



# **SUBMITTAL**

## **CABLE COATING 3i**

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### **(Intumescent Fireproofing)**

- ***FM Approved***
  - ***Passed IEC 60331-11-21  
Cellulosic fire at 750°C for 90 minutes***
  - ***Passed IEC 60331-11-21 Hydrocarbon  
fire at 1100°C for 90 minutes***
  - ***Anti-UV with ASTM G155***
  - ***ASTM E-84***
  - ***Peelable product***
-



# These Cables Are Not Burning.

They are protected by Vinasco's 3i  
Cable Coating:

- FM approved at  $\frac{1}{16}$ " dry film
- Provides intumescent protection
- Water-based, safe, easy to apply
- Requires no cable derating
- Flexible, durable, maintenance free

## INTUMESCENT FIRE-PROOFING COATING FOR CABLES

Cable Coating 3i is a heavy-bodied, water-based intumescent coating which is designed to prevent flame spread along the jacketing of electrical (or other) cables and to provide a thermal barrier for protection against heat damage. CC3i will also prevent a short circuit within an electrical cable from starting a fire and will help identify the location of such a short circuit by forming an intumescent char at the spot. CC3i can be applied to grouped cables or single cables.

Cable Coating 3i is a unique acrylic latex emulsion which has excellent resistance to weathering and aging and which remains flexible indefinitely allowing for cable movement and removal. It is suitable for indoor or outdoor application.

Cable Coating 3i is approved by Factory Mutual at our recommended dried film thickness of 1/16<sup>th</sup> inch and it does not require cable derating (see complete Factory Mutual Test Report). It also meets the requirements of the IEC 60331-11(60331-21) Hydrocarbon fire at 1100°C for 90 minutes and IEC 60331-11 (60331-21) Cellulosic fire at 750°C for 90 minutes.

Cable Coating 3i forms a protective intumescent char when exposed to flame or to a temperature above 350°F. This char should be removed completely and clean cables should be recoated if intumescences should occur.

Cable Coating 3i is easily applied by brush or spray and it adheres well to cables, allowing for vertical or overhead application. Care should be taken to see that cables are clean and dry before application, particularly that they are free of oil, grease and grit. Cable Coating 3i should be applied in 2 coats to ensure complete coverage.

NOTE: CC3i MUST BE PROTECTED FROM FREEZING DURING STORAGE. During application it must be protected from freezing, moisture, oil, grease, and foot traffic until it is thoroughly cured.

### **COLOR**

Yellow, Gray, Black, White (Special colors available upon request)

### **COVERAGE (ASTM C 461)**

14 sq. ft./gal. @ 1/16" dry

(.34 m<sup>2</sup>/liter @ 1.59 mm) (actual flat surface coverage)

Note: Because of the irregular surfaces, a nominal square foot of cable tray, when loaded with cables, will present more than a square foot of surface area to be coated.

### **DRYING TIME (ASTM D 1640)**

To touch: 2 hours Through: 24 to 48 hours

(Dependent upon substrate temperature, ambient temperature and relative humidity)

### **WEIGHT PER U.S. GALLON (ASTM D 1475)**

10.2 pounds (4.63 kg)

### **SOLIDS**

62% by weight 53% ± 2% by volume

### **APPLICATION TEMPERATURE RANGE**

40°F (4°C) to 110°F (43°C)

### **APPROVALS / FIRE TESTS**

**Passed IEC 60331-11(60331-21) Cellulosic fire at 750°C for 90 minutes , voltage up to 500v-rms**

**Passed IEC 60331-11(60331-21) Hydrocarbon fire at 1100°C for 90 minutes, voltage up to 600v-rms**

### **FLAME SPREAD INDEX**

ASTM E 84: Flame Spread: 15 ASTM E 162: Flame Spread:16

Approved under Factory Mutual test requirements

@ 1/16" dry film (1.59 mm)

Passes IEEE-383 flame propagation test (full test report available upon request)

Will not support combustion in wet or dry state.

### **INTUMESCENCE**

600% to 700% typical after 10 minute exposure to 1600°F

### **RADIOACTIVITY DECONTAMINATION FACTOR**

(ASTM D 4256-83 and ANSI 5.12-1974)

5.83 after 10 weeks curing time

### **VOLATILE ORGANIC COMPOUND CONTENT (VOC)**

10 g/L (0.08 lbs/gal) tested per EPA Method 24

### **MEETS REQUIREMENTS FOR LEED CREDIT 4.1**

### **CLEANUP**

Wet state – water Dry state - safety solvent

### **RECOMMENDED SHELF LIFE**

18 months in unopened container @40°F (4°C) to 90°F (32°C)

(when properly stored)

### **ACCELERATED UV TESTING**

ASTM G155/D2565. Equivalent to 5 years of desert conditions: slight yellowing in color but no cracking, loss of flexibility or damage to the coating. Results considered excellent

### **CAUTION**

The addition of water or any thinning agent to this product will change its physical properties and will adversely affect its performance. No expressed or implied warranty will be offered on applications where this product has been thinned or altered in any manner



# VIMASCO CORPORATION

## S D S SAFETY DATA SHEET — 16 Sections

### SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier Cable Coating 3i		June 15, 2015	
Product Use Fire Proofing Latex Coating (Mixture)			
Manufacturer's Name Vimasco Corporation		Supplier's Name	
Street Address		Street Address	
City	State:	City	
Postal Code	Emergency Phone	Postal Code	Emergency Telephone
Prepared by:		Phone Number	

### SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients ( <i>specific</i> )	% By Weight	CAS Number	LD <sub>50</sub> of Ingredient ( <i>specify species and route</i> )	LC <sub>50</sub> of Ingredient ( <i>specify species</i> )
Tri(B-chloroethyl) Phosphate	0.9 – 1.5%	115-96-8	550 mg/kg rat inhal.	5000 mg/kg rat
Chlorinated Paraffin	6 – 7.5 %	68410-99-1 68527-02-6	Not available	Not available
Antimony Oxide	3%	1309-64-4	34.6 g/kg rat ingestion	Not established

### SECTION 3 — HAZARDS IDENTIFICATION

**Primary Routes of Entry:** Dermal, inhalation or eyes

Mixture is believed to be a relatively non hazardous product. Medical care should be directed at control of symptoms. Major hazards would be splashing in eyes and accidental ingestion. Antimony Oxide is IARC 2B, possible human carcinogen.

