

# GETTING INDUSTRIAL FIREPROOFING DONE RIGHT



Whether it's mandated by an insurance company or the recognition of the inherent dangers of a processing facility, fireproofing can be a complicated undertaking. The first step of the process isn't always obvious. But leaning on an expert auditor early on will help get the project off to a strong start. So if you've been told to fireproof, or else, don't panic. Here's how to get it done.

# WHY FIREPROOFING

For some industrial facilities, fireproofing is a prerequisite for holding on to the facility's insurance, at least at rates resembling anything close to affordable. Many owners of refineries, petrochemical and oil and gas facilities that contact us have just received a call from their insurance companies. They've been told that in order to keep their current plan, measures would need to be taken to ensure the facility is adequately protected against a fire.

Throughout the refinement process, regardless of the desired final product, various flammable liquids and byproducts move along a network of pipes supported by structural steel. Pipe racks, refinement vessels, steel supporting structures, any construction which could potentially be exposed to a fire, and which could collapse before the fire is brought under control, will likely be designated for fireproofing. In the event of a fire, the flammable liquids at the heart of a business can quickly become the fuel helping to burn it down. Active fire protection like foaming and sprinkler systems should kick in to battle the fire, but these measure are often meant only to slow a serious blaze.

While fireproofing is certainly a good idea—it can be the difference between a damaged facility and one that has suffered a total collapse—mandates to fireproof are usually followed up by very little in the way of specific direction.

If the insurance company is pushing for a plan to be in place immediately, fireproofing can be a stressful experience. Some areas that now need to be fireproofed may never have been fireproofed before. For other areas, it may have been years since fireproofing was last performed. Perhaps the facility has changed ownership by then, or the previous facility manager has moved on, leaving no personnel with fireproofing experience. Even auditors touring your facility, though they may have strong opinions on what sort of fireproofing work needs to be performed, will offer no clues as to how the work should be performed.

# PASSIVE FIRE PROTECTION

As firefighters and active fire protection systems battle the blaze, passive fire protection can buy valuable time for structural steel that would otherwise become distorted under such extreme heat. The purpose of passive fire protection is to protect this structural steel only for a given amount of time, until the fire can be extinguished. Refinery fires sometimes reach temperatures upwards of 2,000 degrees Fahrenheit; hot enough to melt most structural steel alloys.

Passive fire protection methods such as intumescent coatings are measured according to the time they have been proven to withstand these heats with the laboratory. Independent safety science companies, such as the [Underwriters Laboratories \(UL\)](#), provide third party testing of fireproofing coatings and then rate the products according to how long they are able to withstand the heat of the flames.

Insurance auditors will specify a necessary minimum time rating for an asset based on its use, susceptibility to fire and the anticipated difficulty of extinguishing an outbreak. The most common rating is 1.5 hours. Higher ratings can be achieved by adding mil thickness during application of the coating. [UL 1709](#) is the standard most commonly applied to heavy industrial fireproofing products.



# THREE TYPES OF FIREPROOFING

Passive fire protection tends to fall into one of the following three categories. They are not all created equal. As technology has progressed, intumescent coatings have superseded earlier methods of passive fire protection as the most successful and cost-effective for some of the reasons discussed below.

## Dense concrete

The potential of concrete as a fire-resistant material was recognized long ago. Many refinement facilities constructed prior to World War II made extensive use of dense concrete as a means of protecting against fires. The material is inexpensive and was known to withstand even extremely high temperatures. Problems quickly emerged, though.

Concrete is heavy, which led to the need to over-specify structural steel. It also meant high labor costs, since forming concrete around steel is a laborious, multi-step process. It was also found that rapid cooling following a fire event leads to cracking in concrete and in some severe cases compromises the structural integrity of the material. This damage is sometimes difficult to detect and could become a danger to those working in the facility.

Dense concrete as a means of fireproofing has largely been abandoned in favor of more recent techniques, which offer superior performance and fewer drawbacks.

## Lightweight cementitious

Lightweight cementitious fireproofing retains the benefit of being based on inexpensive raw materials without the problems associated with extreme weight. As its name suggests, the material is significantly lighter than dense concrete and so doesn't require the over specification of structural steel. But lightweight cementitious fireproofing retains the high costs of labor associated with dense concrete. They must be applied in several successive coats, again driving up labor costs. These products also share their predecessor's tendency to crack.

Perhaps the biggest liability with cementitious fireproofing, though, is the inevitable creation of space between the coating and the substrate. This space has a tendency to collect moisture, which in turn fosters corrosion of the substrate. In the long run this unfortunate flaw can actually cause a lightweight cementitious coating to work against the integrity of the asset it was meant to protect.

