



Jotachar

Frequently Asked Questions & Glossary

This FAQ document includes the following topics:

1. Passive Fire Protection, fire testing standards and Classification Societies
2. Substrates, Primers and topcoats
3. Application of Jotachar
4. Technical/Coat-Back
5. Glossary – General fire protection industry terms
6. Glossary - Additional for Hydrocarbon Fire Protection



1. Fire Protection terms, Fire Testing Standards and Classification Societies

What is fire resistance?

The fire resistance of a component, such as a steel column, is its ability to resist the effects of fire for a period of time. Periods of fire resistance are well established for commonly used construction materials. Most construction materials have some inherent resistance to the effects of fire although without additional fire protection, the resistance may be insufficient to prevent premature collapse of the structure.

Most oil & gas offshore and onshore authorities will require that structures have the ability to resist fire for defined periods. Typical resistance periods are 30, 60, 90, or 120 minutes, although other periods can be specified depending on the structure being protected and the relevant regulatory organisation.

What is passive fire protection?

A construction materials inherent fire resistance can be enhanced by the installation of passive or reactive fire protective materials or systems. These are often referred to as "passive fire protection or PFP" materials. For example, the fire resistance of structural steel may be enhanced by the use of intumescent coatings, concrete or lightweight sprayed cementitious materials to extend its period of fire resistance capability.

Why does steel need fire protection?

Under typical structural loads in offshore environments, steel can start to lose load bearing capacity when temperatures typically reach 400C. Hydrocarbon fueled fires often reach more than 1000C within 15 minutes which will soon compromise structural integrity and can lead to collapse, loss of life, asset and inventory



What fire resistance testing has Jotachar undertaken?

BS476 Hydrocarbon Pool Fire Testing –

A Pool Fire occurs when pooling hydrocarbons ignites, forming a high energy flame which can cause rapid temperature rise in primary steel structures within the asset, leading to early structural failure.

Along with Jet fires, pool fires are regarded as one of the most significant hazards in the Oil, Gas and Energy industries due to resulting rapid steel temperature rise and risk of rapid incident escalation.

BS476 provides a demonstration of how passive fire protection materials behave in pool fire conditions, providing time and temperature performance data under specified conditions.

Use of Jotachar Epoxy Intumescent delays steel temperature rise in pool fire conditions. This delay provides a safety window for evacuation and for responders to extinguish the fire prior to collapse or incident escalation.



Jet Fire to ISO 22899-1

A Jet Fire occurs when pressurized liquid or gaseous hydrocarbons ignites, forming an erosive and high energy flame which can impinge on primary steel structures within the asset, leading to early structural failure.



Jet fires are regarded as one of the most significant hazards in the Oil, Gas and Energy industries due to resulting rapid steel temperature rise, highly erosive nature of the flame and risk of rapid incident escalation.

ISO22899-1 provides a demonstration of how passive fire protection materials behave in jet fire conditions, providing time and temperature performance data under specified conditions.

Use of Jotachar Epoxy Intumescent delays steel temperature rise in jet fire conditions. This delay provides a safety window for evacuation and for responders to extinguish the fire prior to collapse or incident escalation.



IMO A754 Division Testing –

Test method for the determination of the fire resistance of steel fire walls (bulkheads) and ceilings (decks). The pool fire hydrocarbon fire testing is carried out on large horizontal and vertical simulations of divisions which have had Jotachar installed. Divisions have ratings such as H0, H60, H120 which refers to the insulation period they provide.



NFPA 290 Hose Stream Test –

Test method for the determination the resistance of a fire protection materials ability to remain attached to the substrate when exposed to high pressure and high volume fire fighting water during a fire test, The test also determines fire performance to a "torch" test which is a low pressure hydrocarbon fire as seen in the photo below.





