



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.

Manufacturer	Roxtec International AB
Address	Box 540 S-371 23 Karlskrona Sweden
Type	PIPE PENETRATION (STANDARD FIRE TEST)
Description	Fire Resisting Pipe Penetration Seals- Type: "RS/RS OMD" For restricted applications in steel bulkheads and decks
Specified Standard	IMO Res. MSC.61 (67) - (FTP Code) Annex 1 Part 3 IMO MSC/Circ.1120 IMO Res. MSC.307(88) - (2010 FTP Code), Annex 1, Part 3

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	15 December 2015	Expiry date	14 December 2020
Certificate No.	SAS F160140	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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Date 9 May 2016	Quote this reference on all future communications MTES/SFS/TA/MF/SA/WP22110235
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ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. SAS F160140

This Design Appraisal Document forms part of the Certificate.

APPROVAL DOCUMENTATION

SINTEF Norwegian Fire Research Laboratory, Fire Test Report Nos. 103070.13B and 103070.13 C, both dated 23 April 2002; No: 22N007.18D dated 29 March 2000.

SP Laboratory, Boras, Sweden, Fire Test Reports Nos: P602999 and P603000, both dated 23 January 2007.

DBI Laboratory, Hvidovre, Denmark, Fire Test Reports Nos: PGA10649/15045 (Deck) and PGA10650/15057 (Bulkhead), both dated 18 May 2015.

Roxtec drawing Nos: S1003826 Rev.A, dated 2 August 2008 and S1503943, Rev.A, dated 21 May 2015.

CONDITIONS OF CERTIFICATION

1. When used in conjunction with A-60 Class steel divisions with the penetrations fitted to the top side of steel decks and the insulated side of steel bulkheads; excluding the GRP single and bundle pipe penetrations for bulkhead applications and GRE single pipe penetrations for bulkhead and deck applications for which no restrictions with regard to the position of sleeves/coamings are applicable
2. For applications in A-0, A-15, A-30 Class steel bulkheads and decks, penetrations 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; excluding steel pipe penetrations (RS OMD 23 to 150) for A-0, A-15 and A-30 steel deck applications, for which the insulation arrangements are to be as described in Roxtec drawing no: S1003826. 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 insulation arrangements for pipes and penetrations for all applications are as described in the Tables no: 1 and 2 below [Also see the foot notes (a), (b), (c) and (d)]
4. Consists of: Roxtec RS/RS OMD seals fitted around steel or copper or type: "NAVICON EP/VE" GRP (single or bundle) pipes or "WAVISTRONG 01/01 EST FR 5" GRE single pipes and enclosed in a steel sleeve that may be welded or bolted to the steel division
5. Permissible copper pipe outside diameter range: 10mm to 108mm (decks), 170mm (bulkheads)
6. Permissible steel pipe outside diameter range: 10mm to 115mm (decks), 170mm (bulkheads)
7. Permissible fibreglass composite single pipe (Type: "NAVICON EP/VE") outside diameters: 32mm to 275mm (decks), 32mm to 89mm (bulkheads)
8. Permissible fibreglass composite bundle pipe (Type: "NAVICON EP/VE") outside diameters: 16mm to 50mm (for bulkhead applications only)
9. Permissible GRE composite single pipe (Type: "WAVISTRONG 01/01 EST FR 5") outside diameters: 75mm to 375mm in both decks and bulkheads



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10. 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

Table: 1 - Insulation arrangements for pipes and penetrations for A-0, A-15, A-30 & A-60 class steel Decks; also see foot notes (a), (b) & (c)

Seal Size	Pipe Insulation (100kg/m ³)	Pipe Material
RS OMD 23-31 ^(a) RS OMD 43-150 ^(a)	30mm thick x 400mm along the pipe from the underside of deck insulation ^(a) . 50mm thick x 400mm along the pipe from the underside of deck insulation and the topside of the deck ^(a) . (Maximum fire rating A-30 only)	Copper
RS OMD 23-31 ^(a) RS OMD 43-150 ^(a)	30mm thick x 100mm along the pipe from underside of deck insulation ^(a) 50mm thick x 300mm along the pipe from underside of deck insulation ^(a)	Steel
RS 68-350 ^{(a)(b)}	50mm thick x 550mm along the pipe from the underside of deck insulation and on the topside of the deck ^{(a) (b)}	Type: "NAVICON EP/VE" GRP Single pipe
RS 100-450 ^{(a) (c)}	60mm thick x 650mm along the pipe from the underside of deck insulation and on the topside of the deck ^{(a) (c)}	Type: "WAVISTRONG 01/01 EST FR 5" GRE Single pipe with 5mm FR coating)

- ^(a) For A-0, A-15 and A-30 applications, the pipe insulation for steel pipes should be extended on the fire exposed (underside) of the deck and for GRP and GRE pipes on both the fire exposed (underside) and non-fire exposed sides (topside) of the deck to minimum lengths, as described in Table 1.
- ^(b) For A-60 Deck applications, the GRP Single pipe penetrations must be fitted with an additional 150mm diameter A-60 insulation collar on both the underside and topside of the deck.
- ^(c) For A-60 Deck applications, the GRE Single pipe penetrations must also be fitted with an additional 150mm diameter A-60 insulation collar, on both the underside and topside of the deck, in addition to the pipe insulation as described in Roxtec drawing S1503943, Rev.A.



