



## 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.

<b>Manufacturer</b>	Roxtec International AB
<b>Address</b>	Box 540 S-371 23 Karlskrona Sweden
<b>Type</b>	<b>CABLE PENETRATION (JET FIRE TEST)</b>
<b>Equipment Description</b>	Multi Cable Penetration Types: SK-8+8x1 (single transit) and SBTB-8+8x1 (double transit)
<b>Specified Standard</b>	Health and 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 11 May 2015 Expiry date 10 May 2020

Certificate No. SAS F160138 Signed 

Sheet No 1 of 5 Name S. Abraham  
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 6 May 2016	Quote this reference on all future communications MTES/SFS/TA/SA/WP22196070
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### ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. SAS F160138

This Design Appraisal Document forms part of the Certificate.

#### APPROVAL DOCUMENTATION

SINTEF Energy, Norwegian Fire Research Laboratory, Trondheim, Norway Test Report No. 846031.02 dated 4 November 1997.

SP Fire Research AS, Trondheim, Norway; Assessment Report No: SPFR Report F15 20119-1 Issue 1 dated 29 January 2015

#### CONDITIONS OF CERTIFICATION

1. When used in conjunction with suitably insulated divisions:  
Single barrier transit, the rear face (unexposed to a fire) of the elastomeric blocks is uninsulated  
Double barrier transit, the face unexposed to a fire is completely insulated
2. Application in each case to be approved by Lloyd's Register at the design stage
3. Single barrier transit is located in 10 mm thick steel recess which is of the same width and height as penetration seal but the transit front face which is exposed to the fire is set back a minimum of 340 mm from the fire side
4. Double barrier transit is to include a minimum air gap of 180mm between the inner barrier faces
5. Frame types SOBTB, SFBTB, SFOBTB and SRBTB also accepted as well as frame types SK (single transit) and SBTB (double transit), in sizes 1-8 and combinations of up to a maximum equivalent size of 580mm high x 130mm wide x 300mm deep
6. May be used with cables similar to the sizes tested and steel pipes up to 20mm maximum outside diameter
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



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**TEST RESULTS\***

**Integrity:**

Integrity of SK-8+8x1 (single transit) = 80 minutes

Integrity of SBTB-8+8x1 (double transit) = 80 minutes

**Temperature:**

SK-8+8x1 (single transit)	Recorded Maximum Temperature on cables	Recorded Maximum Temperature on Single Steel Pipe
Thermocouple No 4 and 8 respectively after 60 minutes exposure	202.5 °C	112 °C
Thermocouple No 4 and 8 respectively after 80 minutes exposure	224 °C	134 °C
Thermocouple No 4 and 8 respectively after 84 minutes exposure	226 °C	135 °C

Capable of preventing a temperature rise at any point on the surface not exceeding 180 °C above the initial temperature for 55 mins.

SBTB-8+8x1 (double transit)	Recorded Maximum Temperature on cables	Recorded Maximum Temperature on Single Steel Pipe
Thermocouple No 14 and 17 respectively after 60 minutes exposure	163 °C	121 °C
Thermocouple No 14 and 17 respectively after 80 minutes exposure	197 °C	155 °C
Thermocouple No 14 and 17 respectively after 84 minutes exposure	202 °C	160 °C

Capable of preventing a temperature rise at any point on the surface not exceeding 180 °C above the initial temperature for 77 mins.

**Maximum temperature recorded on the Fire unexposed face of the transits**

SK-8+8x1 (single transit)	Recorded temperature on the fire unexposed face after 60 minutes	Recorded temperature on the fire unexposed face after 80 minutes
Thermocouples 29 and 30	60°C	80°C
SBTB-8+8x1 (double transit)	Recorded temperature on the fire unexposed face after 60 minutes	Recorded temperature on the fire unexposed face after 80 minutes
Thermocouples 32 and 33	70°C	80°C

**\*NOTE**

The above jet fire test results may be accepted for the cable and pipe penetration device when used in a bulkhead or deck application, subject to both the penetration device and the bulkhead or deck being fitted with the same insulation arrangements as those used in the fire test.



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#### DESCRIPTION OF TEST SPECIMEN

Two transit systems identified as SK-8+8x1 (single type) and SBTB-8+8x1 (double or back to back type) were welded in to a 1500mm high x 1500mm wide x 10 mm thick mild steel division insulated with Rockwool Gullfiber Type 8381-50 (100 mm thick, 150 kg/m<sup>3</sup>) and ceramic fibre Carborundum, Durablanket S D128-25 (25 mm thick, 128 kg/m<sup>3</sup>) to H-120 standard. The transits were mounted vertically and were 313 mm between centres horizontally and 729 mm centre to bottom edge of test piece.

The steel division was fitted with 16 thermocouples generally in accordance with OTI 95 634 and 20 thermocouples fitted to cables and pipes in accordance with IMO Resolution A.754(18) Appendix A.IV. Note that 9 cables and 1 steel pipe 20 mm outside diameter were located in each type transit system with the cables and pipes protruding approximately 50 mm on the exposed face.

The SK-8+8x1 (single) transit was located in a recess set back a minimum of 340 mm from exposed face and the back face of elastomeric blocks were uninsulated. The SBTB-8+8x1 (double) transit was covered by the 50 mm thick Gullfiber on the unexposed face and this transit was flush mounted on the exposed face.

#### SCOPE

Although the test has been designed to reproduce conditions similar to those found in large-scale jet fires resulting from realistic releases of hydrocarbons, it cannot guarantee a specific degree of protection from the large number of possible jet fires. The Jet Fire Resistance Test, or indeed large-scale demonstrations, cannot therefore be used to confirm a universal fire 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 ISO834. This test is not intended to replace the hydrocarbon fire resistance test but is to be seen as a complementary 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 examination should also take into account all the other factors which are pertinent to an assessment of the fire hazard for a particular end use.



Lloyd's  
Register

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##### PLACE OF PRODUCTION

Roxtec AB  
Box 540  
S-37123 Karlskrona  
Sweden



Saji Abraham  
Senior Specialist  
Statutory Fire & Safety  
Marine Technology and Engineering Services  
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).*