

# **TYPE APPROVAL CERTIFICATE**

Certificate no.: TAP000020Z Revision No: 1

This is to certify: that the Pipe Couplings, Bite and Compression Type

with type designation(s) **Cutting ring fitting** 

# issued to EXMAR GmbH Bad Nauheim, Hessen, Germany

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021 DNV class programme DNV-CP-0185 – Type approval – Mechanical joints

# **Application:**

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Temperature range:	see page 2
Max. working press.:	800 bar
Sizes:	6 mm up to 42 mm

Issued at Hamburg on 2024-06-20

This Certificate is valid until **2029-06-19**. DNV local unit: **Essen** 

Approval Engineer: Christian Kaemmer

for DNV



Digitally Signed By: Sven Klinger Location: DNV Hamburg, Germany

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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.



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# **Product description**

The EXMAR cutting ring fittings consist of pipe couplings made of stainless steel, designed in accordance with DIN 2353 and EN ISO 8434-1.

Series L (light) and Series S (heavy). The components are: basic component, connecting nut and cutting ring. Reference: Exmar catalogue "Cutting ring fittings".

### Scope of type approval<sup>1</sup>

This type approval certificate includes the following fitting types and sizes - with all thread types:

L-Series tube O.D. 6mm up to 42mm and S-Series tube O.D. 6mm up to 38mm:

Component:	Type Designation:
Stud couplings	
GEV	Straight male adaptor fittings
WEV	Male adaptor elbow fittings
TEV	Male adaptor T-fittings
LEV	Male adaptor L-fittings
GEV-D	Straight fittings for temperature sensors
GAV	Straight female adaptor fittings
MAV	Manometer fittings
EMAS	Adjustable manometer fittings
Tube to tube couplings	
GV	Straight fittings
WV	Elbow fittings
TV	T-fittings
KV	Cross fittings
VSA	Locking fittings
GSV	Bulkhead fittings
WSV	Bulkhead elbow fittings
Adjustable couplings	
ESS	Male adaptor standpipe union
EWV	Adjustable elbow fittings
WEE	Adjustable male adaptor elbow fittings
ETV	Adjustable T-fittings
ELV	Adjustable L-fittings
VKO	Straight unions with taper and O-ring
VKOR	Straight reducing unions with taper and O-ring
GKO	Straight fittings with taper and O-ring
EGKO	Straight male adaptor unions with taper and O-ring
EWKO	Adjustable elbow fittings with taper and O-ring
ETKO	Adjustable T-fittings with taper and O-ring
ELKO	Adjustable L-fittings with taper and O-ring
EMAKO	Adjustable manometer fittings with taper and O-ring
GRKO	Reducing fittings with taper and O-ring
Welding couplings	
GAS	Straight weld-on fittings
GASK	Straight weld-on fittings with weldable cone and O-ring
WAS	Elbow weld-on fittings
ESV	Weld-in bulkhead fitting
SKO	Weldable cones
SKR	Weldable reducing cones
Reduction couplings	
RS	Reducing adaptor
RS-WD	Reducing adaptor
GR	Straight reducing fittings
KR	Reducing taper standpipe fittings
TR	Reducing T-fittings

Note <sup>1</sup> Excluded from type approval are banjo ESWV and rotary couplings.

# Materials:



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**Cutting ring fitting:** basic component, cutting ring, connecting nut:

Sealing:

FKM or NBR

Stainless Steel:

X 6 CrNiMoTi 17 12 2 / 1.4571 / DIN EN 10088-3 / AISI 316 Ti

Intended for Tubes: Stainless steel; Seamless, cold drawn, high precision stainless steel tubes (acc. to DIN EN 10216-5 / EN ISO 1127, tolerance class D4/T4) with clean, smooth surface.

# Application/Limitation

The EXMAR cutting ring fittings are type approved for application in pipe class I, II and III-piping systems.

The fittings are classified as compression coupling - bite type - as listed in DNV-Rules "Ships" Pt. 4, Ch. 6, Sec. 9 Table 8, 9 & 10. Fittings without elastomeric seals are classified as fire resistant type.

Fittings with elastomeric seals are limited in piping systems with classification "Fire endurance test not required".

In general, mechanical joints are not approved for application in high pressure fuel injection systems of combustion engines.

