Steel fire protection

Budenheim

Effective steel fire protection performing in demanding climate conditions

Intumescent coatings, sealants and adhesives are the preferred option in structural fire protection. The mixture of the right ingredients makes the coatings unique, matching the local requirements.

When designing new formulations, coatings manufacturers have a need for:

- Reliable fire protection in coatings that comply with fire resistance classifications
- Outstanding weatherability of coatings in exterior situations
- Ingredients for use in different synthetic resins
- Eco-friendly, halogen-free flame retardants
- Solutions for water-borne and solvent based coatings

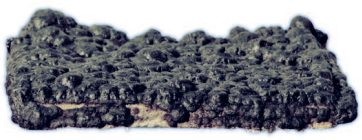
The FR CROS® Series provides halogen-free ammonium polyphosphates for intumescent coating systems. FR CROS® helps to achieve the best performance for your coatings.

FR CROS® is a key ingredient for charring

Chemistry of intumescence

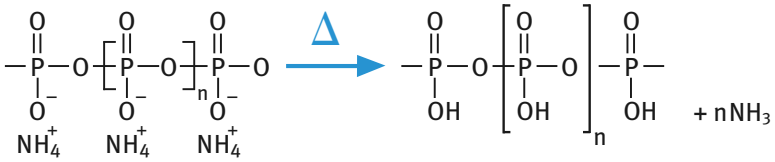
An intumescent system consists of up to 5 major components:

At temperatures of about 300 °C ammonium polyphosphate, as a **charring initiator**, initiates intumescence. The ammonium polyphosphate decomposes into polyphosphoric acid and ammonia (NH_3).



Expanded char foam

Starting of char formation

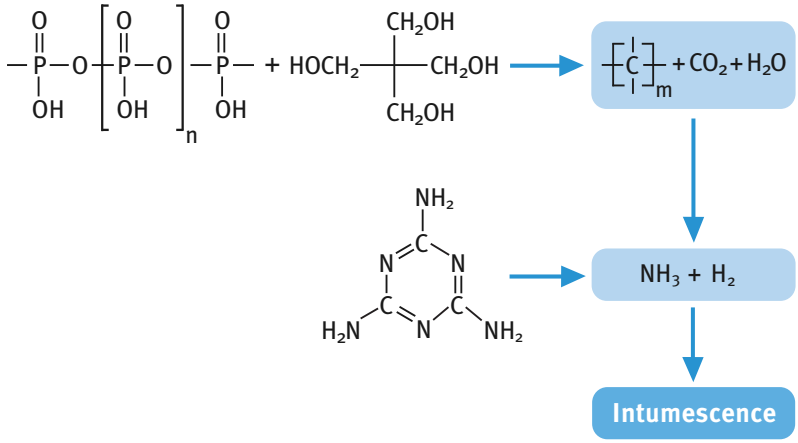


This acid reacts with a **carbon source**, e.g. based on pentaerythritol, and the coating starts to carbonize without burning. At the same time the **blowing agent** (e.g. melamine) starts to create a carbon foam by releasing gases.

White layer formation

Char improvers stabilize the final foam. **Binders and additives** make the paintable matrix and ensure the adhesion to the substrate.

Intumescent reaction



Solidification through crosslinking reactions

Matching your formulation with the right grade of FR CROS®

FR CROS® matches the matrix resin

The softening temperature of the resin binder (e.g. epoxy, urethane, acrylic, polyester, phenol) triggers the coating's reaction of intumescence.

Budenheim offers products with specific properties in terms of water solubility and different reaction points.

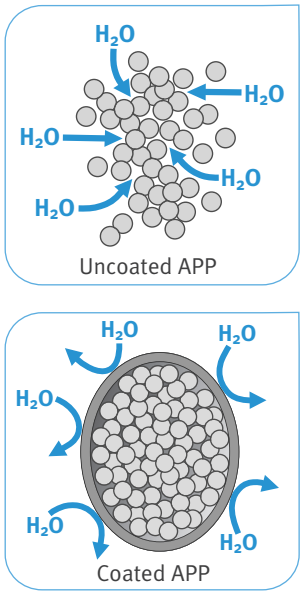
FR CROS® series includes ammonium poly- and pyrophosphates, melamine poly- and pyrophosphates with a wide range of thermostabilities and weatherability.

