Certificate No:
TAP00002JH

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Flexible hoses of metallic material with permanently fitted couplings

with type designation(s)
PARRAP®

Issued to
MATEC GROUP S.R.L.
Peschiera Borromeo, MI, Italy

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-0184 – Type approval – Flexible hoses with permanently fitted couplings

Application :

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

Temperature range:	**-55°C to +550°C (see page 2)**
Max. working press.:	**63 bar (see page 2)**
Sizes:	**DN15 to DN100**

Issued at **Høvik** on **2022-06-16**
This Certificate is valid until **2027-06-15**.
DNV local station: **Italy/Malta CMC**

Approval Engineer: **Andreas Hansen**

for **DNV**

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

Metallic flexible hose assemblies of type PARRAP® with U-formed corrugations, reinforced with one layer of wire braid.

Hose materials:
- 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)

Wire materials:
- AISI 304 (1.4301 according to EN 10088-3)
- AISI 304L (1.4306 or 1.4307 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 316L (1.4404 according to EN 10216-5 or EN 10222-5)

Hose and coupling manufacturing location:
CoreDux France S.A.S
6 avenue du Pré de Barres
Zid de l'Omois 02400 Epaux-Bézu, France

Application/Limitation

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.

Maximum allowable working pressures at 20°C:

DN	PARRAP®		
	ID [mm]	OD [mm]	MAWP [bar]
15	15	24.1	63
20	19.9	29.9	55
25	24.9	36.4	40
32	31.8	45.4	40
40	39.6	54.4	32
50	49.4	67.3	32
65	64	83.4	25
80	78.7	102.6	23
100	101	129.5	15

The hoses covered by this certificate can be used in hydraulic return, lubricating, fresh water cooling, compressed air, steam (class III) and condensate, CO_2, freon and ammonia.

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

Material	Maximum design temperature [°C]
1.4547 (EN 10088-2)	500
1.4301 – 1.4404 – 1.4541 (EN 10222-5)	500
1.4307 (EN 10222-5)	350

Welding shall fulfil requirements in governing rules for the intended application, listed on the front page of this certificate.

At elevated temperatures, maximum allowable pressure is to be reduced according to ISO 10380 [Table A4], as below:

Temperature [°C]	20	50	100	150	200	250	300	350	400	450	500	550
1.4301	1	0,88	0,73	0,66	0,60	0,56	0,52	0,50	0,48	0,47	0,46	-
1.4404 / 1.4435	1	0,88	0,74	0,67	0,62	0,58	0,54	0,52	0,50	0,48	0,47	-
1.4432	1	0,88	0,74	0,67	0,62	0,58	0,54	0,52	0,50	0,48	0,47	0,47
1.4306	1	0,87	0,72	0,65	0,59	0,55	0,51	0,48	0,46	0,45	0,44	0,43
1.4307	1	0,87	0,72	0,65	0,59	0,55	0,51	0,48	-	-	-	-

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

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

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

Type Approval documentation

Production testing

Each hose assembly shall be hydrostatically tested at a pressure of 1.5 times the maximum working pressure and be delivered with the pressure test report with reference to this type approval certificate.

Tests carried out

Burst, pliability, and fatigue test.

Marking of product

For identification purposes the hoses are to be marked with:

- Manufacturer's name or trademark
- Type designation

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 DNV-CP-0338.