

Passive Fire Protection



## About us

Trelleborg Offshore Norway AS is one of the world's leading rubber companies in the offshore industry. As our core business is to protect against corrosion, increase safety through fire protection and secure flow by use of thermal insulation, our vision is:

### Providing safety for people, environment and next generations



**We design, manufacture, test and supply sophisticated rubber solutions based on our customers' requirements. We serve the marine, oil & gas industry, renewable energy projects, defense market, as well as the general industry and equipment manufacturers.**

#### **Our History**

Trelleborg Offshore Norway, established in 1896, has been a major supplier of new products and tailored solutions towards the Oil & Gas industry for decades. Our track record proves and underlines our promises:

- **To create a win-win situation**
- **Reliable relationships**
- **Long lasting solutions**

#### **Development**

Trelleborg Offshore Norway is highly experienced in developing tailored solutions, combining the highest level of performance and competitiveness.

We have a well equipped laboratory and a unique Jet fire rig, with support from Trelleborg Group's extensive R & D resources; we have facilities and knowledge to meet future requirements.

#### **Mobile factory/flexibility**

Enabling us to do coating of pipes/equipment at our client's site, we have developed a mobile factory that can be mobilized worldwide.

#### **Value Driven Company**

Our Company culture is based upon a set of values chosen by the employees, reflecting our behavior and mindset.

- **Respect**
- **Responsibility**
- **Cooperation**
- **Humor**

# FIRESTOP

## – Fire Protection with rubber

Trelleborg's rubber based passive fire protection systems are generally known as the Firestop and Jet Firestop technologies. They include a series of materials and products, but also well proven engineering and manufacturing techniques for protection of all kind of fires from simple cellulose, via HC- and Jetfires to protection by missile launching.

Most of the products are customised and project specific, developed for offshore oil and gas installations.

### Rubber based Firestop Technology

#### 1. Fire resisting → 2. Fire arresting → 3. Fire partition

1. When subjected to heat, for example in a fire, a three step process takes place. At the first step, crystal water is generated. The water evaporates and the reaction is strongly endothermic (heat absorbing).
  2. The Firestop materials are combustible, but are not consumed. This means that the materials themselves create a seal that protects pipes, structures or equipment from overheating.
  3. The third step prevents spread of flame and smoke between i.e. modules and decks.
- Rubber is an excellent material to the rough environment on offshore oil and gas installations.

In other terms, **Fire Protection** is used:

- To protect personnel
- To protect equipment, critical components and structure
- To assist emergency response activity and buy time to gain control of the fire and evacuate the area

The Firestop materials are build up layer by layer to meet requirements such as;

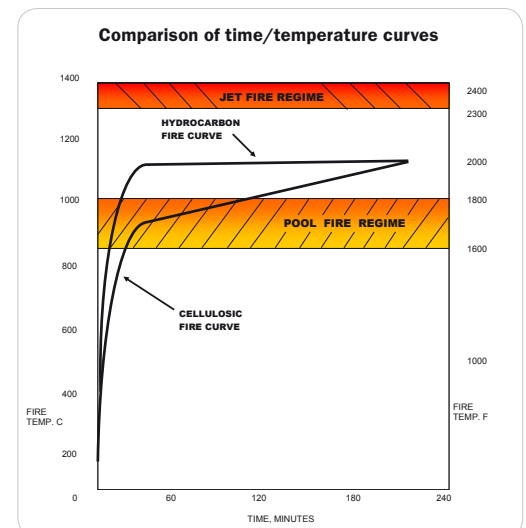
- Corrosion protection
- Thermal Protection
- Fire protection
- Mechanical Protection

We design products and solutions that protect structures from exceeding critical temperature limit.

### Fire

There are alternative definitions to fire:

- **Cellulose Fire** of typically 50 kW/m<sup>2</sup>
- **Hydrocarbon Fire** has a rapid temperature rise and ignition. The typical steady-state temperature is 1100 °C and radiation value of 160 kW/m<sup>2</sup>.
- **Jetfire** has a turbulent diffusing flame, resulting from the combustion of a steady release of pressurised liquid or gaseous fuel. A jetfire is often caused by an explosion, ignites instantly and has a strong erosion effect in addition to the high heat flux of 250–400 kW/m<sup>2</sup>. Typical temperature is 100–1400 °C.
- **Extreme conditions** as “hang off” fire by missile launching, with temperature up to 3000 °C for a short period.



