

**HIGH PERFORMANCE  
NON-TOXIC  
FIRE PROTECTIVE  
INTUMESCENT COATINGS**



**Outline of Discussion**

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  - A. Categories of Fire Protection
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- II. NoFire A-18
  - A. Description
  - B. Advantages
  - C. Standards, Performance, Testing and Approvals
  - D. Application to Surfaces
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## Outline (cont.)

- III. Fire Testing and Results
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- IV. Durability, Non-Toxicity and Environmental Safety Testing
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## Introduction to NoFire

### ***Patented, water-based latex coating***

- Identical in appearance to ordinary paint
- Easily applied by brush, roller or spray
- No special preparation required

### ***High Performance Intumescent Paint***

- Effective protection of most common materials, including metals, wood products, and composites
- Meets the most Severe Performance Requirements for residential, commercial and industrial environments

### ***Can be Tinted to Nearly Any Color***

- Cleans up with soap and water
- Can be applied over painted surfaces, or serve as a primer for top coating

***"NoFire Does everything that ordinary paint does..."***

***EXCEPT BURN!!***

## Categories of Fire Protection

### Comparison of Passive to Active Systems

	Passive	Active
<b>Initial Cost</b>	Low	Very High
<b>Maintenance</b>	None	Periodic
<b>Repairs</b>	Recoat damaged areas	Periodic
<b>Function/Operation</b>	Fire containment	Fire extinguisher
<b>Operational Damage</b>	Resurfacing	Water damage
<b>Potential For Failure</b>	Low	moderate

# ADVANTAGES



## Advantages of NoFire A-18

- Single Component
  - Water Base
- Non-toxic, environmentally safe
  - Non-hazardous
  - Low VOC
- No lead, asbestos, ceramics, halogens or solvents
  - Preparation Identical to Ordinary Paint
- Ordinary equipment- brush, roller or spray
  - No special applicator training
  - No special applicator protection gear
- Strict Internal Quality Control- Audited by Independent Laboratories and U.S. Government



## **Fire Performance Advantages**

- 1. Zero Flame Spread, Smoke Development**
  - (ASTM E84)
- 2. Underwriters Laboratories Classified**
  - (UL723)
- 3. Near Zero Heat Release Rate**
  - (ASTM E162, ASTM E1354)
- 4. Exceeds International Maritime Organization (IMO) Requirement for Low Flame spread, Smoke & Toxicity**
- 5. Fire Resisting Division**
  - (ASTM E119, UL1709, IMO A.754(13))
- 6. Fire Restricting Material, Flashover resistance**
  - (UBC 8-2, ISO 9705)



## **Ease of Application**

- Single Component- No Blending required
- Application by Brush, Roller, Airless or Conventional sprayer
- Nontoxic, Environmentally Safe- No Special Applicator Protection gear
- Ordinary surface preparation for Painting
- Easy cleanup- Soap and water
- Dries quickly, No Hazardous or Objectionable odors
- No Solvents, Lead, Asbestos or Halogens
- Can be used as Primer coat, or Finish coat
- Can be applied to nearly any surface suitable for painting



## **Ease of Application**

- Can be applied to nearly any surface suitable for painting
  - Dries quickly
- Only ordinary surface preparation required for painting
- Single component (no blending required)



## **Testing and Certifications**

## Standard Fire Tests For Building Products

### Flame Spread, smoke and toxicity

ASTM E84  
ASTM E162  
IMO A.653

### Combustibility – Potential for Ignition

ISO 1182  
ASTM E1354 (Cone Calorimeter)

