

# TYPE APPROVAL CERTIFICATE

**This is to certify:**

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

with type designation(s)  
**Defiant SR/SRF, Driller D2B, T3000, T3600, T4000, T5000, T6000**

Issued to  
**RYCO Hydraulics Pty. Ltd.**  
**FOOTSCRAY VICTORIA, Australia**

is found to comply with  
**Det Norske Veritas' Rules for Classification of Ships Pt.4, Ch.6 "Piping Systems"**  
**Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment**  
**Det Norske Veritas' Standards for Certification 2.9 No. 5-791.70**

**Application :**

**Hoses for hydraulic application**

Type:	Temperature range:	Max. working press.:	Sizes:
Defiant SR/SRF Driller D2B	-40°C to +100°C (-40°F to +212°F) dependent on medium	7 to 21 bar size dependent 90 to 100 bar size dependent	SR: DN19, 25, 63, 76, SRF: DN19, 25, 31, 38, 51 DN38, 51
T3000	-40°C to +100°C (-40°F to +212°F)	215 to 245 bar	DN6, 8, 10, 12, 16, 19, 25
T3600	-40°C to +100°C (-40°F to +212°F)	250 bar all sizes	DN6, 8, 10, 12, 16, 19, 25
T4000	-40°C to +100°C (-40°F to +212°F)	280 bar all sizes	DN6, 8, 10, 12, 16, 19, 25
T5000	-40°C to +100°C (-40°F to +212°F)	350 bar all sizes	DN6, 8, 10, 12
T6000	-40°C to +100°C (-40°F to +212°F)	420 bar all sizes	DN6, 8, 10

This Certificate is valid until **2018-12-31**.

Issued at **Høvik** on **2014-11-12**

for **DNV GL**

DNV GL local station: **Melbourne**

Approval Engineer: **Tom Berg-Nielsen**

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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. If any person suffers loss or damage which is proven to have been caused by any negligent act or omission of the Society, then the Society shall pay compensation to such person for his proven direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question. The maximum compensation shall never exceed USD 2 million. In this provision the "Society" shall mean DNV GL AS as well as all its direct and indirect owners, affiliates, subsidiaries, directors, officers, employees, agents and any other person or entity acting on behalf of DNV GL AS.

Certificate No: **P-14694**  
File No: **791.70**  
Job Id: **262.1-015853-1**

## Product description

Defiant SRF: Inner tube of black synthetic rubber reinforced by 2 textile braids and a spiral wireto prevent collapsing during suction operation.  
Couplings: Bitelok non-skive, one-piece series T4000.

Driller D2B and Dinflex DF2A : Inner tube of Black synthetic rubber reinforced by 2 layers of wire braid, cover of Black synthetic rubber.  
Couplings: Bitelok non-skive, one-piece series T7000

Slider T3KS: Inner tube of black synthetic rubber reinforced by one (up to -08) or 2 (-10 and -12 and -16) layers of wire braid. Cover of Black synthetic rubber.  
Couplings: Bitelok non-skive one-piece coupling series T2000

T3000: Inner tube of black synthetic rubber reinforced by one or 2 (size dependent) layers of wire braid. Cover of black synthetic rubber.  
Couplings: Bitelok series non-skive, one-piece T2000

T3600: Inner tube of black synthetic rubber reinforced by 1 (sizes -04 and -06) or 2 (sizes -08 to -16) layers of wire braid. Cover of black synthetic rubber.  
Couplings: Bitelok non-skive, one-piece series T1000 for sizes -04 to -16, Bitelok non-skive, one-piece series T2000 for sizes -19 and -25

T4000: Inner tube of black, synthetic rubber reinforced by one or two (size dependent) layers of wire braid. Cover of black, synthetic rubber.  
Couplings: Bitelok non-skive, one-piece series T2000

T5000: Inner tube of black, synthetic rubber, reinforced by 2 layers of wire braids, cover of black synthetic rubber.  
Couplings: Bitelok non-skive one-piece series T2000

T6000: Inner tube of black, synthetic rubber, reinforced by 2 layers of wire braids, cover of black synthetic rubber.  
Couplings: Bitelok non-skive one-piece series T2000