### Performance criteria for Firestop:

**Stability:** The structure shall fulfil its load-bearing capacity throughout the fire exposure period.

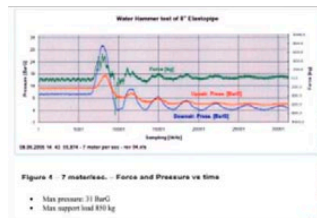
**Integrity:** Partitions shall prevent spread of flames and hot fumes throughout the fire exposure period.

**Insulation:** The unexposed side of partitions shall not reach surface temperature in excess of a certain level throughout the fire exposure period. The allowable/critical temperature on the surface of a component is project specific information, with typical values of max 200–400 °C.

**HSE:** Low generation of smoke and non-toxic fumes

Combine Fire resistance with unique rubber properties:

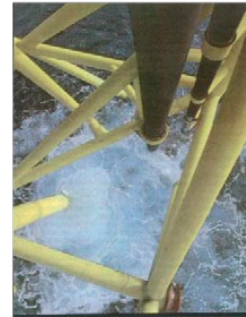
### DAMPEN,



### SEAL &



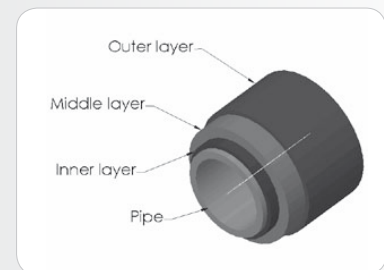
### PROTECT



The dampening and flexible nature of rubber materials is included in engineering to protect against loads and movements from vibrations, collisions, explosions and even earthquakes.

### Advantages of Firestop

- Design life of ± 30 years
- Maintenance free
- HC- and Jetfire resistant up to 2 hours (IMO A653 / OTI 95 634)
- Blast resistant
- Ozone resistant (ISO 1431-1)
- Water resistant (ISO 1817)
- Flexible
- Impact resistant
- Abrasion resistant
- Wide service temperature range (-50–155°C)
- UV resistant



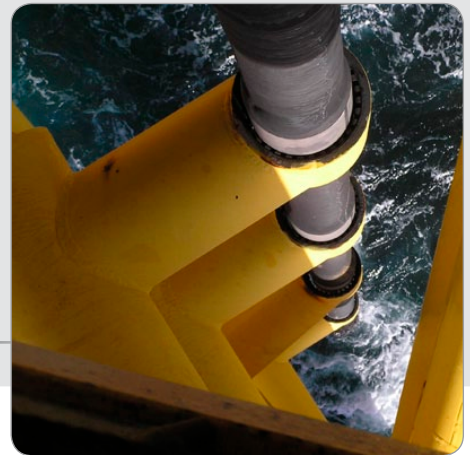
Trelleborg Offshore has many different rubber compounds that than be used “alone” or in various combinations to meet specific requirements. In addition to excellent bonding and corrosion protection of various steel, our materials adheres well and can be used in combination with other polymers like:

- Polyurethane
- Polypropylene
- Polyamide
- Polyethylene
- Epoxy
- Paints
- Rubbers

## Firestop – Fire protection of Risers and Umbilicals

Trelleborg Offshore offers a range of passive fire protection (PFP) systems for risers and umbilicals. Our systems combine blast, jet and pool fire protection with anti-fouling properties and corrosion protection. Wear plates and internal rubber coating of clamps and guides can also be included.

Firestop can be applied in our factory, on site or offshore.  
The system is designed to meet requirements set by our customers.



## Fireflex – Fire protection of Flexible Risers

Trelleborg Offshore is the main supplier of passive fire protection (PFP) for flexible risers. Our systems combine blast, jet and pool fire protection with anti-fouling properties. The Fireflex material adheres excellently to the flexible risers. The unique properties of rubber maintain the flexibility of the riser.

Fireflex can be applied in our factory or on site. The system is designed to meet requirements set by our customers.

## Bolt and Flange Protection

Firestop used as blast, jet and pool fire protection for bolted connections and flange assemblies will extend service life in the event of a fire. The product is tailor made to accommodate any flange dimension.

The rigid and tough design of the product provides excellent resistance to mechanical loads, reduces water ingress and improves protection against corrosion.

The product can be mounted on new or existing flanges and bolts.  
The bolt and flange protection is cost effective and quick and easy to install.