ANSI/UL1709 Edition 4 and 5 – Hydrocarbon Pool Fire

This category covers fire-rating Classifications based upon the test method and acceptance criteria in ANSI/UL1709, "Rapid Rise Fire Tests of Protection Materials for Structural Steel." UL1709 is a pool fire test with a similar time/temperature curve to BS476 described above, although test sample and test thermocouple arrangements can be different

Fire resistance ratings are expressed in hours under the UL standard and a successfully tested material is given a "UL Listing".

A UL listing includes durability performance testing to the UL2431 standard.

What is a Classification Society?

A classification society is a non-governmental organization that establishes and maintains technical standards for the construction and operation of ships and offshore structures. The Society will also validate that construction is according to these standards and carry out regular surveys in service to ensure compliance with the standards. **Type Approval** or Certificate of Conformity is granted to a product that must meet a minimum set of regulatory, technical and safety requirements. Generally, type approval is required before a fire protection product is allowed to be used on a facility that is under Classification Society rules.

What Type Approvals does Jotachar have?

Currently Jotachar carries the following Type Approvals for Structures & Divisions, both pool fire and Jet Fire:

- Lloyd's Register of Shipping (LR)
- Det Norske Veritas (DNV)
- American Bureau of Shipping (ABS)
- Bureau Veritas (BV)

Type Approval Certificates are available via the Jotachar FACTBASE or via JOTTEST



2. Substrates, Approved Primers and Topcoats

What surface preparation is needed before the application of Jotachar?

The preferred surface preparation is abrasive blast cleaning. Minimum surface cleanliness must be a minimum of Sa 2.5 with a blast profile of 50 microns minimum. For small repair areas, hand tools such as wire brush, sanding discs or needle guns can be used. Full details are available in the Jotachar Application Guide on Jotun.com

Can I apply Jotachar over galvanized steel?

Yes it is possible to apply Jotachar over galvanized steel. Surface preparation and suitable priming is required. Full details are available in the Jotachar Application Guide on Jotun.com

Can I apply Jotachar over aluminum and stainless steel?

Yes it is possible to apply Jotachar over aluminum and stainless steel. Surface preparation and suitable priming is required.

Full details are available in the Jotachar Application Guide on Jotun.com

Can I apply Jotachar over any primer?

Only approved and qualified primers can be used in conjunction with Jotachar. For the current list of approved primers please visit the Global TSS section on JOIN where the approved primer and topcoat list is available. Alternatively visit the Jotachar FACTBASE for a link to the document

Can I apply any topcoat over Jotachar?

Only approved and qualified topcoats can be used in conjunction with Jotachar. For the current list of approved topcoats please visit the Global TSS section on JOIN where the approved primer and topcoat list is available. Alternatively visit the Jotachar FACTBASE for a link to the document



3. Application

What is the most efficient way to apply Jotachar?

For the highest production rates with lowest wet waste, a heated plural airless spray pump should be used. For smaller areas a modified single leg airless spray unit or hand trowel can be used although production rates will be lower and there will be a higher volume of wet waste. Full details are available in the Jotachar Application Guide on Jotun.com





Can anyone apply Jotachar?

Only Jotun certified professional applicators can apply Jotachar. Full details of the Jotachar applicator certification scheme are available in the Jotachar Application Guide on Jotun.com or via your local TSS representative

How do I achieve a high standard of finish?

Jotachar is a structural fire protection material and is not designed to achieve a highly decorative finish. An acceptable finish can be achieved by using a combination of trowels and rollers after spray application. Experienced applicators are capable of good quality standards of finish. Full details are available in the Jotachar Application Guide on Jotun.com

Does Jotachar require thinning?

For application via heated plural pump no thinning is required. Thinning up to 5% may be required if the material is applied by modified airless spray or hand tools. Full details are available in the Jotachar Application Guide on Jotun.com

Can Jotachar be repaired if damaged?

Yes, damaged areas can be repaired easily with Jotachar's simple 1:1 mixing ratio and mesh free application. Full details are available in the Jotachar Application Guide on Jotun.com

What is the pot life for Jotachar ?