**Medical conditions prone to aggravation:** Persons with preexisting lung disorders may be more susceptible.

**GHS Labeling:** Not a hazardous mixture.

## Product Identifier - Cable Coating 3i, Vimasco Corporation

### SECTION 4 — FIRST AID MEASURES

**Skin:** Wash with soap and water

**Eyes:** Flush with clean water at least 15 minutes, if irritation persists, consult physician.

**Inhalation:** Remove to fresh air. If breathing is difficult, administer oxygen. If irritation persists, consult physician

**Ingestion:** Give two glasses of water, induce vomiting, consult physician or poison control center. Never give anything by mouth to an unconscious person.

### SECTION 5 — FIRE FIGHTING MEASURES

Flammable <b>No</b>	If yes, under which conditions?	
Means of Extinction: Foam, Alcohol Foam, CO <sub>2</sub> , Dry Chemical, Water Fog		
Flashpoint: >212°F (100C) Tag Closed Cup method ASTM D56-16	Upper Flammable Limit (% by volume) <b>No data available</b>	Lower Flammable Limit (% by volume) <b>No data available</b>
Auto ignition Temperature (°C) <b>No data available</b>	Explosion Data: <b>None known</b>	Explosion Data — Sensitivity to Static Discharge <b>None</b>
Hazardous Combustion Products : Thermal decomposition will yield CO, CO <sub>2</sub> , Chlorinated Compounds, HPO <sub>x</sub> , antimony-oxychloride and traces of fragmented short chain hydrocarbons		
Decomposition Temperature: <b>240°F (115°C)</b>		
Product will not burn until water has boiled or evaporated. For dried film or residual solids, full protective equipment is recommended, including self-contained breathing apparatus		

### SECTION 6 — ACCIDENTAL RELEASE MEASURES

Spills should be collected for disposal. Prevent material from entering drains, sewers and waterways. Spills may be slippery. Before drying product may be washed away with water; after drying, remove with a paint scraper or strong solvent.

### SECTION 7 — HANDLING AND STORAGE

Thoroughly cleanse hands after handling. Launder contaminated clothing before reuse.

Protect from freezing. Keep container closed when not in use.

Do not use empty containers for potables or edibles.

Store indoors at temperatures of 40°F to 90°F. Do not store at elevated temperatures, as containers could pressurize and rupture

For industry/professional use only. Not intended for retail sale or use by individual consumers.

### SECTION 8 — EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure limits: Not available

In restricted ventilation areas, use approved chemical respirator, avoid inhalation of airborne particulates by using an approved respirator. General (mechanical) room ventilation is expected to be satisfactory. Supplementary local exhaust and respiratory protection may be needed in poorly ventilated spaces, or evaporation from large surfaces when spraying.

Personal Protection: Impervious gloves, goggles, face shield or other eyewear to protect from splash. Thoroughly cleanses hands after handling. Launder contaminated clothing before reuse.

**Product Identifier: Cable Coating 3i, Vimasco Corporation**

**SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES**

Physical State: Paste consistency	Odor : Mild latex odor	Wt/Gal: 10.0 lbs.
Specific Gravity: 1.20	Vapor Density (air = 1): Lighter than air	Viscosity: 60,000 to 70,000 cps
Evaporation Rate: Slower than ether	Boiling Point : 212°F to 216°F	Freezing Point : 30°F (-1°C)
pH 9	VOC (lbs/gal): 10 g/L	Volatile Volume: 43% (water)

**SECTION 10 — STABILITY AND REACTIVITY**

Chemical Stability: Stable	Decomposition Temperature: Aprox. 240°F (115°C)
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Avoid materials that are incompatible with water.

Thermal decomposition will yield CO, CO<sub>2</sub>, Chlorinated Compounds, HPO<sub>x</sub>, antimony-oxychloride and traces of fragmented short chain hydrocarbons

**SECTION 11 — TOXICOLOGICAL INFORMATION**

This product contains antimony oxide which is on I.A.R.C. (Group IIB) suspect carcinogen.
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**SECTION 12 — ECOLOGICAL INFORMATION**

Not available
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**SECTION 13 — DISPOSAL CONSIDERATIONS**

Dispose of in accordance with all applicable regulations. Review hazard section of this sheet before attempting cleanup. Major spills should be collected for disposal. Minor spills may be flushed to sewer if regulations permit. Before drying product may be washed away with water; after drying, remove with a paint scraper, or strong solvent. Empty containers are non hazardous under RCRA as industrial waste.
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**SECTION 14 — TRANSPORT INFORMATION**

U.S. Dept. of Transportation (DOT): Not regulated International Maritime Dangerous Goods Code (IMDG): Not regulated
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**SECTION 15 — REGULATORY INFORMATION**

SARA Title III, Section 302, 311/312, 313: None CERCLA Reportable Quantity: None
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**SECTION 16 — OTHER INFORMATION**

For industry/professional use only. Not intended for retail sale or use by individual consumers.
<b>HMIS Hazard Rating</b> Health: 1      Flammability: 0      Physical Hazard: 0
<b>NFPA</b> Health: 1      Flammability: 0      Instability: 0

The Intertek logo consists of the word "Intertek" in a white, sans-serif font, centered within a dark blue rounded rectangular background.

**REPORT NUMBER: 103047259SAT-001A(REV1)**

ORIGINAL ISSUE DATE: May 12, 2017

REVISED DATE: February 22, 2018

**EVALUATION CENTER:**

Intertek Testing Services NA Inc.  
16015 Shady Falls Road  
Elmendorf, TX 78112

**RENDERED TO:**

**Vimasco Corporation**  
**280 W. 19<sup>th</sup> St./Republic Way**  
**Nitro, WV 25143**  
**USA**

**AUTHORIZATION OF TEST**

Report of Testing "**Cable Coating No. 3i**" for compliance with the applicable requirements of the following criteria: IEC 60331-21; Procedures and Requirements – Cables of Rated Voltage up to and including 0.6/1.0 kV.

**TEST REPORT**



### ABSTRACT

Cable I.D. **“Cable Coating No. 3i”**

Cable Description: The sample was measured to be 14.5-mm in diameter and consisted of a single conductor wrapped in a white jacket w/coating.

