STEEL INDUSTRY GUIDANCE NOTES

Intumescent Coatings

Thin film Intumescent coatings are increasingly used in the UK because they provide a high standard of finish, quality and reliability, they can be applied on or off-site and can be used on buildings requiring 30, 60, 90 and 120 minutes fire resistance. This SIGNS describes some of the main features of thin film instumescent coatings.

What is an intumescent coating?

Thin film intumescent coatings are manufactured from organic materials and are inert at low temperatures. They swell (or intumesce) to provide a charred layer of low conductivity foam when exposed to high temperatures This char layer reduces the rate of temperature rise in the steel and prolongs the steels load bearing capacity.

In recent years price efficiencies and improvements in technology have created a situation where intumescent coatings have come to dominate the structural fire protection market. That market is divided into off-site and on-site application, the former being particular to the British Isles and used mainly where issues such as speed of erection, site access, Health & Safety, weather dependency etc are important. In London, more than half of new build office space is protected using this method.

Thin film intumescent coatings can be water or solvent based. The majority, but not all site applied materials are water based. Solvent based products are used in some applications, in particular non-C1 environments (as defined in ISO 12944 Part 2). The manufacturer's advice should always be sought regarding specification, maintenance and guarantees for application outside C1.

Application of intumescent coatings

Most intumescents can be applied by brush, roller or airless spray. Being a wet applied coating the material follows the contours of the steel and can be easily applied in complex and difficult to reach areas.

Applying intumescent coatings off-site

Intumescent coatings can be applied off-site so that the steelwork will arrive on-site with the fire protection already applied. This takes the application of fire protection off the critical path and helps to reduce the overall construction programme. A full list of the advantages of off-site application can be found in SCI P160, Structural Fire Design: Off-site Applied Thin Film Intumescent Coatings (2nd ed). This document also contains a model specification for off-site application from which clauses can be taken and substituted in the client's own contract documents.

The great majority of off-site application is carried out using solvent based materials.

Use with cellular sections

Intumescent coatings are widely used to protect cellular beams. The guidelines for the required thickness of protection have changed in recent years and the advice of the intumescent manufacturer should be sought.

Top-coats

A range of fully tested topcoats can be specified for use with intumescent coatings that offer a wide choice of finish in terms of colour and level of gloss.

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Use of intumescents with galvanized and stainless steel substrates

Intumescent coatings can be applied onto a galvanised substrate. However, the galvanising must be properly degreased before the coating is applied. A primer may be necessary and the advice of the manufacturer should be sought.

Some intumescents can also be applied to a stainless steel substrate but again a primer may be necessary before the coating is applied.

Aesthetic finishes

Three standards are usually specified, and can be achieved for surface finish:

1. Basic Finish – appropriate for areas where surface finish is not important.
2. Normal Decorative Finish – A good standard of finish generally used when viewed from a distance of 5 m or more. Minor 'orange peel' effects or brush marking is acceptable.
3. High Decorative Finish: A high standard of evenness, smoothness and gloss level when viewed from a distance of 2m or more.

A higher standard can be demanded.

There are cost implications associated with the standard of surface required and specifiers should make sure that they are aware of these.

Intumescent Coating Forum

To ensure confidence in performance, consistency and reliability provided by intumescent coatings, the majority of manufacturers and suppliers in the UK have created the Intumescent Coating Forum (ICF). The ICF was formed to create common guidance for the testing, assessment, installation and inspection of intumescent coatings. The ICF's vision is to ensure that by 2010 all intumesent coatings for fire protection of steelwork are:

- Tested and assessed products conforming to European standards and certified by an independent 3rd party.
- Installed by 3rd party certified applicators
- Are subject to independent inspection of complete works as appropriate.

Key Points

1. Thin film intumescent coatings are organic paints which are inert at low temperatures but which swell (or intumesce) to provide a charred layer of low conductivity foam when exposed to high temperatures.
2. They can be used for buildings with fire resistances up to 120 minutes.
3. Intumescents can be applied by brush, roller or airless spray.
4. Intumescent coatings can be applied off-site. This takes the application of fire protection off the critical path and helps to reduce the overall construction programme.
5. A range of fully tested topcoats can be specified for use with intumescent coatings that offer a wide choice of finish in terms of colour and level of gloss.
6. Top coats can easily be repaired and redecorated.
7. Intumescent coatings can be applied onto a galvanised or stainless substrate.
8. The intumescent manufacturers and suppliers have been instrumental in setting up the Intumescent Coating Forum to create common guidance for the testing, assessment, installation and inspection of intumescent coatings.

Further sources of Information

1. **Structural Fire Design: Off-site Applied Thin Film Intumescent Coatings (2nd ed), SCI P160, The Steel Construction Institute.**