

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Flexible Hoses of Metallic Material with permanently fitted couplings**with type designation(s)
PARNOR®, PARRAP®

Issued to

Tubes International Sp. z o.o.
Poznan, Poland

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 July 2015****DNV GL class programme DNVGL-CP-0184 – Type approval – Flexible hoses with permanently fitted couplings****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

Type:	Temperature range:	Max. working press.:	Sizes:
PARNOR®	-55°C to +550°C (dependent on the material - see page 2)	15-140 bar (dependent on size - see page 2)	DN6 to DN100
PARRAP®	-55°C to +550°C (dependent on the material - see page 2)	15-150 bar (dependent on size - see page 2)	DN6 to DN100

Issued at **Høvik** on **2017-11-21**This Certificate is valid until **2021-12-31**.for **DNV GL**DNV GL local station: **Gdansk**Approval Engineer: **Adel Samiei**

Marianne Marveng
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

Metallic flexible hoses with U-formed corrugations, reinforced with one layer of wire braid.

Hose materials:

- AISI 321 (1.4541 according to EN10028-7 or EN 10088-2)
- AISI 316L (1.4404 according to EN10028-7 or EN 10088-2)
- 316L HMO (1.4435 or 1.4432 according to EN10028-7 or EN 10088-2)
- 254SMO (1.4547 according to EN 10088-2)

Wire materials:

- AISI 304 (1.4301 according to EN10088-3)
- AISI 304L (1.4306 or 1.4307 according to EN10088-3)
- AISI 316L (1.4404 according to EN10088-3)

Coupling materials:

- AISI 304 (1.4301 according to EN 10216-5 or EN 10222-5)
- AISI 321 (1.4541 according to EN 10216-5 or EN 10222-5)
- AISI 316 (1.4401 according to EN 10216-5 or EN 10222-5)
- S235JR (1.0038 according to EN 10025-2)

Hoses are manufactured by: BOA Flexible Solutions S.A.S., Epaux-Bezu, France

Couplings are manufactured by: Tubes International Sp. z o.o., Poznan, Poland

Application/Limitation

Maximum working pressure at +20°C:

Nominal internal diameter [mm]	Maximum working pressure [bar]	
	PARNOR®	PARRAP®
6	140	150
8	90	115
10	100	115
12	80	80
15	63	63
20	50	55
25	40	40
32	40	40
40	32	32
50	32	32
65	25	25
80	23	23
100	15	15

Maximum working pressure at temperatures higher than 20°C shall be reduced with reduction factor as given in ISO10380 Table A4.

Maximum design temperature is +550°C, except for below materials:

Material	Working temperature	
	Minimum	Maximum
1.4547 (EN 10088-2)	-55°C	+500°C
1.4301 – 1.4401 – 1.4404 – 1.4541 (EN10222-5)	-55°C	+500°C
1.4307 (EN 10222-5)	-55°C	+350°C
1.0038 (EN 10025-2)	0°C	+50°C

The hoses are approved to be used in hydraulic return, lubricating, fresh water cooling, compressed air, steam (class III) and condensate, CO₂, Freon & ammonia.

This certificate is valid for the specific assembly of hose and coupling type as specified, assembled and delivered by the holder (named as manufacturer) of this certificate.

All hose assemblies delivered under this type approval certificate shall be in compliance with an assembly procedure issued by the certificate holder.

Every hose assembly shall be hydrostatically tested at a hydrostatic pressure of 1.5 times the maximum working pressure shall be delivered with the pressure test report with reference to the type approval certificate. (No product certificate is required.)

The hoses are to be mounted in accordance with the manufacturer's instructions.

The hoses are not to be used in systems where pressure pulsations may occur.

Minimum bend radius is to be in accordance with the manufacturer's specifications.

Flexible hoses are only to be used where it is necessary due to vibrations or flexible mounting of the machinery. The hoses shall not replace/be used where permanent piping is possible/required.

The hoses must only be fitted on places where they are always accessible.

It must be possible to shut off from the system all flexible hoses used in lubricating oil and compressed air systems.

The approval does not cover use of these hoses in LNG/LPG applications.

Welding shall fulfill requirements in DNV GL Rules Pt.2 Ch.4. All welding for piping components for piping classes I and II shall be carried out in an approved welding work shop by DNV GL.

Type Approval documentation

Tests carried out

Burst tests, bending test (pliability), fatigue test

Marking of product

For identification purposes the hoses are to be marked with:

- Manufacturers name or trade mark
- Type designation

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 approval are complied with. Reference is made to DNVGL-CP-0338.

Renewal assessment

During the renewal assessment (as described in DNVGL-CP-0338), burst pressure tests shall be witnessed on every 3rd sizes of each type.