

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Class A and B Penetration**with type designation(s)
GK Packing System - GK-SPK, GK-RM

Issued to

**Roxtec GmbH
Hamburg, Germany**is found to comply with
**DNV GL rules for classification – Ships
DNV GL class programme DNVGL-CP-0165 – Type approval – Cable and pipe penetrations
DNV GL offshore standards****Application :****Pipe penetration system in Class A-60 Aluminium Bulkheads and Decks.****For further details see Applications/Limitations on page 3 of this certificate.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed
by DNV GL.**Issued at **Hamburg** on **2019-09-27**for **DNV GL**This Certificate is valid until **2024-09-26**.DNV GL local station: **Hamburg CMC**Approval Engineer: **Hagen Markus**

**Olaf Drews
Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Product description

GK-SPK System

Pipe penetration system consisting of rectangular shaped frames, compression-wedge seal, standard modular pipe and/or filling modules (green colour), accessories and metal/plastic anchor plates. Module System length is 60mm.

| Frame Type ¹ | Frame Sizes and types | Fixing Method |
|-------------------------|---|-----------------|
| SPK | Single and group frames in nominal sizes 2, 4, 6 and 8. | welded |
| SPK-S30 | Chamber width(s) of 60mm and 120mm. | welded |
| SPK-S50 | Frames available in different combinations and back to back arrangement (BTB). Minimum frame depth of 60mm. | welded |
| SPK- F, - R | | welded + bolted |
| SPK-BTB | Bolted frames are available in aluminium and steel. | welded |
| SPK-h | Single and group frames in nominal sizes 2, 4, 6 and 8 with chamber width(s) of 120mm and 180mm and BTB. Minimum frame depth is 60mm. | welded |
| Maximum frame size | | SPK-8x4 |

Notes

¹ Empty frame types SPK, SPK-F, SPK-S30, SPK-S50, SPK-F-R intended to be installed in non-watertight bulkhead or decks may be closed by using blank covers of type GK-BD.

Packing Modules - GK-SPK System

Halogen-free (green colour) pipe modules, filling modules and accessories (Standard 3-Rib). GK-SPK-Frames may also be fitted with Roxtec international (blue) modules, compressions system and stay plates, however mixing of GK-components and Roxtec-Modules in one opening is not permitted.

GK-RM System

Pipe and bundle tube penetration system consisting of Circular Sleeves², Round Module type RM (Halogen-free, green colour) with square packing space including compression function and modular pipe and/or filling modules. Module System length is 60mm.

| Frame Type | Frame Sizes | Fixing Method |
|------------|--|-----------------|
| SLRM | Nominal sizes 50, 70, 100, 125, 150 and 200, and back-to-back arrangement (BTB). | welded |
| SLRM-F | | welded + bolted |
| SLRM-BTB | Maximum frame size: SLRM 200 | welded |
| SLRM-RED | Nominal sizes 50, 70 and 100 | welded + bolted |

Notes

² Minimum length of 65mm and minimum wall thickness of 5mm.

Application/Limitation

Class A-60 Aluminium Bulkheads and Decks, general application.

For application on A-0, A-15 and A-30 divisions, the penetration system shall be insulated as approved for class A-60. The penetrated division is to be insulated as for A-60 at least 200 mm around the penetration. Other applications are subject to case-by-case approval.

The insulation material used shall be of approved type.

Each pipe penetration system is to be supplied with its actual manual for installation and use.

Minimum Filling Rate 0%: no pipe installed - all modules are empty.

Maximum Filling Rate 100%: multiple pipes installed - pipe installed in every module.

Penetration systems are generally not to be used for penetrating boundaries of tanks. Approval may be given on a case by case basis. The use in dry void spaces is approved.

Size range of penetration pipes (media pipe)

| Pipe material | Outer diameter | Frame types |
|------------------------------------|----------------|-----------------------|
| Carbon, Stainless Steel and Copper | 6 - 108mm | Rectangular, Circular |
| | 6 - 51 | SLRM-Red |
| Bundle tubes | max. 29mm | Rectangular |

Water - and Gas tightness

| GK Packing System | Water Pressure | | Gas Pressure (air) | |
|---------------------------------|----------------|-------------------|--------------------|-------------------|
| | Test pressure | Approved pressure | Test pressure | Approved pressure |
| GK-SPK (with metal stay-plates) | 3.8 bar | 2.5 bar | 0.3 bar | 0.2 bar |
| GK-RM, size 50 up to size 150 | 3.0 bar | 2.0 bar | 0.3 bar | 0.2 bar |
| GK-RM, size 200 | 2.0 bar | 1.3 bar | 0.3 bar | 0.2bar |

Water tightness – special cases

The GK Packing System is not tested with regard to the requirements given in SOLAS Ch. 11-1 Reg. 13.2.3 (combined fire and water tightness test, 2014 issue).

Refer to DNV GL CP-0165, Sec. 2 - Ch.5.

GK Packing System - Installation

The installation and insulation of the GK-Packing System is to be carried out according to the following manufacturer`s instructions, actual versions apply.

