DNV·GL

Certificate No:
TAP00001SG

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings

with type designation(s)
T2C/T2D/T2S, TXA2D, RQP2, DF2D, DK2D

Issued to
RYCO Hydraulics Pty. Ltd.
Derrimut, VIC, Australia

is found to comply with
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018
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 vessels classed by DNV GL.

Type:	Temperature range:	Max. working press.:	Sizes:
T2C/T2D/T2S	-40°C to 100°C (see page 4)	70 bar to 420 bar (size dependant, see page 3)	DN 06 to DN 63 (see page 3)
TXA2D	-40°C to 100°C (see page 4)	175 bar to 375 bar (size dependant, see page 3)	DN 19 to DN 51 (see page 3)
RQP2	-40°C to 100°C (see page 4)	90 bar to 400 bar (size dependant, see page 3)	DN 06 to DN 51 (see page 3)
DF2D	-40°C to 100°C (see page 4)	170 bar to 420 bar (size dependant, see page 3)	DN 06 to DN 25 (see page 3)
DK2D	-40°C to 100°C (see page 4)	175 bar to 450 bar (size dependant, see page 4)	DN 06 to DN 31 (see page 4)

Issued at **Høvik** on **2020-03-05**
This Certificate is valid until **2023-12-31**.
DNV GL local station: **Melbourne**

for **DNV GL**

Approval Engineer: **Maheshraja Venkatesan**

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.

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Product description

5 types of flexible rubber hoses with permanently fitted couplings:

1. **T2C/T2D/T2S** constructed according to SAEJ517 type SAE100R2/ EN853 type 2SN

Hose inner tube	:	Black, oil resistant synthetic rubber
Reinforcement	:	Two braids of high tensile steel wire
Hose cover	:	T2C: Black, oil and abrasion resistant synthetic rubber T2D: DIEHARD™ Black, abrasion and oil resistant synthetic rubber T2S: SLIDER™ Black, abrasion and oil resistant synthetic rubber
End fittings	:	NON-SKIVE ONE-PIECE CRIMP T2000 series
Material for end fittings	:	Carbon steel - AS1443 grades 12L14, 1010, 1020, 1040 & 1045 Stainless steel - ASTM A276 type 316

2. **TXA2D** constructed according to SAEJ517 type SAE100R2/ EN853 type 2SN

Hose inner tube	:	Black, oil resistant synthetic rubber
Reinforcement	:	Two braids of high tensile steel wire
Hose cover	:	DIEHARD™ Black, oil and extra abrasion resistant synthetic rubber
End fittings	:	BITELOK NON-SKIVE T2000 series
Material for end fittings	:	Carbon steel - AS1443 grades 12L14, 1010, 1020, 1040 & 1045 Stainless steel - ASTM A276 type 316

3. **DF2D** constructed according to SAEJ517 type SAE100R16/ EN857 type 2SC

Hose inner tube	:	Black, oil resistant synthetic rubber
Reinforcement	:	Two braids of high tensile steel wire
Hose cover	:	DIEHARD™ Black, oil and extra abrasion resistant synthetic rubber
End fittings	:	BITELOK NON-SKIVE T2000 series
Material for end fittings	:	Carbon steel - AS1443 grades 12L14, 1010, 1020, 1040 & 1045 Stainless steel - ASTM A276 type 316

4. **RQP2** constructed according to SAEJ517 type SAE100R13/ EN856 type R13

Hose inner tube	:	Black, oil resistant synthetic rubber
Reinforcement	:	Two braids of high tensile steel wire
Hose cover	:	Blue, abrasion and oil resistant synthetic rubber
End fittings	:	T2000 series (up to size -20); T7000 series (for sizes -24 & -32)
Material for end fittings	:	Carbon steel - AS1443 grades 12L14, 1010, 1020, 1040 & 1045 Stainless steel - ASTM A276 type 316

5. **DK2D** constructed according to EN 857 Type 2SC

Hose inner tube	:	Black, oil resistant synthetic rubber
Reinforcement	:	Two braids of high tensile steel wire
Hose cover	:	DIEHARD™ Black, oil, ozone and extra abrasion resistant synthetic rubber
End fittings	:	NON-SKIVE ONE-PIECE CRIMP T2000 series
Material for end fittings	:	Carbon steel - AS1443 grades 12L14, 1010, 1020, 1040 & 1045 Stainless steel - ASTM A276 type 316

