NAFTAB Co. (PJS)

Passive Fire Protection Systems

www.naftab.net

Naftab

Naftab, a knowledge-based company (approved by Danesh Bonyan), started its activities in the field of fire protective coatings in Iran over three decades ago, and was the founder of this industry in Iran Originally, Naftab's activities started in collaboration with Cafco International (ISOLATEK), which was replaced by Promat around a decade ago (when Promat bought the rights to license and manufacture Cafco Int'l. products).

Soon after, sanctions were put in place in Iran and Naftab was no longer able to import from abroad, thus commenced the process of Research and Development and themanufacture of our own line of Passive Fire Protection usingdo mestic materials and know-how. By employing a group of expertsconsisting of University Professor and experienced graduates, Naftab was able to produce a wide range of products which were superior to most of its foreign counterparts in quality, density and thickness required.

Factory #1, situated in Soheylieh, Alborz province.

Factory #2, situated in Mahmoud - Abad industrial state, Qom province.

Fire proofing materials

Passive fire protection mortars are protection systems that prevent fire temperatures from penetrating into the surface of steel structures. The purpose is to stop the steel from reaching its critical temperature, and hence avoiding failure.

Products for Cellulosic Fires (Commercial and Residential Buildings, Storage Facilities, etc...):

Nafco M.D.

This is a cement/vermiculite-based mortar with a specific weight of about 450 kg/m^3 suitable for cellulosic fires, designed for all construction projects.

Nafco L.D.

This is a cement/perlite based mortar with a specific weight of about 370 kg/m^3 suitable for all construction projects. Because of its light weight and ease of application, Nafco L.D. is one of our most popular products for the Construction Industry.

Nafco G.P.

This is a gypsum/perlite-based mortar with a specific weight of about 300 kg/m3 suitable for all construction projects. Nafco G.P. is our lightest product to date and is expected to become our top selling product.

Products for Hydrocarbon Fires (Oil, Gas and Petrochemical Projects):

a) Nafco H.D.

This is a cement and vermiculite based mortar designed for oil and gas industry, a product to withstand weathering, jet fire and rapid rise temperatures in hydrocarbon fires, with a specific weight of about 800 kg/m^3.

Naftex PSA-17

This is a primer designed for applicationunder cement-based mortars on top of the steel structure, with the purpose of enhancing adhesion and eliminating a dverse effects of some non-corrosive primers that come into contact with the cement-based materials. Furthermore, because of its elastic nature, Naftex PSA-17 will prevent the applied mortar from hairline fractures.

Various Types of Fires

- **Cellulosic Fires:**

In these types of fires, the combustible materials are mostly cellulosic in nature; such as wood, cloth, paper, and other similar materials that are present in residential and office buildings. A cellulosic fire typically reaches 900 °C after about one hour, and if left unabated, will reach a maximum temperature of 1000 °C but often due to the nature of the combustible materials, the fire will not last, and after the materials are burned out, the fire will eventually stop.

• Hydrocarbon Fires:

Combustible materials in these types of fires include hydrocarbons, oil-based, oil and gas derivatives, and Petrochemical products.

In Hydrocarbon fires, the temperature of the fire reaches 1100 °C after only a few minutes and remains at this temperature for an extended period of time due to the nature of the combustible materials, requiring the need for a protective coating that much more important. Unfortunately, Hydrocarbon fires in Oil, Gas and Petrochemical complexes are often accompanied by explosions and jet fires.

In hydrocarbon fires, generally due to the accumulation of gas, the fire is oftentimes accompanied by an explosion. The explosion impact (Blast over Pressure) requires fireproofing materials that have the necessary stability and resistance against such explosions. This plays a very key role.

In the case of Jet fires, hydrocarbon and combustible materials are released by pressure from a hole or rupture within a tank body or the transmission lines of hydrocarbon materials. This results in the rise of temperature to approximately 1300 °C at a very high speed and pressure (due to high oxygen levels).
Jet fires are highly corrosive and destructive because of these features and can cause catastrophic damages.

