

Certificate No:
P-14950
File No:
791.70
Job Id:
262.1-016581-1

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)
Alfatech 6000, Alfatech 5000

Issued to

ALFAGOMMA HYDRAULIC SPA
CASTELNUOVO VOMANO TE, Italy

is found to comply with

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

Application :

Hydraulic and Pneumatic systems (incl. power and control for steering gears) / Fuel Oil / Lube Oil / Compressed Air / Fresh Water / Sanitary

Type:	Temperature range:	Max. working press.:	Sizes:
Alfatech 6000	-40°C to 125°C (see cert.)	DN10, 445 bar, DN12 to 51, 420 bar	DN10 to 51 mm (3/8" to 2")
Alfatech 5000	-40°C to 125°C (see cert.)	DN6 to DN16, 350 bar; DN20-25, 380 bar; DN32 to DN63; 350bar	DN6 to 63 mm (1/4" to 2 1/2")

This Certificate is valid until **2018-03-31**.

Issued at **Høvik** on **2014-10-02**

DNV GL local station: **Milan**

for **DNV GL**

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. 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.

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Product description

Type designation: ALFATECH 5000

Tube: Oil resistant syntetic rubber compound
 Cover: Syntetic rubber compound, weather-, oil- and abrasion resistant
 Reinforcement: Two high tensile steel braids (DN6, 10 and 12 mm)
 Four high tensile steel spirals (DN16, 20, 25, 32 and 38 mm).
 Six high tensile steel spirals (DN32, 38 and 63 mm)

Type designation: ALFATECH 6000 acc. 100R15 in SAE J517, DUNLOP 420G

Tube: Oil resistant syntetic rubber compound
 Cover: Syntetic rubber compound, weather-, oil- and abrasin resistant
 Reinforcement: Four (DN < 32) or six (DN =>32) layers of high tensile spiral steel wire wrapped in alternating directions.
 Couplings: Alfagomma and Dunlop Hiflex series of inserts and ferrules in carbon or stainless steel.

Manufacturing plants:

Couplings	Hoses
Alfatechnology S.r.l. Zona Industriale Piano Lago 87050 Mangone (CS) Italy	Alfagomma Hydraulic S.p.A Via Enrico Mattei no. 6 64020 Castelnuovo Vomano (TE) Italy
Alfatechnology S.r.l. Via dell'industria, 12 20040 Bellusco (MI) Italy	Alfagomma Hydraulic S.p.A. Area Industriale Piano Lago 87050 Figline Vegliaturo (CS) Italy

ALFATECH 5000

Hose size	Carbon Steel 11SMnPb30 according UNI EN 10277 Stainless Steel AISI 304 - AISI 316				
	Skive fittings		No skive fittings	Interlock fittings	
Dash	AG Branding (Carbon Steel)	AG Branding (INOX Version)	AG Branding	AG Branding (Carbon Steel)	AG Branding (INOX Version)
-04	H1100204-04		H1200102-04		
-06	H1100204-06	H3100204-06	H1200202-06 H1200212-06		
-08	H1100204-08	H3100204-08			
-10	H1100204-10 H1100404-10			H1400200-10	H3400200-10
-12	H1100404-12			H1400200-12	H3400200-12
-16				H1400200-16	H3400200-16
-20				H1400200-20 H1400301-20	H3400200-20 H3400301-20
-24				H1400200-24 H1400301-24	H3400200-24 H3400301-24
-32				H1400200-32 H1400301-32	H3400200-32 H3400301-32
-40				H1T00600-40	

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ALFATECH 6000

Hose size	Carbon Steel 11SMnPb30 according UNI EN 10277 Stainless Steel AISI 304 - AISI 316				
	Skive fittings			Interlock fittings	
Dash	AG Branding (Carbon Steel)	AG Branding (INOX Version)	DH Branding	AG Branding (Carbon Steel)	AG Branding (INOX Version)
-06	H1100404-06	H3100204-06		H1400200-06	
-08	H1100404-08	H3100204-08		H1400200-08	
-10				H1400301-10	H3400200-10
-12			D190000-12	H1400200-12	H3400200-12
-16				H1400200-16	H3400200-16
-20				H1400301-20	H3400301-20
-24				H1400301-24	H3400301-24
-32				H1T00600-32	

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.

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.
- One sample of each hose type is to be burst tested and the testing is to be witnessed by DNV. This testing is to be performed at least once a year.

Temperature range:

Alfatech 5000:

For braided hoses: -40 to 100 °C continuous operation.