Hose manufacturing location
- RYCO Hydraulics Sdn. Bhd., Malaysia

End fittings manufacturing location:
- RYCO Hydraulics, Victoria, Australia
- RYCO Hydraulics (DALIAN), P.R.China

Hose assembling location:
RYCO Hydraulics, Victoria, Australia

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 (MAWP):

Part No.	Hose size			MAWP						End fittings designation
				T2C		**T2D**		**T2S**		
	DN	Inch	Dash	Bar	PSI	Bar	PSI	Bar	PSI	
T24	6	¼	-04	420	6100	420	6100	420	6100	T2000
T25	8	5/16	-05	350	5100	350	5100	350	5100	T2000
T26	10	3/8	-06	350	5100	350	5100	350	5100	T2000
T28	12	½	-08	350	5100	345	5000	345	5000	T2000
T210	16	5/8	-10	250	3600	250	3600	250	3600	T2000
T212	20	¾	-12	215	3100	215	3100	215	3100	T2000
T216	25	1	-16	175	2500	167	2400	167	2400	T2000
T220	32	1-¼	-20	140	2000	125	1800	125	1800	T2000
T224	40	1-½	-24	100	1300	90	1300	90	1300	T2000
T232	50	2″	-32	90	1150	80	1150	80	1150	T2000
T240(1)	63	2-½	-40	-	-	70(1)	1000	-	-	T2000

Part No.	**TXA2D**					
	Hose size			MAWP		End fitting designation (Non-skive)
	DN	Inch	Dash	Bar	PSI	
TXA28D	12	½	-12	375	5440	T2000
TXA210D	16	5/8"	-16	345	5000	T2000
TXA212D	20	¾	-20	313	4530	T2000
TXA216D	25	1"	-24	225	3250	T2000

Part No.	**RQP2**					
	Hose size			MAWP		End fitting designation
	DN	Inch	Dash	Bar	PSI	
RQP24	6	¼	-04	400	5800	T2000
RQP25	8	5/16	-05	350	5100	T2000
RQP26	10	3/8	-06	350	5100	T2000
RQP28	12	½	-08	300	4350	T2000
RQP210	16	5/8	-10	250	3600	T2000
RQP212	19	¾	-12	215	3100	T2000
RPQ216	25	1	-16	167	2400	T2000
RPQ220	31	1.¼	-20	150	2175	T2000
RPQ224	38	1.½	-24	100	1450	T7000
RPQ232	51	2	-32	90	1300	T7000

Part No.	Hose size			**DF2D**		End fitting designation
	DN	Inch	Dash	Bar	PSI	
DF24D	6	¼	-04	420	6100	T2000
DF25D	8	5/16	-05	350	5100	T2000
DF26D	10	3/8	-06	350	5100	T2000
DF28D	12	½	-08	295	4250	T2000
DF210D	16	5/8	-10	250	3625	T2000
DF212D	19	¾	-12	215	3100	T2000
DF216D	25	1	-16	170	2400	T2000

Part No.	DK2D					End fitting designation (Non-skive)
	Hose size			MAWP		
	DN	Inch	Dash	Bar	PSI	
DK24D(1)	6	¼	-04	450	6525	T2000
DK25D	8	5/16	-05	420	6100	T2000
DK26D	10	3/8	-06	385	5590	T2000
DK28D	12	½	-08	345	5000	T2000
DK210D	16	5/8	-10	290	4210	T2000
DK212D	19	¾	-12	280	4100	T2000
DK216D	25	1	-16	200	2900	T2000
DK220D	31	1.¼	-20	175	2540	T2000

(1) Hoses T240D and DK24D are not allowed to be used in piping systems for flammable media or sea water systems where failure may result in flooding, except in cases where such hoses are installed on open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.

Hose assemblies covered by this certificate are approved to be used in:

Operating media	*Temperature range (for all types)*
Petroleum based hydraulic fluids	-40°C to +100°C
Water based Hydraulic fluids	-40°C to +70°C
Water and air	0°C to +70°C

Flexible hoses are only to be used in short lengths 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 hose assemblies must only be fitted in places where they are always accessible. Flexible hoses of these types are not to be used on boiler fronts.

Hose assemblies covered by this certificate shall not be used in system subject to pressure below atmospheric or vacuum condition.

The cover of hoses for gaseous applications shall be pin-pricked.

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

Tests carried out

As per DNVGL-CP-0183 Sec.2 Table 1 and 2 (except vacuum testing)

Marking of product

Flexible hoses are to be permanently marked by the manufacturer with the following details:

- 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.