Certificate number: 01435/I1 BV
File number: ACM 135/0302/01
Product code: 2104I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

ALFAGOMMA FRANCE SAS

SALOME - FRANCE

for the type of product

NON-METALLIC HOSES (FLEXIBLE PIPES) ASSEMBLIES

ALFAGOMMA & DUNLOP Hoses:
R1AT, 1SN, 122, TEMP TECH 1SN, R2AT, 2SN, 222, 1SC, 121, 2SC, 221, 604, 634, 605AA, ALFABIOTECH (POWERFLEXBIO) 3000, 4000, 5000, 5000 PLUS, 6000, SP33, 3SPT, FLEXOPAK 2-241 (241T and 241X), ALFAGOMMA E4K, E5K, E5K PLUS, E6K

Requirements:
Bureau Veritas Rules for the Classification of Steel Ships
Bureau Veritas Rules for the Classification of Offshore Units
Bureau Veritas Rules for the Classification of Naval Ships

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 20 Jun 2030

For Bureau Veritas Marine & Offshore,
At BV VALENCIENNES, on 19 May 2026,
Philippe Calbet

This certificate was created electronically and is valid without signature

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

ALFAGOMMA & DUNLOP Hose Types:

R1AT, 1SN, 122, TEMP TECH 1SN, R2AT, 2SN, 222, 1SC, 121, 2SC, 221, 604, 634, 605AA, ALFABIOTECH (POWERFLEXBIO) 3000, 4000, 5000, 5000 PLUS, 6000, SP33, 3SPT, FLEXOPAK 2-241 (241T and 241X), ALFAGOMMA E4K, E5K, E5K PLUS, E6K

1.1.1 - Ratings Flexor 1SN/R1AT ISO 1436-1 - SAE 100 R1AT - EN 853 1SN - 122

Diameter (mm)	5	6	8	10	12.5	16	19	25	32	38	51
Design pressure (bar)	250	225	215	180	160	130	105	88	63	50	40

Temperature range –40°C to +100°C

1.1.2 - Ratings 1SN EVOLUTION HT 150 - ISO 1436 - 1 - SAE 100 R1AT - EN 853 1SN

Diameter (mm)	6	10	12	16	19	25	32	38	51
Design pressure (bar)	225	180	160	130	105	88	63	50	40

Temperature range –40°C to +150°C

1.1.3 - Ratings Flexor 2SN/R2AT ISO 1436 - 1 - SAE 100 R2AT - EN 853 2SN - 222

Diameter (mm)	5	6	8	10	12.5	16	19	25	32	38	51
Design pressure (bar)	420	400	350	330	275	250	215	165	125	90	80

Temperature range –40°C to +100°C

1.1.4 - Ratings - EN 857 1SC - 121

Diameter (mm)	6	8	10	12	16	19	25
Design pressure (bar)	225	215	210	160	130	105	88

Temperature range –40°C to +100°C

1.1.5 - Ratings FLEXOPAK 2SC - ISO 11237 - EN 857 2SC - 221

Diameter (mm)	6	8	10	12	16	19	25
Design pressure (bar)	400	350	330	275	250	215	165

Temperature range –40°C to +100°C

1.1.6 - Ratings Flexor 604 / 634 - SAE 100 R4

Diameter (mm)	19	25	32	38	51	63	76	90	102
Design pressure (bar)	21	17	14	10	7	4	4	3	2

Temperature range –40°C to +100°C

1.1.7 - Ratings 605AA

Diameter (mm)	19 to 133	152 to 254
Design pressure (bar)	7.5	6

Temperature range –30°C to +80°C

1.1.8 - Ratings ALFAGOMMA ALFABIOTECH 3000 - DUNLOP HIFLEX POWERFLEXBIO 3000

Diameter (mm)	32	38	51	76
Design pressure (bar)	210	210	210	210

Temperature range –40°C to +121°C

1.1.9 - Ratings ALFAGOMMA ALFABIOTECH 4000 - DUNLOP HIFLEX POWERFLEXBIO 4000

Diameter (mm)	13	19	25	32	38	51
Design pressure (bar)	280	280	280	280	290	280

Temperature range –40°C to +121°C

1.1.10 - Ratings ALFAGOMMA ALFABIOTECH 5000 - DUNLOP HIFLEX POWERFLEXBIO 5000

Diameter (mm)	16	19	25	32	38	51	63
Design pressure (bar)	350	350	350	350	350	350	350