Welding and mounting instructions

| Document title |
|---|
| GK Welding Instructions Steel and Aluminium |
| GK-SPK Mounting Instructions |
| GK-RM Mounting Instructions |

GK Packing System - Installation

Insulation instructions

| Drawing Title | Drawing | Transit |
|---|----------|------------------------|
| Steel Pipe Rectangular A-60 Alu B & D | Z2019009 | Rectangular |
| Steel Pipe Circular A-60 Alu B & D | Z2019010 | Circular |
| Copper Pipe Rectangular A-60 Alu B & D | Z2019011 | Rectangular |
| Copper Pipe Circular A-60 Alu B & D | Z2019012 | Circular |
| Blind Cover BD Rectangular A-60 Alu B & D | Z2019020 | Rectangular |
| Routing Combination Frames A-60 Alu B & D | Z2019031 | Rectangular |
| Routing BTB Frames A-Class Alu B & D | Z2019033 | Rectangular / Circular |

Marking of product

| Scope | Packaging unit – Modules | Frames |
|-------------------|----------------------------------|--|
| | Example | Example |
| Manufacturer name | Roxtec GmbH | Roxtec GmbH |
| Type designation | GK Packing System FM-30/00 HF | GK Marine Packing System SPK-S50-6x2/1.0570-Sigmaweld |
| Fire Rating | A0, A15, A30, A60 | A0-A60 |

Tests carried out

- Fire tests according to IMO Res.MSC.307(88)-(2010 FTP Code).
- IMO MSC.1/Circ.1488
- Pressure tests according to DNV GL CP-0165, Sec. 2 - Ch.4 Water tightness and gas tightness.

Type Approval documentation

Watertightnes and gastightnes test reports

| Test report | Date | Test specimen | Drawing |
|-------------|------------|--|--|
| GK 20190815 | 2019-08-15 | C_RM 150_empty_Side A_ | GK20190815-18 GK-04-RM150-Kaefig, Rev. B GK-01-Beschlag RM 150 - O, Rev. b |
| GK 20190516 | 2019-05-16 | B_SPKh-180-8_pipes 6 up to108mm_Side A+B | GK20190516-07 |
| | | B_RM200_st pipe 108_Side A+B | GK20190516-05 |
| | | B_RM200_pipes 6 up to 54_Side A+B | GK20190516-06 |
| GK 20190606 | 2019-06-06 | A_RM200_empty_Side A | GK20190606-02 |
| | | SPKh-180-8_empty_Side A+B | GK20190606-04 |
| | | SPK-8x1 (122)_empty_Side A+B | GK20190606-14 |
| | | B_SPK-2x1_empty Side A+B | GK20190606-16 |
| GK 20190730 | 2019-07-30 | A_RM-200_empty_Side A | GK20190730-02 |

Job Id: **262.1-031421-1**
Certificate No: **TAF00001AZ**

A-60 Fire test reports

Reference DNVGL Fire Test program matrix GK Packing system, 2019-08-27

| Test report | Test report issued | Division | Test specimens | Pipe material | Frame types |
|-------------------------------|--------------------|----------|---------------------------------------|----------------------------------|-------------------------------|
| PGA10569, Serial no: 14822 | 2015-03-04 | Bulkhead | B, F, D,E,P, G, K, M, C | Steel, Copper, Bundle tube | SPK, SPK-h, SLRM, SLRM-RED |
| RS-19/B-020/E | 2019-05-27 | | D | Copper | SLRM-RED |
| PGA10568, Serial no: 1822 | 2015-03-04 | Deck | B, C, E, F, H, I, K, L, N, O, Q, R | Steel, Copper, | SPK-h, SPK, SLRM, SLRM-RED |
| RS/1/295/19 (statement) | 2019-06-24 | | L | Copper | SLRM-RED |

GK Packing System - Insulation instructions

| Drawing Title | Drawing | Transit |
|---|---------------------|---------------------------|
| Steel Pipe Rectangular A-60 Alu B & D | Z2019009, Rev. A | Rectangular |
| Steel Pipe Circular A-60 Alu B & D | Z2019010, Rev. A | Circular |
| Copper Pipe Rectangular A-60 Alu B & D | Z2019011, Rev. A | Rectangular |
| Copper Pipe Circular A-60 Alu B & D | Z2019012, Rev. A | Circular |
| Blind Cover BD Rectangular A-60 Alu B & D | Z2019020, Rev. A | Rectangular |
| Routing Combination Frames A-60 Alu B & D | Z2019031, Rev. A | Rectangular |
| Routing BTB Frames A-Class Alu B & D | Z2019033, Rev. A | Rectangular / Circular |

GK Packing System - Installation instructions

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| GK Welding Instructions Steel and Aluminium, September 2019 |
| GK-SPK Mounting Instructions, August 2019 |
| GK-RM Mounting Instructions, February 2016 |

Miscellaneous documents

- Drawing GK-SLRM-RED-50 (screwed), 2019-09-17
- GK Flange System Overview single & combination frames GK20190611-01, 2019-06-11
- SPK-F Einzelrahmen / Single frame – GK 01-05-120-01-060-0037-SO
- MED Audit report of Roxtec GmbH, Hamburg dated 2019-06-18

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNVGL-CP-0338, Sec.4.

End of certificate