

# TYPE APPROVAL CERTIFICATE

**This is to certify:**

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

with type designation(s)  
**H12A and D and S, H15D, H3000, H4000, H5000, H6000**

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 :**

**May be used for hydraulic application**

Type:	Temperature range:	Max. working press.:	Sizes:
<b>H12A and D and S</b>	<b>-40°C to +100°C (-40°F to +212°F)</b>	<b>210 to 350 bar size dependent</b>	<b>DN10, 12, 16, 19, 25, 31, 38, 51</b>
<b>H15D</b>	<b>-40°C to +100°C (-40°F to +212°F)</b>	<b>420 bar all sizes</b>	<b>DN19, 25, 31, 38, 51</b>
<b>H3000</b>	<b>-40°C to +100°C (-40°F to +212°F)</b>	<b>215 bar all sizes</b>	<b>DN31, 38, 51</b>
<b>H4000</b>	<b>-40°C to +100°C (-40°F to +212°F)</b>	<b>280 bar all sizes</b>	<b>DN12, 16, 19, 25, 31, 38, 51</b>
<b>H5000</b>	<b>-40°C to +100°C (-40°F to +212°F)</b>	<b>350 bar all sizes</b>	<b>DN6, 8, 10, 12</b>
<b>H6000</b>	<b>-40°C to +100°C (-40°F to +212°F)</b>	<b>420 bar all sizes</b>	<b>DN10, 12, 16, 19, 25, 31, 38, 51</b>

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-14695**  
 File No: **791.70**  
 Job Id: **262.1-015853-1**

## Product description

Hose types:

H12A, D and S: Inner tube of black synthetic rubber reinforced by 4 alternating layers of spiralled wire. Cover of black synthetic rubber. Couplings: Bitlok, non-skive, one-piece series T7000

H15D: Inner tube of black synthetic rubber reinforced by 4 layers of alternated spiralled steel wire for sizes -12 and -16, 6 layers for sizes -20, -24 and -32. Couplings: Bitelok non-skive, one-piece series T9000 for sizes -16 and -20, 69000N for the rest of the sizes

H3000: Inner tube of black synthetic rubber reinforced by 4 alternating layers of spiralled steel wire. Cover of black synthetic rubber. Couplings: Bitlok, non-skive, one-piece series T7000

H4000: Inner tube of black synthetic rubber reinforced by 4 layers of alternated spiralled steel wire for sizes -06, -08, -10, -12, -16  
 6 layers for sizes -20, -24 and -32. Couplings: Bitelok non-skive, one-piece series T7000

H5000: Inner tube of black synthetic rubber reinforced by 4 layers of alternated spiralled steel wire for sizes -06, -08, -10, -12 and -16, 6 layers for sizes -20, -24 and -32. Couplings: Bitelok non-skive, one-piece series T7000

H6000: Inner tube of black synthetic rubber reinforced by 4 layers of alternated spiralled steel wire for sizes -06, -08, -10, -12 and -16, 6 layers for sizes -20, -24 and -32. Couplings: Bitelok skive, two-piece series 69000N

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

Hose manufacturer: RYCO Hydraulics Sdn Bhd Malaysia

Coupling manufacturers: RYCO Hydraulics, Footscay, Vic, Australia  
 RYCO Hydraulics (DALIAN) Ltd, China

## Application/Limitation

Max working pressure :

H12A	Hose size			Max working pressure		Couplings	
	DN	INCH	DASH	BAR	PSI	Bitelok	
H1206A	10	3/8	-06	350	5100	T7000	T2000
H1208A	12	1/2	-08	350	5100	T7000	T2000
H1210A	16	5/8	-10	350	5100	T7000	T2000
H1212A	19	3/4	-12	350	5100	T7000	-
H1216A	25	1	-16	350	5100	T7000	-
H1220A	31	1 1/4	-20	275	4000	T7000	-
H1224A	38	1 1/2	-24	255	3700	T7000	-
H1232A	51	2	-32	210	2050	T7000	-

Temperature range: -40°C to +121°C (-40°F to +250°F)

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H12D	Hose size			Max working pressure		Couplings	
	DN	INCH	DASH	BAR	PSI	Bitelok	
H1206D	10	3/8	-06	350	5100	T7000	T2000
H1208D	12	1/2	-08	350	5100	T7000	T2000
H1210D	16	5/8	-10	350	5100	T7000	T2000
H1212D	19	3/4	-12	350	5100	T7000	-
H1216D	25	1	-16	350	5100	T7000	-
H1220D	31	1 1/4	-20	275	4000	T7000	-
H1224D	38	1 1/2	-24	255	3700	T7000	-
H1232D	51	2	-32	210	3050	T7000	-
H1240D	63	2 1/2	-40	140	2000	T7000	-

Temperature range: -40°C to +121°C (-40°F to +250°F)

H12S	Hose size			Max working pressure		Couplings	
	DN	INCH	DASH	BAR	PSI	Bitelok	
H1206S	10	3/8	-06	350	5100	T7000	T2000
H1208S	12	1/2	-08	350	5100	T7000	T2000
H1210S	16	5/8	-10	350	5100	T7000	T2000
H1212S	19	3/4	-12	350	5100	T7000	-
H1216S	25	1	-16	350	5100	T7000	-
H1220S	31	1 1/4	-20	275	4000	T7000	-
H1224S	38	1 1/2	-24	255	3700	T7000	-
H1232S	51	2	-32	210	3050	T7000	-

Temperature range: -40°C to +121°C (-40°F to +250°F)

H15D	Hose size			Max working pressure		Couplings	
	DN	INCH	DASH	BAR	PSI	Bitelok	
H1512D	19	3/4	-12	420	6000	69000N	
H1516D	25	1	-16	420	6000	T9000	
H1520D	31	1 1/4	-20	420	6000	T9000	
H1524D	38	1 1/2	-24	420	6000	69000N	
H1532D	51	2	-32	420	6000	69000N	

Sizes 1 1/2" and 2" are not fire tested and are therefore not approved for flammable fluids.

