KBS® Coating
Fire protective coating for electrical cables and penetration seals
General Information

KBS® Coating is a water-based, ablative fire protective coating, especially developed for the fire protection of grouped or bundled electrical cables and for penetration seals.

The main function of KBS® Coating is to prevent flame propagation along vertical and horizontal cable ways. KBS® Coating will also delay short circuit, whereby circuit integrity depends on the distance of the cables from fire and the incurred temperature. KBS® Coating is easily applied by conventional methods such as spray and brush, as well as by hand (see application data). KBS® Coating is also available free of halogens – named KBS® Coating CLF.

KBS® Coating has been tested to all recognized international standards and is used worldwide, from the arctic circle to the tropics. Its effectiveness has been proven in several documented cases of actual fires. KBS® Coating is produced only by BASF in Illertissen where a quality system fulfilling the requirements of DIN EN ISO 9001 and DIN EN ISO 14001 has been in place for more than a decade.

KBS® Coating is also an integral part of the cable penetration seal KBS® Panel Seal ABL. Here it is used as a coating for the mineral wool panels, the sealing of the penetrating cables and other utilities. For use of KBS® Coating in the installation of KBS® Panel Seal ABL please refer to our separate brochure.

How does an ablative coating work?

KBS® Coating protects electrical cables through ablation as opposed to intumescence. Energy is consumed or generated to change any material from one condition or state to another.

Processes consuming energy are called “endothermic”. Some materials need large amounts of energy to decompose or “break down”. A good ablative composition requires a maximum of energy to decompose. KBS® Coating when exposed to fire starts to ablate by chemical and physical reactions, for instance evaporation, chemical cracking, melting - all this is consuming energy (heat) while keeping the cable relatively cool (for a certain space of time, as the process is self-sacrificial).

The gases and vapours generated during the ablative process push oxygen away from the surface, dilute flammable gases preventing them from burning and interrupt the “chain reaction” of fire chemically. After decomposition of all organic components, a solid structure of inorganic components remains offering further protection by insulation.

KBS® Coating...
... lasts for the lifetime of cables
... does not derate electrical cables
... is totally weather and water resistant
Special Features

Fire protection

KBS® Coating prevents flame propagation on cables, thus keeping a cable fire localized to its source, where, however, some minor damage to the most exposed cables must be accepted.

According to bibliographical references, a fire on vertical cable ways can spread 20 m per minute. Flame spread on KBS®-coated vertical cables in the 40-minute IEC 60332-3 test has been restricted to less than 10 cm (see list of international test results).

KBS® Coating has an LOI (Limiting Oxygen Index) value of 100.

What is an LOI value of 100?
The Limiting Oxygen Index value test, in accordance with ASTM D 2863, determines the percentage of oxygen in a nitrogen/oxygen mixture at which a material sustains burning on its own. In this test, which determines the burning characteristics of all plastic materials, the sample is secured in a glass cylinder – containing a definite gas flow of O2/N2 mixture – and ignited with a gas flame. Then the gas flame is removed and the sample is observed for continued burning. Soft PVC, as used for cable jackets, continues to burn at a low 25 – 30% oxygen content. Teflon, however, sustains burning only at a high 90 - 95% oxygen content.

KBS® Coating has an LOI of 100, which means, it does not even burn in a 100% oxygen environment.

Ampacity

KBS® Coating does not affect the current carrying capacity of electrical cables. The FM test states “no derating required” (see list on page 5).

Why no derating when cables are coated with KBS® Coating?
KBS® Coating protects electrical cables through ablation and not through insulation. It is dense and thermally conductive during normal cable operating temperatures. Its thermal conductivity is better than that of PVC. The coating increases the circumference (= surface) of the cable or cable bundle. The surficial area is further enlarged by the roughness of the coat (radiator effect). This extended surface allows more heat to dissipate. The cable temperature, therefore, does not increase.

Prevention of poisonous and corrosive gases and smoke
By preventing the fire from spreading and eventually involving all cables, KBS® Coating also prevents the development of the dreaded HCl (hydrochloric acid) from PVC cables as well as the dense black smoke and poisonous gases developing from all types of cables.

Mechanical resistance

KBS® Coating is tough enough to sustain physical abuse such as walking on coated cable trays.

Human health compatibility

KBS® Coating is in no way affecting the human health system, it is non-toxic, solvent-free, phosphate-free and does not contain asbestos or any other substance identified as being cancerrogenic. KBS® Coating is practically odourless and does not affect the human skin.

