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FIRE SECURITY

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Fire Protection & Jacket Repair of Electrical Cables

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COATING OF CABLES

Abstract

From a historic point of view there has been a need to protect cables for as long as cables have existed. Coating as a mean of cable protection has been used for more than 50 years. Most nuclear power plants in Europe have had their cables coated the last 50 years.

Introduction

Fire Security is a company from Norway specializing in coating of cables. Fire Security has two coating systems, the Firesec FS1 and Firesec FS5. Fire Security has protected cables for more than 20 years in the oil and gas industry. Initially only fire protection were performed but over the years more benefits and a wider scope of work has been added.

Areas of benefit

Fire Security has over the years found further benefits to coating as a form of protection. Fire security has certified coating systems which upgrades cables fire technically to industry common standards such as IEC 331 and 332, among others. Fire Security's coating of cables extends the lifetime of existing cables. This being from general protection of the cables in normal conditions and specialized protection in certain harsh areas. Fire Security's Firesec FS5 is approved to repair cables' outer sheath. This is a major benefit as the repaired cable will be upgraded fire technically as well as protected from the environment.

Industry Segments

The following industries have traditionally been the main markets for Fire Security's coating work. Oil and gas industry: onshore plants and terminals, petrochemical plants etc. Offshore platforms, drilling rigs, ships, FPSO's and tankers.

Cruise Ships

Power Plants

Cement Industry

Melting Plants

Tall Buildings

Lifetime Extension of Cables

FS has over the years noted the remarkable effect of extending the lifetime of FS coated cables. The last 10 years FS has researched these effects and further developed our coating systems to maximize these effects.

Research has shown that by applying FS's coating to your cables you will extend the cables normal design lifetime of the cables by up to 100%. The underlying reasons for this are found in the coating being Ozone resistant, UV resistant, and resistant to chemicals as well as greatly limiting the Oxygen's influence on the cable sheathing. FS's coating is greatly enhancing the safety of old cables by providing an insulating layer that is approved to rebuild a cable's outer sheath.

Three main focuses:

1. Taking care of the cables ability to function
2. Upgrading the cables to meet today's standards
3. Minimize detrimental effects

1. Taking care of the cables ability to function

We have to ascertain that the cables conductivity is in working condition before any further work is done. FS coatings have a very high insulation value and dielectric strength. This ensures that the electrical safety is maintained and that the cables working capacities are maintained.

2. Upgrading the cables to meet today's standards

FS coated cables is upgraded to meet today's most stringent standards with regards to toxicity, smoke emission, smoke toxicity, flame spread and fire resistance.

3. Minimize detrimental effects

The work of applying the FS coating is done with the cables operating as normal.

Our work crew can be as small as two men and upwards. This again ensures a smooth normal operation for the installation.

FS has references from projects from the greater parts of the world all proving this. Examples are cables in harsh environment with a design lifetime of 20 and 25 years that was coated 10 to 25 years ago and remains in good operational condition even today.

Among these we like to mention cables on an oil and gas facility in Indonesia that is operated in some of the world's most exposed area when it comes to UV, Ozone, mud and saltwater. FS had repaired and coated these cables more than a decade ago, at that time the cables were at the end of its normal designed life.

FS's FS5 is the leading coating in the world when it comes to protection and lifetime extension of electrical cables and as an advanced coating system your cables is also fire protected by the coating.

We have documentation from test facilities, the world's leading classifications societies and governmental organizations, so no matter what your cables are exposed to you will benefit from our coating in extending the life time of the cables.

Major cost saver

By substantially extending the lifetime of the cables the benefit will be a huge cost saver as no downtime and no costly cable replacements are required. Fire Security has a range of cases of successful life extensions of cables. Some of which the cables has reached twice its designed lifetime. The coating has been tested and certified by a range of independent test facilities. These tests have been witnessed by class societies and authorities.

Risk Reduction

Fire Security may contribute to a large risk reduction of any plant or installation. The main factors of reduced level of risk derived from coating of cables are listed below.

A) Fire risk, fire scenario.

