

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)

ALFAGOMMA ISO-TECH 4K / ISO-LINE 4K, ALFAGOMMA ISO-TECH 5K / ISO LINE 5K, ALFABIOTECH EVOLUTION 4K / POWERFLEXBIO 4K EXTRA, ALFABIOTECH LEADER 5K, ALFABIOTECH EVOLUTION 5K / POWERFLEXBIO 5K EXTRA, ALFABIOTECH EVOLUTION 5KP / POWERFLEXBIO 5K PLUS EXTRA, ALFABIOTECH EVOLUTION 6K / POWERFLEXBIO 6K EXTRA

issued to

Alfagomma Hydraulic S.p.A.
Castelnuovo Vomano – Castellalto, TE, Italy

is found to comply with

Application:

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV.

Type:	Temperature range:	Max. working press.:	Sizes:
ALFAGOMMA ISO-TECH 4K / ISO-LINE 4K	See page 5.	280 bar	DN06 to DN19
ALFAGOMMA ISO-TECH 5K / ISO LINE 5K	See page 5.	350 bar	DN06 to DN12
ALFABIOTECH EVOLUTION 4K / POWERFLEXBIO 4K EXTRA	-40°C to + 120°C	280 bar to 290 bar	DN12 to DN51
ALFABIOTECH LEADER 5K	-40°C to +120°C	350 bar	DN06 to DN51
ALFABIOTECH EVOLUTION 5K / POWERFLEXBIO 5K EXTRA	-40°C to + 120°C	350 bar	DN16 to DN51
ALFABIOTECH EVOLUTION 5KP / POWERFLEXBIO 5K PLUS EXTRA	-40°C to + 120°C	380 bar	DN19, DN25
ALFABIOTECH EVOLUTION 6K / POWERFLEXBIO 6K EXTRA	-40°C to + 120°C	420 bar to 450 bar	DN06 to DN51

Issued at **Høvik** on **2025-10-29**

This Certificate is valid until **2030-10-28**.

for **DNV**

DNV local unit: **Italy/Malta CMC**

Approval Engineer: **Tobias Berntsen**

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

Seven different types of non-metallic hoses with permanently fitted couplings:

ALFABIOTECH 4000 Evolution (Alfagomma branding)/ POWERFLEXBIO 4000 EXTRA (Dunlop branding)
 (according to ISO 18752 Type CC Class 280)

Tube	: Synthetic rubber resistant to oil and Biodegradable Hydraulic Fluids
Reinforcement	: Four high tensile steel spirals (4S)
Cover	: Abrasion, ozone, and hydrocarbon resistant synthetic rubber – MINETUFF and Supertuff cover
Coupling	: Material grade 11sMnPb30, AISI 316

ALFABIOTECH 5000 Evolution (Alfagomma branding)/ POWERFLEXBIO 5000 EXTRA (Dunlop branding)
 (according to ISO 18752 Type CC Class 350)

Tube	: Synthetic rubber resistant to oil and Biodegradable Hydraulic Fluids
Reinforcement	: Four High Tensile Steel Spirals(4S) up to DN32, Six Spirals(6S), over DN32
Cover	: Abrasion, ozone, and hydrocarbon resistant synthetic rubber – MINETUFF and Supertuff cover
Coupling	: Material grade 11sMnPb30, AISI 316

ALFABIOTECH 6000 Evolution (Alfagomma branding)/ POWERFLEXBIO 6000 EXTRA (Dunlop branding)
 (according to ISO 18752 Type CC Class 420)

Tube	: Synthetic rubber resistant to oil and Biodegradable Hydraulic Fluids
Reinforcement	: Four High Tensile Steel Spirals(4S) up to DN25, Six Spirals(6S), over DN32
Cover	: Abrasion, ozone, and hydrocarbon resistant synthetic rubber – MINETUFF and Supertuff cover
Coupling	: Material grade 11sMnPb30, AISI 316

ALFABIOTECH 5000 Plus Evolution (Alfagomma branding)/ POWERFLEXBIO 5000 Plus EXTRA (Dunlop branding)
 (constructed according to ISO 18752 Type CC Class 350)