The pot life at 23°C is 45 minutes and at 15°C it is 60 minutes. Full details are available in the Jotachar Application Guide on Jotun.com

4. Technical/Coat-back

What is a coat back?

Fire & Explosion analysis is often carried out on the structure to be fire protected to establish where fire protection is required. The focus is on the "primary" structural steel elements of the construction. However, any steel bracing or attachments (known as secondary steel elements) that are welded or bolted to the primary steel structure may also require fire protection. This is to ensure that any flame impinging onto the secondary steel is not allowed to transfer heat into the primary structure, leading to localised collapse. "Coat-back" is where the secondary steel is protected with Jotachar and is typically applied 400mm along the length of the secondary steel, starting at the primary structure. Contact Jotun Fire Engineering Services (JFES) for guidance



5. Glossary of Common Terms Used in the Fire Protection Industry

ASB	Asymmetric Beam	Where top half and bottom half of a section are different sizes (Symmetric= same)
ASFP	Association of Specialist Fire Protection	
A/V	European expression-same concept as Hp/A	Also called "massivity" in Spain and Portugal
Basecoat	Term used by contractors in relation to the intumescent	
Beam	Refer UB	UB = Universal Beam
Bracing	Secondary steel used to stabilise a steel structure-often used in high rise buildings etc	
BREEAM	BREEAM is the world's leading sustainability assessment method for masterplanning projects, infrastructure and buildings.	
BS476	British standard for fire protection systems	Parts 20/21 relate to loaded steel sections
BS5950	Part 8 structural use of steelwork in buildings	Gives default structural integrity temperatures
CCT	Critical Core Temperature	Temperature at which structural steel will start to collapse under load
Cellbeam/Cell Form Beam/CFB	Beam with holes cut out of the web	
CHS	CHS=Circular Hollow Section	
Column	Refer UC	UC= Universal Column
Composite beam	Composite beams are those where the profiled steel deck slab is designed to act structurally with the beam, -by means of shear (stud) connectors.	
DFT	Dry Film Thickness	
Dovetail decking	Often positioned directly above steel beams (concrete is poured into the decking). Also known as re-entrant decking. Eg Ward MD50	Provided steel beam is "flush" to dovetail decking, no increase in intumescent thickness is required.
EAD	European Assessment Document	This covers durability of intumescent coatings



EN13381-8	European fire test standard for reactive fire protection	
EN1993-1-1: Eurocode 3	European standard for the design of steel structures	Defines structural integrity temperatures according to building use
ETA	European Technical Assessment	
Fire rating	Relates to fire protection requirement of building	Usually 30, 60, 90, 120 or 180 minutes for intumescent coating
GB14907	Chinese fire test standard for reactive fire protection	
GOSHT	Russian fire test standard for reactive Fire protection	
HD	European wide flange columns	
HE/HL	European wide flange beams	
Hp	Heated perimeter	Not all perimeter may be exposed-it is the area "exposed" that is important
Hp/A	Heated perimeter divided by cross sectional area	Heated Perimeter(m) divided by the cross sectional area (sq metres) result= m^{-1}
HP	European wide flange bearing piles	
IFB	Integrated Floor Beams	
IPE	European I beams	
IPN	European standard beam	
Jotachar	Jotun's hydrocarbon intumescent coatings range for the Oil & Gas market	
LEED	The LEED rating systems make up a voluntary program meant to objectively measure how sustainable a building is.	The LEED standards are maintained by the U.S. Green Building Council (USGBC)
Load/Fire Load	Relates to the stress a steel section is designed for. Dead load = static weight e.g. weight of upper floors. Live load = things that can be moved e.g. people/furniture	Not to be confused with loading
Loading	Term often used by applicators – relates to SteelMaster thickness	



