

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Compensator, Bellows of Rubber Material

with type designation(s)

Yellow Ring - 3K, Red Ring - 3K

Issued to

**Rubber Design B.V.
Heerjansdam, Netherlands**

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems

DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018

DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV.

Type:	Temperature range:	Max. working press.:	Sizes:
Yellow Ring - 3K	0°C to +90°C	4 bar	inner diameter: 25.0 mm to 168.3 mm
Red Ring - 3K	0°C to +130°C	4 bar	inner diameter: 25.0 mm to 168.3 mm

Issued at **Høvik** on **2021-07-14**

This Certificate is valid until **2024-03-18**.

for **DNV**

DNV local station: **Benelux VMC**

Approval Engineer: **Renata Rossi**

.....
Zeinab Sharifi
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

Rubber compensators Red 3K type

Design:

Inner liner: Ethylene propylene diene polymer [EPDM]

Reinforcement: Layers of Aramid cords (depending on size)

Cover: Ethylene propylene diene polymer [EPDM]

Sizes: internal diameter from 25 mm to 168.3 mm

I.D. for 3K type (mm): 25.0–26.9–30.0–32.0–33.7–38.0–40.0–42.4–44.5–48.3–50.8–54.0–57.0–60.3–63.5–76.1–88.9–101.6–108.0–114.3–115.8–127.0–133.0–139.7–168.3

Rubber compensators Yellow 3K type

Design:

Inner line: Nitrile butadiene [NBR] / Chloroprene [CR]

Reinforcement: 3 or 4 layers of Aramid

Cover: Nitrile butadiene [NBR] / Chloroprene [CR]

Sizes: internal diameter from 25 mm to 168.3 mm

I.D. for 3K type (mm): 25.0–26.9–30.0–32.0–33.7–38.0–40.0–42.4–44.5–48.3–50.8–54.0–57.0–60.3–63.5–76.1–88.9–101.6–108.0–114.3–115.8–127.0–133.0–139.7–168.3

Application/Limitation

Compensators covered by this certificate are approved to be used in fresh water cooling systems.

The compensators shall only be fitted on places where they are always accessible.

Compensators are only to be used where it is necessary due to vibrations or flexible mounting of the machinery.

The compensators are not permitted used in systems where pressure pulses may occur.

The approval does not cover compensators that will be installed in diving systems or drilling units. For these applications, separate approval shall be granted in each case.

The location of the bellows in the piping system shall be approved in each separate case.

The compensators covered by this certificate shall not be installed in systems where fire safe application is required.

Type Approval documentation

Tests carried out

Burst test, resistance against liquid (water), ozone resistance, endurance test

Production testing

Each compensator is to be hydraulic pressure tested to 1.5 times the working pressure, and delivered with the manufacturer's pressure test report.

Marking of product

For traceability to this type approval, the compensators are to be marked with:

- Manufacturer's trade Mark
- Type designation
- Size
- Maximum working Pressure

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNVGL-CP-0338.