Coating Thickness: 1.6-mm

Test Standard: IEC 60331: Tests for Electric Cables Under Fire Conditions – Circuit Integrity, First Edition 1999-04

- Part 11: Apparatus – Fire alone at a flame temperature of at least 750 °C
- Part 21: Procedures and Requirements – Cables of Rated Voltage up to and including 0.6/1.0 k

#### Modified Test

**Per clients request the temperature was maintained at 1100°C throughout the duration of the 90 minute test.**

Test Date: May 11, 2017

Client: **Vimasco Corporation**

Witnessed by: N/A

Test Results: **PASS**

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**Description of Test Specimen:**

<b>Model:</b>	AWC CT1-09ET (MV-105)
<b>Application:</b>	Cable is intended for use in aerial, direct burial, cable trays, conduit, and underground duct installations as permitted by the NEC.
<b>Temperature Rating:</b>	105°C: Continuous normal operation 140°C: Emergency overload conditions 250°C: Short circuit conditions
<b>Voltage Rating</b>	5000V @ 133% insulation level (Un-grounded system) 8000V @ 100% Insulation level (Grounded System)
<b>Size (AWG)</b>	2
<b>Conductor Diameter</b>	0.283 in. / 8.19 mm
<b>Insulation Diameter</b>	0.547 in. / 13.89 mm
<b>Extruded Insulation Shield Diameter</b>	0.623 in. / 15.82 mm
<b>Jacket Thickness</b>	0.055 in. / 1.4 mm
<b>Approximate Overall Diameter</b>	0.759 in. / 19.28 mm
<b>Approximate Net Weight</b>	450 Lb/Mft 670 kg/km
<b>Allowable Current (Amps)</b>	Duct: 155A Conduit in Air: 145A

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## TEST DATA

### Test Method (IEC 60331-11):

#### Sample supporting system

The cable sample, as described in the relevant procedure in part 21 onwards of IEC 60331, shall be held horizontally by means of suitable supports at each end of the sheathed or protected portion. The sample shall be securely clamped at one end to prevent movement and supported at the other end to allow for thermal expansion in the longitudinal direction. The middle portion of the cable shall be supported by two metal rings placed approximately 300 mm apart; these, as well as any other metal parts of the supporting apparatus, shall be earthed. The rings shall have an inside diameter of approximately 150 mm and shall be made from a circular steel rod of  $(10 \pm 2)$  mm in diameter.

#### Source of heat

The source of heat shall be a ribbon type propane gas burner with a nominal burner face length of 500 mm with Venturi mixer. A centre-feed burner is recommended. The nominal burner face width shall be 15 mm. The face of the burner shall have three staggered rows of drilled holes, nominally 1,32 mm in diameter and drilled on 3,2 mm centres. Additionally, a row of small holes milled on each side of the burner plate, to serve as pilot holes for keeping the flame burning, is permitted.

The flow rates used for the test at reference conditions (1 bar and 20 °C) was as follows:

- air:  $(80 \pm 5)$  l/min per 500 mm burner face length;
- propane:  $(5 \pm 0,25)$  l/min per 500 mm burner face length.

#### Positioning of source of heat

The burner face shall be positioned in the test chamber so that it is at least 200 mm above the floor of the chamber and at least 300 mm from any chamber wall.

The burner shall be aligned with the test sample, as shown in figure 4, so that:

- its horizontal central plane is at a distance of  $(70 \pm 10)$  mm below the lowest point of the test sample;
- its vertical front face is approximately 45 mm from the central vertical plane of the test sample.

**Observed Results:**

<b>Test Voltage</b>	<b>Time Flame on</b>	<b>Flame Temperature (°C)</b>	<b>Cooling Time</b>
300VAC	90 Minutes	750	15 Minutes

When tested in accordance with the procedures specified in IEC 60331-11: for a period of 90 minutes at a temperature of at least 750°C followed by a 15 minute cooling period, at a rated voltage of 300V-rms, the cable maintained its circuit integrity and consequently satisfied the performance requirements specified in Clause 5 of the standard Material began to expand at 1 minute and 27 seconds. Damage from the flame is evident on the top layer of the insulation system.

See following pages for post test photos.

<b>Test Voltage</b>	<b>Time Flame on</b>	<b>Flame Temperature (°C)</b>	<b>Cooling Time</b>
500VAC	90 Minutes	750	15 Minutes

When tested in accordance with the procedures specified in IEC 60331-11: for a period of 90 minutes at a temperature of at least 750°C followed by a 15 minute cooling period, at a rated voltage of 500V-rms, the cable maintained its circuit integrity and consequently satisfied the performance requirements specified in Clause 5 of the standard Material began to expand at 2 minutes and 12 seconds. Severe damage from the flame is evident on the top layers of the insulation system.

See following page for post test photos.



100 E.Glenside Ave, Glenside, PA 19038  
tel: 215-517-8700 | fax: 215-517-8747  
www.solarlight.com

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## ACCELERATED UV TEST REPORT OF CUSTOMER SUPPLIED MATERIAL

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4. PROCEDURE
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7. DISCUSSION
8. PHOTO SURVEY
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### INTRODUCTION

This document presents the results of an accelerated UV test for VIMASCO on the exposure of a plastic material simulating a 5 year outdoor dose simulating a Desert climate. Photographs at various angles were taken at each 12 month mark, as well as spectral reflectance measurements.

DREW HMIEL, PHYSICIST

VER 1.1 SEPT-6-2016

SOLAR LIGHT CO. INC

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### CUSTOMER INFORMATION

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**APPLICABLE STANDARDS**

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This section details the relevant procedural components from ASTM G155 and ASTM D2565, particularly relating to UV exposure:

**ASTM G155: “Standard practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials ”**

6.13 Spectral Irradiance of Xenon Arc with Daylight Filters – Filters are used to filter xenon arc lamp emissions in a simulation of terrestrial sunlight.

6.16 ...Report the irradiance and bandpass in which it is measured.

6.3 Instrument associated with the exposure apparatus ...require periodic calibration. Wherever possible, calibration should be traceable to national or international standards.