Temperature range: -40°C to +121°C (-40°F to +250°F)

H3000	Hose size			Max working pressure		Couplings	
	DN	INCH	DASH	BAR	PSI	Bitelok	
H3020	31	1 1/4	-20	215	3100	T7000	
H3024	38	1 1/2	-24	215	3100	T7000	
H3032	51	2	-32	215	3100	T7000	

Temperature range: -40°C to +121°C (-40°F to +250°F)

H4000	Hose size			Max working pressure		Coupling	
	DN	INCH	DASH	BAR	PSI	Bitelok	
H4006	10	3/8	-06	280	4100	T7000	
H4008	12	1/2	-08	280	4100	T7000	
H4010	16	5/8	-10	280	4100	T7000	
H4012	19	3/4	-12	280	4100	T7000	
H4016	25	1	-16	280	4100	T7000	
H4020	31	1 1/4	-20	280	4100	T7000	
H4024	38	1 1/2	-24	280	4100	T7000	
H4032	51	2	-32	280	4100	T7000	

Temperature range: -40°C to +121°C (-40°F to +250°F)

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H5000	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	Bitelok
H5006	10	3/8	-06	350	5100	T7000
H5008	12	1/2	-08	350	5100	T7000
H5010	16	5/8	-10	350	5100	T7000
H5012	19	3/4	-12	350	5100	T7000
H5016	25	1	-16	350	5100	T7000
H5020	31	1 1/4	-20	350	5100	T7000
H5024	38	1 1/2	-24	350	5100	T7000
H5032	51	2	-32	350	5100	T7000

Only 1/2" is fire tested. No other hose is approved for flammable fluids.  
 Temperature range: -40°C to +121°C (-40°F to +250°F)

H6000	Hose size			Max working pressure		Couplings
	DN	INCH	DASH	BAR	PSI	T7000
H6006	10	3/8	-06	420	6100	T7000
H6008	12	1/2	-08	420	6100	T7000
H6010	16	5/8	-10	420	6100	T7000
H6012	19	3/4	-12	420	6100	T9000
H6016	25	1	-16	420	6100	T9000
H6020	31	1 1/4	-20	420	6100	T9000
H6024	38	1 1/2	-24	420	6100	T9000 or 69000N
H6032	51	2	-32	420	6100	69000N

Temperature range: -40°C to +121°C (-40°F to +121°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.

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 in short lengths for ordinary machinery purposes in the systems mentioned on the front page. They are not to be used where fixed piping is possible/required.

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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, 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:

H12A, D, S:

- Manufacturers leaflets H12A, H12 D and H12S
- Manufacturers test reports nos. RHAU-HA-H1206A, RHAU-HA-H1208A, RHAU-HA-H1212A, RHAU-HA-H1224A,
- RH-WI-11, RH-WI-22, RH-WI-33, RH-FT-54

H15D:

- Manufacturer's leaflet "H15D"
- Manufacturer's test reports nos: 4771i, 5042i, 767, RH-FT-41, RH-FT-58

H3000

- Manufacturer's leaflet H3000
- Manufacturers test reports nos RHAU-IS-1005A, RHAU-IS-1005D, RHAU-IS-1005S, RH-FT-94, RH-FT-127

H4000

- Manufacturer's leaflet "H4000"
- Manufacturer's test reports nos: RHAU-IS-1002A, RHAU-IS-1002D, RHAU-IS-1002S, RHAU-IS-1010A, RHAU-IS-1010D, RHAU-IS-1010S, RHAU-IS-1011A, RHAU-IS-1011D, RHAU-IS-1011S, RH-FT-83, RH-FT-110, RH-FT-111, RH-FT-133

H5000:

- Manufacturer's leaflet "H5000"
- Manufacturer's test reports nos. RHAU-IS-1004A, RHAU-IS-1004D, RHAU-IS-1004S, RHAU-IS-1008A, RHAU-IS-1008D, RHAU-IS-1008S, RH-FT-112, RH-FT-124

H6000:

- Manufacturer's leaflet "H6000"
- Manufacturer's test reports nos: RHAU-IS-1006A, RHAU-IS-1006D, RHAU-IS-1006S, RHAU-IS-1007A, RHAU-IS-1007D, RHAU-IS-1007S, RH-FT-130, RH-FT-118, RH-FT-119, RH-FT-109

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## Tests carried out

Dimensional check test, cover adhesion test, Change in length test. Burst pressure test, Impulse pressure test, proof test, leakage test, cold flexibility test, ozone test, abrasion resistance test, oil resistance test, Fire 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