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Table: 2- Insulation arrangements for pipes and penetrations for A-0, A-15, A-30 & A-60 class steel Bulkheads; also see foot notes (d), (e) & (f)

Seal Size	Pipe Insulation (100kg/m ³)	Pipe Material
RS OMD 23-31 ^(d)	30mm thick x 400mm along the pipe on the insulated face of the bulkhead ^(d)	Copper
RS OMD 43-150 ^(d)	50mm thick x 700mm along the pipe on the insulated face of the bulkhead ^(d)	
RS OMD 23-31 ^(d)	30mm thick x 350mm along the pipe on the insulated face of the bulkhead ^(d)	Steel
RS OMD 43-150 ^(d)	50mm thick x 400mm on the insulated face of the bulkhead ^(d)	
RS 68-125 ^{(d) (e)}	50mm thick x 500mm along the pipe on the insulated face of the bulkhead ^{(d) (e)}	Type: "NAVICON EP/VE" GRP Single pipe
RS 43- 100 ^{(d) (e)}	50mm thick x 400mm along the pipe on the insulated face of the bulkhead ^{(d) (e)}	Type: "NAVICON EP/VE" GRP bundle pipe
RS 100-450 ^{(e)(f)}	60mm thick x 650mm along the pipe from the bulkhead on both sides of the bulkhead ^{(e) (f)}	Type: "WAVISTRONG 01/01 EST FR 5" GRE Single pipe (with 5mm FR coating)

- ^(d) For A-60 bulkhead applications, the copper and steel pipe penetrations must be fitted with an additional 150mm diameter A-60 insulation collar around the pipe insulation on the insulated side of the bulkhead.
- ^(e) For A-0, A-15 and A-30 applications, the pipe insulation for metallic (steel or copper) pipes and for GRP pipes should be extended at least one side of the bulkhead and for GRE pipes on both sides of the bulkhead, to minimum lengths as described in Table 2.
- ^(f) For A-60 bulkhead applications, the GRE Single pipe penetration must be insulated with an additional 150mm diameter A-60 insulation collar on both sides of the bulkhead, in addition to the pipe insulation as described in Roxtec drawing S1503943, Rev. A.

NOTES

1. A Type RS-23/OMD and Type RS-150/OMD pipe penetrations were subjected to a hydrostatic test (6 bar) and gas-tightness test (4 bar) for 30 minutes without any leakage, as witnessed by DNV in Certificate No. MLM 020106 dated 19 December 2001.
2. The following penetrations-RS 43 to RS 100 (with stainless steel bundle pipes) and RS 68 to RS 500 (with GRP single pipes) were subjected to a hydrostatic test (6 bar) and gas-tightness test (3 bar) for a period of 60 minutes and 30 minutes respectively without any leakage, as identified in DNV Witness certificate no: MLM 060561 dated 01 December 2006.



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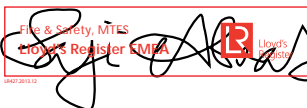
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- An indicative fire test was conducted on the following Roxtec steel pipe penetration test specimens- RS 31 (Pipe O.D 10mm), RS 43 (Pipe O.D 10mm), RS 75 (Pipe O.D 30mm) and RS 150 (Pipe O.D 114mm) - for 60 minutes; after cooling the specimens were subjected to a hydrostatic test of 2 bar, held for 30 minutes, without any reported leakage. All detailed in Roxtec Test Report No. 101151 for test conducted at their test facilities and witnessed by Lloyd's Register Surveyor and detailed in Inspection report No: HBG 1110050 dated 20 May 2011. The penetration device consisted of a back to back arrangement, with an RS seal fitted to both ends of a 312mm long fully insulated steel sleeve with an approved A-60 insulation system as shown in Roxtec drawing No: S1024156, Rev. A.
- An indicative fire test was conducted on the following Roxtec GRE single pipe penetration test specimens- RS 100 (Type: "WAVISTRONG 01/01 EST FR 5" GRE Pipe DN 50mm) and RS 450 (Type: "WAVISTRONG 01/01 EST FR 5" GRE Pipe DN 350mm) - 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 DNV-GL Survey Report No: N1415GHG dated 25 September 2015, for testing conducted at Roxtec International AB's test facilities at Karlskrona, Sweden. The penetration device consisted of an RS seal fitted in a 65mm long standard SLRS Sleeve welded symmetrically to the indicative bulkhead and fully insulated both on the sleeve and pipe with an approved A-60 insulation system as shown in Roxtec drawing No: S1506417 Rev. B

PLACE OF PRODUCTION

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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).