Conformity of the specimen fixturing and irradiance uniformity shall be in conformance of practice ASTM G151:

*Lamp replacement, lamp rotation and specimen repositioning may be required to obtain uniform exposure to UV and temperature. Periodic repositioning is not necessary if the positions farthest from the center of the exposure area are at least 90% of that measured at the center of the exposure area.*

**8. Report**

8.1 In addition to the report requirements of ASTM G 155, report the following additional information:

8.1.1 Any variations from the specified conditions,

8.1.2 Description and dimensions of specimens.

6.13	Spectral Irradiance	Simulator	W/m <sup>2</sup>
6.16	Bandpass [See Appendix: Spectra]	UV simulator 300 - 400 NM	
8.1.1	Conditions specified in Table 2, 9.1.7, 9.1.8		

Table 1

**ASTM D2565: “Xenon Arc Accelerated Weathering, Artificial Weathering: Standard Practice for Xenon Arc Exposure of Plastics Intended for Outdoor Applications”.**

Table 2 details the parameter values in conformance with the requirements:

## REQUIRED REPORTING per ASTM 2565

9.1.1	Type and model of exposure device	Solar Light 16S-300
9.1.2	Type of Light Source	Xenon arc 300 W UV simulator
9.1.3	Type and age of filters used at the start of the exposure, and whether there were any filters changed during the exposure	UV transmitting, visible blocking Shortwave (320 nm) blocking, no changes
9.1.4	Irradiance in W/m <sup>2</sup> nm or radiant exposure in J/m <sup>2</sup> at the sample plane and the measurement wavelength region.	613 W/m <sup>2</sup> 2,163.8 MJ/m <sup>2</sup> 601 kWhr/m <sup>2</sup>
9.1.5	Elapsed exposure time	981 Hrs
9.1.6	Light and dark water condensation or humidity cycle	N/A
9.1.7	Type of black panel used and operating black panel temperature.	Standard, Avg.32.2°C; Range [20 - 43°C]
9.1.8	Operating relative humidity	Avg. 34%, Range [23 - 57%]

Table 2

The spectral characteristics of the Solar Light 16S simulator are verified by calibration in our laboratory using NIST traceable standard sources and detectors. The filters and other optical components are periodically inspected and verified for proper conditions. The basis for this Desert Zone dose profile was calculated from the daily measured UVA and UVB irradiances averaged from several atmospheric observatories that are located in Flagstaff AZ (35° 12' N), Perth AU (32.0° S) Brisbane, AU (27.5° S), over 3 – 7 years. These measurements take into account environmental and time-of-year factors. The total dose for the experiment is calculated by multiplying the number of years times the *Annual Tropical Exposure of 120.2 kWh/m<sup>2</sup>*.

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### PROCEDURE

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Accelerated UV testing using the methods described above at SOLAR LIGHT® employ the specific design elements of the custom simulator to achieve a means to expose the customer supplied material to one or more years of accelerated UV testing.

The light source was measured across the diameter of the focused exposure spot, by a detector sensitive to the range of 280 – 400 nm, in order to comply with the standard. The specimens were removed at each event point for photos and colorimetric measurements.



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TIME CHART FOR THE ACCELERATED TEST

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EVENT TIME	ELAPSED HOURS	EQUIVALENT YEARS
7/21/2016 17:17		
7/29/2016 14:43	189.42	0.97
8/7/2016 12:21	403.05	2.06
8/16/2016 12:12	618.90	3.16
8/23/2016 14:39	789.35	4.03
8/30/2016 16:34	980.57	5.00

Table 3

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SUMMARY OF COLORIMETRIC RESULTS

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	L*	a*	b*	Y	$\Delta E$	$\sigma$	$\Delta Y$
Baseline	88.52	1.11	10.81	21.76		0.134	
1Y	88.59	1.08	9.99	20.21	0.82	0.084	-1.55
2Y	88.66	1.04	9.17	18.66	1.65	0.105	-3.10
3Y	89.71	1.14	6.83	14.22	4.15	0.090	-7.54
4Y	89.23	1.18	6.58	13.85	4.29	0.147	-7.91
5Y	87.40	1.18	6.13	13.21	4.81	0.135	-8.55

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DISCUSSION

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The samples did not show very much change visually; however, the colorimetric spectral reflectance measurements did detect a shift at the 3 year mark.

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PHOTO SURVEY

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# VIMASCO CABLE COATING 3i (WHITE)



# VIMASCO CABLE COATING 3i (GRAY)



# VIMASCO CABLE COATING 3i (YELLOW)







# Certificate of Compliance

This certificate is issued for the following:

## **Fire Retardant Cable Coating No. 3i Formulation Revision for Grouped Electrical Cables**

### **Prepared for:**

Vimasco Corporation  
P.O. Box 516  
Nitro, WV 25143

FM Approvals Class: 3971

Approval Identification: 3011551

Approval Granted: July 25, 2001

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

A handwritten signature in dark ink that reads "Cynthia E. Frank".

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Cynthia Frank  
AVP - Manager of Materials  
FM Approvals  
1151 Boston-Providence Turnpike  
Norwood, MA 02062



*Member of the FM Global Group*



## Factory Mutual Research

1151 Boston-Providence Turnpike  
Norwood, Massachusetts 02062

1F7A4.AF  
(3971)

March 30, 1982

### FIRE RETARDANT CABLE COATING NO. 3i FOR ELECTRIC POWER AND CONTROL CABLES

from

VIMASCO CORPORATION  
PLANT ROAD  
P. O. BOX 516  
NITRO, WEST VIRGINIA 25143

#### I INTRODUCTION

1.1 Vimasco Corporation requested approval of their Fire Retardant Cable Coating No. 3i for use as a protective coating for electric power and control cables.

1.2 Cable Coating No. 3i is a fire retardant, asbestos-free, non-toxic, flexible, intumescent coating. It is gray in appearance before and after curing. White, black and other special colors are available upon request.

1.3 The product contains water, and therefore precautions should be taken to ensure that any storage, transportation, or application of the material is done at temperatures above freezing and in accord with the manufacturer's instructions.

1.4 These coatings prevent flame spread in conductors when exposed to a moderate fire source that might occur from arcs or sparks falling or occurring in the cable tray, or from fire exposure of combustible trash or foreign material around the cable(s) in grouped or trayed conditions. These coatings were not tested to maintain cable protection under severe and extended fire exposure conditions.

When applied according to the manufacturer's instructions, the protective coating does not of itself require electrical de-rating.

Observe any special instructions listed with the product.

