

## PYRO-SAFE® FLAMMOTECT-A Cable Coating

Coating system for cables and cable support systems –  
protection against fire and external influences

# svt – Your Full-Service Provider for Passive Structural Fire Protection

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The svt group of companies has been one of the leading full-service providers in the area of passive structural fire protection for more than 50 years. We offer an extensive portfolio of state-of-the-art fire protection products and applications worldwide. This includes both simple penetration sealing solutions and complex combined penetration seals as well as solutions for fire protection joints or protecting entire cable systems.

Our own research & development, production and furnaces at six locations as well as international branches and a partner network covering 50 countries make comprehensive support possible on the basis of certified fire protection solutions, which can be tailored to your individual market requirements if required.

This makes us a powerful partner for your success!



# Contents

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Areas of Use .....	4
Extended Service Life of Cables .....	5
Fire Protection on Cable Systems .....	6
Benefits at a Glance .....	7
References .....	8
Product Data, Tests/Approvals & Documentary Evidence .....	10
Safety, Health and Environmental Protection .....	11
Fire Protection and Fire Behaviour .....	11
Electrical Parameters and Measurement Values .....	12
Resistance Properties .....	12
Chemical Resistance as per DIN EN ISO 2812-1 .....	13
Step-by-Step Application Guide .....	14
Application and Workability Properties .....	15

# PYRO-SAFE® FLAMMOTECT-A

## Areas of Use

### General Information

Today's buildings are home to cables of the most varied types, sizes and orientations. Countless cable systems catering to different requirements run through public buildings, industrial plants, power stations and other high-tech facilities. Many cables lie open on cable support systems, others are routed through cable tunnels or hidden behind wall and floor cladding. Cable systems run from floor to floor to provide connectivity, and they usually supply every room.

PYRO-SAFE® FLAMMOTECT-A is a protective coating that has been proving its practical worth and value time and time again: It safeguards cables and their functionality around the globe not only in residential and public buildings, but also in industrial buildings and plants as well as in offshore environments. Examples include hospitals, railway stations/airports, production facilities, power stations/transformer stations, heavy industry and nuclear facilities, to name but a few.



Industrial plants



Infrastructure projects



Public building



Energy supply & distribution

PYRO-SAFE® FLAMMOTECT-A is designed for coating electrical cables and wiring lines of any type and also regardless of the size of a cable's total conductor cross-section. Cables can be arranged individually or in bundles, and cable routing may be vertical, horizontal or at an angle. Cable support structures (cable trays or cable ladders) can also be coated.

### Areas of use

Media lines	Application
	Electrical, data and telecommunication lines of any type
	Cable bundles
	Cable support structures



## Extended Service Life of Cables

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Many cables are routed openly in outdoor areas, where they are exposed to environmental stresses (such as UV radiation); others are used in industries where exposure to oils or chemicals may pose a hazard.

Cable sheaths are not usually designed to withstand these types of impact: As they tend to become porous and brittle, they can no longer fully perform their insulating function. This again increases the risk of fire and failure.

Cable replacement is a time-consuming and cost-intensive undertaking, and downtimes are inevitable, especially in 24/7 industrial operations. Therefore, prevention is an all-round worthwhile investment! Protecting cables with a dedicated coating material will extend their service life while reducing the risk of failure.

PYRO-SAFE® FLAMMOTECT-A is a particularly resistant coating material: It forms a protective shield around cables, thus improving their durability against environmental influences such as e.g. UV radiation, salt water, oils and other chemicals.

Outdoor cable tray before/after coating



# Fire Protection on Cable Systems

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Electrical cables are prone to self-ignition as a result of overheating or short circuiting; they can also be set on fire by exposure to external fire or heat. Cable sheaths and insulation materials are usually combustible so that fire will spread along the cables with lightning speed.

Heat-induced melting of plastic cable sheaths causes burning dripping to occur and is accompanied by a release of toxic and corrosive fire gases that can lead not only to the destruction of technical systems and other materials, but also to life-threatening flue gas poisoning.

Any such incidents must be effectively prevented so as to minimise damage and counteract aftermath.



Comparative fire behaviour of cable trays (from left to right)

Coated with PYRO-SAFE® FLAMMOTECT-A,  
wrapped with PYRO-SAFE® DG-CR 0.7,  
unprotected cables

PYRO-SAFE® FLAMMOTECT-A has been awarded with a large number of country- and industry-specific product and application approvals.