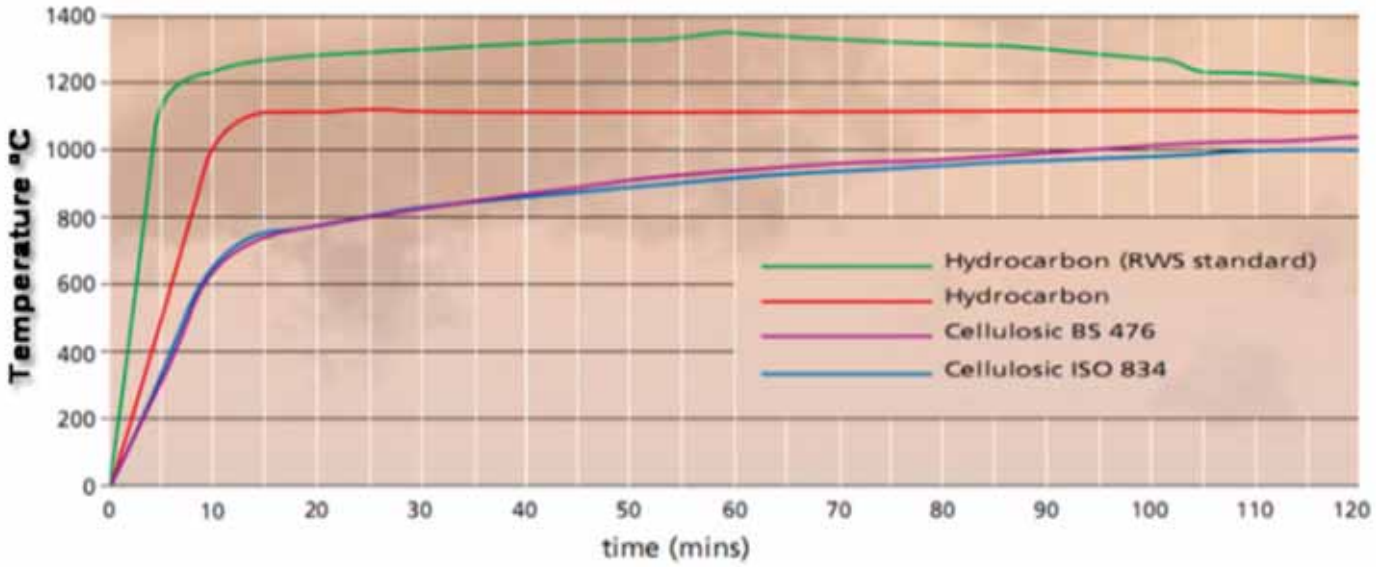
- **Tunnel Fires:**

Among other types of fires, Tunnel fires are worth mentioning due to the specific conditions of its environments, making it conducive for fires to reach 1300°C inside the tunnel. In such conditions, the surface concrete of the tunnel walls/panels undergoes severe mechanical and chemical changes. part from the loss of mechanical strength, the concrete undergoes severe spalling within a few minutesand the surface of the concrete begins to collapse exposing the steel rods of the concrete reinforcement to the fire, further reducing its mechanical resistance r esulting in the collapse of the tunnel altogether.
In order to prevent such catastrophes, Fire protection of tunnels is highly recommended and is the reason our neighboring countries have been doing so for many years.

Necessity of Passive Fire Protection Materials on Structural Elements and Equipment

At 430 °C, steel structures will retain up to 94% of its initial resistance, however at 760 °C, only 16% of its initial resistance remains. In simple words, metal structures lose their required mechanical resistance between the temperatures of 550 °C and 620 °C and will collapse.
The objective of Passive Fire Protection Materials is to sustain the mechanical strength of steel structures and minimize the loss of resistance of the structure against fires by creating a buffer during which individuals can have ample timeto evacuate and exit the buildings on fire ,as well as creating an opportunity for Firefighters to extinguish the fire.

Figure 1: Comparison of typical 'cellulosic' and 'hydrocarbon' time/temperature curves



Points to consider when choosing Passive Fire Protective Materials:

1- The use and type of Building, whether the building will be exposed to the possibility of Cellulosic or Hydrocarbon fires; Residential, Office, or Commercial building; the height and number of floors, etc.

