

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Flexible Hoses of Metallic Material with permanently fitted couplings**

with type designation(s)

PARMECA™, PARNOR®, PARRAP®, HP25, THP, PARRAP® 2 braids

Issued to

**BOA Flexible Solutions S.A.S.
Epoux-Bezu, France**

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**DNV GL class programme CP-0184 – Type Approval of flexible hoses of metallic material****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:
PARMECA™	-200°C to +550°C (dependent on the material standard)	see certificate	DN 6 to DN 25
PARNOR®	-200°C to +550°C (dependent on the material standard)	see certificate	DN 6 to DN 100
PARRAP®	-200°C to +550°C (dependent on the material standard)	see certificate	DN 6 to DN 100
HP25	-200°C to +550°C (dependent on the material standard)	75 bar	DN25
THP	-200°C to +550°C (dependent on the material standard)	See certificate	DN25, DN32, DN40, DN50
PARRAP® 2 braids	-200°C to +550°C (dependent on the material standard)	125 bar	DN12

This Certificate is valid until **2017-06-30**.Issued at **Høvik** on **2016-01-18**for **DNV GL**DNV GL local station: **Paris CMC / VMC**Approval Engineer: **Adel Samiei**

On behalf of 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)
- 316L HMO (1.4435 or 1.4432 according to EN10028-7 or EN 10088-2)
- 254SMO (1.4547 according to EN 10088-2)
- Inconel 625 according to ASME SB443

Wire materials:

- AISI 304 (1.4301 according to EN10088-3)
- AISI 304L (1.4306 or 1.4307 according to EN10088-3)
- AISI 321 (1.4541 according to EN10088-3)
- AISI 316L (1.4404 according to EN10088-3)
- 316L HMO (1.4435 or 1.4432 according to EN10088-3)

Coupling materials:

- AISI 304 (1.4301 according to EN 10216-5 or EN 10222-5)
- AISI 304L (1.4306 or 1.4307 according to EN 10216-5 or EN 10222-5)
- AISI 321 (1.4541 according to EN 10216-5 or EN 10222-5)
- AISI 316L (1.4404 according to EN 10216-5 or EN 10222-5)
- Inconel 625 according to ASME SB-366 or ASME SB-564 or ASME SB-444

Application/Limitation

Maximum working pressures:

PARMECA™						
Nom. int. diameter, mm	ID, mm	OD, mm	Max. work pressure (20°C), bar			
6	6.4	11.4	158			
8	8.3	13.5	115			
10	10.3	16.1	85			
12	12.3	18.2	75			
16	15.3	21.1	56			
20	20.1	27	50			
25	24.9	32.4	38			
PARRAP® + PARRAP 2				PARNOR®		
Nom. int. diameter, mm	ID, mm	OD, mm	Max. work pressure (20°C), bar	ID, mm	OD, mm	Max. work pressure (20°C), bar
6	6	11.4	150	6.2	11.4	140
8	8.3	15.2	115	8.5	15.2	115
10	10.1	17.8	115	10.4	17.8	100
12	12	20.2	80, 125 for Parrap2	12.4	20.2	80
15	15	24.1	63	15.4	24.1	63
20	19.9	29.9	55	20.3	29.9	50
25	24.9	36.4	40	25.4	36.4	40
32	31.8	45.4	40	32.3	45.4	40
40	39.6	54.4	32	40.2	54.4	32
50	49.4	67.3	32	50.0	67.3	32
65	64	83.4	25	64.9	83.4	25
80	78.7	102.6	23	79.6	102.6	23
100	101	129.5	15	101.5	129.5	15

Job Id: **262.1-005472-4**
Certificate No: **TAP0000030**

Nom. Int. diameter, mm	HP			THP		
	ID, mm	OD, mm	Max. work pressure (20°C), bar	ID, mm	OD, mm	Max. work pressure (20°C), bar
DN25	24,9	36,4	78	24,2	40,0	124
DN32	-	-	-	30,7	46,5	115
DN40	-	-	-	39,3	54,9	90
DN50	-	-	-	49	67,3	78

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

Material	Maximum working temperature
254SMO	+400°C
1.4547 (EN 10088-2)	+500°C
1.4301 – 1.4404 – 1.4541 (EN10222-5)	+500°C
1.4307 (EN 10222-5)	+350°C

Maximum working pressure at temperatures higher than 20°C shall be reduced with reduction factor equal to ratio of tensile stress at maximum working temperature to tensile stress at +20°C.

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.

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.

Type Approval documentation

Tests carried out

Burst tests, bending fatigue test for type B hoses.

Marking of product

For identification purposes the hoses are to be marked with:

- Manufacturers name or trade mark
- Type designation.



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Periodical assessment

For renewal of the type approval certificate, a DNVGL Surveyor shall perform a survey every second year, to verify that the conditions for the type approval are complied with and to witness burst test on every 3rd sizes.