

AARONITE GROUP

P R O T E C T I O N

LEADER IN HYDROCARBON FIRE PROTECTION

PASSIVE FIRE PROTECTION





ABOUT US

AARONITE IS A LEADER COMPANY SPECIALIZED EXCLUSIVELY IN THE FIRE PROTECTION FOR HYDROCARBON FIRE.

In the early '90s, to answer an increasing demand for greater specialization and professionalism in the passive fire protection (fireproofing), it was formed a company addressed to the market needs oil and gas. In 1995 so Aaronite Italia who inherited the know-how and the twenty years of experience of Aaronite Ltd (UK), quickly established himself in the industry for the supply and installation of the most innovative hydrocarbon passive fire protection "fireproofing" systems that technology can offer. Aaronite is a leader company specialized exclusively in the fire protection for hydrocarbon fire.

Our business includes painting, sandblasting and industrial painting, passive fire protection by hydrocarbons and cellulosic and insulations with innovative products, result of nano technologies, ensuring a qualified and detailed assistance to customers at all work stages.



THE GROUP

THE COMPANIES' GROUP ARE TECHNICALLY AND COMMERCIALY STRUCTURED IN ORDER TO ENCOUNTER EACH SPECIFIC JOB IN THE PASSIVE FIRE PROTECTION SECTOR.



Aaronite ITALIA S.R.L. over the years it has grown and is structured to meet the needs of the market in terms of organization, logistics and commercial decisions, by setting up companies in other EU countries and outside the EU. Aaronite GROUP, today, includes companies active in the field of protective anti-fire treatments, using the most advanced technologies ensuring competencies, professionalism, quality standards in full compliance with operator safety and the environment. We believe that our greatest resource is represented by considerable experience, knowledge, professional resources and know-how.

AARONITE GROUP TODAY CLAIMS AN EXTENSIVE LIST OF:

- References for works performed in Italy and abroad
- Application licenses
- Equipment/machines for application of all materials in the execution of all aspects of work to be performed
- Financial and economic stability
- Operators trained and qualified in: application, quality, safety and professionalism



OUR MARKETPLACE

WE CAN CARRY OUT OUR ACTIVITIES ON BOTH LIVE PLANTS OR STOPPED PLANTS, OR AT THE MECHANICAL'S COMPANIES WORKSHOPS THAT PROVIDE TO THE FINAL CUSTOMERS:

-  Heat Exchangers
-  Vessels
-  Reactors
-  Piping
-  Valves
-  Actuators
-  Modules
-  Skids
-  Piperacks
-  Cabinati

ALREADY FIREPROOFED

Our final customers are mainly represented by the industries at high risk of fire and explosion such as: LPG storages; Refineries; Chemical Plants; Power Plants; Offshore platforms; Tunnels; where the insurance premiums are very expensive and where the protection of the human lives, the environment and the process plants, are the essential targets to reach.



WHERE WE WORK



01 – EUROPE

- | | | |
|----------|---------|----------|
| Italy | Croazia | Poland |
| Uk | Romania | Danimark |
| Spain | Holland | Greece |
| France | Belgium | Turkey |
| Bulgaria | Albania | Malta |

02 – AFRICA SAHARIAN

- Lybia
- Algeria
- Cameroon
- Tunisia

03 – ARAB EMIRATES

04 – CASPIAN SEA REPUBLICS

05 – FAR EAST

06 – RUSSIA

MAIN CLIENTS

APPLICATION LICENCES

Companies must provide documentary evidence to meet this requirement already in the budgeting phase in the technical section of their offering. You can have a proof of this, by contacting the manufacturers of fireproofing systems and asking them a list of licensed applicators.

Finally, fireproofing must be performed by the application company employing only employees who have attended a specific training and using only suitable and approved equipment. A team type, at a minimum should include field a worksite Cape, a supervisor, a manager QA / QC and operators holding individual qualifications to have attended a training school application. These are minimum requirements that the company must document in order to take part in a competition of fireproofing

ONLY COMPANIES THAT BENEFIT FROM THE STATUS OF "QUALIFIED APPLICATOR" CAN BE USED FOR FIREPROOFING ACTIVITIES.



