

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Flexible Hoses of Metallic Material with permanently fitted couplings

with type designation(s)
700 series, P3

Issued to
PENFLEX VIETNAM Co., LTD
Dong Nai Province, Viet Nam

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 January 2018
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 vessels classed by DNV GL.

Type:	Temperature range:	Max. working press.:	Sizes:
700 series	-40°C to +550°C	11 to 45 bar (161 to 656 psi)	2.5" to 12"
P3	-40°C to +550°C	39 to 195 bar (570 to 2832 psi)	1/4" to 2"

Issued at **Høvik** on **2020-03-31**

for **DNV GL**

This Certificate is valid until **2025-03-30**.
DNV GL local station: **Vung Tau Station**

Approval Engineer: **Adel Samiei**

.....
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.



Product description

Two types of flexible hoses of metallic material

- 1) P3: single and double braided close pitch hose: ¼", 5/16", 3/8", 1/2", 5/8", ¾", 1", 1-1/4", 1-1/2", 2"
- 2) 700 series: single and double braided close pitch hose: 2.5", 3", 4", 5", 6"
 standard pitch: 8", 10", 12"

Material of hose, braid and end pipe: SS304, SS304L, SS316, SS316L, SS321

Hose manufacturer: Penflex VIETNAM Co., LTD. Trang Bom District, Dong Nai Province, Vietnam

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.

The flexible hoses covered by this certificate may be used in fresh water cooling system, lubrication oil, fuel oil, steam (class III) and condensate, fresh water and compressed air applications.

Maximum working Pressure (in psi):

Size	P3	
	Single Braid	Double Braid
¼"	2360	2832
5/16"	1647	1976
3/8"	1639	1967
½"	1438	2300
5/8"	1200	1775
¾"	1063	1700
1"	917	1467
1-1/4"	797	1275
1-1/2"	734	1175
2"	594	950

Size	700 series	
	Single Braid	Double Braid
2.5"	410	656
3"	335	536
4"	240	384
5"	292	468
6"	165	264
8"	234	374
10"	230	367
12"	161	257

At elevated temperatures, maximum allowable pressure is to be reduced according to ISO10380 Table A4, as below:

Temperature °C	≤20	50	100	150	200	250	300	350	400	450	500	550
SUS304 (1.4301)	1	0.88	0.73	0.66	0.60	0.56	0.52	0.50	0.48	0.47	0.46	0.42
SUS304L (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
SUS316 (1.4401)	1	0.90	0.78	0.71	0.66	0.62	0.58	0.56	0.53	0.52	0.51	0.51
SUS316L (1.4404)	1	0.88	0.74	0.67	0.62	0.58	0.54	0.52	0.50	0.48	0.47	0.47
SUS321 (1.4541)	1	0.92	0.83	0.78	0.74	0.71	0.67	0.64	0.62	0.61	0.60	0.59

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 for inspection.

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

Hose assemblies covered by this certificate shall not be used in:

- LNG/LPG applications or seawater systems.
- Systems subject to pressure pulsation

The hoses are to be mounted according to the manufacturer's instructions.

Welding shall fulfill requirements in DNV GL Rules Pt.2 Ch.4.

Job Id: **262.1-026258-1**
Certificate No: **TAP0000223**

The outer end of the pipe coupling (performing the connection to the fixed piping) is not covered by this certificate and shall follow the below requirements:

- Flanged ends shall be according to a recognized standard.
- Slip-on threaded joints having pipe threads where pressure-tight joints are made on the threads with parallel or tapered threads, shall comply with requirements of a recognized standard. Limitations stated in DNVGL-RU-SHIP Pt.4 Ch.6 Sec.9 [5.2.6] to be followed.
- If these outer ends are going to be part of a mechanical joint as covered by Table 10 DNVGL-RU-SHIP Pt.4 Ch.6 Sec.9, then they shall be separately type approved.

Production testing

All hose assemblies delivered under the DNV GL type approval scheme shall be subject to a pressure test at 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to this type approval certificate.

Type Approval documentation

Manufacturer's catalogue
Pliability, fatigue, electrical conductivity and burst pressure test reports

Tests carried out

Burst test, Bending Fatigue test, Static Bending test, electrical conductivity

Marking of product

For traceability to this Type Approval, the products are at least to be marked with:

- hose manufacturer's name or trademark;
- date of manufacture (month/year);
- designation type reference;
- nominal diameter;
- pressure rating;
- temperature rating.

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.