DNV·GL

Certificate No:
TAP00001E0

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Flexible Hoses of Metallic Material with permanently fitted couplings

with type designation(s)
HR I/S

Issued to
Rattay Metallschlauch- und Kompensatorentechnik GmbH
Hünxe, Germany

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:	**-20 °C up to 550 °C**
Max. working press.:	**Up to 272 bar. Refer to certificate.**
Sizes:	**DN 6, DN 8, DN 10, DN 12, DN 15, DN 20, DN 25, DN 32, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125, DN 150**

Issued at **Hamburg** on **2018-12-18**
This Certificate is valid until **2023-12-17**.
DNV GL local station: **Essen**

Approval Engineer: **Andrii Pishchanskyi**

for **DNV GL**

Olaf Drews
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.

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Product description

Type HR I/S is a corrugated metal hose with one or two layers of braid with welded end fittings ready for installation. The hose assemblies consist of the following components:

Component	Material	Remark
Corrugated hose	1.4404 (Austenitic stainless steel)	
	1.4541 (Austenitic stainless steel)	
	1.3471 (Austenitic manganese steel castings)	
Braiding	1.4301 (Austenitic stainless steel)	
	1.4571 (Austenitic stainless steel)	
	1.4404 (Austenitic stainless steel)	
Ferrule	1.4301 (Austenitic stainless steel)	According to EN 10216 and EN 10217
	1.4404 (Austenitic stainless steel)	
Fitting	1.4404 (Austenitic stainless steel)	According to DIN ISO 10806
	1.4571 (Austenitic stainless steel)	
	1.4301 (Austenitic stainless steel)	
	CuZn40Pb2 (Copper-zinc-lead alloys)	

An overview of nominal diameter and nominal pressure (working pressure at 20 °C) is as follows:

Nominal diameter DN	one layer of braid PN	two layer of braid PN
6	170	272
8	138	220
10	85	136
12	88	140
15	50	80
20	50	80
25	53	84
32	46	74
40	35	56
50	26	42
65	25	40
80	22	34
100	18	28
125	15	24
150	12	18

Pressure reduction factor shall used for high service temperature as follows:

Temperature [°C]	Pressure reduction factor [%] of material				
	1.3471	1.4301	1.4404	1.4541	1.4571
20	1	1	1	1	1
50	0.95	0.88	0.88	0.92	0.9
100	0.85	0.73	0.74	0.83	0.81
150	0.77	0.66	0.67	0.78	0.76
200	0.71	0.6	0.62	0.74	0.73
250	0.67	0.56	0.58	0.71	0.69
300	0.63	0.52	0.54	0.67	0.65
350	0.6	0.5	0.52	0.64	0.63
400	0.58	0.48	0.5	0.62	0.61
450	0.57	0.47	0.48	0.61	0.59
500	0.56	0.46	0.47	0.6	0.59
550	0.55	0.42	0.47	0.59	0.58

Application/Limitation

The metallic hose assemblies of type HR I/S are type approved for application according to their suitability in the following piping systems:

1. Fuel, lubricating, hydraulic and thermal oil;
2. Fresh water cooling;
3. Compressed air;
4. Bilge and ballast;
5. Refrigeration;
6. Class III steam.

Flexible metal hose assemblies are not approved for use in systems where they may be subjected to high pressure pulsation or vibration.

Installation on board ship

Hose assemblies shall be:

- Limited to a quantity and length necessary to provide for relative movement between fixed and flexibly mounted items of machinery / equipment or systems (ref. to MSC.1/Circ.1321);
- Fitted in places where they are always accessible;
- As short in length as practicable, but, in general, shall notexceed 1.5m in length. Exceptions are subject to case by case approval.

The manufacturer’s instructions for installation are to be observed.

Type Approval documentation

Marking of product

For traceability to this type approval the hose ferrules are to be marked according to EN ISO 10380 7.4 as follows:

Marking scope	Example
The name of manufacturer	Rattay
The year of manufacture	04/2018
A reference to this International Standard	ISO 10380
The type of corrugated metal hose	T1-50a
The corrugated metal hose materia	1.4404
The nominal size	DN 25
The maximum allowable pressure	PS 16
The operating temperature	120°

Periodical assessment

A condition for retention of the TA certificate in its validity period is that periodical assessments are successfully carried out. The objective of the periodical assessment is to verify that the conditions for the TA have not been altered. Periodical assessments for type approvals with a validity period of five years will be required after two years (+/- 90 days) and after 3.5 years (+/- 90 days).
Main scope of the assessment:

- Verification of the production and quality control system;
- Review of quality control documentation of recent deliveries;
- Review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application;
- Verification of the product marking.

For further information regarding the retention of a type approval certificate refer to DNVGL-CP-0338, Section 4.
In addition a DNV GL surveyor shall witness burst and production tests on every 3rd size.