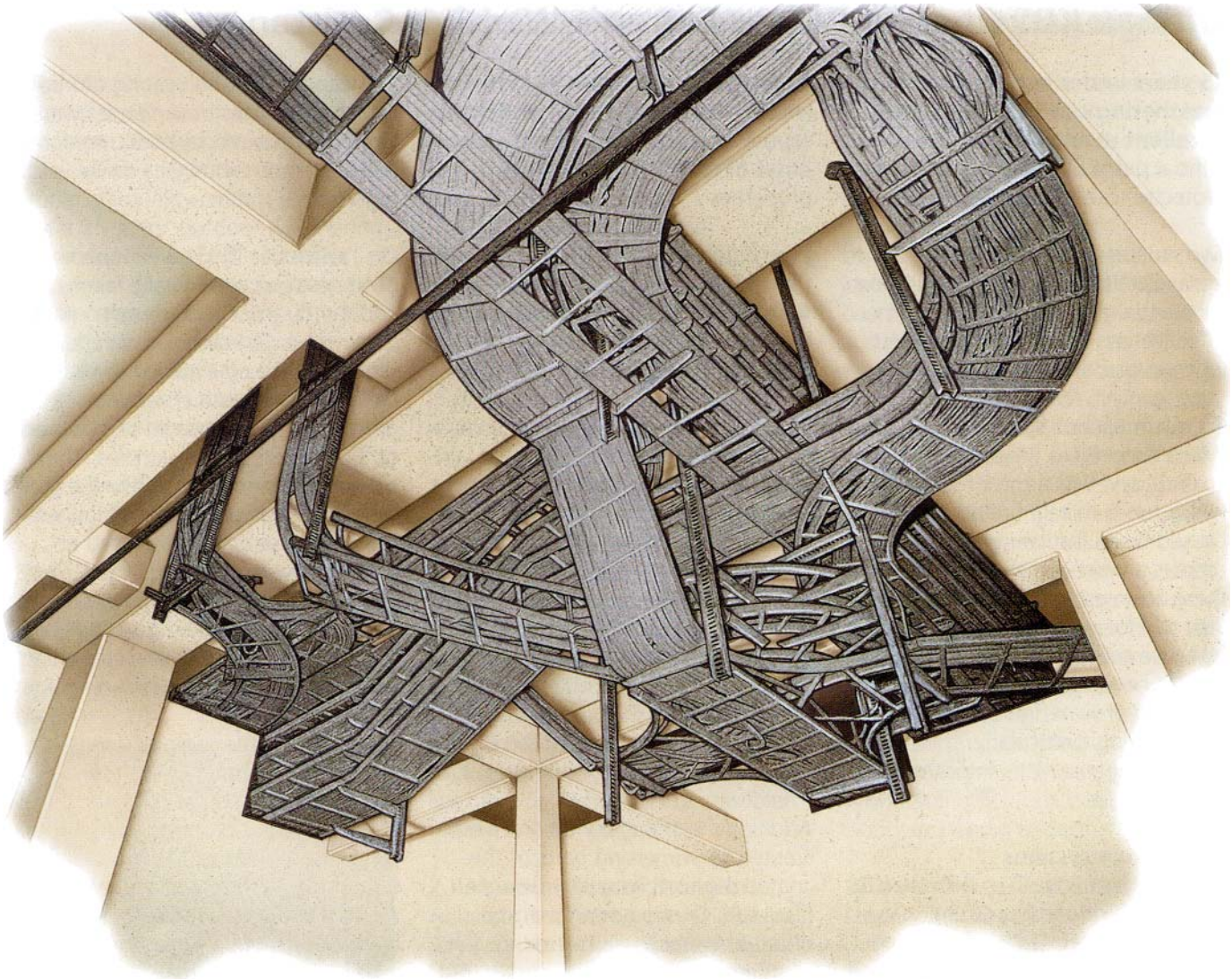
The Proven Solution



KBS FIRE PROTECTION SYSTEM

Coating

25 Years Extreme Weather Resistance
Officially Approved

www.KBSpassivefire.com

KBS Coating Proves Extreme Weather Resistance

25 years under extremely adverse weathering conditions lead to excellent results!
Official proof of performance for fire protective cable coating

Two systems for fire protection of cables are available which are known to be substantially different in their effectiveness and their characteristics when in use.

1.) Intumescent systems
When exposed to fire an intumescent coating develops a thick foam layer which has a certain fire protection caused by an insulating effect. But there is an inherent disadvantage in these intumescent materials because they are not resistant to water (caused by active substances which are water-soluble or can be altered through the influence of water) and they are very brittle. This is particularly disadvantageous with smooth and flexible cables.