Coating of APP prevents water attacks

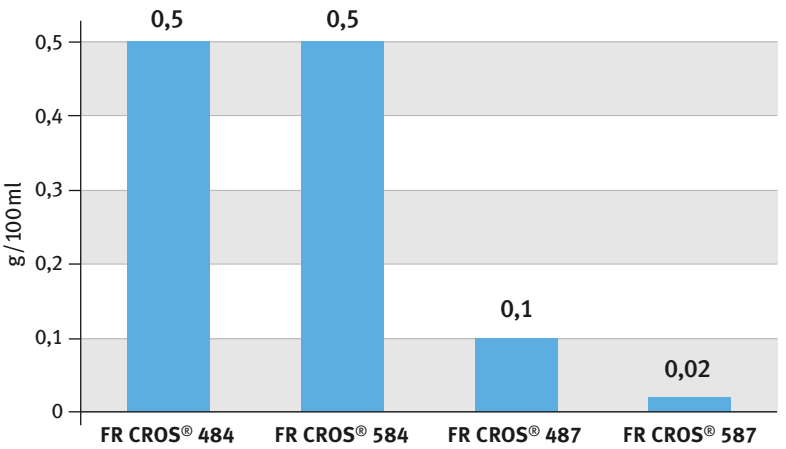
FR CROS® for all weather conditions

Hydrolysis accelerates with extended exposure to water and higher temperature. This process may affect the properties of the paint during storage, e.g. changes in viscosity and possible reduction of the intumescent effect.

The water solubility of APP II can be considerably reduced by applying a surface coating.



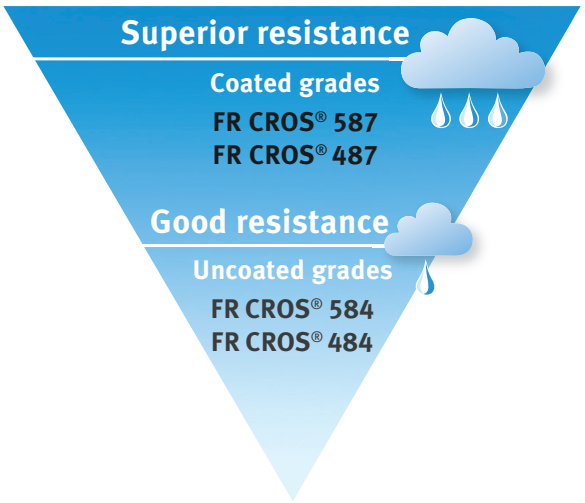
Coated grades with lower water solubility



Source: Budenheim laboratories

Budenheim developed unique technologies for particle coatings achieving grades of FR CROS® with superior resistance to hydrolysis.

FR CROS® – resistance to hydrolysis



Our expertise is your benefit

FR CROS® coated APP II grades are easy to disperse in the matrix with good compatibility (resin) and reduced abrasiveness. They ensure a longer service life of final coatings

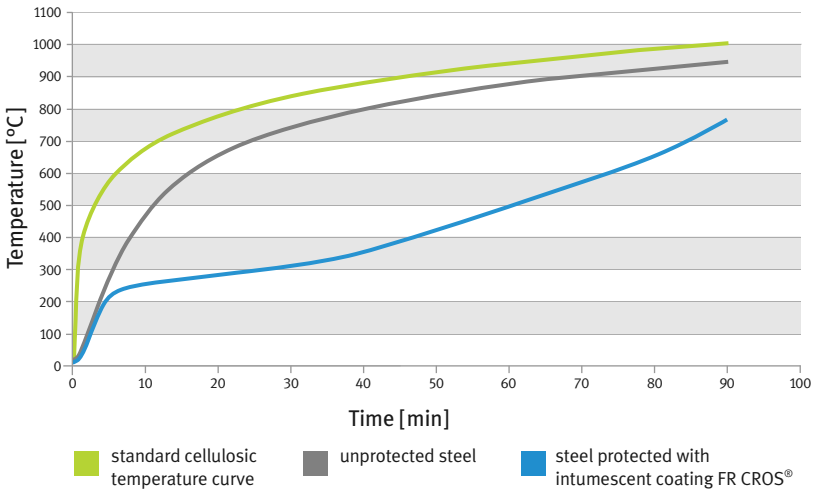
Choosing the right charring initiator for an intumescent coating depends on different requirements with regard to fire resistance, health and environment. Budenheim's experienced specialists and technicians are ready to assist.

FR CROS® improves the fire resistance of steel

Time counts in fire resistance of steel beams

When a fire breaks out, every minute counts:

Steel temperature rise in a fire



Source: Budenheim laboratories

FR CROS® – Protecting what really matters in life

FR CROS® specialties are key ingredients in intumescent paints and coatings influencing the performance and stability of the finished coating. They ensure the long-term bearing capacity of the steel beam in case of fire.

FR CROS® – Benefits at a glance

- Low water solubility
- Extended weather resistance with coated FR CROS® grades
- Less polarity
- Reduced acidity

For further technical assistance and for the right product selection, please contact us.

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