CERTIFICATIONS

DESIGNING FOR A FIREPROOFING JOB IT'S NECESSARY:

01

To use specific fireproofing systems designed, tested and certified for hydrocarbon fire;

02

To choose licensee companies highly specialized and provided of approved machineries for application of fireproofing systems;

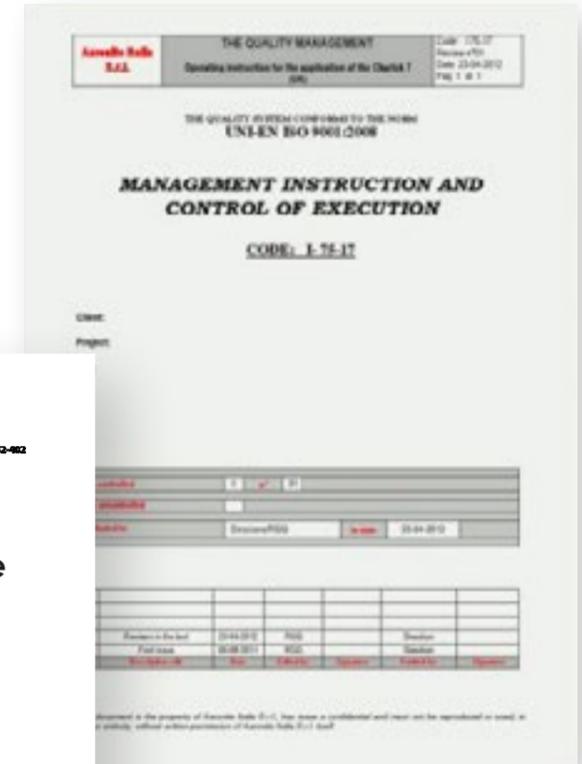
03

To have a quality control system and application procedures approved by producers of the fireproofing systems;

04

To choose experienced companies with know-how and trained operators

Close collaboration with leading manufacturers of fire protection systems and engineering and construction companies allows us to offer our customers the best application by operators and technicians with over twenty years of experience, the best technical solution, the correct choice of materials in full compliance with technical standards, design criteria, international tests, in order to ensure full acceptance of the work by the final customer and competent authorities.



PASSIVE FIRE PROTECTION



Due to the high risk present in the refinery, offshore platforms, LPG deposits etc. and because of major accidents that may occur, European legislation and national laws, impose in addition to the "active fire protection" (splinkers, hydrants etc.) also the use of "fire protection PASSIVE" (fireproofing).

Over the decades, engineering and safety's analysis on the fire accidents, defined the first fundamental difference between the types of fire (cellulose or hydrocarbon), and thereby selection of the products (tested and certified) to assess their suitability for the application and to guarantee the fireproofing performance.

PASSIVE FIREPROOFING MEANS

insulating systems designed to prevent heat transfer from a fire to the structure or equipment being protected.

These are generally coatings such as:

● INTUMESCENT EPOXY BASED

● CEMENT BASED PRODUCTS

In most cases, passive fire protection materials are used in conjunction with "active" systems such as water sprays, sprinklers and deluge, foam generation and inert gas suppression.



FIRES

STANDARD FIRES, TWO STANDARD FIRES SHALL BE CONSIDERED:

A cellulosic fire

The cellulosic fires are powered by fuels such as wood, paper, fabrics, etc. The standard curve of the fire from cellulose has a slow and gradual increase of the temperature after the ignition of the fire. The curve reaches 500 ° C in 5 minutes and climbs to above 1100 ° C over time. The typical irradiation value is 50 kW / m².

A hydrocarbon fire

01. - Pool Fire: Hydrocarbon fires are fuelled by oil and gas and have a very rapid heat rise to 1000°C within 5 minutes and rises to 1100°C shortly thereafter. Hydrocarbon fires are also extremely turbulent as the fire entrains oxygen to maintain combustion. Typical radiation value is 160 kW/m²

02 - Jet fire is a particular group of fires of hydrocarbons that is produced when the fire is ejected at a pressure of 2 bar and more from an orifice of a pipe, a tank or the collapse of a flange which contain pressurized flammable product. They represent the worst-case scenario of fire, considering the effect of its erosion and also the highest combustion speed significant due to the turbulent fuel / air mixture. The ISO22899 standard is the first and only internationally recognized model for jet fire, while OTI standard 95634 is the reference standard for jet fire for offshore installations.

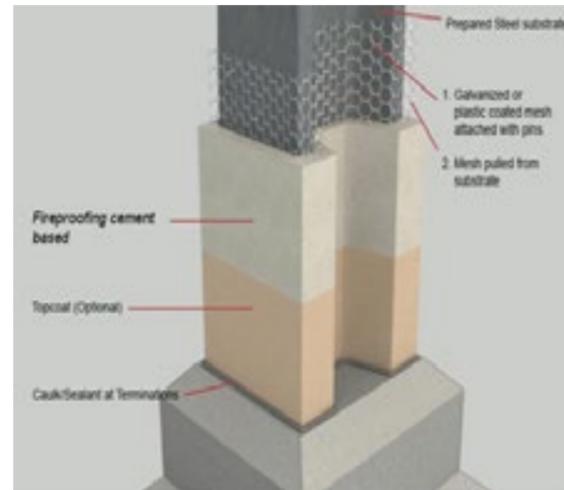


SPRAYED LIGHT CEMENT

CEMENTITIOUS COATINGS ARE GENERALLY BASED ON PORTLAND CEMENT PLUS LIGHTWEIGHT AGGREGATES.