### Room Fire Growth Potential (flashover)

UBC 8-2  
UBC 17-5  
ISO 9705

### Structural Fire Protection

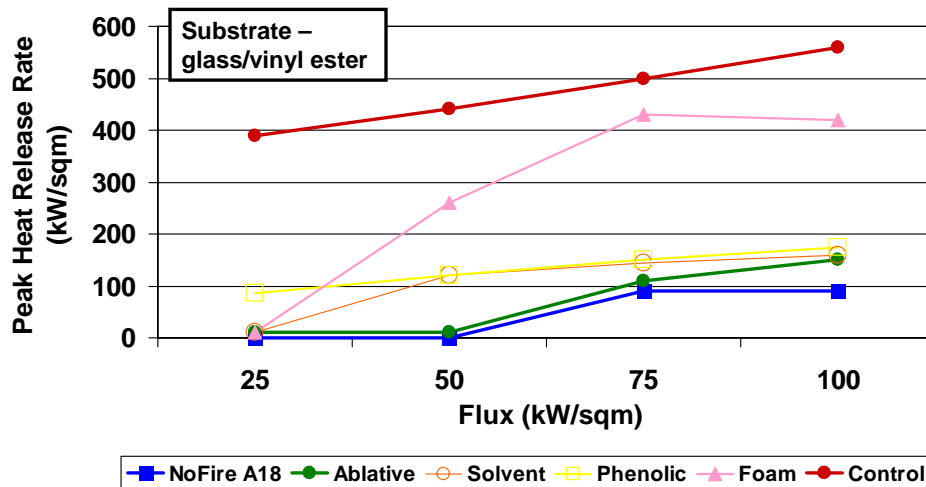
ASTM E119  
IMO A.754  
UL 1709

### Health and Environmental Impact

NES 713  
ASTM E662  
Modified Pittsburgh Protocol

## Cone Calorimeter Tests

ASTM E1354  
Sorathia, US Navy (NSWC)



## Surface Burning Characteristics Of Building Material

ASTM E84  
Various Materials

	Flame Spread Index (FSI)	Smoke Developed Index (SDI)
<b>Class A Requirements</b>	<b>25</b>	<b>450</b>
<b>NoFire A-18 Cement Board</b>	<b>0</b>	<b>0</b>
<b>NoFire A-18 0.0038" Douglas Fir</b>	<b>15</b>	<b>40</b>
<b>NoFire A-18 0.0015" Low Density Fiberboard</b>	<b>15</b>	<b>20</b>

### FIRE TEST RESULTS- IMO Resolution A.653(16)

Low Flame Spread

Conducted by Southwest Research Institute, San Antonio, TX

**NoFire A-18**

	Calcium Silicate Surface	Polyester	Acceptance Criteria
<b>Heat for Ignition (MJ/sqm)</b>	<b>&gt;30.0</b>	<b>11.8</b>	<b>&gt;1.5</b>
<b>Total Heat Release (MJ)</b>	<b>0.01</b>	<b>0.03</b>	<b>&lt;0.7</b>
<b>Peak Heat Release (KW)</b>	<b>0.00</b>	<b>0.19</b>	<b>&lt;4.0</b>

## Fire Test Results- U.S. Navy Qualified Products List

NoFire A-18NV

Conducted by NSWC, Carderock Div., Bethesda, MD

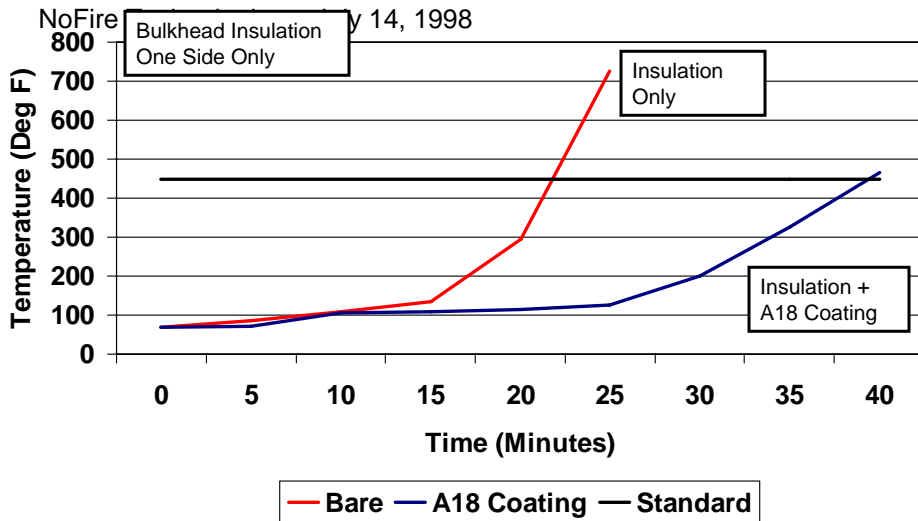
Test Description	Spec. No.	Type I (F124)	Results	
			Type II (F9788)	A-18NV
Surface Flammability	ASTM E162	FSI 2.33	3	1
Resistance to Ignition	MIL-PRF-24596	Ignites	No	No
Optical Density of Smoke Generated	ASTM E662			
Non Flaming Mode		40	67	23
Flaming Mode		41	83	25