Temperature range –40°C to +121°C

1.1.11 - Ratings ALFAGOMMA ALFABIOTECH 5000 PLUS - DUNLOP HIFLEX POWERFLEXBIO 5000 PLUS

Diameter (mm)	19	25
Design pressure (bar)	380	380

Temperature range –40°C to +121°C

1.1.12 - Ratings ALFAGOMMA ALFABIOTECH 6000 - DUNLOP HIFLEX POWERFLEXBIO 6000

Diameter (mm)	6	10	13	16	19	25	32	38	51
Design pressure (bar)	450	445	420	420	420	420	420	420	420

Temperature range –40°C to +121°C

1.1.13 - Ratings SP33 - 3SPT

Size (mm)	10	12	16	20	25	32
Size (inch)	3/8"	1/2"	5/8"	3/4"	1"	1-1/4"
Design pressure (bar)	500	470	410	375	327	240

Temperature range –40°C to +100°C

1.1.14 - Ratings FLEXOPAK 2 - MINETUFF - 241 (241T and 241X) - EN 857 2SC (up to 1") - ISO 11237 - SAE 100 R16

Size (mm)	6	8	10	12	16	19	25	32	38	51	63	76
Size (inch)	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
Design pressure (bar)	420	375	350	310	280	240	210	145	125	100	75	70

Temperature range –40°C to +100°C

1.1.15 - Ratings ALFAGOMMA ABT4K EVOLUTION - DUNLOP HIFLEX POWERFLEXBIO 4000 EXTRA - E4K

Size (mm)	12	16	19	25	32	38	51
Design pressure (bar)	280	280	280	280	280	290	280

Temperature range –40°C to +121°C

1.1.16 - Ratings ALFAGOMMA ABT5K EVOLUTION - DUNLOP HIFLEX POWERFLEXBIO 5000 EXTRA - E5K

Size (mm)	16	19	25	32	38	51
Design pressure (bar)	350	350	350	350	350	350

Temperature range –40°C to +121°C

1.1.17 - Ratings ALFAGOMMA ABT5KP EVOLUTION - DUNLOP HIFLEX POWERFLEXBIO 5000 PLUS EXTRA - E5P

Size (mm)	19	25
Design pressure (bar)	380	380

Temperature range –40°C to +121°C

1.1.18 - Ratings ALFAGOMMA ABT6K EVOLUTION - DUNLOP HIFLEX POWERFLEXBIO 6000 EXTRA - E6K

Size (mm)	6	10	12	16	19	25	32	38	51
Design pressure (bar)	450	445	420	420	420	420	420	420	420

Temperature range –40°C to +121°C

For each type of hose, the maximum working pressure is not to exceed one quarter of the burst pressure at the service temperature.

1.2 - Material specification

Part	Material
Tube	Oil resistant synthetic rubber
Reinforcement	One/two/three/four/six high tensile steel braids/spirals
Cover	Abrasion, ozone and hydrocarbon resistant synthetic rubber
Fittings	As per manufacturer's catalogues (*)

**Hydraulic fittings can be in carbon steel and stainless steel*

When other choices of materials are used per manufacturer's recommendations, the BV agreement is to be obtained.

2. DOCUMENTS AND DRAWINGS

- ALFAGOMMA catalogue for Hydraulic Hose Fittings & Adapters Edition N° HO/AG-EN dater 09/2022
- ALFAGOMMA catalogue for Industrial Hose & Fittings Edition May 2019
- ALFAGOMMA catalogue Hydraulic Printed February 2017
- ALFAGOMMA technical datasheet for ABTXK model dated 01/09/2019
- ALFAGOMMA technical datasheet for EXK model dated 01/09/2019
- ALFAGOMMA technical datasheet for FLEXOPAK 2/241 T&G model dated 01/10/2020
- ALFAGOMMA technical document for E4K model dated 07/2023
- ALFAGOMMA technical document for E5K model dated 07/2023
- ALFAGOMMA technical document for E5K PLUS model dated 07/2023
- ALFAGOMMA technical document for E6K model dated 07/2023

No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

3.1 - Tests carried out: dimensional check, proof pressure test, change in length, burst test, ozone resistance test, impulse test, cold flexible test, ageing test and overspeed test as per DIN 74310. Manufacturer's test reports 253/05, 253/05-A, 254/05, 255/05, 256/05, 256/05-A, 257/05, 257/05-A, 258/05, 259/05, 260/05, 260/05-A and 261/05.