2.) Ablative systems
Ablative systems, such as KBS Coating, produced by Cognis Illertissen, since 1969, work differently: Exposed to fire an endothermic reaction occurs. The material contains substances which alter chemically and physically under heat influence. This process results in a cooling effect for the coated cable. Additionally gaseous substances come out thus producing a strong flame retardant effect and preventing fire spreading reliably.

However, in practice there are further, important advantages of KBS Coating:

- No flame-propagation due to ablation process
- High flexibility
- Total resistance to high humidity, moisture and water
- No deterioration at all with age - even when used externally

Cognis Illertissen, a world-wide leader of systems for fire protection of cables, is able to provide impressive proof of the above mentioned properties.

In an outdoor experiment, lasting more than 25 years, cables coated with KBS Coating were exposed to all weathers, from highest summer heat to snow and ice.

In late summer 1980 a L-shaped cable tray was manufactured and then laid with 17 cables (11 cables 5 x 1,5 mm^2, 3 cables 5 x 2,5 mm^2 and 3 cables 4 x 16 mm^2).
These cables had been coated with a dry coat thickness between 2-3 mm applied with an airless spray gun according to the manufacturer's instructions. After complete drying the cable tray was placed outdoors in the company grounds of Cognis in Illertissen/ Bavaria.

Additional extreme conditions were created by immersing parts of the coated cables in a water-filled tub, thus exposing them to different water levels caused by changing weather conditions.

25 years of continuous sun, rain, freezing and thawing as well as uninterrupted UV-radiation made extreme but realistic demands on the KBS Coating.

Regular inspections did not produce any reasons for complaints.

The adhesion of the coating on the cables was perfect, even under water. On the surface no cracks occurred, the surface did not show any disintegration.

On 9 November 2005 two specimens of the coating were finally taken off and thoroughly checked under official supervision. The samples were taken both from the air-exposed as well as from the water-immersed part. A difference in colour could be observed on the surface of the samples. The coating exposed to air showed a grey tone due to atmospheric influences, the „water samples" displayed a green/yellow discolouring.
An excellent adhesion of the coating on the cables was ascertained. Neither UV- and heat-radiation nor moisture and water had led to any brittleness.

Subsequently the samples were examined according to the LOI-measurement in order to check the most important property, the fire protective efficiency.

The Limited Oxygen Index test, in accordance with ASTM D2863, determines the percentage of oxygen in a nitrogen/ oxygen-mixture at which a material sustains burning on its own.

The KBS Coating manufactured in September 1980 and batch-tested according to DIN EN ISO 9001 had a LOI-value of >100, which means it does not burn in pure oxygen. The samples from the above mentioned long-term experiment performed as well as newly manufactured materials and the measured results were excellent.

On 10 January 2006 the samples were measured with a LOI-value of exactly 100. The samples did not burn within 3 minutes after the burner was taken off.

The final report by the Institute for Fire Protection of TU Brunswick/Germany came to the following conclusion:

„The LOI-values of 100% O_2-concentration obtained on the aged specimens correspond to the LOI-values obtained on specimens during the producer's quality control test. Therefore a 25 years' outdoor weathering - „air storage" as well as „water storage" - does not have a negative influence on the LOI-value. The 25 years' outdoor weathering neither has a negative influence on the adhesion of the coating on the cables nor on the flexibility of the coating."

This is an official confirmation, already known in practice for a long time:
Even after 25 years exposure under extreme outdoor conditions the ablative system KBS Coating maintains its excellent properties regarding fire protection and everyday use.

Numerous tests and daily practice of our customers in many countries have confirmed the resistance of KBS Coating to all major diluted acids, lyes, solvents, mineral oils, lubricants and other organic compounds.

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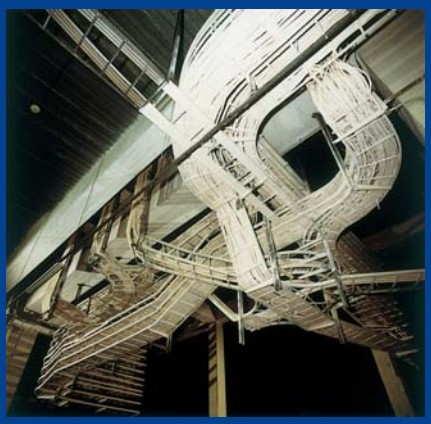
02. December 1980 -
The cable tray covered with snow at -16°C
02. Dezember 1980 -
Die Kabeltrasse, schneebedeckt bei -16°C

Cable tray under extreme weather conditions - varying water level.
Kabeltrasse unter härtesten Bedingungen - wechselnder Wasserstand.

Taking samples after 25 years
Probe-Entnahmen nach 25 Jahren

The coated cables - in perfect shape even after 25 years outdoor exposure.
Die beschichteten Kabel - auch noch nach 25 Jahren in exzellentem Zustand.



KBS Coating: High Application-Flexibility
KBS Coating: Flexibel in der Anwendung

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