## Enclosures for Hang Off, Valves and Flanges

Firestop used on Hang-Off, valves and flanges offers blast, jet and pool fire protection. The rigid and tough design of the product provides excellent resistance to mechanical loads during operation and is equipped with hatches for inspections purposes.

The firestop protection is cost effective and quick and easy to install with no requirement for hot work.

## Flexible Seal

Trelleborg Offshore offers a flexible seal connection between rigid metal sections. It is used to connect modules and to provide blast, jet and pool fire protection. The flexible seal is capable of handling large displacements so it can absorb misalignments and angular deviations. Flexible seals eliminates concentrations of stress and the propagation of vibrations and dynamic loads.

The system is designed to meet all customer requirements and is manufactured to fit customer installations. The flexible seals can easily be bolted to a wide variety of structures and is well suited to be used during modifications of metal work. During installation there is no need for hot work.

Product applications: Escape Tunnel Seal, Door Seal, Vessel Seal, Conductor Seal, Linear Seal, Equipment Protection and Lifeboat Tunnel Seal.

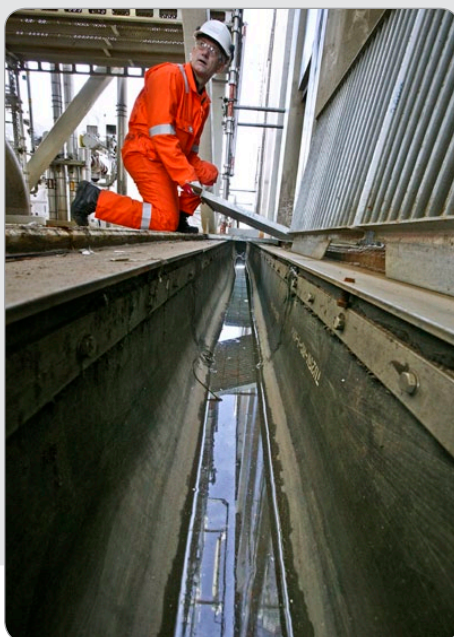


## Drain Gully

Trelleborg Offshore offers a drain gully design that connects modules in a flexible way and provides blast, jet and pool fire protection. The Drain Gully absorbs misalignments, angular deviations and eliminates concentrations of stress. Effectively stopping the propagation of vibrations and dynamic loads.

Drain Gullies allow spillage from process modules to drain efficiently. It is delivered complete with drainage boxes and an integrated overflow, eliminating the requirement for multiple additional drainage boxes.

The system is designed to meet requirements set by our customers and is designed to accommodate customers' installations. Trelleborg Offshore's Drain Gully can easily be bolted to a wide variety of structures and is well suited to be used during modifications of metal work. Drain Gully is cost effective and quick and easy to install with no need for hot work.



## HPT – Pipe Penetration Seals

HPT is a blast, jet and pool fire rated flexible seal. HPT is made of a tough and durable material.

HPT protects the pipe at the penetration location and allows movement of the pipe during operation. The system is designed to meet requirements set by our customers and is designed to accommodate customers' installations

HPT is cost effective and quick and easy to install with no need for hot work.



## Vikodeck – Surface Protection

Vikodeck is designed to offer surface protection against blast, jet and pool fire in offshore oil and gas environments.

The system is designed to meet requirements set by our customers and is designed to fit customers' installations. The Vikodeck system can be designed to withstand various chemical and mechanical conditions.

Vikodeck is cost effective and quick and easy to install with no need for hot work.

## Elastoshield – Cable and Hose Protection

Trelleborg Offshore has developed electric cable and hose protection to extend the service life in case of a fire. It is able to resist blast, jet and pool fire.

Elastoshield has a robust design which provides mechanical protection of cables and hoses.

The system is designed to meet customer requirements and is designed to fit customers' installations. Elastoshield's properties can be adjusted to withstand various chemical and mechanical conditions.

Elastoshield is cost effective and quick and easy to install with no need for hot work.



**OUR VISION:**

# **Providing safety for people, environment and next generations**

Please contact us for further information about our product range within:

PFP (Passive Fire Protection)  
Engineered Solutions  
Flexible piping system – ELASTOPIPE™  
Thermal Insulation – Vikotherm  
Defence  
Rubber components  
Corrosion-/HISC-protection

International representatives:

Please visit: [www.trelleborg.com/offshore/no](http://www.trelleborg.com/offshore/no)



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