



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 installations classed with Lloyd's Register, and for use on offshore installations 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 (UK)
Type	STRUCTURAL STEEL JET FIRE PROTECTION SYSTEM
Equipment 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
Specified Standard	Health & Safety Executive, Offshore Technology Report OTI 95 634 "Jet Fire Resistance Test of Passive Fire Protection Materials"

The attached Design Appraisal Document forms 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.

Date of issue	26 July 2016	Expiry date	25 July 2021
Certificate No.	SAS F170005	Signed	
Sheet No	1 of 4	Name	K. Taylor Surveyor to Lloyd's Register EMEA A Member of the Lloyd's Register Group

Note:

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 of any modification or changes to the equipment in order to obtain a valid Certificate.

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DESIGN APPRAISAL DOCUMENT

Date	Quote this reference on all future communications
10 January 2017	SOUTSO/SFS/TA/KT/WP27337546

ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. SAS F170005

This Design Appraisal Document forms part of the Certificate.

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

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



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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.



Lloyd's
Register

Lloyd's Register EMEA

71 Fenchurch Street, London, EC3M 4BS

Telephone 020 7423 2416 Fax 020 7423 2053

Email med@lr.org

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PLACES OF PRODUCTION

Unifrax UK
Mill Lane
Rainford
St. Helens
Merseyside, WA11 8LP
United Kingdom (UK)

Unifrax France
17 Rue Antoine Durafour
BP2
42420 Lorette
France

Unifrax India
99 k Stone
Ahmedabad Surendrangar Hwy
Lakhtar, Dist. Surendrangar
382 775 Gujarat
India

Unifrax Brazil Ltd.
Avenida Independencia 7033
Bairro Sao Matheus
Vinhedo SP13280-000
Brazil

Unifrax (Suzhou) Co. Ltd
59 Shiyuang Road
Xushuguan New Zone
215151 Suzhou
China

Unifrax Inc.LLC
54401 Smilax Road
New Carlisle
Indiana 46552
United States of America

Keith Taylor
Senior Specialist
Aberdeen Technical Support Office
Marine & Offshore Lloyd's Register

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).