For spiral hoses: -40 to 121 °C continuous operation.

Alfatech 6000:

-40 to 100 °C continuous operation

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.

For compressed air or gases the cover should be pin-prickled.

Flexible hoses are only to be used in lengths up to 2 meters 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.

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The hoses must only be fitted in places where they are always accessible.

Flexible hoses of these types are not to be used in 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.

Each hose is to be hydraulic pressure tested to 1.5 times the maximum working pressure and to be delivered with manufacturer's pressure test certificate.

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:
- Production Cycle and Branding Procedure
- Alfagomma Technical data sheet edition 2 dated 27/05-2004.
- Alfagomma test reports: N°119/2004, 120/2004, 121/2004, 122/2004, 123/2004, 124/2004, 125/2004, 126/2004, 127/2004, 127/2004, 128/2004 and 157/2004 dated 10/05-2004.
- Alfagomma Hose/fitting combination dated 04/06-2004.
- Ferrule drawings: H1100204-040000/01, H1100204-060000/01, H1100204-080000/01, H1400200-100000/01, H1400200-120000/03, H1400200-160000/02, H1400200-200000/02, H1400200-240000/01, H1400301-200000/02, H1400301-240000/02, H1400301-320000/02.
- Insert Dimensions for Braid Hoses 5/G/U/TA/800 rev 00 dated 10/06-2004.
- Insert Dimensions for Spiral Hoses 5/G/U/TA/801 rev 00 dated 10/06-2004.
- Crimping tables: 5/G/U/TA/126 rev 00 dated 16/06-2004, 5/G/U/TA/002 rev 09 dated 03/06-1994 and 5/G/U/TA/088 rev 02 dated 16/06-2004.
- LAPI fire test reports: 219/05, 277/05 and 279/05 dated 07.03 and 08.03-2005.
- Test reports on Rubber Compounds: Cold flex.test, Ozone resistance test, and Oil resistance test (volume change).
- Quality control manual dated 12.04.99
- Test reports dated 03.07.2000
- Alfagomma hose catalogue 99/03, 3rd Edition
- Other Alfagomma documents: "Hose / fitting combinations", dated 26.07.2000, "Fitting drawings list", rev. 1 dated 20.07.1999 and "Crimping table", rev.00 dated 10/03/00 and rev.6 dated 19/09/00
- Insert Dimensions For Spiral Hose, rev. 01 dated 20/07/00
- Ferrule Dimensions H1100204-, H1400200- and H1400301- rev. 01 dated 20/07/00
- LAPI fire test reports: 225/05 and 278/05 dated 07.03 and 08.03-2005.
- DNV test reports dated 2009-10-12
- Alfagomma Test report 153/2012 for Alfatech6000 – 2"
- Alfagomma Impulse Test Report 140/11A for Alfatech6000 – 2"
- Burst Test report 25/2012 for Alfatech6000 – 2"
- LAPI fire test report for for Alfatech6000 – 2": 385.0IS0110/12 dtd. 29.03.2012
- Alfagomma drawing for interlock coupling H1T00600-32 for for Alfatech6000 – 2"
- Test report dated 2014-03-05 witnessed by DNV local station Milan (acc. to ISO 1402)
- Type approval assessment report dated 2014-03-06 signed and stamped by DNV local station Milan.
- -LAPI fire test report for AT5K - 2.1/2" with coupling H1T00600-40: 299.0IS0110/14
- -Impulse test report for for AT5K - 2.1/2" with coupling H1T00600-40 n° 020/12

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Tests carried out

Dimensional Check Test, Change in Length Test, Burst Test, Cold Flexibility Test, Ozone Resistance Test, Impulse Test, Oil Resistance Test according to EN853 and SAE J517 respectively and Fire Test in accordance to ISO 15540.

Marking of product

For traceability to this type approval, the final products (hoses with couplings) are to be marked:

- Manufacturer's name or trademark and type designation:
 - Alfagomma Alfatech 5000, Alfatech 6000
 - Dunlop 420G
- Additional marking at manufacturer's option

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a periodical assessment every second year and before the expiry date of this certificate, to verify that the conditions for the type approval are complied with and to witness the Burst test on a selection of sizes.

The Burst tests shall be performed in accordance with procedures given in DNV Certification notes no. 2.9 5-791.70 "Type Approval of Flexible Hoses of Non-Metallic Material" or another recognized standard. The test is to be performed with the type of couplings fitted that is Type Approved with the compensators.

END OF CERTIFICATE