DNV·GL



# Product Benefits at a Glance



## Easy to use and versatile

- ✓ PYRO-SAFE® FLAMMOTECT-A is available in different viscosities – the level of viscosity can be adjusted as desired by adding water; viscosity also depends on the intensity of stirring (thixotropy)
- ✓ Even thick layers can be applied in one operation, which enables cost-effective application
- ✓ Applicable with an airless spray device
- ✓ Formulated for indoor and outdoor use
- ✓ No electrical derating required
- ✓ Awarded with multiple approvals for use in nuclear facilities
- ✓ No impact on other building materials such as polyethylene (PE) and polyvinyl chloride (PVC), steel, stainless steel or aluminium

## Excellent resistance

- ✓ Resistant to moisture, freeze-thaw cycling, UV radiation as well as various oils and chemicals
- ✓ Saltwater-approved
- ✓ No spalling of material under mechanical stress, high flexibility of the coating
- ✓ High flexibility and adhesion tested to EN ISO 1519 (cylindrical mandrel, 5 mm in diameter)

## High-quality fire protection – made in Germany

- ✓ Solvent-free, contains no halogens
- ✓ Free of asbestos, lead, mercury, hexavalent chromium and polybrominated biphenyl ether
- ✓ Does not release toxic fumes
- ✓ Classified as non-hazardous material in acc. with the German Ordinance on Hazardous Substances ("GefStoffV")
- ✓ Monitored by national and international accredited certification bodies



# References

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## Lusail CP 1 Tunnel Katar

Project: Installation of Cable Coatings and Penetration Sealing Systems for High-Voltage Cables up to 66 kV  
Product: PYRO-SAFE® FLAMMOTECT-A Cable Coating  
Application: PYRO-SAFE® Penetration Sealing Systems  
Standard: FM 3971



## Shoaiba Power Plant Saudi Arabia

Project: Installation of Cable Coatings and Penetration Sealing Systems  
Product: PYRO-SAFE® FLAMMOTECT-A Cable Coating  
Application: PYRO-SAFE® Penetration Sealing Systems  
Standard: EN 1366



## Siam Cement Group Thailand

Project: Several Cement Plants in Thailand and Cambodia  
Products: PYRO-SAFE® FLAMMOTECT-A Cable Coating and PYRO-SAFE® FLAMMOTECT Penetration Sealing Systems  
Application: Coating for high- and medium-voltage cables, fire protection systems for building entrances  
Standard: IEC 60332-3-22 Kat. A, EN 1366-3

## **Tenaga Nasional Berhad (TNB) Malaysia**

Project: 132 kV and 33 kV Transformer Substations  
Product: PYRO-SAFE® FLAMMOTECT-A Cable Coating  
Application: Coating for high- and medium-voltage cables  
Standard: IEC 60332-3-22



## **Refinaria de Sines Portugal**

Project: Cable Coatings in a Petrochemical Plant  
Product: PYRO-SAFE® FLAMMOTECT-A Cable Coating  
Application: Coating for high-voltage, medium-voltage cables  
and control lines  
Standard: FM 3971



## **Pumpspeicherwerk Goldisthal Germany**

Project: Pumpspeicherwerk (pumped-storage power plant) Goldisthal  
Products: PYRO-SAFE® FLAMMOPLAST KS 1,  
PYRO-SAFE® FLAMMOTECT-A Cable Coating  
and Cable Ducts  
Application: PYRO-SAFE® Penetration Sealing Systems



# PYRO-SAFE® FLAMMOTECT-A

## Product Data, Tests & Documentary Evidence

PYRO-SAFE® FLAMMOTECT-A is an ablative fire protection coating. In the event of a fire, PYRO-SAFE® FLAMMOTECT-A will absorb thermal energy and split off crystalline-bound water, thus exerting a cooling effect on the cable and its surroundings. The endothermic reaction starts at approx. 170 °C. Furthermore, a protective layer is created in the process so as to insulate the surface and reduce the intensity of the fire impact on the coated material.