3.2 - Fire resistance tests according to ISO 15540: 1999 and ISO 15541: 1999 were carried out at LAPI Laboratory (Italy) and found in order per the following test reports N° 600/04/AC (241T-04); N° 601/04/AC (241T-08); N° 602/04/AC (241T-16); N° 604/04/AC (3SPT-06 with fire protection); N° 606/04/AC (713L-12); N° 607/04/AC (713L-32); N° 611/04/AC (4SH-20); N° 612/04/AC (713L-20) dated 21/06/2004; N° 1413.0IS0110/09, 1414.0IS0110/09 and 1415.0IS0110/09 dated 09/11/2009.

3.3 - Fire resistance tests according to ISO 15540: 1999 and ISO 15541: 1999 were carried out at LAPI Laboratory (Italy) and found in order per the following test reports dated 12/02/2014:

- N° 074/14 (ALFABIOTECH 4000 DN 19), N° 075/14 (ALFABIOTECH 4000 DN 32), N° 076/14 (ALFABIOTECH 4000 DN 51), N° 077/14 (ALFABIOTECH 5000 DN 16), N° 078/14 (ALFABIOTECH 5000/5000 PLUS DN 25), N° 079/14 (ALFABIOTECH 5000 DN 51), N° 080/14 (ALFABIOTECH 6000 DN 6), N° 081/14 (ALFABIOTECH 6000 DN 19), N° 082/14 (ALFABIOTECH 6000 DN 38).

3.4 - Fire resistance tests according to ISO 15540: 2016 and ISO 15541: 2016 were carried out at LAPI Laboratory (Italy) and found in order per the following test reports:

- N° 2089/16 (ALFABIOTECH 3000 DN 32), N° 2090/16 (ALFABIOTECH 3000 DN 38), N° 2091/16 (ALFABIOTECH 3000 DN 76), N° 2092/16 (ALFABIOTECH 5000 DN 76), N° 278/18 (ALFABIOTECH 6000 DN 6), N° 277/18 (ALFABIOTECH 6000 DN 20), N° 278/18 (ALFABIOTECH 6000 DN 51).

3.5 - Burst test reports:

- N° 01/2018 (ALFABIOTECH 6000 DN 10), N° 02/2018 (ALFABIOTECH 4000 DN 20), N° 03/2018 (ALFABIOTECH 5000 PLUS DN 20), N° 04/2018 (ALFABIOTECH 5000 DN 38), N° 05/2018 (ALFABIOTECH 3000 DN 38), N° 165/2014 (ALFABIOTECH 4000 DN 25), N° 166/2014 (ALFABIOTECH 4000 DN 51), N° 167/2014 (ALFABIOTECH 5000 PLUS DN 19), N° 168/2014 (ALFABIOTECH 5000 DN 38), N° 169/2014 (ALFABIOTECH 6000 DN 10), N° 170/2014 (ALFABIOTECH 6000 DN 19), N° 171/2014 (ALFABIOTECH 6000 DN 38), N° 11/2017 (ALFABIOTECH 3000 DN 31), N° 13/2017 (ALFABIOTECH 3000 DN 76).

- Test report dated 09/04/2020 (ALFABIOTECH 4000 DN 38) including burst test, test description (according to UNI EN ISO 1402).

3.6 - Test reports N° BV.VLS.3.91.078 dated 16/06/1992, N° CR.77.M.95.0170.W dated 31/05/1996, N° VLS.1I.00.0836.G dated 16/01/2001.

3.7 - Tests carried out: dimensional check, proof pressure test, change in length, burst test, ozone resistance test, impulse test, cold flexible test and ageing test as per test reports dated 05/03/2014 performed on type TEMP TECH 1SN on sizes DN 06 / 10 / 19 & 38.