Cementitious coatings are generally based on Portland cement plus lightweight aggregates. The cementitious coatings should always be of the products tested and certified and must be CE marked. Cementitious materials protect the steel in two ways:

- Releasing the moisture contained therein that during the fire, achieved the degree of boiling of the water (100°C), evaporates by keeping the temperature of the steel low until full evaporation.
- Upon completion of the evaporation phase, the coating acts as an insulator depending on its thickness applied.



The cementitious fireproofing systems are lightweight products typically made with cement and vermiculite and sprayed with special plastering machines and approved and are generally reinforced with wire mesh and a specific TOPCOAT protected with a paint finish. They are premixed in bags and dosed water must be added on site and have a density of 650kg - 850kg per cubic meter and they have a very low thermal conductivity (λ). They allow to isolate the steel sections or structure for a period of up to 4 hours of fire resistance for both hydrocarbon pool fire and jet fire.

They also apply to the protection of GPL storage tanks. Depending on the size of the metal profile to be coated, the cement coatings are applied according to the "SOLID FILL" method, which means full filling of the cavities of the profile and always with the same fireproofing material or according to the "PROFILED" method, this means following the perimeter of the metal profile to be protected.

Usually they require a special primer as "keycoat" to ensure perfect adhesion on steel surfaces. Applied to a minimum practical thickness of 30 mm to 60 mm have lower thicknesses than conventional concrete and do not require molding for installation. Systems cement-vermiculite (cement lighth) in case of fire does not have the dangerous phenomenon of SPALLING, however present in the traditional CLS.

SPALLING

Spalling occurs when the traditional concrete (CLS), is exposed to fire. The phenomenon consists in the explosion of the coating CLS due to the increase of the internal pressure due to the overheating of the water contained that cannot evaporate outside.

The explosion throws dangerous shards of concrete that damage everything that is located in the surrounding areas and threaten workers and fire fighters engaged in fire extinguishing. This explosion occurs on several occasions, layer after layer until the total elimination of all the coating. The cracks and gaps, allowing the fire to attack more quickly protected surfaces, drastically reduce the actual duration of fire resistance.



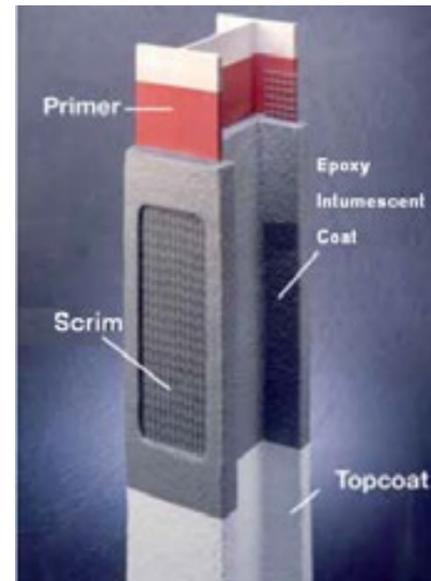
INTUMESCENT EPOXY

INTUMESCENT COATINGS REACT TO HEAT BY SWELLING IN A CONTROLLED MANNER TO MANY TIMES THEIR ORIGINAL THICKNESS

Intumescent coatings react to heat by swelling in a controlled manner to many times their original thickness to produce a carbonaceous char which acts as an insulating layer to protect the steel section to which it is applied.

Intumescence is a complex process involving chemical reactions (endothermic) that convert epoxy coating into a very viscous foam. At the same time, the gases produced remain trapped within this foam, producing an increase in the volume of the coating and the formation of the insulating char. The intumescent mechanism and subsequent char formation absorbs heat from the fire helping to keep the temperature of the steel below its limiting temperature and to provide the required period of structural fire-resistance.

Epoxy resins intumescent systems are two components applied by spraying, using special equipment for heating and mixing of the components. Generally they are applied in practical minimum thicknesses of 3-4mm without reinforcement mesh. For higher thicknesses or in case of jetfire protection, a carbon fiber or other material (scrim) reinforcement network is usually located at half the total thickness, which may also reach, in this case, 15/16 mm and over.



AAROCAST

AAROCAST ARE BOXES (FIRE PROTECTION ENCLOSURE SYSTEM) DESIGNED WITH CAD SOFTWARE

AAROCAST © are boxes (fire protection enclosure system) designed with CAD software. They are made of intumescent epoxy resins reinforced with a stainless steel chassis. Tested and certified for hydrocarbon both pool fire and jet fire up to 150 minutes.