### Product Data



### Delivery and Packaging

Description	Art. No.	Container*	Bucket/Pallet	Net Weight/ Pallet
PYRO-SAFE® FLAMMOTECT-A Coating	01155101	12.5 kg bucket	40 pcs	500 kg
	01155105	15 kg bucket	32 pcs	480 kg
PYRO-SAFE® FLAMMOTECT-A Solid Emulsion	01155128	5 kg bucket	60 pcs	300 kg
	01155106	12.5 kg bucket	40 pcs	500 kg
	01155107	15 kg bucket	32 pcs	480 kg

\*Further container sizes are available upon request

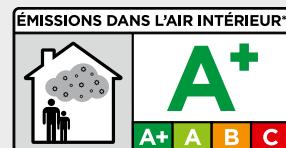
- Store at room temperature (+5 °C to +30 °C).
- Protect from frost!
- 18 months minimum shelf life if stored unopened and properly.
- Classified as a non-hazardous substance in acc. with the German Ordinance on Hazardous Substances ("GefStoffV") and as a non-dangerous good in acc. with the German Ordinance on the Carriage of Dangerous Goods by Road ("GGVS") and with the European Agreement on the International Carriage of Dangerous Goods by Road ("ADR").

### Key physical and chemical properties

State of aggregation		Liquid or pasty, resp.		
Colour		White		
Smell		Almost odourless		
pH-value		7.0–7.8		
pH solution		10 % in water		
Density (at +20 °C)		1.34–1.48 g/cm³		
Viscosity (at +20 °C)	Coating	6,000–10,000 mPa s	the level of viscosity can be adjusted by adding water)	
	Solid emulsion	25,000–40,000 mPa s		
Non-volatile matter		66–86 % as per EN ISO 3251		
Loss of mass on heating		38–48 % as per EN ISO 3451-1 / EOTA TR024 at 400 °C for 30 minutes		
LOI (Limited Oxygen Index)		52–58 % as per ISO 4589; sample thickness 1.5 mm		
Flexibility of the coating		> 5 mm as per EN ISO 1519; sample thickness 1.5 mm		
Fire behaviour		Class E as per EN 13501-1		

# Safety, Health and Environmental Protection

- ✓ Contains no PBT/vPvB substances > 0.1 %, assessed in accordance with REACH Annex XIII
- ✓ Contains no substance subject to the restrictions of Annex XVII of the REACH Regulation
- ✓ Contains no REACH candidate substance
- ✓ Contains no substance listed in REACH Annex XIV
- ✓ Contains no substances subject to Regulation (EU) 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals
- ✓ Contains no substances subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants
- ✓ Contains no substances subject to Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer
- ✓ Contains no substance subject to Regulation (EU) 2019/1148 of the European Parliament and of the Council of 20 June 2019 on the marketing and use of explosives precursors
- ✓ PYRO-SAFE® FLAMMOTECT-A is rated as class A+ as per the French VOC regulation  
(Eurofins Product Testing, Report No. 392-2021-00490501)



## Fire Protection and Fire Behaviour

<b>Fire Protection</b>	Class E	<ul style="list-style-type: none"><li>• As per EN 13501-1</li></ul>
<b>Flame spread</b>	Cat. A: 2018 for 60 min. Dry film thickness > 0.5 mm	<ul style="list-style-type: none"><li>• As per IEC 60332-3-22 (DNV GL Certificate No. TAE00003BN)</li></ul>
	Cat. A for 60 min. Dry film thickness > 1.0 (PE); 1.4 mm (PVC)	<ul style="list-style-type: none"><li>• GOST IEC 60332-3-22</li></ul>
	Class Rating: A (0-25 flame spread, 0-450 smoke-developed) Flame spread index: 15 Smoke-developed index: 60	<ul style="list-style-type: none"><li>• ASTM E84</li></ul>
<b>Circuit integrity maintenance</b>	Multiple tests up to 180 min. for different cable types and voltage ranges	<ul style="list-style-type: none"><li>• As per IEC 60331-21</li></ul>
<b>FM Approval Class 3971</b>	FM Approvals – Certificate of Compliance Approval Identification: 3037058 Certified dry film thickness of 1.6 mm	
<b>Smoke density</b>	$D_s(4) = 81$ , $VOF4 = 154$ min., $D_s(\max) = 85$ $D_s$ Average = 174.36	<ul style="list-style-type: none"><li>• As per DIN EN ISO 5659-2</li><li>• As per ASTM E 662</li></ul>
<b>Smoke toxicity</b>	$CIT_G = 0.20$ (Conventional Index of Toxicity) No release of HCl, HF, HBr, HCN	<ul style="list-style-type: none"><li>• EN 45545-2 Annex C and ISO 5659-2</li></ul>

