

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**

with type designation(s)

301, 381, 421, 481, 701, 731, 771 (721TC), 781 (781TC)

Issued to

Han Wool H&P Co., Ltd.**Yongsan-si Gyeongsangnam-do, Republic of Korea**

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses****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:
301	-40°C to +125°C	78 bar to 345 bar (dependent on the size)	1/4" to 2"
381	-40°C to +100°C	87 bar to 400 bar (dependent on the size)	1/4" to 2"
421	-40°C to +125°C	26 bar to 190 bar (dependent on the size)	1/4" to 2"
481	-40°C to +100°C	40 bar to 225 bar (dependent on the size)	1/4" to 2"
701	-40°C to +100°C	280 bar to 415 bar	1/2" to 1"
731	-40°C to +100°C	250 bar to 420 bar	3/4" to 2"
771 (721TC)	-40°C to +125°C	172 bar to 276 bar	3/4" to 2"
781 (781TC)	-40°C to +125°C	345 bar	3/4" & 1"

Issued at **Høvik** on **2017-08-03**This Certificate is valid until **2021-12-31**.for **DNV GL**DNV GL local station: **Busan**Approval Engineer: **Adel Samiei**

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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

Types 301 & 381 hose assemblies with Synthetic rubber hoses and two braids of high tensile steel wire with Parker couplings series 43

Types 421 & 481 hose assemblies with Synthetic rubber hoses and one braid of high tensile steel wire with Parker couplings series 43

Four types of hose assemblies with Synthetic rubber hoses and four spiral plies of heavy wire wrapped in alternating directions:

- 701 according to EN 856-4SP with Parker couplings series 70
- 731 according to EN 856-4SH with Parker couplings series 73
- 771(721TC) with Parker couplings series 71
- 781(781TC) with Parker couplings series 78

Hose and couplings are manufactured by Parker Hannifin connectors LTD., Gyeongsangnam-do, Republic of Korea.

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 hose assemblies types 381, 481, 701 & 731 are approved for use with :

- Hydraulic fluids in accordance with ISO 6743-4 with the exception of HFD-R, HFD-S and HFD-T at temperatures ranging from -40°C to +100°C.
- Water base fluids at temperature ranging from -40°C to 70°C.
- Water fluids at temperatures ranging from 0 to +70°C.

The hose assemblies' types 301, 421, 771 & 781 are approved for use with petroleum base fluids and water base fluids within a temperature range of -40°C to +125°C. Operating temperatures in excess of +121°C may materially reduce the life of the hose.

Maximum working pressure of hose assemblies shall be as follows:

Dash size	Hose ID		Maximum working pressure (301)		Maximum working pressure (381)		Maximum working pressure (421)		Maximum working pressure (481)	
	inch	mm	bar	psi	bar	psi	bar	psi	bar	psi
-4	¼	6.4	345	5000	400	5800	190	2750	225	3250
-5	5/16	7.9	293	4250	362	5250	172	2500	225	3250
-6	3/8	9.5	276	4000	345	5000	155	2250	207	3000
-8	½	12.7	241	3500	295	4270	138	2000	173	2500
-10	5/8	15.9	190	2750	245	3550	103	1500	138	2000
-12	¾	19.0	155	2250	214	3100	86	1250	121	1750
-16	1	25.4	138	2000	173	2500	69	1000	88	1275
-20	1 ¼	31.8	112	1625	156	2250	43	625	63	900
-24	1 ½	38.1	86	1250	121	1750	34	500	50	725
-32	2	50.8	78	1125	87	1250	26	375	40	575

Nominal bore	Hose ID		Maximum working pressure for 701		Maximum working pressure for 731		Maximum working pressure for 771 (721TC)		Maximum working pressure for 781 (781TC)	
	inch	mm	bar	psi	bar	psi	bar	psi	bar	psi
12	½	12.7	415	6000	-	-	-	-	-	-
19	¾	19.1	350	5000	420	6000	276	4000	345	5000
25	1	25.4	280	4000	380	5500	276	4000	345	5000
31	1 ¼	31.8	-	-	325	4700	207	3000	-	-
38	1 ½	38.1	-	-	290	4200	172	2500	-	-
51	2	50.8	-	-	250	3600	172	2500	-	-

Job Id: **262.1-024437-1**
Certificate No: **TAP00000TZ**

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.

All hoses delivered 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 the type approval certificate.

Flexible hoses of these types are not to be used on boiler fronts.

Type Approval documentation

Tests carried out

Burst, Ozone Resistance, Cold Flexibility, Impulse, Dimensional Check, Fire test, Vacuum test, Cover adhesion, Oil resistance, Change in length test.

Marking of product

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

- Manufacturer's name or trade mark
- Type designation
- Maximum working pressure
- Size

Periodical assessment

For retention of the Type Approval, DNV GL Surveyor shall perform a periodical assessment every second year, to verify that the conditions for the type approval are complied with and to witness the burst tests on a selection of sizes (every 3rd sizes).