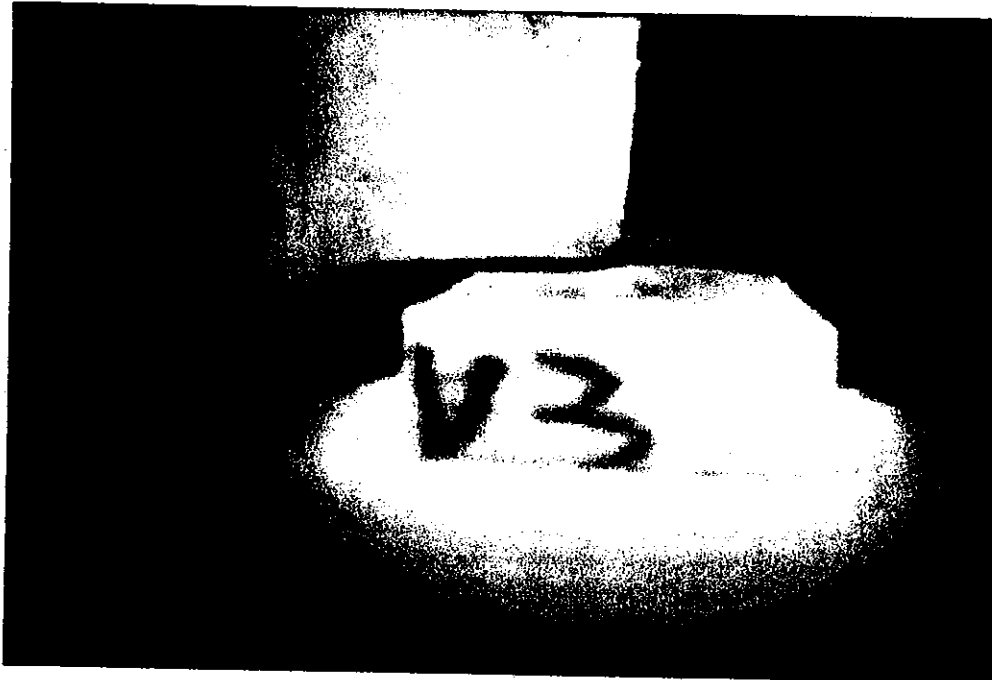
RESULTS OF TESTING (Cont'd)



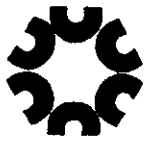
Photograph #1 - Trabeum, Placenta and Versicolor (Left to Right) on Wood Blocks Surface.



RESULTS OF TESTING (Cont'd)



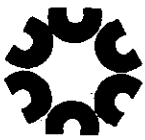
Photograph #2 - Versicolor on Wood Block Surface.



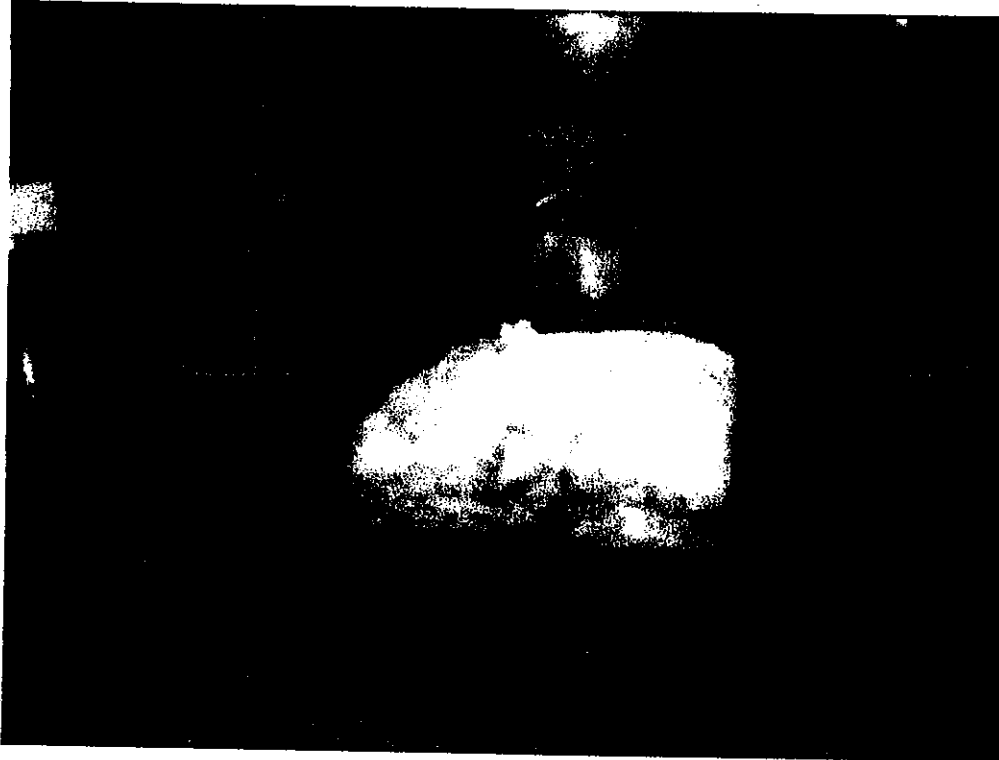
RESULTS OF TESTING (Cont'd)



Photograph #3 - Trabeum, Placenta and Versicolor (Left to Right) on Composites Surface.



RESULTS OF TESTING (Cont'd)



Photograph #4 - Versicolor on Composite Surface.