# Electrical Parameters and Measurement Values

<b>Cable heating</b>	No electrical derating required	• As per FM Approval Class 3971
	Thermal comparison of coated and uncoated cables. Temperature difference < 2 %	• GOST IEC 60332-3-22
	No temperature difference between coated and uncoated cables while under current for 8 hours	• Test Report No. 00541 Elektrisches Prüfamt München (Electrical Testing Office, Munich)
<b>Dielectric strength</b>	Leakage current < 5.0 mA between conductor and outer sheath during high-voltage test	• As per FM Approval Class 3971
<b>Surface resistance</b>	$\geq 1,000 \text{ M}\Omega$	• As per DIN VDE 0427/05.85, Section 503-4.2

## Resistance Properties

<b>Resistant to ageing</b>	The essential properties of PYRO-SAFE® FLAMMOTECT-A are not affected by ageing	
	<b>Artificial ageing without impairment Indoor/Outdoor use:</b> Temperature extremes alternating between +71 °C and -40 °C, UV irradiation and humidity	• As per FM 3971 • As per EOTA TR024
<b>Long-term ageing without impairment</b>		
	<b>Outdoor use:</b> The material was exposed to natural weathering for 5 years without exhibiting any change in fire behaviour (MPA Nordrhein-Westfalen (notified body 0432), Report No. 230006109-1) <b>Indoor use:</b> The material was stored indoors for 10 years without exhibiting any change in fire behaviour (MPA Braunschweig (notified body 0761), Report No. 3224/821/11)	
<b>Resistant to weathering</b>	Use category X (product suitable for use in areas exposed to natural weathering)	• As per EOTA TR024
<b>Resistant to salt water</b>	Long-term exposure to salt water	• As per FM 3971 • As per EOTA TR024 • As per EN ISO 2812-1
<b>Resistant to radiation</b>	Classified as radiation-resistant at a radiation dose of $1.0 \times 10^6 \text{ Gy}$ (108 rad)	
<b>Resistant to aggressive deactivation media</b>	Approved to withstand various types of deactivation media, e. g. nitric acid, sodium hydroxide, boric acid	

# Chemical Resistance as per DIN EN ISO 2812-1

The resistance to chemicals of PYRO-SAFE® FLAMMTECT-A was determined based on DIN EN ISO 2812-1 (Paints and varnishes – Determination of resistance to liquids – Part 1: Immersion in liquids other than water).

The test series covers the most common chemicals that may be present in vulnerable areas. The scope of testing ranges from short-term exposure (e.g. resulting from accidental contact for usually no longer than 30 minutes) to sustained exposure (measured with an exposure time of 28 days).

The coated cable samples were directly exposed to the respective chemical for 80 % of their length. After exposure, the samples were cleaned with distilled water, dried for 24 hours and then evaluated for coating integrity.

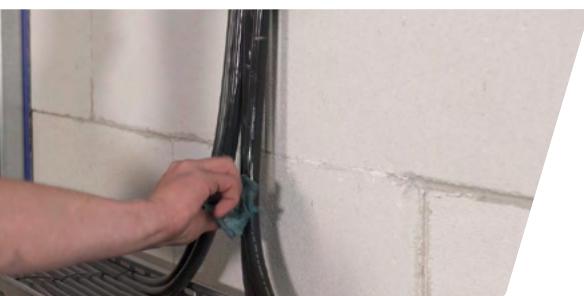
## Evaluation criteria

Complete resistance is intact, no changes occur	+++
Resistance is intact, slight changes are visible	++
Resistance is still intact, visual and minor mechanical changes occur	+
Resistance is no longer intact, mechanical changes restrict functionality	-
Resistance is no longer intact, the chemicals partially destroy the coating	--