#### II DESCRIPTION (See Attached Manufacturer's Data Sheet)

2.1 Surfaces to be coated with Cable Coating No. 3i must be clean and free from oil, grease and dirt. Cleanup is accomplished with water before the material cures.

2.2 The most effective application of Cable Coating No. 3i is by spray. The coating dries to the touch in two hours and cures thoroughly in 24 to 48 hours, depending on cable temperature, ambient temperature, and relative humidity. Minimum required thickness for dry coating is 1/16 in. (1.59 mm).

2.3 After curing, the coating remains sufficiently pliable so that individual cables may be removed from a grouping if necessary, and damaged portions of the protective coating may be repaired by spraying. The coating has good adhesive properties and will stick readily to vertical and overhead surfaces. When exposed to flame, it does not melt or drip, but merely intumesces.

### III MARKINGS

Vimasco Cable Coating No. 3i is available in 1, 2, 5 and 55 gal. (3.78, 7.6, 18.9 and 208 liter) containers. The manufacturer's name and address, product name, batch number, application instructions and the Factory Mutual mark of approval are shown on the container label.

### IV TESTS

4.1 Four strips of Cable Coating No. 3i, 18 in. (457 mm), 3 in. (76 mm) wide and 1/16 in. (1.59 mm) thick were prepared and conditioned at room temperature. Two specimens were clamped vertically and parallel 1/2 in. (13 mm) apart to expose 17 in. (432 mm) from the free (lower) end. A bunsen burner with a 2 in. (51 mm) total flame height with a 1 in. (25 mm) inner core was then positioned vertically under the free end of one specimen for a two minute period with the flame cone just touching the specimen. Examination at the end of the fire exposure period showed flames did impinge and scorch the specimens up to 5 in. (127 mm) above the lower gauge mark. There was some disintegration of the specimen below the 3 in. (76 mm) gauge mark when handled by squeezing lightly between the thumb and two fingers. The area above the 3 in. (76 mm) gauge mark remained intact. Direct flame impingement did cause some loss of flexibility, but this area was considered structurally sound.

4.2 The test outlined in paragraph 4.1 was repeated with the second set of specimens and the results were similar. These test results satisfy approval requirements which allow no degradation of specimen above the 3 in. (76 mm) gauge mark and no scorching or burning above the 17 in. (432 mm) gauge mark.

4.3 Ten 3 ft (0.9 m) long samples of 2/0, 600 V, 90°C, 220 ampere rated (National Electrical Code) aluminum cables were given a high potential check of 1000 V, plus 200% of rated voltage for one minute. The cables were wrapped tightly in aluminum foil and the potential applied between the foil and the copper conductor and any leakage current in milliamperes was recorded for each cable sample. Cables were then coated according to the manufacturer's instructions and, after the recommended curing time, this high potential test was repeated to ensure no change or damage occurred to the cable insulation prior or during coating. (This test is also repeated after the fire tests described below as a means of determining any coating breakdown).



4.4 Three 3 ft (0.9 m) long coated cables were individually heated electrically with 150% of rated current (330 A) until the aluminum conductor stabilized at 197°F (92°C). A flame from a Meeker gas burner was adjusted to give an overall flame height of 5 in. (127 mm) with a 3 in. (76 mm) inner cone (natural gas) and applied to the horizontally positioned cable for two minutes with the tip of the inner cone touching the bottom of the coated cable. At the end of a two minute flame exposure, there was simultaneous burner flame cutoff and electrical shutdown. All flaming extinguished immediately. After cooling, the charred and scorched area exposed to the burner flame was measured and found to be 3 to 4 in. (76 to 102 mm) in length. This satisfies approval requirements that burning shall not continue longer than one minute after flame cutoff and the burned (exposed area) shall not exceed 9 in. (228 mm) in length.

4.5 Results on the second and third cables exposed to the test described in paragraph 4.4 were similar. These three cables were then given a repeat of the high potential test described in paragraph 4.3 and current leakage averaged .23 milliamperes. This satisfies the approval requirement that leakage current shall not exceed 5.0 milliamperes when measured between the conductor and the outer jacket during this high potential test.

4.6 A 3 ft (0.9 m) length of cable coated with Cable Coating No. 3i was subjected to a saltwater test consisting of 8 hours submerged alternating with 16 hours drying in a 24 hour span in a 1% saltwater solution over a 30 day period with the water temperature at 150°F (66°C). At the end of this period, the sample was allowed to dry for 36 hours. There was no disintegration or deterioration of the coating. The cable sample was then subjected to the fire tests described in paragraph 4.4 and the required high potential test; the results of these tests were satisfactory.

4.7 Two 3 ft (0.9 m) lengths of cable coated with Cable Coating No. 3i were subjected to alternating temperatures of 160°F (71°C) and -40°F (-40°C) for 24 hours over a two week duration. At the end of this accelerated aging test period, the cables were subjected to the fire test described in paragraph 4.4 and the high potential test. The results of these tests were satisfactory.

4.8 A coated cable section was subjected to an ampacity test prior to which a No. 28 gauge chromel-alumel thermocouple was imbedded in the bare aluminum conductor. The cable was then subjected to its rated current carrying capacity of 220 A (according to the National Electrical Code) until the temperature indicated by the thermocouple had stabilized, in approximately one hour at 127°F (53°C). This is well below the 90°C maximum temperature rating of the cable insulation; therefore, no electrical derating is necessary when a cable is sprayed with Vimasco Cable Coating No. 3i according to the manufacturer's recommendations.

4.9 A sample cable length coated with Cable Coating No. 3i has been under actual weather exposure test conditions for approximately four months. The coated cable sample appears satisfactory at this time; however, continued observation of this sample is planned to supplement present field experience.

V CONCLUSIONS

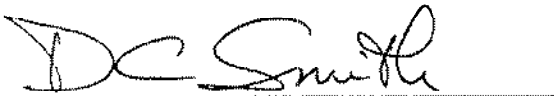
Vimasco Fire Retardant Cable Coating No. 3i meets Factory Mutual approval requirements. Approval is effective when the Approval Agreement is signed and returned to Factory Mutual.