Coupling material: Carbon steel 12L14, 1010, 1020, 1040, 1045  
Stainless steel 316 ASTM A276 or equivalent

Hose manufacturer: RYCO Hydraulics Sdn, Bhd, Malaysia  
SRF series: Wellcall Hose (M) SDN, BHD, Malaysia

Coupling manufacturer: RYCO Hydraulics, Footscray, Vic, Australia  
RYCO Hydraulics (DALIAN) Ltd, P.R.China

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## Application/Limitation

May be used for hydraulic applications.

Max working pressure:

Defiant SRF	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	Bitelok
SRF12	19	¾	-12	21	1200	T4000
SRF16	25	1	-16	17	1000	T4000
SRF20	31	1 ¼	-20	14	800	T4000
SRF24	38	1 ½	-24	10	600	T4000
SRF32	51	2	-32	7	400	T4000

This hose may be used for oil suction and delivery  
 Temperature range: -40°C to +100°C (-40°F to +212°F)

Defiant SR	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	Bitelok
SR12	19	¾	-12	21	300	T4000
SR16	25	1	-16	17	250	T4000
SR40	63	2 ½	-40	4,3	62	T4000
SR48	76	3	-48	3,9	56	T4000

This hose may be used for oil suction and delivery  
 Temperature range: -40°C to +100°C (-40°F to +212°F)

Driller D2B	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	Bitelok
D224B	38	1 ½	-24	100	1450	T7000
D232B	51	2	-32	90	1300	T7000

Temperature range: -40°C to +100°C (-40°F to +212°F)

T3000	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	Bitelok
T3004	6	¼	-04	245	3500	T1000 or T2000
T3005	8	5/16	-05	245	3500	T1000 or T2000
T3006	10	3/8	-06	215	3100	T1000 or T2000
T3008	12	½	-08	215	3100	T1000 or T2000
T3010	16	5/8	-10	215	3100	T1000 or T2000
T3012	19	¾	-12	215	3100	T1000 or T2000
T3016	25	1	-16	215	3100	T1000 or T2000

Hose size 1" is not fire tested and as such not approved for flammable fluids.  
 Temperature range: -40°C to +100°C (-40°F to +212°F)

T3600A T3600S	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	Bitelok
T3604	6	¼	-04	250	3625	T1000 or T2000
T3605	8	5/16	-05	250	3625	T1000 or T2000
T3606	10	3/8	-06	250	3625	T1000 or T2000
T3608	12	½	-08	250	3625	T1000 or T2000
T3610	16	5/8	-10	250	3625	T1000 or T2000
T3612	19	¾	-12	250	3625	T1000 or T2000
T3616	25	1	-16	250	3625	T1000 or T2000

Temperature range: -40°C to +100°C (-40°F to +212°F)

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T4000	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	Bitelok
T4004	6	¼	-04	280	4100	T2000
T4005	8	5/16	-05	280	4100	T2000
T4006	10	3/8	-06	280	4100	T2000
T4008	12	½	-08	280	4100	T2000
T4010	16	5/8	-10	280	4100	T2000
T4012	19	¾	-12	280	4100	T2000
T4016	25	1	-16	280	4100	T2000

Hose size 1" is not fire tested and as such not approved for flammable fluids.  
 Temperature range: -40°C to +100°C (-40°F to +212°F)

T5000	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	Bitelok
T5004	6	¼	-04	350	5100	T2000
T5005	8	5/16	-05	350	5100	T2000
T5006	10	3/8	-06	350	5100	T2000
T5008	12	½	-08	350	5100	T2000

Temperature range: -40°C to +100°C (-40°F to +212°F)

T6000	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	Bitelok
T6004	6	¼	-04	420	6100	T2000
T6005	8	5/16	-05	420	6100	T2000
T6006	10	3/8	-06	420	6100	T2000

Only size 3/8" is fire tested and as such is the only hose approved for flammable fluids.  
 Temperature range: -40°C to +100°C (-40°F to +212°F)

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.

