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 STANDARD FIRE PROTECTION SYSTEM**
Equipment Description	Fire Protection System for "I" Section Structural Steel – Type: "FyreWrap® Blanket"
Specified Standard	British Standard BS 476: Part 8: 1972

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 2011	Expiry date	25 January 2013
Certificate No.	SAS F110288	Signed	Lloyd's Register EMEA London Office Lloyd's Register
Sheet No	1 of 8	Name	M. Farrier 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.

Lloyd's Register EMEA
71 Fenchurch Street, London, EC3M 4BS
Telephone 020 7423 2416 Fax 020 7423 2053
Email tad@lr.org

Document number
SAS F110288

Issue number
1

DESIGN APPRAISAL DOCUMENT

Date	Quote this reference on all future communications
26 July 2011	LDSO/SFS/TA/SA/MF

ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. SAS F110288

This Design Appraisal Document forms part of the Certificate.

APPROVAL DOCUMENTATION

Fire Insurers' Research and Testing Organisation (FIRTO), Borehamwood, United Kingdom, Fire Test Report Nos. TE 4936 and TE 4937, both dated 22 June 1984.

CONDITIONS OF CERTIFICATION

1. Previously known as FIBERFRAX DURABLANKET S or INSULFRAX BLANKET.
2. Evaluation of the test results are given in the attached Appendices 1, 2 & 3.
3. Arrangements to be approved by Lloyd's Register at the design stage.
4. Layers of insulation to be retained to steel substrate with welded steel pins 3mm diameter and steel washers at 250mm maximum spacing and at 50mm from all edges of the top layer of insulation and to all webs and flanges.
5. Thinnest layer of insulation to be applied outermost.
6. At least two layers of insulation to be applied, with staggered joints.
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.

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, SP 13280-000
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

Lloyd's Register EMEA London Office Lloyd's Register

Martin Farrier
Lead Specialist
Statutory Fire and Safety
London Design Support Office
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).

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APPENDIX 1

Minimum thickness of FyreWrap® Blanket of thickness(es) and densities given below, necessary to restrict the temperature of the "I" section steel cores to 300°C within the specified time period as a function of the cross sectional area and shape of the structural element represented by the Hp/A value:

Where HP is the perimeter of the cross-section of the element exposed to the fire
and
A is the area of the cross-section of the element in square metres.

Hp/A	30 mins	60 mins
20	12	26
25	12	26
30	12	26
35	12	26
40	12	26
45	12	26
50	12	26
55	12	26
60	12	26
65	12	26
70	12	26
75	12	26
80	12	26
85	12	26
90	12	26
95	12	38
100	12	38
105	12	38
110	12	38
115	12	38
120	12	38
125	12	38
130	12	38
135	12	38
140	12	38
145	12	38
150	12	38
155	12	38
160	12	38
165	12	38
170	12	38
175	12	50
180	12	50

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Hp/A	30 mins	60 mins
185	12	50
190	12	50
195	12	50
200	12	50
205	12	50
210	12	50
215	12	50
220	12	50
225	12	50
230	12	50
235	12	50
240	12	50
245	19	50
250	19	50
255	19	50
260	19	50
265	19	50
270	19	50
275	19	50
280	19	50
285	19	50
290	19	50
295	19	50
300	19	50
305	19	63
310	19	63
315	19	63

12mm - 2 layers of 6mm, density 112kg/m^3
19mm - 1 layer of 13mm, density 112kg/m^3 and 1 layer of 6mm, density 112kg/m^3
26mm - 2 layers of 13mm, density 112 kg/m^3
38mm - 1 layer of 25mm, density 132kg/m^3 and 1 layer of 13mm, density 112kg/m^3
50mm - 2 layers of 25mm, density 132kg/m^3
63mm - 1 layer of 50 mm, density 122 kg/m^3 and 1 layer of 13mm, density 112kg/m^3

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APPENDIX 2

Minimum thickness of FyreWrap® Blanket of thickness(es) and densities given below, necessary to restrict the temperature of the "I" section steel cores to 350°C within the specified time period as a function of the cross sectional area and shape of the structural element represented by the Hp/A value:

Where HP is the perimeter of the cross-section of the element exposed to the fire
and
A is the area of the cross-section of the element in square metres.

Hp/A	30 mins	60 mins
20	12	26
25	12	26
30	12	26
35	12	26
40	12	26
45	12	26
50	12	26
55	12	26
60	12	26
65	12	26
70	12	26
75	12	26
80	12	26
85	12	26
90	12	26
95	12	26
100	12	26
105	12	26
110	12	26
115	12	26
120	12	38
125	12	38
130	12	38
135	12	38
140	12	38
145	12	38
150	12	38
155	12	38
160	12	38
165	12	38
170	12	38
175	12	38
180	12	38

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Hp/A	30 mins	60 mins
185	12	38
190	12	38
195	12	38
200	12	38
205	12	38
210	12	38
215	12	38
220	12	38
225	12	38
230	12	38
235	12	38
240	12	50
245	12	50
250	12	50
255	12	50
260	12	50
265	12	50
270	12	50
275	12	50
280	12	50
285	12	50
290	12	50
295	12	50
300	12	50
305	12	50
310	12	50
315	12	50

12mm - 2 layers of 6mm, density 112kg/m^3
19mm - 1 layer of 13mm, density 112kg/m^3 and 1 layer of 6mm, density 112kg/m^3
26mm - 2 layers of 13mm, density 112kg/m^3
38mm - 1 layer of 25mm, density 132kg/m^3 and 1 layer of 13mm, density 112kg/m^3
50mm - 2 layers of 25mm, density 132kg/m^3

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APPENDIX 3

Minimum thickness of FyreWrap® Blanket of thickness(es) and densities given below, necessary to restrict the temperature of the "I" section steel cores to 400°C within the specified time period as a function of the cross sectional area and shape of the structural element represented by the Hp/A value:

Where HP is the perimeter of the cross-section of the element exposed to the fire
and
A is the area of the cross-section of the element in square metres.

Hp/A	30 mins	60 mins
20	12	19
25	12	19
30	12	19
35	12	19
40	12	19
45	12	19
50	12	19
55	12	19
60	12	19
65	12	19
70	12	19
75	12	19
80	12	19
85	12	19
90	12	19
95	12	19
100	12	19
105	12	26
110	12	26
115	12	26
120	12	26
125	12	26
130	12	26
135	12	26
140	12	26
145	12	26
150	12	26
155	12	26
160	12	26
165	12	38
170	12	38
175	12	38
180	12	38

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Hp/A	30 mins	60 mins
185	12	38
190	12	38
195	12	38
200	12	38
205	12	38
210	12	38
215	12	38
220	12	38
225	12	38
230	12	38
235	12	38
240	12	38
245	12	38
250	12	38
255	12	38
260	12	38
265	12	38
270	12	38
275	12	38
280	12	38
285	12	38
290	12	38
295	12	38
300	12	38
305	12	38
310	12	38
315	12	38

12mm - 2 layers of 6mm, density 112kg/m^3
19mm - 1 layer of 13mm, density 112kg/m^3 and 1 layer of 6mm, density 112kg/m^3
26mm - 2 layers of 13mm, density 112kg/m^3
38mm - 1 layer of 25 mm, density 132kg/m^3 and 1 layer of 13mm, density 112kg/m^3