



# DET NORSKE VERITAS

## TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. P-13635

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

with type designation(s)  
**AVENGER T2A, SURVIVOR RQP2, DIEHARD T2D, DIEHARD TXA2D, DINFLEX DF2A, SLIDER T2S, ADVANTAGE T2E,  
ADVANTAGE DF2E**

Manufactured by  
**RYCO Hydraulics Pty. Ltd.**  
**FOOTSCRAY VICTORIA, Australia**

is found to comply with  
Det Norske Veritas' Rules for Classification of Ships  
Det Norske Veritas' Standards for Certification 2.9 No. 5-791.70

### Application

May be used for the following systems: Hydraulics, pneumatics, fuel and lube oil, fresh water, sea water and sanitary.

Temperature range:	-40°C to 150°C (dep. on type, see cert.)
Max. working press.:	69 bar to 420 bar (dep. on size and type, see cert.)
Sizes:	DN6 - DN32, 1/4" - 1 1/4" (see cert.)


Høvik, 2011-02-07  
for Det Norske Veritas AS



This Certificate is valid until  
2014-12-31

  
Marianne Spæren  
Head of Section

DNV local office:  
Melbourne

  
Øyvind Skåra  
Surveyor

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.  
If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Certificate No.: P-13635  
File No.: 791.70  
Job Id.: 262.1-010711-1

## Product description

2 wire braid reinforced flexible rubber hoses with permanently attached couplings, according to SAE100 R2 AT/ EN853 type 2SN/2SC. Some pressures are outside the limits of the standards. These are based on manufacturer's test reports.

### Materials:

Inner tube: Oil resistant synthetic rubber (Nitrile)  
RQP2: Specially compounded for temperature and chemical resistance.

Reinforcement: 2 steel wire braids .

Cover: T2D, TXA2D: Oil and weather resistant rubber.  
DF2A, AS2D, T2A, RQP2: Oil and abrasion resistant synthetic rubber.  
T2S: Oil and abrasion resistant synthetic rubber, sheated with polyethylene.  
DF2E, T2E: Oil and abrasion resistant synthetic rubber.

### Hose manufacturer:

SURVIVOR RQP2 :	DIESSE Rubber Hoses, Italy
DIEHARD T2D, TXA2D:	RYCO Hydraulics Sdn. Bhd.,Malaysia
DIEHARD AS2D:	RYCO Hydraulics Sdn. Bhd.,Malaysia
AVENGER T2A:	RYCO Hydraulics Sdn. Bhd.,Malaysia
DINFLEX DF2A:	DIESSE Rubber Hoses, Italy
SLIDER T2S:	DIESSE Rubber Hoses, Italy
ADVANTAGE DF2E:	RYCO Hydraulics Sdn. Bhd.,Malaysia
ADVANTAGE T2E:	RYCO Hydraulics Sdn. Bhd.,Malaysia

End couplings: Carbon steel AISI/SAE 12L14, electroplated Fe/Zn12c acc. to AS1789  
End couplings are produced by RYCO Hydraulics

## 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 covered by this type approval may be assembled and delivered by other than the certificate holder under the conditions as described in DNV type approval programme 5-791.70.

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the working pressure, and delivered with the manufacturer's/assemblers pressure test report and CoC (certificate of compliance) with reference to this Type Approval Certificate.

The hoses can be used in short lengths for ordinary machinery purposes in the systems mentioned on the front page.

Hoses used for continuous operation at temperatures higher than 100°C will have their lifetime reduced. In such cases more frequent inspections and planned exchange should be a part of the maintenance program.

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

The hoses are to be mounted in accordance with the manufacturer's instructions.

It must be possible to shut off from the system all flexible hoses used in systems for compressed air, lube. oil, fuel oil and petroleum base hydraulic oil.

Hose assemblies with couplings made of carbon steel are not to be used at temperatures below -10°C unless the material is normalized.

For use with compressed air or gases, the cover of the hose has to be pricked.