Chemical	Concen- tra-tion	Short-term exposure	Sustained exposure	Chemical	Concen- tra-tion	Short-term exposure	Sustained exposure
Boric acid	5 %	+++	+++	Ammonia	undiluted	+++	--
Acetic acid	undiluted	--	--	Hydrogen peroxide	3.5 %	+++	--
	10 %	+++	-		undiluted	--	--
Nitric acid	undiluted	+++	--	Seawater	3 %	+++	+++
	10 %	+++	--		10 %	+++	+++
Hydrochloric acid	1 %	+++	+++	Tap water	undiluted	+++	+++
	undiluted	+++	--	Urea	undiluted	+++	+++
	10 %	+++	++	Formaldehyde	30 %	+++	+++
Sulphuric acid	1 %	+++	+++		3 %	+++	+++
	undiluted	+++	--	Hydrogen fluoride	undiluted	--	--
	10 %	+++	+++	Butyl acetate (ester)	undiluted	++	--
Phosphoric acid	1 %	+++	--	Acetone	undiluted	+++	+
	undiluted	+	--	Isopropyl alcohol	undiluted	+	--
	10 %	++	--	Methanol	undiluted	++	--
Potassium chloride	10 %	+++	+++	Ethanol	undiluted	++	+
Potash lye	50 %	++	--		20 %	+++	+
	10 %	+++	--	Butanol	undiluted	++	--
	1 %	+++	+++	White spirit, aromatics-free	undiluted	+++	++
Caustic soda	50 %	+++	-	White spirit	undiluted	+++	++
	10 %	+++	-	Glycerine	undiluted	+++	++
	1 %	+++	+	Fuel oil/Diesel	undiluted	+++	++
Sodium chloride	10 %	+++	+++				

# Step-by-Step Application Guide

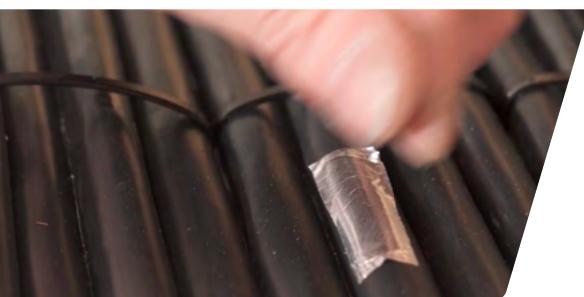
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Clean dust and dirt from the cables/cable support structures, then degrease them thoroughly with a neutral cleaner.



Cover or mask-tape the floors, walls and electrical equipment.



Make preparations for proper subsequent measurement of the coating's layer thickness. For example, wrap metal tape around the cable or arrange metal plates in place against which the coating's dry film thickness can later on be measured.



Apply PYRO-SAFE® FLAMMOTECT-A evenly to all exposed surfaces. Hard-to-reach surfaces can be coated with the help of accessories, e.g. extension tubes and articulated nozzles.



After the coating has cured (completely dried), determine its dry film thickness with a measuring device.



Remove the tape and covers, clean the installation area and (if applicable) attach the identification label.

# Application and Workability Properties

Type of application	Coating	Thin-layer application			
	Solid emulsion	Thick-layer application			
Application procedure		<ul style="list-style-type: none"> <li>Spreading with a brush or roller</li> <li>Spraying with an airless spray device</li> <li>Recommendation for application:</li> <li>Coating: Recommended nozzle bore &gt; 0.019“ = 0.48 mm</li> <li>Solid emulsion: Recommended nozzle bore &gt; 0.021“ = 0.53 mm</li> <li>Pressure: 150-180 bar</li> </ul>			
Consumption (example)		Solid content (weight) 66–86 %	Application quantity [g/m <sup>2</sup> ]	Film thickness [mm]	
				wet      dry	
			1,000	approx. 0.9      approx. 0.5	
			2,000	approx. 1.8      approx. 1.0	
			3,200	approx. 2.9      approx. 1.6	
			4,000	approx. 3.6      approx. 2.0	
Drying times at +23 °C and 65 % rel. humidity		Dust-dry (touch-dry)	Recoatable with itself	Fully cured	
	Coating	min. 4 hours	min. 8 hours	min. 4 days	
	Solid emulsion	min. 4 hours	min. 8 hours	min. 4 days	
	Filler	min. 6 hours	–	min. 10 days	

## Installation Video

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Be sure to watch the **installation video** of PYRO-SAFE® FLAMMOTECT-A and of other penetration sealing systems in full length!





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