All hose assemblies delivered under this type approval certificate shall be in compliance with an assembly procedure issued by the certificate holder.

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure.

Hose assemblies delivered from the certificate holder shall be delivered with the following documentation:  
 - Pressure test report with reference to the type approval certificate.

The hose assemblies covered by this type approval may be assembled and delivered by other than the certificate holder under the following conditions:  
 - The assembler is authorised by a written authorization from the certificate holder. The certificate holder shall keep record of all assembler authorisations.  
 - Hose assemblies are in accordance with an assembly procedure issued by the certificate holder and the assembler has proved their qualifications by burst testing of a selection of hose/coupling combinations.  
 - Selection of sizes and testing is to be performed in compliance with the DNV Type Approval Programme 5-791.70 and the testing is to be witnessed by DNV.

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Hose assemblies delivered from an authorized assembler shall in addition to the pressure test report with reference to the type approval certificate be delivered with a copy of the written authorization stamped by DNV.

The hoses can be used for the systems mentioned on the front page. They are not to be used where fixed piping is possible/required.

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, lubrication 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.

## **Type Approval documentation**

The approval is based on the following documentation :

Defiant SR and SRF:

- Manufacturers leaflets DEFIANT SRF and DEFIANT SR
- Test report no RYAU-111, WC-2012/0810/8177, RYAU-TR-13-02, R076/09 from Wellcall Hose (M) SDN.BHD, Malaysia
- Manufacturers fire test report nos RH-FT-60, RH-FT-61, RH-FT-62.

Driller D2B:

- Manufacturers leaflet DRILLER D2B
- Manufacturers fire test report no RH-FT-136 and IRH-FT-003/13
- Manufacturers test report no RHAU-DB-101

T3000

- Manufacturers leaflet "T3000"
- Manufacturers test reports nos: RHAU-IB-1001A, RHAU-IB-1001D, RHAU-IB-1001S, RHAU-IB-1007D, RHAU-IB-1007S, RHAU-IB-1008A, RHAU-IB-1008D, RHAU-IB-1008S, RHAU-IB-1009D, RHAU-IB-1009S
- Manufacturers fire test reports nos. RH-FT-121, RH-FT-120, RH-FT-114, RH-FT-115, RH-FT-97, RH-FT-98, RH-FT-99, RH-FT-100, RH-FT-101.

T3600

- Manufacturers leaflets "T3600A" and T3600S
- Manufacturers burst test reports nos 6144, 6128i
- Manufacturers email dated October 3<sup>rd</sup> 2013

T4000

- Manufacturers leaflet T4000
- Manufacturers test reports nos : RHAU-IB-1002A, RHAU-IB-1002D, RHAU-IB-1002S, RHAU-IB-1003A, RHAU-IB-1003D, RHAU-IB-1003S, RHAU-IB-1004D, RHAU-IB-1004S,
- Manufacturers fire test reports nos. RH-FT-102, RH-FT-103, RH-FT-116, RH-FT-117, RH-FT-12 2, RH-FT-123,

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#### T5000

- Manufacturers leaflet "T5000"
- Manufacturers test reports nos: RHAU-IB-1006A, RHAU-IB-1006D, RHAU-IB-1006S
- Manufacturers fire test nos. RH-FT-104, RH-FT-105, RH-FT-106, RH-FT-107

#### T6000

- Manufacturers leaflet "T6000"
- Manufacturers test reports nos RHAU-IB-1005A, RHAU-IB-1005D, RHAU-IB-1005S
- Manufacturers fire test reports no RH-FT-140

### Tests carried out

Dimensional check test, cover adhesion test, tube adhesion test, hydrostatic test, Ozone resistance, fire test, oil resistance test, cold flexibility test, fire test, change in length test, Burst test, impulse test, abrasion resistance test

### Marking of product

For traceability to this type approval, the hoses should at least be marked with:

- Manufacturer's trade mark
- Type designation

### Periodical assessment

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 – 5-791.70 "Type Approval of Flexible Hoses of Non-Metallic Material", or another recognised standard.

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

END OF CERTIFICATE