Tube	: Synthetic rubber resistant to oil and Biodegradable Hydraulic Fluids
Reinforcement	: Four High Tensile Steel Spirals(4S)
Cover	: Abrasion, ozone, and hydrocarbon resistant synthetic rubber – MINETUFF and Supertuff cover
Coupling	: Material grade 11sMnPb30

ALFABIOTECH 5000 Leader (Alfagomma branding & Dunlop branding)
 (constructed according to ISO 18752 Type DC)

Tube	: synthetic rubber resistant to hydraulic oil
Reinforcement	: 4-high tensile steel spirals for sizes DN06 to DN32; 6-high tensile spirals for size DN38 to DN51
Cover	: synthetic rubber resistant to oil, abrasion, ozone and weather – MINETUFF and Supertuff cover
Coupling	: Material grade 11sMnPb30

ALFAGOMMA ISO-TECH 4000(Alfagomma branding)/ ISO-LINE 4000 (Dunlop branding)

(constructed according to EN857 – 2C / SAE J517 100R16, ISO 18752 Type CC for sizes DN06 to DN12, Type BC for sizes DN16 and DN19)

Tube	: Synthetic rubber resistant to oil
Reinforcement	: Two wire steel braids
Cover	: Abrasion, weather, and oil resistant synthetic rubber – MINETUFF and Supertuff cover
Coupling	: Material grade 11sMnPb30, AISI 316

ALFAGOMMA ISO-TECH 5000(Alfagomma branding)/ ISO-LINE 5000 (Dunlop branding)

(constructed according to EN857 – 2C / SAE J517 100R16, ISO 18752 Type CC for sizes DN06 and DN08, Type BC for sizes DN10 and DN12)

Tube	: Synthetic rubber resistant to oil
Reinforcement	: Two wire steel braids
Cover	: Abrasion, weather, and oil resistant synthetic rubber – MINETUFF and Supertuff cover
Coupling	: Material grade 11sMnPb30, AISI 316

Hose assembling location:

1. Alfagomma Hydraulic S.P.A., Mangone, Italy
2. Alfagomma Hydraulic S.P.A., Bellusco, Italy
3. Alfagomma Hydraulic S.P.A., Castelnuovo Vomano, TE, Italy.
4. Alfagomma Germany GmbH, Herne, Germany
5. Alfagomma UK Ltd, Hydock, UK
6. Alfagomma Korea Co, Ltd., Hwaseong-Si, Gyeonggi-do, Korea
7. Alfagomma China, No.188 Ci Dong Avenue, Zheqiang Intelligent Logistics Park, Cixi Coastal Economic Development District, Ningbo, Zhejiang Province 315338, China
8. Argus Fluidtechnik GmbH, Ettlingen, Germany
9. Dunlop Hiflex OY, Turku, Finland
10. Dunlop Hiflex OY, Vantaa, Finland
11. Dunlop Hiflex Oy, Pirkkala, Finland
12. Dunlop Hiflex AB, Halmstad, Sweden
13. Dunlop Hiflex AS, Stavanger, Norway
14. Dunlop Hiflex AS, Bergen, Norway
15. Dunlop Hiflex AS, Kristiansand, Norway
16. Dunlop Hiflex AS, Kolding, Denmark

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.

Design pressure details:

Hose I.D. DN	Maximum working pressure (bar)						
	Alfabiotech 4000 Evo	Alfabiotech 5000 Evo	Alfabiotech 6000 Evo	Alfabiotech 5000 Leader	Alfabiotech 5000 Evo plus	Alfagomma ISO-TECH 4000	Alfagomma ISO-TECH 5000
6	-	-	450	350	-	280	350
8	-	-	-	-	-	280	350
10	-	-	445	350	-	280	350
12	280	-	420	350	-	280	350
16	280	350	420	350	-	280	-
19	280	350	420	350	380	280	-
25	280	350	420	350	380	-	-
32	280	350	420	350	-	-	-
38	290	350	420	350	-	-	-
51	280	350	420	350	-	-	-

End fitting details:

Hose Fitting Combination, ISO-TECH Family								
Hose	Size			Fitting one piece	Skive Ferrule	No Skive Ferrule	Interlock	Insert
	DN	Inch	DASH					
Alfagomma ISO-TECH 4000	6	1/4	-04	C12AXXXX-04XXX	H1100SK1-04	H1200AD1-04	-	H12xxxxx
	8	5/16	-05	C12AXXXX-05XXX	H1100SK1-05	H1200AD1-05	-	H12xxxxx
	10	3/8	-06	C12AXXXX-06XXX	H1100SK1-06	H1200AD1-06	-	H12xxxxx
	12	1/2	-08	C12AXXXX-08XXX	H1100SK1-08	H1200AD1-08	-	H12xxxxx
	16	5/8	-10	C12AXXXX-10XXX	H1100SK1-10	H1200AD1-10	-	H12xxxxx
	19	3/4	-12	C12AXXXX-12XXX	H1100SK1-12	-	-	H12xxxxx
Alfagomma ISO-TECH 5000	6	1/4	-04	C12AXXXX-04XXX	H1100SK1-04	H1200AD1-04	-	H12xxxxx
	8	5/16	-05	C12AXXXX-05XXX	H1100SK1-05	H1200AD1-05	-	H12xxxxx

	10	3/8	-06	C12AXXXX-06XXX	H1100SK1-06	H1200AD1-06	-	H12xxxxx
	12	1/2	-08	C12AXXXX-08XXX	H1100SK1-08	-	-	H12xxxxx
Alfabiotech 4000 Evo	12	1/2	-08	C18SXXXXX-08XXX	H1100404-08	-	-	H12xxxxx
	16	5/8	-10	C18SXXXXX-10XXX	H1100404-10	-	-	H12xxxxx
	19	3/4	-12	C18SXXXXX-12XXX	H1100404-12	-	-	H12xxxxx
	25	1	-16	C18SXXXXX-16XXX	H1100404-16	-	-	H12xxxxx
	32	1 1/4	-20	C18SXXXXX-20XXX	-	-	H1700200	H12xxxxx
	38	1 1/2	-24	C18SXXXXX-24XXX	-	-	H1700301	H12xxxxx
	51	2	-32	C18SXXXXX-32XXX	-	-	H1700301	H12xxxxx
Alfabiotech 5000 Evo	16	5/8	-10	C18SXXXXX-10XXX	-	-	-	-
	19	3/4	-12	C18SXXXXX-12XXX	-	-	H1700200	H17xxxxx
	25	1	-16	C18SXXXXX-16XXX	-	-	H1700200	H17xxxxx
	32	1 1/4	-20	C18SXXXXX-20XXX	-	-	H1700200	H17xxxxx
	38	1 1/2	-24	C18SXXXXX-24XXX	-	-	H1700301	H17xxxxx
	51	2	-32	C18SXXXXX-32XXX	-	-	H1700301	H17xxxxx
Alfabiotech 6000 Evo	6	1/4	-04	C18SXXXXX-04XXX	H1100404-04	-	-	H12xxxxx
	10	3/8	-06	C18SXXXXX-06XXX	H1100404-06	-	-	H12xxxxx
	12	1/2	-08	C18SXXXXX-08XXX	H1100404-08	-	-	H12xxxxx
	16	5/8	-10	C18SXXXXX-10XXX	-	-	H1700301	H17xxxxx
	20	3/4	-12	C18SXXXXX-12XXX	-	-	H1700200	H17xxxxx
	25	1	-16	C18SXXXXX-16XXX	-	-	H1700200	H17xxxxx
	32	1 1/4	-20	C18SXXXXX-20XXX	-	-	H1700301	H17xxxxx
	38	1 1/2	-24	C18SXXXXX-24XXX	-	-	H1700301	H17xxxxx
Alfabiotech 5000 Leader	6	1/4	-04	C18SXXXXX-04XXX	-	-	-	-
	10	5/16	-05	C18SXXXXX-05XXX	-	-	-	-
	12	3/8	-06	C18SXXXXX-06XXX	-	-	-	-
	16	1/2	-08	C18SXXXXX-08XXX	-	-	-	-
	19	5/8	-10	C18SXXXXX-10XXX	-	-	-	-
	25	3/4	-12	C18SXXXXX-12XXX	-	-	-	-
	32	1 1/4	-20	C18SXXXXX-20XXX	-	-	-	-
	38	1 1/2	-24	C18SXXXXX-24XXX	-	-	-	-