DCS:bb

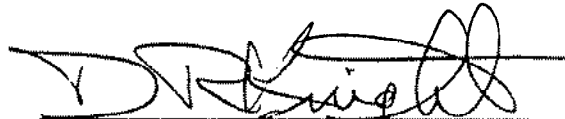
EXAMINATION AND TESTS BY: D. C. Smith and W. Pelrine

REPORT BY:

REVIEWED BY:



David C. Smith  
Assistant Manager - Fuels Section



Dallas R. Knight  
Manager - Fuels Section

ORIGINAL TEST DATA: Test Notebook No. 81-120

ATTACHMENTS: Manufacturer's Data Sheet



## VIMASCO CORPORATION

P.O. Box 516 \* Nitro, WV 25143  
(304) 755-3328 or (800) 624-8288  
[www.vimasco.com](http://www.vimasco.com)

**Factory Mutual Research Corporation States:  
“Vimasco Fire Retardant Cable Coating No. 3i  
Meets Factory Mutual Requirements”**

### **Test Summary:**

- The coating prevents flame spreading in conductors when exposed to a moderate fire source that might occur from arcs or sparks falling or from fire exposure of combustible trash or foreign material around the cables (FM Test Report, paragraph 1.4)
- No electrical derating is necessary when a cable is coated with Vimasco Cable Coating No. 3i according to the manufacturer’s recommendations (FM Test Report, paragraph 4.8)
- The coating remains sufficiently pliable so that individual cables may be removed from a grouping if necessary. The coating has good adhesive properties and sticks readily to vertical and overhead surfaces. When exposed to flame it does not melt or drip but merely intumesces (FM Test Report, paragraph 2.3)
- The coating causes no change or damage to the cable insulation (FM Test Report, paragraph 4.3)
- In the fire test, horizontal coated cables were impinged by flame from a Meeker gas burner for 2 minutes, and when the burner flame was cut off, all flaming extinguished immediately (FM Test Report, paragraph 4.4)
- A coated cable subjected to a 30 day saltwater submergence test showed no disintegration or deterioration of the coating (FM Test Report, paragraph 4.6)
- Coated cables exposed to an accelerated aging test involving 2 weeks of alternating temperatures of 160°F still performed satisfactorily under other tests, including the fire test (FM Test Report, paragraph 4.7)
- A cable length coated with cable Coating 3i was exposed to actual weather exposure conditions for approximately 4 months and was still satisfactory (FM Test Report, paragraph 4.9)



VIMASCO CORPORATION

P. O. BOX 516 NITRO, WEST VIRGINIA 25143

**SUMMARY OF ACCELERATED UV TEST RESULTS  
CABLE COATING NO. 3i WHITE  
September 2016**

Accelerated UV testing was performed on Vimasco's Cable Coating 3i White in accordance with ASTM G155 and D2565.

After an exposure equivalent to 5 years in desert conditions, the coating had only yellowed slightly. Otherwise, the spectral reflectance values had changed minimally and there were no identifiable adverse effects to the coating. The exposed sample showed no cracking or loss of flexibility.

See comments below from the testing laboratory, full test report available on request:

The changes seen were small, and the starting reflectance of the material was

**L\*    a\*    b\***  
**88.52  1.11  10.81**

And after the exposure:

**87.40  1.18  6.13**

So L\* (Whiteness- blackness) stayed high (nearly all the way to white)

a\* didn't change significantly (that's the green - red axis)

but b\* changed the most (blue - yellow axis)

A high positive b\* is yellow, a highly negative b\* is blue.

So the material started 10% of the way from neutral to yellow and made a small shift towards neutral

The st. dev.s of the measurements is typically  $\approx 1$  so changes have to be  $> 1$  to be significant.

Drew Hmiel    Physicist - Materials Test and Radiometry Lab  
Solar Light Company Inc.  
100 E. Glenside Ave.  
Glenside, PA 19038



# United States Testing Company, Inc.

291 FAIRFIELD AVENUE • FAIRFIELD, NEW JERSEY 07004 • 201-575-5252 • Fax 201-575-8271

## REPORT OF TEST

### Engineering Services

**CLIENT:** Vimasco Corporation  
P.O. Box 516  
Nitro, West Virginia 25143

**NUMBER:** 105716  
Sept. 25, 1992

**SUBJECT:** Surface Burning Characteristics of Building Materials

### REFERENCE:

Vimasco Corporation, Purchase Order Number 1687 dated September 21, 1992.

### TEST PERFORMED:

The submitted sample was tested for Flammability in accordance with the procedures outlined in ASTM E-84-91a.

### SAMPLE IDENTIFICATION:

One (1) sample was submitted and identified by the Client as:

Vimasco Corp. Cable Coating No. 3i,  
spray applied to non combustible board  
at a dry film thickness of 1/16 inch.

### INTRODUCTION:

This report presents test results of Flame Spread and Smoke Developed Values per ASTM E-84-91a. The report also includes Material Identification, Method of Preparation, Mounting and Conditioning of the specimens.

The tests were performed in accordance with the specifications set forth in ASTM E-84-91a, "Standard Test Method for Surface Burning Characteristics of Building Materials", both as to equipment and test procedure. This test procedure is similar to UL-723, ANSI No. 2.5, NFPA NO. 255 and UBC 42-1.

The test results cover two parameters: Flame Spread and Smoke Developed Values during a 10-minute fire exposure. Inorganic cement board and red oak flooring are used as comparative standards and their responses are assigned arbitrary values of 0 and 100, respectively.

**PREPARATION AND CONDITIONING:**

Three (3) 24" x 8'0" panels were fitted end to end to form a 24" x 24'0" specimen. Since the sample was self-supporting, no further preparation was necessary. The mounting was such as to expose the coated side to the flame.

The panels were conditioned at  $73^{\circ} \pm 5^{\circ}$  Fahrenheit and  $50 \pm 5\%$  relative humidity.

**TEST PROCEDURE:**

The tunnel was thoroughly pre-heated by burning natural gas. When the brick temperature, sensed by a floor thermocouple, had reached the prescribed  $105^{\circ}$  Fahrenheit  $\pm 5^{\circ}$  Fahrenheit level, the sample was inserted in the tunnel and test conducted in accordance with the standard ASTM E-84-91a procedures.

The operation of the tunnel was checked by performing a 10-minute test with inorganic board on the day of the test.

**TEST RESULTS:**

The test results, calculated in accordance with ASTM E-84-91a for Flame Spread and Smoke Developed Values are as follows:

Test Specimen:	Cable Coating 3i
Flame Spread Index*:	15
Smoke Developed Value*:	45

\*Graphs of the Flame Spread, Smoke Developed and Time-Temperature are shown in Figures 1, 2 and 3 at the end of this report.

