

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 GmbH
Address	Neuer Höltigbaum 1-3, Hamburg, 22143, Germany
Type	CABLE AND PIPE PENETRATION (STANDARD FIRE TEST)
Description	GK Packing system, modular and Circular penetrations type "RM" and "EMC-RM" (Steel or Aluminium Sleeves)
Trade Name	"RM" and "EMC-RM" (Steel or Aluminium Sleeves)
Specified Standard	IMO Res. MSC.307 (88)-(2010 FTP Code) Annex 1 Part 3 IMO Res. MSC.61 (67)-(FTP Code) Annex 1 Part 3 IMO MSC/Circ.1120 IMO Res. MSC.307 (88)-(2010 FTP Code) Section 8 IMO MSC.1/Circ.1488

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 North America, Inc. of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document and its supplementary Type Approval Terms and Conditions form 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.

1330 Enclave Parkway, Houston, Texas, 77077,
United States

Bruce McDonald

Technical Authority - Statutory to Lloyd's
Register North America, Inc.
A member of the Lloyd's Register group

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DESIGN APPRAISAL DOCUMENT**ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. LR2253328SF-02**

The undernoted documents have been appraised for compliance with the relevant requirements of International Conventions, and this Design Appraisal Document forms part of the Certificate.

This Certificate is an Amendment of Certificate Number LR2253328SF

TEST REPORTS

SP Technical Research Institute of Sweden, test report numbers 4P07023 dated 4PthP February 2015, 4P00576 dated 7PthP May 2014, 4P00572 dated 6PthP May 2014, 4P06068 dated 17PthP January 2015,

DMT _ Test Laboratory for Fire Protection, Lathen Germany, test Report numbers DMT-DO-53-112 dated, 22PndP May 2019, DMT-DO-53-111 dated 27PthP March 2019, DMT-DO-53-099 dated 21th January 2019, DMT-DO-53-110 dated 27PthP March 2019, DMT-DO-53-103 dated 27PthP February 2019, DMT-DO-53-104 dated 26PthP February 2019, DMT-DO-53-100 dated 24PthP January 2019.

TUV Nord Laboratory Hamburg Germany, test report, GV09/6415 15PthP June 2009.

DBI Danish Institute of Fire and Security Technology, test report numbers PGA10568 dated 4PthP March 2015, PGA10517 dated 20PthP November 2014, PGA10569 dated 4PthP March 2015, PGA 10518 20PthP November 2014, PGA11387A dated 5PthP July 2019,

Ship Design and Research Centre Gdansk Poland, Test report numbers RS-19/B-017/E dated 27PthP May 2019, RS-19/B-224/E dated 1PstP August 2019, RS-19/B-019/E dated 27PthP May 2019, RS-19/B-020/E dated 27PthP May 2019, RS-19/B-018/E dated 17PthP June 2019, RS-19/B-225/E dated 1PstP August 2019.

Pressure Witness statements reference GK20190424 dated 24PthP April 2019, GK20190516 dated 16PthP May 2019, GK20190606 dated 6PthP June 2019, GK20190730 dated 30PthP July 2019, GK20190815 dated 15PthP August 2019 , HBG0200283-1 dated 17PthP October 2002.

INSTALLATION DOCUMENTATION

Installation of all Roxtec GK-Transit Systems is to be done in accordance with:

- GK_Welding_Instruction_Steel&Alu, dated October 2018 or newer
- GK_SPK_Mounting_Instruction, dated December 2019 or newer
- GK_EMV-SPR-RM_Mounting_Instruction, dated January 2015 or newer
- Roxtec GK Transit system drawings reference;