On-Site Application	Where intumescent coatings are applied on the building site	
Off-Site Application	Where intumescent coatings are applied in steel fabrication workshops	
Partial Exposure	Where a steel section has its perimeter reduced-eg section flush to wall or blockwork built into the web of columns	
PFC	Parallel Flange Channel	
PG	Plate Girder	
Primary Steelwork	Structural steel forming the main load bearing part of the steel frame	
RHS	Rectangular Hollow Section	
RSA	Rolled Steel Angle	
Section Factor	Same as H_p/A	
Secondary Steelwork	Steel that may be attached to the main steel frame, but not fully loaded e.g. cross-bracings	
Solvent based	Intumescent coatings that use hydrocarbon solvents as the thinner	
SHS	Square Hollow Section	
SFB	Slim Floor Beams	
Topsealer	Topcoat/finish coat on intumescent project	
Trapezoidal decking	Often positioned directly above steel beams, where concrete is poured into the decking.	
UAP	European channels with parallel flanges	
UB/UKB	British Universal Beam	
UBP	British wide flange bearing piles	
UC/UKC	British Universal Column	
UPN	European standard channels	



W beams	American wide flange beams	
Waterborne	Intumescent coatings that use water as the thinner	
WFT	Wet Film Thickness	
Yellow book	ASFP Publication	



6. Additional Glossary for Hydrocarbon Fire Protection

Pool Fire	A fire characterised by the burning of hydrocarbons such as spilled crude oil	Typical tests and standards: BS476 (Hydrocarbon curve) UL1709 Rapid Rise Fire Test Edition 4 or 5 GB14907 (China) GOST R EN 1363-2 (Russia)
Jet Fire	A fire characterised by pressurised burning hydrocarbons such as oil or gas	Typical tests and standards: ISO 22899-1
Heat Flux	Flow of energy per unit of area and used to describe the "energy" of the fire	Measured in Watts per m ² (W/m ²)
High Heat Flux Jet Fire (HHF)	A fire characterised by highly pressurised burning hydrocarbons such as oil or gas combined with other factors that may increase the Heat Flux such as heat reflection	Typical tests and standards: ISO 22899-1 (Modified)
Type Approval	Endorsement of fire testing and assessment by a Classification Society who set technical rules for offshore safety	Typical Classification Societies: Lloyds Register, DNV, ABS, Bureau Veritas
PFPNet	Umbrella member organisation for the hydrocarbon fire protection industry	Jotun are one of the founding members
Hose Stream	A special test to determine the resilience of a reacted fire protection material when subject to high pressure fire fighting water	NFPA 290 is the usual standard
Coatback	A procedure where attached secondary steelwork is protected to ensure heat transfer to the primary steel is reduced ensuring safety	400mm is a typical distance to "coat back" any attached secondary steelwork
BAM	Pool fire testing for steel plates and pressure vessels undertaken by the German Federal Materials Research & Testing Institute	DFT's for Intumescent are established depending on steel plate thickness and CCT.
BLEVE	A boiling liquid expanding vapor explosion occurring when pressure vessels are subject to fire	Fire protection combined with pressure relief safety systems (eg pressure release valves) is used to protect pressure vessels subject to fire
Divisions	Steel bulkheads and decks, often used in offshore or floating production construction. Construction of these is defined under IMO A754 (18)	Structural integrity in fire, passage of smoke and non fire side temperature rise are test parameters.



CSP	<p>Cryogenic Spill Protection, or, Cryogenic Steel Protection.</p> <p>Products that are capable of protecting steel substrates from super cooling and cracking in the event of cryogenic spill such as LNG (-160C)</p>	<p>Can be a single fire protection & CSP capable product, or, a duplex system using an insulation + a fire protection product</p>
Norsok M501 system 5a	<p>Durability test standard for epoxy intumescent materials</p>	
Flaring	<p>Used to safely regulate pressure in chemical plants, as well as handling natural gas release in offshore or onshore oil wells</p>	<p>Installed epoxy Intumescent materials may need protecting from the heat radiation generated from flaring</p>