**OBSERVATIONS:**

Ignition was noted at 18 seconds along with charring and cracking of the specimen directly exposed to the flame. The flamefront advanced a maximum distance of 3 feet at 51 seconds. Neither afterflame nor afterglow were evident upon test completion.

Testing Supervised by:

*S. Caldarola*  
Steve Caldarola  
Senior Supervisor  
Fire Technology

SIGNED FOR THE COMPANY

BY *J. Lomash*  
John Lomash  
Vice President

 **SGS** Member of the SGS Group (Société Générale de Surveillance)

• Biology • Chemistry • Environmental • Materials • Facilities in Principal Cities •

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# SOUTHWEST RESEARCH INSTITUTE

6220 CULEBRA ROAD • POST OFFICE DRAWER 28510 • SAN ANTONIO, TEXAS, USA 78228-0510 • (210) 684-5111 • TELEX 244846

CHEMISTRY AND CHEMICAL ENGINEERING DIVISION  
DEPARTMENT OF FIRE TECHNOLOGY  
FAX (210) 622-3377

May 2, 1995

Mr. John Tidquist  
Vimasco Corporation  
P.O. Box 516  
Nitro, West Virginia 25143

Subj: SwRI Project No. 01-6739-232 **FINAL LETTER REPORT**  
Fire Exposure test in general accordance with IEEE-383, Flame Propagation Test, dated  
1974, Section 2.5 Flame Tests

Dear Mr. Tidquist:

This letter constitutes our final report on the above reference project. This report contains a description of the material evaluated, procedures used, and the results. Note that the results apply only to the material tested, in the manner tested, and not to the entire production of this or similar materials when used in combination with other materials.

The electrical cable trays with electrical power cables installed and coated were received from Vimasco Corporation in a "ready to test" condition on March 23, 1995.

Vimasco Corporation prepared three 8 ft galvanized steel ladder cable trays measuring 12 in. wide x 3 in. deep, loaded with electrical power cables identified as Rome XLP Power Cable E-60379 (UL) MV-90 DRY 2 AWG CU 5KV, nonshielded and coated with intumescent cable coating, identified as Cable Coating No. 3i gray, a water-based, latex, intumescent, fire retardant cable coating, which was spray applied in two coats at a coverage rate of 12 sq ft/gal.

The cable trays were subjected to the flame propagation test in accordance with the procedures as specified in IEEE-383, dated 1974, section 2.5, paragraphs 2.5.1 through 2.5.5. The three tests were conducted on March 29, 1995. Observations taken during the tests are provided in the following attachment. Based on these observations, the intumescent cables identified as Cable Coating No. 3i, passed the acceptance criteria as specified in IEEE-383 Flame Propagation Test.

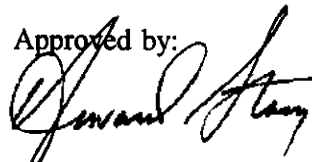
If you should have any questions or comments, if we can be of any further assistance, please do not hesitate to contact me at 210/522-3718 or by fax at 210/522-3377.

Sincerely,



Anthony L. Saucedo  
Assistant Supervisor  
Fire Testing Services  
ALS/lr  
Attachments

Approved by:



Howard W. Stacy  
Manager  
Fire Testing Services



SAN ANTONIO, TEXAS

HOUSTON, TEXAS • DETROIT, MICHIGAN • WASHINGTON, DC

Vimasco Corporation  
SwRI Project No.: 01-6739-232  
Date of Test: March 29, 1995  
Test Material: Cable Coating No. 3i gray

Ambient temperature at start of test was 69°F and 35% relative humidity

TIME min:sec	TEST ONE OBSERVATIONS
00:00	start of test
00:30	discoloration of cable coating
01:00	surface charring, flames to 4 ft
01:38	small pieces of cable coating falling to floor
01:50	spotty ignition of cables at burner location, light gray buildup of smoke
02:26	steady ignition of cables at burner location
02:35	surface cracks in cable coating, flames to 4 ft
10:00	no change, flames still at 4 ft
15:00	surface blisters, swelling of the cable coating, charring with small pieces of the cable coating falling to the floor, flames to the 4.5 ft level
20:00	burner extinguished, flames continuing to burn from the 2.5 ft level up to the 3.5 ft level
25:00	flames have reduced in size and are still burning from the 2.5 to the 3.5 ft level
28:30	flames have gone out at the 3.5 ft level, a small flame remains at the 2.5 ft level
35:19	all flaming ceased, end of test

#### Cable damage - back side burner

Damage to the cables resulted in severe surface charring from the 24 in. level up to the 39 in. level (total height of charring: 15 in.).

Surface distortion and melting of the cable coating was from the 39 in. level up to the 67 in. level (total height of melt away/distortion: 28 in.).

#### Cable damage - front of cable tray

Damage to the cables resulted in severe surface charring from the 24 in. level up to the 58 in. level (total height of charring: 24 in.).

Surface distortion and melting of the cable coating was from the 58 in. level up to the 74 in. level (total height of melt away/distortion: 16 in.).

This intumescent cable coating identified as Cable Coating No. 3i gray when spray applied to electrical power cables identified as Rome XLP Power Cable E-60379 (UL) MV-90 DRY 2 AWG CU 5KV, nonshielded has passed the IEEE-383 flame spread test by not allowing the flames to spread up and past the 8 ft extremity of the cable tray.

Vimasco Corporation  
SwRI Project No.: 01-6739-232  
Date of Test: March 29, 1995  
Test Material: Cable Coating No. 3i gray

Ambient temperature at start of test was 70°F and 35% relative humidity

TIME min:sec	TEST TWO OBSERVATIONS
00:00	start of test
00:18	discoloration of cable coating
01:28	spotty ignition of cable at the burner location
02:07	surface cracks in the cable coating at the burner location
02:32	small pieces falling to floor
02:39	steady ignition of the cables at the burner location, light gray buildup of smoke in room
05:00	surface swelling and small blisters developing on the cables up to the 5 ft level with flames to the 4.5 ft level
10:00	flames still at the 4.5 ft level, light gray smoke in room
15:00	no change
20:00	burner extinguished, flames are continuing to burn from the 1.5 ft level up to the 3.75 ft level
23:26	flames have gone out at the 1.5 ft level, flames are now between 2.5 and 3.5 ft
27:30	all flaming has gone out on the front side of the cable tray, however there is still flaming on the back side of the cable tray at the 3 ft level
30:11	flaming has gone out on the back side of the cable tray
30:15	all flaming ceased, end of test

Cable damage - back side burner

Damage to the cables resulted in severe surface charring from the 24 in. level up to the 39 in. level (total height of charring: 15 in.).

