

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

Flux Active Service AS
LAKSEVÅG, Norway

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**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.****Temperature range:** -200°C to +550°C
Max. working press.: 15 bar to 150 bar (see certificate)
Sizes: 6 mm to 100 mmIssued at **Høvik** on **2017-03-02**for **DNV GL**This Certificate is valid until **2017-12-31**.DNV GL local station: **Bergen**Approval Engineer: **Adel Samiei**

Marianne Spæren 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)

Wire materials:

- AISI 304 (1.4301 according to EN10088-3)
- AISI 321 (1.4541 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 316L (1.4404 according to EN 10216-5 or EN 10222-5)

Hose manufacturer:

BOA Flexible Solutions S.A.S., Epaux-Bezu, France

Application/Limitation

The hoses can be used in hydraulic return, lubricating, fresh water cooling, compressed air, steam (class III) and condensate, CO₂, Freon, ammonia, propane, butane and methane systems, with the following maximum working pressures (@20°C) in bar:

Nominal diameter	PARRAP®			PARNOR®		
	ID, mm	OD, mm	Max. work pressure	ID, mm	OD, mm	Max. work pressure
6	6	11.4	150 bar	6.2	11.4	140
8	8.3	15.2	115 bar	8.5	15.2	115
10	10.1	17.8	115 bar	10.4	17.8	100
12	12	20.2	80 bar	12.4	20.2	80
15	15	24.1	63 bar	15.4	24.1	63
20	19.9	29.9	55 bar	20.3	29.9	50
25	24.9	36.4	40 bar	25.4	36.4	40
32	31.8	45.4	40 bar	32.3	45.4	40
40	39.6	54.4	32 bar	40.2	54.4	32
50	49.4	67.3	32 bar	50.0	67.3	32
65	64	83.4	25 bar	64.9	83.4	25
80	78.7	102.6	23 bar	79.6	102.6	23
100	101	129.5	15 bar	101.5	129.5	15

In elevated temperature, maximum working pressure is to be reduced according to reduction factors (According to ISO 10380 Table A.4):

Temperature	20°C	50°C	100°C	150°C	200°C	250°C	300°C	350°C	400°C	450°C	500°C	550°C
304	1,00	0,88	0,73	0,66	0,60	0,56	0,52	0,50	0,48	0,47	0,46	0,42
316L	1,00	0,88	0,74	0,67	0,62	0,58	0,54	0,52	0,50	0,48	0,47	0,47
321	1,00	0,92	0,83	0,78	0,74	0,71	0,67	0,64	0,62	0,61	0,60	0,59

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.

Job Id: **262.1-024567-1**
Certificate No: **TAP00000V7**

Each hose assembly shall be hydrostatically tested at a hydrostatic pressure of 1.5 times the maximum working pressure and 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.

Type Approval documentation

Technical report DL8-037 dated 2008-09-30

Technical specifications stainless-steel and special strips ref. CCMAT 10001 dated 2008-03-20

Drawings DESSIN2008386431 Parnor and Parrap

Notice Marine EW9-002 v2 dated 2009-01-28

Burst Pressure Test Results, 2013-06-12

Technical specification CCMAT 10002

Burst pressure test reports dated 1985-04-29, 1992-02-03 & 1992-01-27

Authorization Letter from BOA, France with Reference number DL17-06 dated 2017-02-23

Tests carried out

Burst Test, bending & fatigue test for type B hoses

Marking of product

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

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

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey - every second year and before the expiry date of this certificate - to verify that the conditions for the type approval are complied with and to witness a burst test on every 3rd sizes.