## RESISTANCE TO AGING & HIGH HUMIDITY

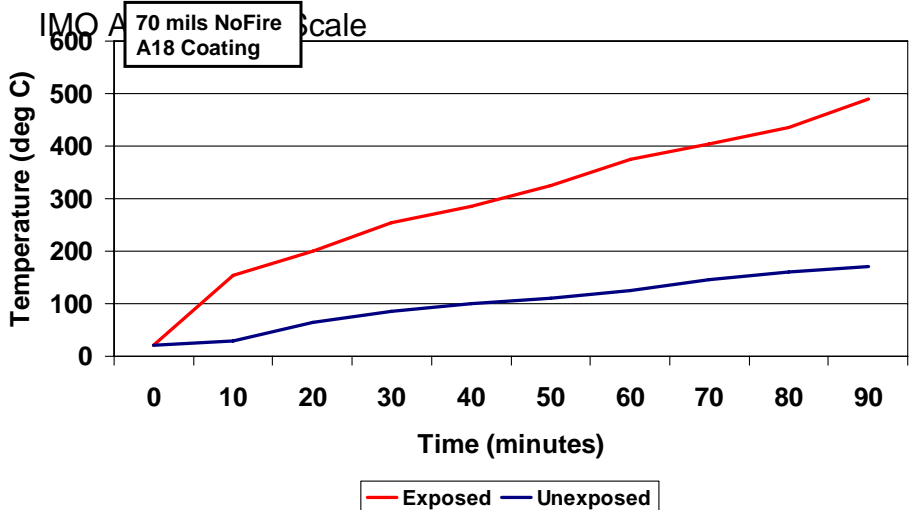
UL 263

Condition	Percent to Control	
	with Topcoat	w/o Topcoat
Acceptance Criteria	>75%	>75%
Accelerated Aging 270 days, 158° F	100%	90%
High Humidity 250 hours, 100% humidity, 95° F	100%	88%
High Humidity 180 days, 100% humidity, 95° F	95%	91%

# STEEL BULKHEAD INSULATION



# GLASS/VINYL ESTER COMPOSITE



## **Environmentally Safe**

- **Non-toxic**
- **No hazardous or objectionable odors**
- **Low VOC**
- **No lead, asbestos, ceramics, halogens or solvents**
- **Strict internal quality control- audited by independent laboratories and U.S. government**

## **Durability, Environmental, Health and Safety Features**

**Resists Moisture, High Humidity and Aging**  
(UL263)

**Durability, Flexibility, Impact Resistance**  
(Federal Standard 141, US Navy Qualified Products)

**Low VOC**  
(EPA 24)

**Resists Rust, Exudate Formation**  
(MIL-PRF-24596)

**Resists Growth of Mold, Fungus**  
(ASTM D3273 and D3274)

**Resists Bacterial Growth**  
(NYS Modified Pittsburgh Protocol)

**Low Smoke, Toxic Products of Combustion**  
(NES 713, ASTM E662, BSS7239)

## Toxicity Tests of NoFire A18

ASTM E662, BSS 7239, & NES 713

Gas	Maximum Safe Limit (ppm)	Test Results Flaming Mode
<u>(ppm)</u>		
H2S	750	0
Acrylonitrile	400	5.5
Phosgene	25	0
SO2	400	0
CO	4,000	27.5
HCN	150	0
NH3	750	20
Formaldehyde	500	0
HCL	500	0
HF	100	0
Phenol	250	0
CO2	100,000	5,000
NOX	250	5

## FIRE TEST PERFORMANCE- UBC8-2(150KW)

NoFire A-18NV

Substrate				Result	
Material	Under	Topcoat	NoFire A-18 (mils)	Max. Peak HRR (kW)	Max. Flux Density (kW/sqm)
Acceptance Criteria				300	20
Cement Board	18 coats alkyd	None	27	250	4.9
Sheet Rock	8 coats latex	1 coat latex	5	186.7	2.13
Cement Board	6 coats alkyd	1 coat alkyd	15	214.5	3.39
T-111 plywood	none	1 coat latex	13	267.1	5.28