Z2019002 - Cable Circular A-60 Steel B & D, Rev. A

Z2019004 - Cable Circular A-60 Alu B & D, Rev. A

Z2019006 - Steel Pipe Circular A-60 Steel B & D, Rev. A

Z2019008 - Copper Pipe Circular A-60 Steel B & D, Rev. A

Z2019010 - Steel Pipe Circular A-60 Alu B & D, Rev A

Z2019012 - Copper Pipe Circular A-60 Alu B & D, Rev A

Z2019017 - Cable Circular A-0 Steel B & D, Rev. A

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Z2019018 - Cable Circular SLRM-RED A-0 Steel B & D, Rev A
 Z2019030 - Routing Combination Frames A-60 Steel B & D, Rev. A
 Z2019031 - Routing Combination Frames A-60 Alu B & D, Rev. A
 Z2019032 - Routing BTB Frames A-Class Steel B & D, Rev. A
 Z2019033 - Routing BTB Frames A-Class Alu B & D, Rev. A

CONDITIONS OF CERTIFICATION

1. GK Packing System, circular solutions, for cable and pipe transits in A Class steel and aluminium Bulkheads and Decks. GK-RM and GK-EMC-RM system consisting of circular sleeves, Round Module type RM (Halogen-free and green, 3 rib or MultiFlex modules) with square packing space including compression function and modular cable and/or filling modules. Module System length: GK-RM is 60mm; GK-EMC-RM is 80mm.
2. Approved for maximum diameter cables of 88 mm and maximum diameter metal bundle pipe of 29 mm. Modules can be provide with no cables/pipes (i.e. blank module) to multiple pipes/cables with a pipe/cable in each module.
3. The minimum length and wall thickness for sleeves used for GK-RM Packing System is:
length: min. 65mm / thickness: min. 4mm
The minimum length and wall thickness for sleeves used for GK-EMC-RM Packing System is:
length: min. 85mm / thickness: min. 4m
4. For applications in A-0, A-15 or A-30 Class steel bulkheads and decks, a 200mm diameter collar of insulation must be added to bring the insulation collar up to A-60 penetration. For A-0 penetrations which have been tested without insulation additional ring of insulation is not required. Please refer to manufacturer's drawings for details.
5. Table 1 below details frame sizes

Table 1. Frame sizes for GK Packing system

GK Packing system	Frame Type	Frame Sizes	Fixing Method
GK-RM GK-EMC-RM	SLRM	Nominal sizes 50,70,100,125,150 and 200 including BTB,	Welded
	SLRM-F		Bolted and Welded
	SLRM-BTB		Welded
	EMC-SLRM		Welded
	EMC-SLRM-F		Bolted and Welded
	EMC-SLRM-BTB		Welded
	SLRM-RED	Nominal sizes 50, 70 and 100	Bolted and Welded

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6. Table 2 below gives details of maximum pipe sizes

Table 2. Maximum pipe sizes

Pipe Material	Frame Type	Outer Diameter
Carbon, Stainless Steel and Copper	SLRF(-F, -BTB) EMC-SLRM (-F, -BTB)	6-108mm
	SLRM-RED	6-51mm
Bundle Pipe	SLRF(-F, -BTB) EMC-SLRM (-F, -BTB) SLRM-RED	Max 29mm

7. Table 3 below gives details of hydrostatic and pneumatic pressure testing

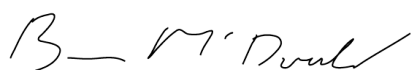
Table 3. hydrostatic and pneumatic pressure testing

GK Packing System	Water Test Pressure	Gas Test Pressure (Air)
GK-RM / GK-EMC-RM (size 50 up to 150)	3,0 bar	0,3 bar
GK-RM / GK-EMC-RM (size 200)	2,0 bar	0,3 bar

8. 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.
9. The certificate holder is solely responsible for the products supplied under this Certificate and to ensure that their products, whether manufactured by themselves or their licensee manufacturers, if agreed by Lloyd's Register, are fully compliant with the relevant statutory regulations and Lloyd's Register Class rules as applicable and designed, manufactured and installed to the same quality and specifications as the prototype tested, including components that are designed and manufactured by third parties.

DESIGN APPRAISAL DOCUMENT**ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. LR2253328SF-02****PLACE OF PRODUCTION**

Roxtec GMBH
Neuer Höltingbaum 1-3
22143 Hamburg
Germany



Bruce McDonald
Technical Authority-Statutory
Lloyd's Register Americas

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).