



New Thin-Film Intumescent Fire Protection Products Are the Wave of the Future, But Only When Uniform Standards Are in Place

Over the past couple of years, thin-film intumescent fire protection has found wider acceptance in specifications across North America and around the world. Architectural designers and structural engineers have discovered the benefits of this new technology. The specific features that make this group of products attractive to the architects and engineers include a "paint-like" thin coatings, i.e., thin-film; a durable finished surface; a wide

Range of finish colors and the ability to leave structural steel exposed. These qualities have helped this family of products create its own “niche” in the passive fire protection business. This niche is also the fastest growing segment in the passive fire protection business. With the recent acceptance of thin-film intumescent in lieu of traditional spray-applied fire resistive materials, many questions are being raised.

INSTALLED COST

Installed cost is a prime factor in the selection of a passive fire protection product/system. While architectural designers like the freedom provided by the use of thin-film intumescent, the question arises whether the increased cost may outweigh the benefits. Increasingly, thin-film intumescent specifications are showing up in the budget process, and are being used in schools, offices, retail establishments, airports and retrofit projects. This upward trend may be due to cost efficiencies available in the new generation of thin-film intumescent products that have been recently introduced.

Historically, the primary cost hurdle has been the installation labor costs. Job site limitations and complex application procedures also add to the costs. Outdated mastic intumescent technology required adhesive base-coats or glass fiber mesh reinforcement to meet the Fire Test standards. But the new generation of thin-film intumescent can be applied in thicker coats and they normally do not require any complex reinforcements, making them more cost efficient. The necessary performance properties have been engineered into these products. The new thin-film intumescent are reducing installation time; therefore, application costs are dramatically reduced.

STEEL SECTION SHAPES and SIZES

From a structural engineering standpoint, hollow-shaped steel and 3-hour fire rating requirements further increased the demands on this new technology. Thickness alone is not the only cost barometer. Architects need to increase steel sizes in order to reduce intumescent thickness. By adding

this critical design step, projects will yield further material cost savings.

INTUMESCENT CHAR PROPERTIES

Compared to the older products, the char generated by the new thin-film intumescent products demonstrates far greater integrity in a fire to avoid cracking, resist delaminating, and adhere to smaller steel shapes and sizes.

This next generation of thin-film intumescent coatings could revolutionize the fire protection industry.

UNIFORM TESTING STANDARDS

The long term survival of thin-film intumescent will be determined by their ability to meet the stringent environmental exposure testing requirements. These tests are paramount to the survival of thin-film intumescent because they assure long term thermal performance. Currently, Underwriters Laboratories, Inc. is the only not-for-profit independent testing agency to mandate this critical step for classification.

A recent article, "The Significance of the UL Classification Mark on Thin-film Intumescent Coatings," by the Regulatory Authorities at UL tells us that “To obtain a UL classification, thin-film intumescent coatings must... demonstrate fire resistive performance after being subjected to several simulated environmental conditions. These conditions include accelerated aging... elevated humidity, ultraviolet light,” etc. to insure that the thin-film intumescent coating will perform after it ages.

Often, the re-engineering of older thin-film intumescent coatings requires the use of a topcoat to provide a protective barrier to meet these essential life safety assurances. Topcoat requirements limit the type of finishing material for all subsequent coats and significantly add to the cost burden. New generation thin-film intumescent can meet these standards without the need for a topcoat.

UL FOLLOW-UP SERVICE PROCEDURE

Also unique to UL is their follow-up Service Procedure for all tested products. UL conducts quarterly audits at the manufacturer's facilities to ensure materials are manufactured in accordance with the same specifications as the products tested at their laboratories. In short, this process confirms that identical raw materials are utilized, the manufacturing process is performed correctly, and the finished product meets all specifications.

UL's follow-up Service Program ensures that manufacturers maintain the highest standard of product processing, raw materials and finished materials throughout the product's lifetime. No other major testing laboratory within the country offers such a comprehensive and thorough means of product assurance and substantiation.

PRODUCT FORMULATION and ENVIRONMENTAL CONCERNS

The new generations of thin-film intumescent coatings are water-based products because of the following:

- Use of solvents like Xylene and Ethyl Benzenes (known carcinogens) are eliminated
- Removal of HAZMAT issues, in shipping, storage, spill clean-up and waste product disposal
- Compliance with VOC rules in ALL 50 states
- Elimination of chlorinated products and chlorine gas issues in a fire

New water-based thin-film intumescent coatings have been designed around the UL requirements to establish a new technological standard for environmental safety.

USER FRIENDLINESS

The new generations of water-based thin-film intumescent coatings are applicator friendly. Job site concerns regarding welding, drying time and ventilation during application of solvent-based products are not issues with these new water-based products. Typically, the water-based coatings dry

in one third of the time versus solvent-based products. The ability to quickly build-up thickness substantially reduces labor costs. Trade scheduling can be more streamlined and flexible with the new water-based thin-film intumescent coatings.

The new generation of water-based thin-film intumescent fire protection products will virtually eliminate the common concerns associated with solvent-based products.

UL TEST STANDARDS

UL, through adopting ASTM standards, has set the fire test standards for the past few decades and has set the precedent by which all thin-film intumescent products must be measured. The UL Classification insures that all listings are based on full-scale fire tests conducted in accordance with UL 263 (ASTM E119).

Code Agencies have long raised concerns over small-scale or assessment reports not necessarily based on full-scale ASTM E-119 fire tests. A broad based understanding of the moral and ethical value in the UL environmental testing requirements is essential to the survival of thin-film intumescent technology in structural fire protection. Some participants in the marketplace are proposing extrapolated thicknesses beyond the UL tested parameters of steel size and coating thickness which are potentially life threatening and must not be approved without legitimate fire testing justification.

Passive fire protection is a life safety discipline. Therefore, the long-term survival of thin-film intumescent technology will depend on the industry - code bodies, regulatory agencies, manufacturers, contractors, applicators and architects - adopting a uniform fire testing and environmental standard.

About the author

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