## Intumescent coatings

Intumescent coatings work by charring and expanding in the presence of extreme heat. The increase in volume and subsequent decrease in density slows the heating of the substrate, increasing the time before the steel itself begins to melt. Intumescent coatings typically swell to 25 times their original thickness when engulfed in flames. This expansion allows them to provide a barrier between the flames and the steel that is exponentially larger than a coating that does not swell.

Adding thickness to an intumescent coating application increases the amount of swelling that will occur in the case of a fire incident. For example, if 350 mils of a given intumescent has been determined to have a fire rating of 1.5 hours, 700 mils would theoretically be necessary to achieve a fire rating of 3 hours. In reality, though, added thickness is sometimes specified in certain areas such as curves and crevices, so something like a thickness of 750 mils may be required in order to achieve a 3-hour rating.

When intumescent coatings come in single-component formulas, they are much simpler to apply than dense concrete and lightweight cementitious coatings and are therefore accompanied by far lower labor costs.

Additionally, since they are applied directly to steel, no gap is created in which moisture can sit and incite corrosion. Intumescent coatings fight corrosion in much the same way as traditional protective coatings, the difference being their ability to swell and the much greater thicknesses at which they are initially applied.

# GETTING STARTED FIREPROOFING

Following a call with an insurance firm or a company auditor, many owners simply don't know where to turn to put a fireproofing plan in motion. As with writing any type of [paint specifications](#), they tend to turn to one of three sources: an engineering firm, a trusted contractor or a supplier of fireproofing coatings.



Unlike with general paint specifications, fireproofing projects are highly specialized and it's important that an owner fall back on an individual or firm with extensive experience with similar projects. If engineering firms have an in-house fireproofing expert, they can be a valuable resource in devising a plan. If not, a customer may wind up paying an engineer to outsource a job, a step that could undoubtedly be skipped to reduce costs. The same holds true for applicators. If they are unfamiliar with the products on the market, or even how they're best applied, they will likely need to seek outside advice themselves.

In the end, a coatings supplier will likely have the best understanding of the fireproofing products they supply. Experience should once again be a factor, though.

If a supplier only recently began carrying a fireproofing product, and has little idea of how they behave, best practices for application and no suggestions for preferred contractors, it may be best to continue shopping for an expert with more experience that still remains within the project's budget.

Regardless of which path is pursued, owners should expect a few things from an initial facility audit. It should come with detailed notes and photographs explaining the fireproofing measures to be undertaken in each section of the facility and why. It should include budgetary projections so that owners know what they're paying for at each stage of the project. It's also helpful if the expert is able to offer recommendations on applicators that have performed good work in the past and have experience with fireproofing facilities.

The best reports following an initial audit will provide an owner with the peace of mind that comes from knowing how to proceed. Though a fireproofing project may have been mandated from an outside source, this document should alleviate any panic that comes from not knowing how to move forward.

# Let's talk

US Coatings is a supplier of a full line of Albi fireproofing products. Easy application of these single-component products makes them less expensive to apply, typically closing any gap in cost between an intumescent solution and a lightweight cementitious one.

We also have the in-house fireproofing expertise. Full facility audits provide owners with all the knowledge they need to move forward with a fireproofing project with confidence. It's part of our promise to be more than just a paint and coatings supplier.

So whether industrial fireproofing is an unexpected project that needs to be dealt with immediately, or a facility safety measure that's been put off for far too long, we'd be happy to be your first step. Get in touch with US Coatings today.

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## Contact

### **Mike Reed**

General Manager

*NACE Level 3 Coating Inspector #31422*

**Email** [mreed@uscoatings.com](mailto:mreed@uscoatings.com)

**Mobile** 314.220.4768

**Office** 314.205.1500

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## ABOUT US COATINGS

US Coatings is a leading provider of high-performance coatings and linings. We custom tailor our industrial coating products to fit the needs of clients across a wide variety of markets, and we pride ourselves on offering superior customer service through the duration of the job.

Founded in 2000 in St. Louis, Missouri, US Coatings has emerged as a company doing business all over the country, with close connections spanning a vast number of specialty coatings markets. Despite this success, we're committed to remaining nimble enough to be able to take on any coatings challenge, large or small.

US Coatings is focused on building relationships with our customers so we're here before, during and after the sale with personalized attention to your project that our competitors can't match. More than just purveyors of paint, we take collaborating with our customers seriously, providing superior service throughout the course of your job.