



## CERTIFICATE OF FIRE APPROVAL


This is to certify that

The product detailed below will be accepted for compliance with the applicable Lloyd's Register Rules and Regulations and with the International Convention for the Safety of Life at Sea, (SOLAS), 1974, as amended, for use on ships and offshore installations classed with Lloyd's Register, and for use on ships and 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 AND PIPE PENETRATION (STANDARD FIRE TEST)</b>
<b>Description</b>	Rectangular Penetrations for Cables and Pipes- Type: "S-Series" Steel Frames for applications in steel bulkheads and decks
<b>Specified Standard</b>	IMO Res.MSC.61(67)-(FTP Code), Annex 1 Part 3 IMO MSC/Circ.1120 IMO Res. MSC.307 (88)-(2010 FTP Code)

**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	12 May 2016	Expiry date	30 March 2020
Certificate No.	SAS F150098/M3	Signed	
Sheet No	1 of 6	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.**

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### ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. SAS F150098/M3

This Design Appraisal Document forms part of the Certificate.

#### APPROVAL DOCUMENTATION

##### Tests in accordance with IMO Res. MSC.61 (67)-(FTP Code) Annex 1 Part 3:

Norwegian Fire Research Laboratory (SINTEF), Trondheim, Norway; Test Report Nos. 103070.13B, dated 23 April 2002, 103070.14B, dated 4 July 2002, 22N007.16A, dated 25 January 2000, 22N007.18A and 22N007.18C both dated 29 May 2000. SP Laboratory, Boras, Sweden; Fire Test Reports No: P402000 dated 8 September 2004, PX05454 dated 30 September 2010, P602999 and P603000 both dated 23 January 2007. Research Institute of Marine Engineering (RIME), Tokyo, Japan; Fire Test Reports No: 09-344(E) dated 20 January 2009 and 09-346(E) dated 27 February 2009. Danish Institute of Fire and Security Technology, Hvidovre, Denmark; Fire Test Reports No: PGA10024 dated 14 October 2011 and PGA1002514 dated 24 October 2011. Southwest Research Institute, Texas, United States of America; Fire test report: 01060101117a dated 18 April 2003.

##### Tests in accordance with IMO Res. MSC.307 (88)-(2010 FTP Code) Annex 1, Part 3:

SP Technical Research Institute of Sweden, Fire Test Report Nos: 4P04959 dated 24 March 2015, Danish Institute of Fire and Security Technology, Hvidovre, Denmark; Fire Test Reports No: PGA10651 and PGA10652 both dated 3 July 2015 and PGA10723A dated 4 February 2016 (penetrations A, B & C only).

#### CONDITIONS OF CERTIFICATION

##### Cable Penetrations

1. For applications in A-60 Class steel bulkheads and decks with insulation arrangements generally as described in manufacturer's guidance drawings no: S1038643 Rev C and S1041697 Rev C. Final insulation arrangements onboard are to be approved by the relevant project authority on a case-by-case basis
2. For applications in A-0, A-15, A-30 Class steel bulkheads and decks, all penetrations tested only in A-60 Class divisions are to be fitted with the same or equivalent A-60 Class insulation arrangements as those used in the fire tests (including any insulation fitted on the penetration itself in the tests) for a minimum distance of 200mm around the penetration, on both sides in bulkheads and on the underside in decks and insulation should be extended to cover the full side(s) and the end face(s) of the steel frame, with an overlap of at least 20mm from the steel edges. The above mentioned A-60 Class insulation arrangements should be additional to any thermal or acoustic insulation, but may include any fire rated insulation (e.g. A-15, or A-30) already fitted on the bulkhead or deck and/or on the penetration itself, such that the total fire rating is A-60
3. The following penetrations in Table 1 below were tested separately in A-0 Class divisions and therefore they may be accepted in A-0 Class divisions with as-tested arrangements as described below in lieu of the above requirements



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**Table 1: Approved arrangements in A-0 Class steel bulkheads and decks (as applicable)**