2- Factors required for external appearance of building.

3- Necessary resistance time.

4- Being exposed to the natural and structural elements of the environment such as physical shocks and vibrations (such as during the building process), earthquakes, rain etc.

5- Not having any environmental pollutants, especially the absence of asbestos particles.

6- Will the applied coating maintain its performance after the fire or will it require complete reconstruction?

7- The applied coating does not lose its quality over time and does not change shape.

8- The intended cover maintains its stability in the event of an explosion.

9- Thickness required for implementation.

10- Specific weight of the materials that are to be used.

11- The speed of implementation of the protective coating (application process).

12- The intended coating does not cause corrosion or deterioration of the steel structure.

13- The dead load that the cover imposes on the structure.

14- Cost.

New Products (Recent Developments)

1- S.L.F. (Super Light Flooring)

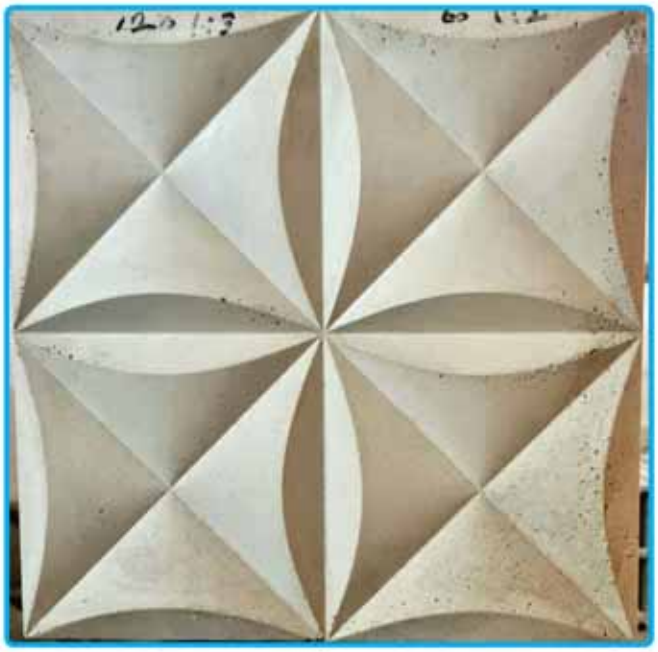
An extremely light product with specific weight of 700 kg/m^3, suitable for flooring to dramatically decrease the dead weight in high rise buildings. Easy to use under any construction situation, with high strength, and excellent heat and sound protections.

2- S.L.B. (Super Light Blocks)

Easy implementation, with specific weights of 550, 650, and 750, with a yield strength of 3, 5 and 7 M.Pa.

3- E.C.P. (Exposed Concrete Parts)

Ideal for use in buildings facaders, floors and urban garden areas.



4- Naftex PSA 24 (Top Coat)

An extremely effective top coat.
Anti-rain, resistant to sunlight, U.V. rays, and harsh weather conditions.
Suitable for use on all construction materials, and oil and gas applied motars.
Available in a variety of colors.

5- Naftex C.T. (Ceramic Tiles Adhesive)

For installing all types of floor and wall ceramic tiles.
This water solvent adhesive is based on acrylic resin emulsion, with no after installation cracking or shrinkage is suitable for all types of tiles.

6- Naftex C.A. (Concrete Additive)

This adhesive is for increasing concrete strength, based on acrylic and vinyl resins, is used to increase the adhesion of mortar, or when required to add a new layer of concrete.
On top of having an extremely high adhesion, it also creates cohesion in the concrete texture.
It also increases the tensile and bending strength, increases resistance to cracking and frost cycles.

7- Naftex S.C.G. (Sealing Concrete Glue)

This material is used to increase the adhesion texture of concrete layers, to repair the existing layer, and to seal the structure.
It is based on vinyl acetate resins.

8- Naftex P.C.R. (Powder Concrete Restorer)

This powder concrete restorer is a combination of polymers, cement and granules, this mortar has high adhesion to concrete surface, is impenetrable with no shrinkage, and it has high pressure resistance.

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