#### Selection of materials

It shall be noted that the selection of the materials considers the applicable service condition with respect to type of media, flow velocity, media temperature and installation area of the piping system. In particular, the resistance to corrosion, erosion, oxidation and other deterioration during projected service life are to be considered. References: DNV Rules "Ships" Pt.4 Ch.6 – Section 2 – Materials; & EXMAR catalogue cutting ring fittings.

#### Sea water application

The term sea water application includes sea water piping systems and installation of piping systems on open deck. Stainless steel materials 1.4571 (AISI 316Ti) are approved for sea water systems with operation mode "flowing seawater" but not for application in piping systems with operation mode "stagnant seawater".

#### Service Pressure range<sup>1</sup>

The couplings are type approved for the following nominal pressures PN.

Series	Tube OD [mm]	PN [bar]
	6 to 10	500
L - series	12 to 18	400
	22 to 42	250
	6 to 10	800
S - series	12 to 14	630
	16 to 25	420
	30 to 38	320

Note

<sup>1</sup> Individual pressure ratings of the fittings as specified in the EXMAR fittings catalogue "Version 22" are to be observed.



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Temperature range for pipe coupling and sealing material		
Stainless steel (Components)	-55°C to +400°C	
FKM (Sealing)	-20°C to +200°C	
NBR (Sealing)	-35°C to +100°C	
NBR LT (Low Temperature Sealing)	-50°C to +100°C	
Metallic Sealing	-55°C to +400°C	

The maximum service temperature (M.A.W.T.) arise out of the tube fitting and the sealing material combination. It depends on the sealing material selected.

In addition, temperature limits regarding seal durability with hydraulic fluids is to be observed.

#### Pressure reduction factor:

For service temperatures above 20°C the operating pressure is to be reduced with the pressure reduction factors:

20°C up to 50°C:	-4.5%
up to100°C:	-11%
up tp200°C:	-20%
up to 300°C:	-29%
up to 400°C:	-33%

A tube grade suitable for cold bending and flaring is to be used. The wall thickness of the tubes is to be selected acc. to DNV Rules Part 4 Chapter 6 Section 9 Table 3.

#### Bulkhead and Deck pipe penetrations:

- Screwed Bulkhead Couplings of type GSV and WSV are not approved through tank walls, watertight decks and bulkheads. For application through fire divisions a separate type approval is required.
- Welded Bulkhead Couplings of type ESV are approved through tank walls, watertight decks and bulkheads. Through fire divisions the coupling and connected pipe is to be provided with same insulation material as used for the divisions. Total insulation length of 450mm.

#### Thread types:

Pipe fittings where pressure -tight joints are made on the threads are limited in the application as follows:

Pipe connector design	Range of application <sup>1</sup>	
with tapered or parallel thread	not approved for toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur	
with parallel thread	approved for pipe class III	up to outside diameter 60.3mm
with tapered thread	approved for pipe class I	up to outside diameter 33.7mm
	approved for pipe class II, III	up to outside diameter 60.3mm

Note <sup>1</sup> Refer to DNV Rules, Pt.4, Ch.6 – Section 9 – 5.2.6.

# Assembling and Installation

To ensure the performance of the mechanical joint connection the assembly instructions specified in EXMAR catalogue "Cutting ring fittings" are to be observed.

# Production site

EXMAR Frauenfeld, Suisse

# Responsibility

The EXMAR GmbH, Germany takes the responsibility that both design and production follow the Rules, Standards and/or Regulations listed on page 1 of this certificate.



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# **Type Approval documentation**

Test report from IMA No. C 080/11 dated 08.08.2011 Fire resistance tests IHA No: 044-11; 045-11; 046-11; 047-11; 048-11; 049-11 dated August 2011 Manufacturer's catalogue Edition 16/2017 Burst pressure test reports dated 2020-01-14 Type Approval Assessment Report Authorization letter Exmar dated 2020-12-11 Techn. Datasheet Rubber Gasket NBR.

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Burst Pressure Tests reports witnessed by DNV-Surveyor dated 2024-05-28

# Tests carried out

Burst pressure test, pressure pulsation and vibration test, fire resistance test, vacuum test. pull-out test, tightness test.

# Marking of product

For traceability to this Type Approval, the tube fittings are to be marked with:

- Manufacturer's name or trade mark
- Type designation
- Size

# Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNV - CP-0338, Section 4. In addition, burst pressure testing on selected sizes to be carried out in the course of renewal of the certificate. To check

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