Certificate No.: P-13635  
 File No.: 791.70  
 Job Id.: 262.1-010711-1

The hoses may be used for hydraulic systems with the following max. allowable working pressures:

SURVIVOR RQP2	Hose size ID		Max. pressure		Couplings		
	Inches	mm	psi	bar	Insert	Ferrule	Bitelok
RQP24	1/4"	6	5800	400	600 ser	L00-04	T200
RQP26	3/8"	10	5100	350	600 ser	L00-06	T200/T700
RQP28	1/2"	12	4350	300	600 ser	L00-08	T200/T700
RQP210	5/8"	16	3600	250	600 ser	L00-10	T200/T700
RQP212	3/4"	20	3100	215	600 ser	L00-12	T200/T700
RPQ216	1"	25	2420	167	600 ser	L00-16	T200/T700
RPQ220	1 1/4"	32	2175	150	600 ser	L00-20	T200/T700
RPQ224	1 1/2"	40	1450	100	600 ser	B00-24	T700
RPQ232	2"	50	1300	90	600 ser	B00-32	T700

Temp. range:  
 Petroleum-base fluids: -40°C to +150 °C  
 Water/ oil emulsions: to +121 °C  
 Diesel fuels: to +93 °C  
 Air: to +121 °C (max. press. to be reduced by 30%)

AVENGER T2A	Hose size ID		Max. pressure		Couplings		
	Inches	mm	psi	Bar	Insert	Ferrule	Bitelok
T24A	1/4"	6	6000	420	600 ser	L00-04	T200
T26A	3/8"	10	5100	350	600 ser	L00-06	T200/T700
T28A	1/2"	12	5000	345	600 ser	L00-08	T200/T700
T210A	5/8"	16	3600	250	600 ser	L00-10	T200/T700
T212A	3/4"	20	3100	215	600 ser	L00-12	T200/T700
T216A	1"	25	2400	167	600 ser	L00-16	T200/T700
T220A	1 1/4"	32	1800	125	600 ser	L00-20	T200/T700
T224A	1 1/2"	40	1300	90	600 ser	B00-24	T700
T232A	2"	50	1150	80	600 ser	B00-32	T700
T240A	2 1/2"	63	1000	69			1200-40 two piece

Temp. range: -40 °C to +100 °C

DIEHARD T2D	Hose size ID		Max. pressure		Couplings		
	Inches	Mm	psi	Bar	Insert	Ferrule	Bitelok
T24D	1/4"	6	6000	420	600 ser	L00-04	T200
T26D	3/8"	10	5100	350	600 ser	L00-06	T200/T700
T28D	1/2"	12	5100	350	600 ser	L00-08	T200/T700
T210D	5/8"	16	3600	250	600 ser	L00-10	T200/T700
T212D	3/4"	20	3100	215	600 ser	L00-12	T200/T700
T216D	1"	25	2420	167	600 ser	L00-16	T200/T700
T220D	1 1/4"	32	1800	125	600 ser	L00-20	T200/T700
T224D	1 1/2"	40	1300	90	600 ser	B00-24	T700
T232D	2"	50	1150	80	600 ser	B00-32	T700

Temp. range: -40 °C to +100 °C

DIEHARD TXA2D	Hose size ID		Max. pressure		Couplings		
	Inches	mm	psi	bar	Insert	Ferrule	Bitelok
TXA28D	1/2"	12	5440	375	600series	L00-08	T200/T700
TXA210D	5/8"	16	5000	345	600series	L00-10	T200/T700
TXA212D	3/4"	20	4530	313	600series	L00-12	T200/T700
TXA216D	1"	25	3260	225	600series	L00-16	T200/T700
TXA220D	1 1/4"	32	2540	175	600series	L00-20	T200/T700

Temp. range: -40 °C to +100 °C



Certificate No.: P-13635  
 File No.: 791.70  
 Job Id.: 262.1-010711-1

SLIDER T2S	Hose size ID		Max. pressure		Couplings	
	Inches	mm	psi	Bar		Bitelok
T24S	1/4"	6	6000	420		T200
T26S	3/8"	10	5100	350		T200/T700
T28S	1/2"	12	5100	350		T200/T700
T210S	5/8"	16	3600	250		T200/T700
T212S	3/4"	20	3100	215		T200/T700
T216S	1"	25	2420	167		T200/T700
T220S	1 1/4"	32	1800	125		T200/T700
T224S	1 1/2"	40	1300	90		T700
T232S	2"	50	1150	80		T700
Temp. range: -40 °C to +100 °C						
DINFLEX DF2A	Hose size ID		Max. pressure		Couplings	
	Inches	mm	psi	Bar		Bitelok
DF24A	1/4"	6	6000	420		T200
DF26A	3/8"	10	5100	350		T200/T700
DF28A	1/2"	12	4250	295		T200/T700
DF212A	3/4"	20	3100	215		T200/T700
Temp. range -40 °C to +100 °C						
DF2E	Hose size ID		Max. pressure		Couplings	
	Inches	mm	psi	Bar		Bitelok
DF26E	3/8"	10	5100	350		T200/T700
DF28E	1/2"	12	4250	295		T200
DF210E	5/8"	16	3600	250		T200
DF212E	3/4"	20	3100	215		T200/T700
Temp. range -40 °C to +100 °C						
T2E	Hose size ID		Max. pressure		Couplings	
	Inches	mm	psi	Bar		Bitelok
T24E	1/4"	6	6000	420		T200
T25E	5/16"	8	5100	350		T200
T26E	3/8"	10	5100	350		T200/T700
T28E	1/2"	12	5000	345		T200/T700
T210E	5/8"	16	3600	250		T200/T700
T212E	3/4"	20	3100	215		T200/T700