The sections (shells) of the AAROCAST are made with molds necessary for their prefabrication. They can also be made with flanges for fixing. The AAROCAST are self-supporting and do not require external anchoring.

They are particularly suitable for the protection of valves, process pipes, flanged couplings, round section rods and so on. They do not incur any additional costs when repairs are made. They are removable to allow maintenance of protected items. They are not affected by the ambient temperature, the dripping of chemicals and petroleum products, and they do not require maintenance.



BLANKET

BLANKET ARE LIGHT-WEIGHT, WEATHER-RESISTANT AND DURABLE.

Fireproofing blanket are lightweight, weather-resistant and oil-dripping systems. Are prefabricated with CAD software and therefore can be ready to be "worn" on the media for which they are designed. No special laces, bands and special tools are required for their assembly. Everything you need for installation is part of the blanket itself. Small field modifications and repairs can also be made. No other fire protection system makes it easy to remove and reinstall like the blanket. They have been extensively tested with a wide range of fire tests ranging from cellular and hydrocarbon fire tests to jetfire tests.

Being qualified by many "UL1709" test tests, they were the first to pass the jetfire test. More recently they have passed the standard OTI 95 634 test. They meet a wide range of fire resistance class even at low temperatures. Typically fire resistance starts from 15 to 120 minutes, but can be designed for longer periods if required. They are able to protect artifacts in a wide range of critical temperatures. The blast test explosion overpressure test was exceeded by 0.8 bar, 1.25 bar and 1.46 bar and demonstrated the ability to withstand repeated exposures to explosion and drag forces without compromising fire protection.

The blast test was performed with a very strict protocol in a fully enclosed and saturated gas cabin on a fireproofing blanket installed on a tubular. The explosion thus affected the whole blanket and not like the test on the plate that affects only one side of the article.

- 01 Integrated control door for immediate access
- 02 BUCKLES & STRAPS
- 03 Fixed with 2 n. Buckles and collars and VELCRO on 3 sides of the hatch
- 04 4th SIDE fixed at JACKET REST (Without loose pieces)



PERFORMANCE & TESTING

PERFORMANCE
The graph below shows the temperature development curve of a jet fire to ISO 22899 standard, the standard at which the AIS Jet Fire Pro product has been tested and approved.

Also highlighted on the graph is the core temperature curve of equipment protected by the Jet Fire Pro material.

STANDARD OF TESTING
The AIS Jet Fire Pro has been tested in line with international standard ISO 22899 (Determination of the resistance to jet fire of passive fire protection materials) with exceptional test results.

The ISO 22899 standard is typically used in testing materials for protection of process equipment including valves and actuators.

By testing to ISO 22899 standard ensures the highest possible time for compliance according to the temperature development curve of additional standards i.e. 100% for Hydrocarbon fire and ISO 844 for Ethanol fire.

The Jet Fire Pro has been certified by Lloyd's Register and DNV GL to provide the level of protection.

TIME VS TEMPERATURE
The table below shows the use temperature of equipment protected by the Jet Fire Pro during maximum testing.

TIME	TEMPERATURE
0	0°C
15	100°C
30	150°C
60	200°C

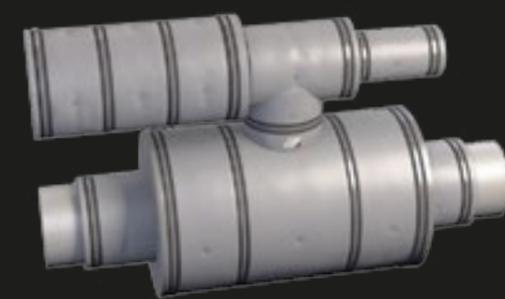
LIGHTER & THINNER
INACTIVE, LIGHTWEIGHT AND THIN SINGLE LAYER DESIGN WITH SUPERIOR THERMAL PERFORMANCE.

HYDROPHOBIC PERFORMANCE
WEATHER PROTECTIVE OUTER LAYER AND HIGHLY HYDROPHOBIC VALUES PROTECTING AGAINST CORROSION UNDER INSULATION (CUI).

SINGLE LAYER 80% LIGHTER THAN ALTERNATIVES

FROM ONLY 30MM

READ MORE ABOUT OUR HYDROPHOBIC SYSTEM ON PAGE 10



FIREPROOFING DOESN'T MEAN THE FIRE
WILL NEVER COME.

IT MEANS THAT WHEN THE FIRE COMES,
YOU WILL BE ABLE TO WITHSTAND IT.



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