Weather and water resistance

KBS® Coating is permanent protection under all weather and climatic conditions. A 30 years outdoor test, documented by the Institute for Fire Protection of TU Brunswick/Germany, found KBS® Coating still performing the same as freshly produced material. Here cables had been exposed from highest summer heat to snow and ice in winter, part of their length being constantly immersed in water.

Chemical compatibility

KBS® Coating has been tested for compatibility with close to 90 chemicals and has been found to be unaffected by those most frequently found in industrial installations such as Diesel fuel, ethylene glycol, fuel oil, lubricating oil, turbine oil and many others.

Flexibility

KBS® Coating is highly flexible (see technical data).

Endurance / lifetime

KBS® Coating lasts for the lifetime of cables.
Application on cables

Surface preparation
Extensive cleaning of cables is not required. However, oil or grease should be taken up with dry rags (no solvent). Using a broom or vacuum cleaner to remove heavy layers of dust is sufficient.

Spray Application
This is performed in the conventional way by spraying crosswise. On all exposed surfaces the wet thickness of the coating must be at least 2.5 mm. The use of an extension nozzle is recommended when full coating is required in areas with limited accessibility. If cables are situated close to a wall, the cavity between cables and wall is stuffed with mineral wool and then coated over. Usually the required thickness may be applied in one coat. However, if new vertically mounted cables are to be coated, it is recommended that a thin “fog-coat” should be applied first, let dry and the final coat be applied thereafter.

Application by Hand
Single large diameter cables or bundles may be coated by hand. Again, a thin coat should be allowed to dry before the rest is applied, using both hands (wear rubber gloves) like an extruder. To achieve a smooth, even finish, use a wet brush.

Recommended coating thickness on cables:
Coverage at recommended thickness:
Approx. 3.0 kg/m² for level surface. For grouped cables or cables in trays allow 30% more material considering the curved surfaces.

Application on mineral wool panels
This substrate can be coated either by spraying or by hand, using a trowel. When preferring the latter application technique, use a large steel trowel, such as employed for leveling out concrete surfaces. For the KBS® Panel Seal ABL an application rate of approximately 3.0 kg/m² will result in the required dry thickness of approx. 1.6 mm.

KBS® Coating is available in two kinds of make-up. KBS® Coating sprayable and KBS® Coating Brushable.

Thinning
KBS® Coating is water-based. However, both types mentioned before, usually do not require thinning.

Spray equipment
KBS® Coating may be applied with a large variety of spray equipment designed for application of high viscosity materials. Good results have been obtained with the following:

Airless spray equipment
Graco Smart Mark V
Pressure at gun: 0 – 200 bar
Spray gun orifice: 0.9 – 1.0 mm
(preferably reversible tip)

Please note
Air supply, air pressure, diameter of material hose as well as minimum orifice opening must be adhered to as recommended. All filters with the equipment must be removed prior to operating with KBS® Coating.

Technical Data
Composition:
KBS® Coating consists of water-based thermoplastic resins, inorganic incombustible fibres, fillers, pigments and various flame retardant chemicals. KBS® Coating is free of asbestos and solvents.

Colour: Off-white
Viscosity: Approx. 40,000 mPas
Density: Approx. 1.43 g/cm²
pH-value: Approx. 8.0

Solids: Approx. 70%
Limiting Oxygen Index (LOI): ≥ 95
(to German approval)
Toxicity: Non-toxic
Storage temperature: 5 – 30°C, Must be protected from frost!
Shell-life: In closed original containers at room temperature at least 16 months

Packaging:
Plastic drums of 35, pails of 25 and 7 kg

Thinning i.e. cleaning of equipment: Water
Drying time:
To the touch: within 24 hours (20°C/65% RH)
Cured: approx. 3 days (20°C/65% RH)

Flexibility:
PVC cables of 12 mm diameter coated with KBS® Coating may be bent to a 3 cm radius without cracking.

Thermal conductivity:
λ = 0.69 W m⁻¹ · K⁻¹ at 25°C

Specific resistance:
ρₚ = 1.06 · 10⁹ (Ohm · cm) at 23°C / 50% RH
ρₚ = 4.10 · 10⁵ (Ohm · cm)

Shelf-life:
In closed original containers at room temperature at least 18 months

Limiting Oxygen Index (LOI):
≥ 95
(minimum requirement acc. to German approval)

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### Selection of International Test Results and Approvals

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