## Type Approval documentation

Reference documents for T2A, RQP2, T2D, TXA2D:  
 Manufacturers brochure.

Drawing nos.: 701-1616 dated 1992-08-03, CT201-1616 dated 1992-04-13, 4000-16 dated 1992-10-12 and 2000-16 dated 1996-03-22.

Burst Test Cert. Nos.: 1070 dated 1999-09-15, 1073 dated 1999-09-20, 1074 dated 1999-09-20 and 1069 dated 1999-09-15.  
 Impulse test cert. nos.: 1061 dated 1999-04-14, 1062 dated 1999-09-14, 1063 dated 1999-09-14, 1066 dated 1999-09-14, 787 dated 1998-04-23, 847 dated 1998-08-28, 849 dated 1998-09-03, 1065 dated 1999-09-14, 1022 dated 1999-07-06, 1024 dated 1999-07-06, 1026 dated 1999-07-06, 1038 dated 1999-07-26, 1014 dated 1999-07-02, 1015 dated 1999-07-07, and 1035 dated 1999-07-14.

Material cert. nos.: 2717/99 dated 1999-07-23, 2067/99 dated 1999-04-28, 2102/99 dated 1999-04-30, 2094/99 dated 1999-04-30, 2095/99 dated 1999-04-30, 960/99 dated 1999-02-27 and 961/99 dated 1999-02-27.

Material declarations issued by Phoenix Rubber Products on 1999-09-03, 1999-07-26 and 1999-08-13.

Fire test report: Wehrtechnische Dienststelle für Schiffe und Marinewaffen, test no. 6/96 dated 1996-03-20.

Fire resistant test certificates:



Certificate No.: P-13635  
File No.: 791.70  
Job Id.: 262.1-010711-1

Hose Type T2A: RH-FT-3/15/37  
Hose Type T2D: RH-FT-5/8/9  
Hose Type RQP2: RH-FT-25/35/40  
Hose Type TXA2D: RH-FT-12/13/14  
Hose Type DF2A: RH-FT-26/38/39  
Hose Type T2S: RH-FT-42/43/44  
Hose Type DF2E: RH-FT-74/75/76  
Hose Type T2E: RH-FT-79/80/81

Reference documents for new hoses:

T2S: Burst test report RYCO No. 1561 dated 2003-04-11  
Test reports No. 93, 94, 95, 97, 98.  
AS2D: Report No. E2100437, E2100409, E2000426.  
DF2A: Burst test report RYCO No. 1564 dated 2003-04-11  
Test reports DIESSE No.35-38-39/2001-06-05, No.40/2001-06-14, No.68-69/2001-08-02  
DF2E: Manufacturer's test reports dated 2010-09-08  
T2E: Manufacturer's test reports dated 2010-09-08

### Tests carried out

Dimensional check, Burst, Change in length, Impulse, Cold flexibility, Oil resistance, Ozone resistance, fire test.

### Marking of product

For traceability to this Type Approval, the hoses are to be marked by an embossed system with:

- Manufacturers logo
- Type designation
- Nominal size
- Quarter and year of production.

### Certificate Retention Survey

For retention of the Type Approval, DNV Surveyor shall perform a survey every second year, to verify that the conditions for the type approval are complied with and to witness the following tests on a selection of sizes:

- Dimensional check.
- Change in length
- Leakage test
- Burst test

The tests shall be performed in accordance with procedures given in Det Norske Veritas' Standard for Certification No. 2.9, Type Approval programme 5-791.70, "Type Approval of Flexible Hoses of Non-Metallic Material".

The tests are to be performed with the type of couplings fitted that are Type Approved with the hoses.