	51	2	-32	C18SXXXXX -08XXX	-	-	-	-
Alfabiotech 5000 Evo +	19	3/4	-12	-	-	-	H1700200	H17xxxxx
	25	1	-16	-	-	-	H1700200	H17xxxxx

Hose assemblies of type Alfabiotech Evolution 4000, Alfabiotech Evolution 5000, Alfabiotech Evolution 6000, Alfabiotech Leader 5000, and Alfabiotech Evolution 5000 Plus covered by this certificate are approved for use with petroleum and water base hydraulic fluids within a temperature range of -40°C to +120°C.

Hose assemblies of type Alfagomma ISO-TECH 4000 and Alfagomma ISO-TECH 5000 covered by this certificate are approved for use with petroleum and water base hydraulic fluids within a temperature range of:

Hose I.D.	Design temperature range	
DN	Alfagomma ISO-TECH 4000	Alfagomma ISO-TECH 5000
6	-40°C to + 120°C	-40°C to + 120°C
8	-40°C to + 120°C	-40°C to + 120°C
10	-40°C to + 120°C	-40°C to + 100°C
12	-40°C to + 120°C	-40°C to + 100°C
16	-40°C to + 100°C	-
19	-40°C to + 100°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 hoses are to be mounted in accordance with the manufacturer's instructions.

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 DNV-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 DNV-RU-SHIP Pt.4 Ch.6 Sec.9, then they shall be separately type approved.

Materials chosen for the specific system shall be suitable for the intended medium and environmental conditions.

Production testing

All hose assemblies delivered under the DNV type approval scheme shall be hydrostatically tested to a pressure of 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to this type approval certificate and also the hose assembling location.

Type Approval documentation

Tests carried out

Fire test, burst test, dimensional check test, change in length test, cold flexibility test, oil resistance test, cover adhesion test, ozone resistance test, impulse test

Marking of product

For traceability to this Type Approval, the products are at least to be marked with:

- hose manufacturer's name or trademark;
- date of manufacture (month/year);



Job ID: **262.1-044257-1**
Certificate no.: **TAP0000326**

- designation type reference;
- nominal diameter;
- pressure rating;
- temperature rating.

Periodical assessment

The certificate is only valid if required periodical assessments are carried out with satisfactory results.

For retention of the Type Approval, a DNV 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 DNV-CP-0338.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>.

Manufactured by:

Manufacturing locations:

Hose types	Hose manufacturing location	Couplings location
ALFABIOTECH 4000 Evolution, ALFABIOTECH 5000 Evolution, ALFABIOTECH 6000 Evolution ALFABIOTECH 5000 Plus Evolution	Alfagomma Hydraulic S.p.A., Via Enrico Mattei no.6,64020 - Castelnuovo Vomano (TE), Italy Alfagomma Hydraulic - Area Industriale Piano Lago – 87050 Figline Vegliaturo (CS), Italy Alfagomma Malaysia Sdn Bhd - PLO 344, Jalan Perak 4 – 81700 Pasir Gudang – Johor, Malaysia	Alfagomma Hydraulic S.p.A, Area Industriale Piano Lago, 87050 Mangone (CS), Italy Alfagomma (Ningbo) Co. Ltd. – Zhejiang, 315311 China
ALFAGOMMA ISO-TECH 4000, ALFAGOMMA ISO-TECH 5000	Alfagomma Hydraulic S.p.A., Via Enrico Mattei no.6, 64020 – Castelnuovo Vomano (TE) Alfagomma Hydraulic S.p.A., Area Industriale Piano Lago, 87050 Figline Vegliaturo (CS)	Alfagomma Hydraulic S.p.A., Area Industriale Piano Lago, 87050 Mangone (CS) – Italy
ALFABIOTECH LEADER 5000	Alfagomma Hydraulic S.p.A., Castelnuovo Vomano – Castellalto, TE, Italy	Alfagomma Hydraulic S.p.A., Area industriale Piano Largo, 87050 Mangone (CS) Italy