## PAINT TEST RESULTS- A-18NV

QPL-24596

Conducted by U.S. Testing, Fairfield, NJ

Test Description	Spec. No.	Result
Total Solids	ASTM D-2369	65%
Viscosity	ASTM D-562	90 KU
Mass/Volume	ASTM D-475	11.9 lb/gal (1.43g/ml)
Drying Time	Fed. Std 144-4061	Tack Free: 9.5 min Dry Hard:15.5 min
Flexibility	Fed. Std 141-6221	No cracking along bend Using 3.2mm Mandril
Brushing Properties	Fed. Std 141-4321.2	No seeds, sags, runs, slight brush strokes visible
Spraying Properties	Fed. Std 141-2131	No runs, drips or sags
Blister Properties	DOD-C24596 ASTM D-1735 -500 hours ASTM D-714	No blistering
VOC	EPA 24	40.2 g/litre

## ADDITIONAL PAINT TEST RESULT – A18NV

QPL – 24596

Conducted by U.S. Testing, Fairfield, NJ

Test Description	Spec. No.	Result
Resistance to Exudate Formation	MIL PRF-24596(4.6.17)	Paint film dry
Washability	Fed Standard 141- 6141.1	Gloss at 60 deg – 75.0%
Flash Rust	MIL PRF-24596 (4.6.19)	No rust or corrosion
Freeze Thaw (5 cycles)	ASTM D-2243	No change
Recoatibility	MIL PRF-24596 (4.6.20)	No wrinkles, blistering or flaking
Resistance to Growth of Mold	ASTM D3273 & D3274	No fungal growth
Salt Spray Resistance	MIL PRF – 24596A	No red rust

<b>COMPARISON OF ORDINARY INTUMESCENTS TO NOFIRE A-18</b>				
	<b>EPOXY (2 PARTS)</b>	<b>SOLVENT</b>	<b>WATER BASE</b>	<b>NOFIRE</b>
<b>TOXICITY</b>	HIGH	HIGH	LOW	<b>NONE</b>
<b>ENVIRONMENTAL HAZARD</b>	HIGH	HIGH	LOW	<b>NONE</b>
<b>CONTAINS HAZARDOUS INGREDIENTS</b>	YES	YES	SOME	<b>NO</b>
<b>SPECIAL EQUIPMENT REQUIRED</b>	YES	YES	NO	<b>NO</b>
<b>PERFORMANCE</b>	HIGH	MODERATE	LOW	<b>HIGH</b>
<b>NUMBER OF COATING APPLICATIONS</b>	MULTIPLE	MULTIPLE	MULTIPLE	<b>ONE</b>
<b>COST</b>	HIGH	HIGH	MEDIUM	<b>MEDIUM</b>
<b>MILITARY, COAST GUARD, IMO APPROVALS</b>	NO	NO	NO	<b>YES</b>

# Practical Applications



**nofire**  
NoFire Technologies Inc.

# Uses for NoFire

## Commercial & Industrial



## Specialty Products



## Building Construction



## Military



## Transportation

Trains, Bulkheads, Undercarriage  
Automobiles fuel tanks  
Composite vehicles- monorails, people movers, buses, vans  
Aircraft, Bulkheads, Cargo containers, Fuel tanks, Electrical wiring  
Subway systems, cables, wiring

## Military

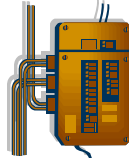
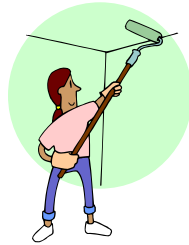
Warships, Bulkheads, overheads  
Composites  
Insensitive Ammunition Boxes  
Land Vehicles

## Specialty Products

Convention Displays  
Fiberglass coatings  
Aluminum trims  
Protective gear  
Foam Insulation

# More Uses of NoFire

## Residential



## Civilian Maritime



## Transportation



## Residential

Walls, Ceilings  
Garage, Basement  
Electrical Boxes, Utility rooms

## Commercial and Industrial

Walls, Ceilings, Doors, Partitions  
Cables, Wiring, Electrical rooms, Utility rooms  
Manufacturing plants, Fuel storage  
Wood products, Composites, Paneling, Displays

## Building Construction

Structural steel  
Building Products- wood, steel, aluminum, composites, drywall, gypsum, plaster  
Cables, wiring, electrical and utility rooms

## Civilian Maritime

Cruise ships, Ferries, High-speed crafts, Workboats  
Bulkheads, Overheads  
Cables, Conduits, Wiring  
Composites, Decorations  
Offshore Platforms



## **Summary**

- **High performance- eliminates flame spread, smoke & toxic by-products**
- **Non-toxic & environmentally safe**
- **Easy to apply- Ordinary equipment**
- **Adheres well to cable wraps**
- **Durable**
- **Resists aging, UV, rust, mold & high humidity**