Penetration Size	Application (Bulkheads/Decks)	Position of Penetration in Division	Approximate Cable Fill Ratio	Minimum Insulation Arrangements Required for A-0 Divisions
S 1x1 to S 8x1	Bulkheads	Symmetrical	40%	Additional insulation not required on or around the penetration
S 1x1 to S 8x1	Decks	Symmetrical	40%	To be fitted with a 100mm diameter A-60 insulation collar around the penetration on the underside
S 1x1 to S 8x1	Decks	Symmetrical	(2010 FTP Code) 5% to 11.5%	Additional insulation not required on or around the penetration
S 1x1 to S 8x1	Decks	Non-symmetrically to the fire unexposed side (topside) of the deck	40%	Additional insulation not required on or around the penetration

4. Consists of: Roxtec mild steel frames 10mm thick, filled with 60mm thick RM modules, standard or EMC types (ES, PE, BG, BGB), around the cables and welded/bolted to the steel bulkhead or deck
5. Minimum size of penetration approved for general applications <sup>(a)</sup> in A-60 Class steel bulkheads and decks: S 1x1
6. Maximum size of penetration approved for general applications in steel bulkheads and decks: S 8x1 and multiples thereof to a maximum size equivalent to S 8+8x3 (for applications in A-60 bulkheads and decks) and up to S 8+8+8x10 (for applications in A-30 bulkheads only)
7. Penetrations greater than S 8+8x3 and up to S 8+8x7 are approved for restricted applications <sup>(b)</sup> in A-60 Class steel decks only, with the penetration fitted non-symmetrically to the fire unexposed side (topside) of the steel deck in all cases
8. Penetrations up to the size of S8x3 are approved for use in A-60 Class beam floors of minimum height 16" (404.4mm), consisting of 7 layers of (50mm, 120kg/m<sup>3</sup>) Rockwool Firebatt insulation or equivalent



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9. Approved Frame types: S, SO, SF, SFO, SK, SR, SRC, r20 & r40 and BTB
  - (a) General applications refer to installation arrangements where the penetrations are fitted either symmetrically or non-symmetrically on the fire exposed side or fire unexposed side of the bulkhead or deck
  - (b) Restricted applications refer to installation arrangements where the penetrations are fitted non-symmetrically on the insulated side of the bulkhead or topside of the deck in all cases
  - (c) Paragraph 2.2.6.1 in the 2010 FTP Code, Appendix 2, A.IV - Cable Transits, states that the test results obtained from a given "penetration" configuration are generally valid for the tested types of cables of size equal to or smaller than tested

#### Pipe Penetrations

1. For applications in A-60 Class steel bulkheads and decks, with insulation arrangements generally as described in manufacturer's guidance drawings no: S1038666 Rev D. Final insulation arrangements onboard are to be approved by the relevant project authority on a case-by-case basis
2. For applications in A-0, A-15, A-30 Class steel bulkheads and decks, all penetrations tested only in A-60 Class divisions are to be fitted with the same or equivalent A-60 Class insulation arrangements as those used in the fire tests (including any insulation fitted on the penetration itself in the tests) for a minimum distance of 200mm around the penetration, on both sides in bulkheads and on the underside in decks and insulation should be extended to cover the full side(s) and the end face(s) of the steel frame, with an overlap of at least 20mm from the steel edges. The above mentioned A-60 Class insulation arrangements should be additional to any thermal or acoustic insulation, but may include any fire rated insulation (e.g. A-15, or A-30) already fitted on the bulkhead or deck and/or on the penetration itself, such that the total fire rating is A-60
3. Consists of: Roxtec mild steel frames 10mm thick, filled with 60mm thick RM modules around the pipes and welded/bolted to the steel bulkhead or deck. Penetrations with copper and bundle pipes are approved for general applications <sup>(a)</sup> and penetrations with steel pipes are approved for restricted applications <sup>(b)</sup> with the penetration fitted to the upper side of the deck or to the insulated side of the bulkhead
4. Minimum size of penetration for use with steel pipes approved for restricted applications in A-60 Class steel bulkheads and decks: S 1x1. Maximum steel pipe diameter tested: 50mm
5. Maximum size of steel pipe penetration approved for restricted applications in A-60 Class steel bulkheads and decks: S 8x1. Maximum steel pipe diameter tested: 50mm
6. Minimum size of copper pipe penetration approved for general applications in A-60 Class steel bulkheads and decks: S 2x1. Maximum copper pipe diameter tested: 28mm
7. Maximum size of copper pipe penetration approved for general applications in A-60 Class steel bulkheads and decks: S 8x2. Maximum copper pipe diameter tested: 54mm
8. Minimum size of bundle pipe penetration approved for general applications in A-60 Class steel bulkheads and decks: S 2x1. Maximum bundle pipe diameter tested: 20mm
9. Maximum size of bundle pipe penetration approved for general applications in A-60 Class steel bulkheads and decks: S 8x2. Maximum bundle pipe diameter tested: 50mm



