

Certificate Of Fire Approval

This is to certify that the product(s) detailed below will be accepted for compliance with the applicable Lloyd's Register Rules and Regulations for use on offshore units classed with Lloyd's Register, and for use on offshore units and onshore facilities when authorised by contracting governments to issue the relevant certificates, licences, permits etc.

Manufacturer	Unifrax Limited
Address	Mill Lane, Rainford, St Helens, MERSEYSIDE, WA11 8LP, United Kingdom
Type	Structural Steel Jet Fire Protection System
Description	Structural Tubular Steel Sections, Cylindrical Vessels or Pipework protected with "Foamglas T4" (or "Foamglass T4+/ONE") and "FyreWrap Blanket" (or "FyreWrap LT Blanket") with stainless steel cladding
Trade Name	"Foamglas T4 (or Foamglass T4+/ONE) and FyreWrap Blanket (or FyreWrap LT Blanket) and stainless-steel cladding insulation assembly for Structural Tubular sections"
Specified Standard	Health & Safety Executive, Offshore Technology Report OTI 95 634 "Jet Fire Resistance Test of Passive Fire Protection Materials"

This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document and its supplementary Type Approval Terms and Conditions form part of this Certificate.

This certificate remains valid unless cancelled or revoked, provided the conditions in the attached Design Appraisal Document are complied with and the equipment remains satisfactory in service.

71 Fenchurch Street, London, EC3M 4BS, United Kingdom

Saji Abraham

Surveyor to Lloyd's Register EMEA
A member of the Lloyd's Register group

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DESIGN APPRAISAL DOCUMENT

ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. LR21311850SF

This Design Appraisal Document forms part of the Certificate.

This Certificate is a Renewal of Certificate Number SAS F170005

APPROVAL DOCUMENTATION

SINTEF Norwegian Fire Research Laboratory, Trondheim, Norway, Fire Test Report No. NBL-107217.01, dated 20 February 2003.

Unifrax Application Procedure document ref. UFX/JPINST/001, Rev.1.

CONDITIONS OF CERTIFICATION

1. Applications to be based on a 66 minute jet fire exposure test performed on a Tubular Section (Hp/A factor: 130), covered with one 37 mm minimum thick (120 kg/m³ density) layer of "Foamglas T4" (or "Foamglas T4+ / ONE"), one 25 mm thick (128 kg/m³ density) layer of "FyreWrap Blanket" (or "FyreWrap LT Blanket") and stainless steel cladding 0.7 mm thick
2. Insulation to be applied to the fire exposed side in all cases
3. Suitable for applications on tubular sections, cylindrical vessels or pipework up to 500 mm diameter and not exceeding an 'Hp/A' factor of 130. (Where 'Hp' is the outside circumference and 'A' is the cross-sectional area). Jacket insulation system is not to include any corners or edge features
4. Minimum stainless steel cladding joint overlap: 50mm, retained by stainless steel rivets at 100 mm centres and "Bandimex" straps or approved equivalent banding system at 250 mm centres. All insulation joints to be staggered by a minimum of 100 mm
5. Suitable approved insulation is to be applied to any other part of the protected fire exposed surfaces not covered by the "Foamglas T4" (or "Foamglass T4+ / ONE") and "FyreWrap Blanket" (or "FyreWrap LT Blanket") system, in all cases. In particular, attention is to be paid to means of securing jacket boundaries and the prevention of heat bridging; an overlap of at least 150mm should be provided between the two systems
6. Applications in each case to be approved by Lloyd's Register at the design stage
7. Production items are to be manufactured in accordance with a quality control system which shall be maintained to ensure that items are of the same standard as the approved prototype
8. The certificate holder is solely responsible for the products supplied under this Certificate and to ensure that their products, whether manufactured by themselves or their licensee manufacturers, if agreed by Lloyd's Register, are fully compliant with the relevant statutory regulations and Lloyd's Register Class rules as applicable and designed, manufactured and installed to the same quality and specifications as the prototype tested, including components that are designed and manufactured by third parties

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TEST RESULTS FOR AN INSULATED TUBULAR SECTION (63 mm minimum thickness)

Integrity: 66 minutes (protection remained intact for the duration of test)

Insulation: The following maximum temperatures (including a 9°C initial temperature) were recorded on the specimen:

Thermocouple No. 1	after 15 minutes of jet fire exposure	66.3 °C
Thermocouple No. 1	after 30 minutes of jet fire exposure	187.6 °C
Thermocouple No. 1	after 60 minutes of jet fire exposure	387.1 °C
Thermocouple No. 1	after 66 minutes of jet fire exposure	423.1 °C

DESCRIPTION OF TEST SPECIMEN

The Tubular test specimen comprised of a circular hollow section 169mm OD, a wall thickness of 7.5mm (Hp/A factor of 130) and a length of 3.0m, covered on the outside with one 37mm minimum thick (120kg/m³ density) layer of "Foamglas T4" (or "Foamglas T4+/ONE") and one 25mm thick (128kg/m³ density) layer of "FyreWrap Blanket" (or "FyreWrap LT Blanket") and covered with 316 stainless steel cladding 0.7mm thick. The "Foamglas" joints were sealed with "Pittseal 444N" butyl paste and the cladding was secured with stainless steel rivets and "Bandimex" 316 stainless steel bands 19mm wide x 0.5mm thick.

SCOPE

Although the test has been designed to reproduce conditions similar to those found in a large-scale jet fires resulting from realistic releases of hydrocarbons, it cannot guarantee a specific degree of protection from the myriad of possible jet fires. The Jet Fire Resistance Test, or indeed large-scale demonstrations, cannot therefore be used to confer a universal resistance rating for a specified time in the way that a standard furnace test confers a hydrocarbon rating. Hence, this test does not give a rating analogous to the "H" rating derived from the hydrocarbon fire resistance test as detailed in ISO 834. This test is not intended to replace the hydrocarbon fire resistance test but as seen as a complimentary test.

Although the method specified has been designed to simulate some of the conditions which occur in an actual jet fire, it cannot reproduce them all exactly. The results of this test do not guarantee safety but may be used as elements of a fire risk assessment for structures or plant. This should also take into account all of the other factors which are pertinent to an assessment of the fire hazard for a particular end use.

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PLACE OF PRODUCTION

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Saji Abraham
Senior Specialist
Fire & Safety, Statutory Discipline Team
UK&I Technical Support Office, Marine & Offshore
Lloyd's Register EMEA

Supplementary Type Approval Terms and Conditions

This certificate and Design Appraisal Document relates to type approval, it certifies that the prototype(s) of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein, it does not mean or imply approval for any other use, nor approval of any products designed or manufactured otherwise than in strict conformity with the said prototype(s).