Surface distortion and melting of the cable coating was from the 39 in. level up to the 70 in. level (total height of melt away/distortion: 31 in.).

Cable damage - front of cable tray

Damage to the cables resulted in severe surface charring from the 24 in. level up to the 68 in. level (total height of charring: 44 in.).

Surface distortion and melting of the cable coating was from the 68 in. level up to the 78 in. level (total height of melt away/distortion: 10 in.).

This intumescent cable coating identified as Cable Coating No. 3i gray when spray applied to electrical power cables identified as Rome XLP Power Cable E-60379 (UL) MV-90 DRY 2 AWG CU 5KV nonshielded has **passed** the IEEE-383 flame spread test by not allowing the flames to spread up and past the 8 ft extremity of the cable tray.

Vimasco Corporation  
SwRI Project No.: 01-6739-232  
Date of Test: March 29, 1995  
Test Material: Cable Coating No. 3i gray

Ambient temperature at start of test was 72°F and 37% relative humidity

TIME min:sec	TEST THREE OBSERVATIONS
00:00	start of test
00:17	discoloration of the cable coating
00:27	surface charring
01:00	spotty ignition
02:19	surface cracks in the cable coating
02:40	swelling of the cables at the burner location, light gray smoke
04:55	flames still at the 4 ft level, small pieces of char falling to floor
12:00	flames at the 4 ft level, with surface swelling and jacket distortion to the 5 ft level
15:00	no change
20:00	burner extinguished, flames continuing to burn from the 2 ft to the 3.5 ft level
25:20	burning on the front side of the cable tray has gone out, cables are still burning on the back side of the cable tray at the 3 ft level
28:25	all flaming ceased, end of test

Cable damage - back side burner

Damage to the cables resulted in severe surface charring from the 24 in. level up to the 39 in. level (total height of charring: 15 in.).

Surface distortion and melting of the cable coating was from the 39 in. level up to the 74 in. level (total height of melt away/distortion: 35 in.).

Cable damage - front of cable tray

Damage to the cables resulted in severe surface charring from the 24 in. level up to the 48 in. level (total height of charring: 24 in.).

Surface distortion and melting of the cable coating was from the 48 in. level up to the 64 in. level (total height of melt away/distortion: 16 in.).

This intumescent cable coating identified as Cable Coating No. 3i gray when spray applied to electrical power cables identified as Rome XLP Power Cable E-60379 (UL) MV-90 DRY 2 AWG CU 5KV, nonshielded has passed the IEEE-383 flame spread test by not allowing the flames to spread up and past the 8 ft extremity of the cable tray.



## VIMASCO CORPORATION

### PROJECT REFERENCES

#### POWERPLANT PROJECTS

Emirates CMS-Taweela Power Plant  
Florida Power & Light Co  
Commonwealth Edison Co.  
Dayton Power & Light Co.  
Carolina Power & Light Co  
Commonwealth Edison Co.  
Commonwealth Edison Co.  
Consolidated Edison Co.  
Duke Power Company  
Georgia Power Company  
American Electric Power  
Philadelphia Electric Company  
Sacramento Municipal Utility District  
Pennsylvania Power & Light Co.  
Washington Public Power Supply System

#### TYPE OF FACILITY

Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant  
Power Plant

#### LOCATION

Abu Dhabi, UAE  
Florida  
Bolingbrook, IL  
Aberdeen, OH  
Southport, NC  
Morris, IL  
Zion, IL  
New York, NY  
Clover, SC  
Baxley, GA  
New Haven , WV  
Philadelphia, PA  
Sacramento , CA  
Martins Creek, PA  
Richland , WA

#### INDUSTRIAL PLANTS

Allegheny Ludlum Steel  
Domtar, Inc  
Great Lakes Steel Company  
Jefferson Smurfit Corporation  
LTV Steel  
Ravenswood Aluminum Company  
USS/Kobe Steel Co.  
U.S. Steel Co  
U.S Steel Co

#### TYPE OF FACILITY

Industrial Plant  
Industrial Plant  
Industrial Plant  
Industrial Plant  
Industrial Plant  
Industrial Plant  
Industrial Plant  
Industrial Plant  
Industrial Plant

#### LOCATION

Natrona, Pennsylvania  
Windsor, Quebec, Canada  
Ecorse, Michigan  
Brewton, Alabama  
Cleveland , OH  
Ravenswood, West Virginia  
Lorain, Ohio  
Birmingham, Alabama  
Gary, Indiana

### INDUSTRIAL PLANTS Cont.

National Steel Corporation  
U.S. Steel Corporation  
Weirton Steel Corporation  
USX Corporation  
Weirton Steel Corporation

### TYPE OF FACILITY

Industrial Plant  
Industrial Plant  
Industrial Plant  
Industrial Plant  
Industrial Plant

### LOCATION

Granite City, IL  
Gary, IN  
Weirton, WV  
Mount Iron, Minnesota  
Weirton West Virginia

### TELECOMMUNICATIONS

Northern Telecom, Inc,

### TYPE OF FACILITY

Telecommunications

### LOCATION

Research Triangle Park,NC

### NUCLEAR PLANTS

TVA Watts Bar Nuclear Plant  
TVA Sequoyah Nuclear Plant

### TYPE OF FACILITY

Nuclear Plant  
Nuclear Plant

### LOCATION

Silver City, TN  
Daisy, TN

### OTHER PLANTS

St. Regis Pulp & Paper Co.  
Champion Paper Company  
New Brunswick Pulp & Paper  
Prince George Pulp & Paper  
Encon Insulation Limited  
Oando Wings

### TYPE OF FACILITY

Other  
Other  
Other  
Other  
Other  
Building

### LOCATION

Monticello, MS  
Decatur, AL  
Prince George, BC Canada  
Prince George, BC Canada  
Quebec, Canada  
Lagos, Nigeria



# FIREPROOFING APPLICATION ON CABLES