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10. Insulation arrangements for individual penetrations, including minimum insulation lengths for each type of pipe to be as per manufacturer's guidance drawings no: S1038666 Rev D. Final insulation arrangements onboard are to be approved by the relevant project authority on a case-by-case basis
11. Approved Frame types: S, SO, SF, SFO, SK, SR, SRC, r20 & r40 and BTB
  - (a) General applications refer to installation arrangements where the penetrations are fitted either symmetrically or non-symmetrically on the fire exposed side or fire unexposed side of the bulkhead or deck
  - (b) Restricted applications refer to installation arrangements where the penetrations are fitted non-symmetrically on the insulated side of the bulkhead or topside of the deck in all cases
12. 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

### NOTES

1. Single frame "S Series" Cable and Pipe penetration seals, types: "S-2x1", "S 6x1" and "SRC-20 6x1" were subjected to a gas pressure test at 4 bar for a period of 30 minutes with no leakage and a hydrostatic pressure of 6 bar for a period of 30 minutes with no leakage as detailed in DNV Report No. MLM 020133 dated 26 February 2002. Such arrangements may be considered to prevent flooding or maintain gastight requirements on a ship approval basis. These types of penetrations are not suitable for tank boundaries and where the penetrations are subject to frequent immersion in fluids
2. An indicative fire test was conducted on a type: "S BTB 8x1" cable penetration for 60 minutes, after cooling the specimens were subjected to a hydrostatic test of 2 bar, held for 30 minutes, without any reported leakage. All detailed in Roxtec Test Report No. 101108 for test conducted at their test facilities and all witnessed by DNV Surveyor and detailed in their survey report No. 40007014 dated 4 March 2011. The penetration device consisted of a back to back Roxtec "S" seal fitted to both ends of a 200mm long fully insulated steel sleeve with an approved A-60 insulation system as shown in drawing No: S1023416, Rev. A
3. Single frame "S Series" Cable penetration seal, type: "S-8x1", was subjected to a gas pressure test at 4 bar for a period of 30 minutes with no leakage and a hydrostatic pressure of 6 bar for a period of 60 minutes with no leakage as detailed in DNV Report No. MLM 020106 dated 19 December 2001. Such arrangements may be considered to prevent flooding or maintain gastight requirements on a ship approval basis. These types of penetrations are not suitable for tank boundaries and where the penetrations are subject to frequent immersion in fluids
4. Single frame "S Series" steel pipe penetration seals, type: "S-2x1" and "S-6x1" were subjected to a gas pressure test at 4 bar for a period of 30 minutes with no leakage and a hydrostatic pressure of 6 bar for a period of 60 minutes with no leakage as detailed in DNV Report No. MLM 020133 dated 26 February 2002. Such arrangements may be considered to prevent flooding or maintain gastight requirements on a ship approval basis. These types of penetrations are not suitable for tank boundaries and where the penetrations are subject to frequent immersion in fluids



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5. Single frame "S Series" steel pipe penetration seals, type: "S-8x1" were subjected to a gas pressure test at 4 bar for a period of 30 minutes with no leakage and a hydrostatic pressure of 6 bar for a period of 60 minutes with no leakage as detailed in DNV Report No. MLM 020400 dated 25 March 2002. Such arrangements may be considered to prevent flooding or maintain gastight requirements on a ship approval basis. These types of penetrations are not suitable for tank boundaries and where the penetrations are subject to frequent immersion in fluids

### PLACE OF PRODUCTION

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Martin Farrier  
Lead Specialist  
Statutory Fire and 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).*