- 1) Limit the risk of a fire starting from the cables themselves.
- 2) Avoid cables as a way of spreading fire
- 3) Keeping the cables live in a fire situation and thus maintain control, surveillance and communication.
- 4) Prevent the development of smoke and toxic gases from burning cables
- 5) Reduce the overall fire load in any area with cables

B) Normal operation

- 1) Maintain the insulation levels in the cables
- 2) Prevent cracks from developing in the cables.
- 3) Prevent water or gas ingress.
- 4) Increase the cables resistance to chemicals.
- 5) Delay natural ageing of the cables.

Enhanced Operational Flexibility

The ability to upgrade the cables fire technically and at the same time extend the life time of the cables without any shutdown required gives you a huge flexibility when maintaining or upgrading an existing facility.

Cables in a fire situation

The amount of PVC in cable sheaths in cable rooms such as switch rooms or control rooms may make up a fire load (caused by PVC in cables) in a single cable room that is more than 15,000 kg. The room will then have a heating value of 75,000 kwh. In a fire situation this will be disastrous. This does not take into consideration other materials that may contribute to a fire load. 1 kg of PVC has a heating value of 5 kwh, fire loads of 350 kwh/m² is very common. In a fire situation the PVC will reach temperatures of 950°C to 1000°C in a short duration. In case of a fire, each kilogram of PVC will release approximately 600 litres of saturated hydrochloric acid gas and 3000m³ of smoke with hydrochloric acid. Fire damage caused to control rooms, switch boards and electronic equipments have caused fire affected plants to stop production for several months with all the disastrous effects related thereto. Cable protection by coating will immediately eliminate the above effects from a fire.

The coating systems

Both coating systems are non-toxic, water based, flexible and has very good adhesion. The coating does not de-rate cables and this is also applicable for high voltage power cables. Both coating systems are tested in accordance with IEC 331 and 332 but with much higher temperatures of 1100°C which is in close correlation to the temperatures of a hydrocarbon curve. Firesec FS 1 is an intumescent coating system that expands up to 100 times its own thickness in a fire situation. Firesec FS 5 is an ablative coating system that starts an endothermic reaction in a fire situation. We will focus on the Firesec FS 5 below.

Authorization

Certificate No. E-7653 from Det Norske Veritas Certificate No. 04-HG475651-PDA from ABS Certificate No. 48846 HH from Germanischer Lloyds Certificate No. 3018998 from FM Approvals Certificate No. 164.112/EC 0801/ 26103-05 from US Coast Guard

Use

Firesec FS5 is a universal fire resistant coating used on electrical cables laid horizontally or vertically indoor or outdoor.

Properties

Firesec FS5 is a medium viscous, non-hygroscopic fire resistant compound that is applied in thick coats to cables. Firesec FS5 is based on a solvent free latex with fire resistant pigments and is free of halogens, asbestos and ceramic fibres. Under the influence of heat, energy will be absorbed. At an average temperature of 230°C the water of hydration starts to escape. The endothermic reaction abstracts energy from the combustion process causing a dilution of escaping flammable gases with water vapour. The reaction delays the ignition and prevents spreading fire. Firesec FS5 after drying is viscoelastic, impermeable according to DIN 1048,

resistant to oil and petrol spills, weatherproof, virtually odourless and environmentally friendly.

FS5 is resistant to radiation and is resistant to chemicals.

Firesec FS5 conforms to ablation fire resistant coating compound according to DIN 4102 for electric cables laid horizontally or vertically.

Application

Firesec FS5 is ideal for spray application, but may also be applied with brush or roller application. When spray application is being utilised, up to 3% water may be required depending on the type of equipment being used.

Drying times

Temperature 20°C, relative humidity 65%, coverage rate 1900g/m² corresponding to 1mm dry film thickness. Lower temperatures and higher humidity delay drying.

Dust Dry : 3 hrs

Touch Dry : 6 hrs

Full Cure : 6 weeks

Health and Safety

Use Firesec FS5 in accordance with all applicable local and national regulation.

Ecological information

Firesec FS5 is a water based system and does not present any health hazard. No labelling is required in accordance with 91/155 EWG.

Storage and Transportation

Shelf life : 12 months in unopened containers provided the product is stored at ambient temperature.