3.8 - Impulse test reports:

- N° 041/12 (ALFABIOTECH 3000 DN 32), N° 216/12 (ALFABIOTECH 3000 DN 38), N° 217/17 (ALFABIOTECH 3000 DN 51), N° 061/14 (ALFABIOTECH 3000 DN 76), N° 206/13 (ALFABIOTECH 4000 DN 25), N° 083/13 (ALFABIOTECH 4000 DN 51), N° 138/15 (ALFABIOTECH 5000 DN 16), N° 068/16 (ALFABIOTECH 5000 DN 19), N° 186/12 (ALFABIOTECH 5000 DN 38), N° 169/15 (ALFABIOTECH 5000 DN 51), N° 257/14 (ALFABIOTECH 5000 DN 63), N° 053/14 (ALFABIOTECH 5000 PLUS DN 19), N° 217/15A (ALFABIOTECH 6000 DN 06), N° 071/13 (ALFABIOTECH 6000 DN 10), N° 138/11 (ALFABIOTECH 6000 DN 19), N° 197/13 (ALFABIOTECH 6000 DN 38), N° 161/16 (ALFABIOTECH 6000 DN 51).

3.9 - Ageing test reports dated 19/04/2017 for:

- ALFABIOTECH 6000 DN 51, ALFABIOTECH 5000 DN 76 & ALFABIOTECH 3000 DN 31, DN 38, DN 76

3.10 - Ageing test reports dated 22/07/2014 for:

- ALFABIOTECH 6000 DN 06, DN 10, DN 38, DN 20, ALFABIOTECH 5000 DN 16, DN 25, DN 38, DN 51, DN 76, ALFABIOTECH 5000 PLUS DN 19 & ALFABIOTECH 4000 DN 19, DN 25, DN 31, DN 51

3.11 - Test reports including visual inspection and dimension check, burst test, change in length, resistance against liquid, cover adhesion, cold flexibility, ozone resistance and impulse test dated 25/11/2022

- E4K: DN 13/25/51
- E5K: DN 16/25/38
- E5K PLUS: DN 20/25
- E6K: DN 6/20/38

3.12 - Fire resistance test from LAPI:

- E4K: DN 12 N° 1621.0IS0110/22 dated 14/09/2022
- E5K: DN 20 N° 614.0IS0110/22 dated 25/03/2022
- E5K PLUS: DN 20 N° 618.0IS0110/22 dated 25/03/2022
- E6K: DN 6 N° 101.0IS0110/22 dated 24/01/2022

3.13 - Type tests performed on FLEXOPAK 2 - MINETUFF:

- Test report N° 002/2026 dated 15/04/2026 *DN76 including Cold bend test, Visual inspection, Proof pressure*
- Test report N° 01/2026 dated 09/04/2026 *DN76 including Change in length, Burst test*

4. APPLICATION / LIMITATION

4.1 - To use as hose assemblies on the following services:

- Sea water and fresh water, compressed air, fuel oil, lubricating oil, hydraulic oil, water spraying fire system, fixed fire extinguishing system (for fuel oil and lubricating oil: series 241 up to 1").

- CO2 (except type R4, 605AA, R1A - 1SN for diameters 19 to 51 mm, R2A - 2SN for diameters 32 to 51 mm, 1SC for diameters 19 to 25 mm, 241 for diameters 38 to 51 mm and 713 series). The maximum service pressure is to be in accordance with the maximum expected pressure taking into account the filling ratio of the bottles and the safety devices fitted on the CO2 lines.

- Halon 1301: Initial pressurization 25.8 bar (21°C). Except type R4, R1A and 1SN (for diameters 32 to 51 mm).

- Halon 1301: Initial pressurization 42.5 bar (21°C). Except type R4, R1A and 1SN (for diameters 25 to 51 mm).

4.2 - ALFAGOMMA hose Type R4 & T605 may be used for wet exhaust systems of internal combustion engines. The complete installation on board is to be first submitted for review when intended to a BV classed ship. The fitting of the flexible pipe is to be secured by 2 corrosion resistant clips.

4.3 - End fittings as per manufacturer's catalogue. The hoses are to be entirely assembled in the manufacturer's workshop.

4.4 - The hose assemblies are to be installed according to manufacturer's instructions and Bureau Veritas Rules requirements.

4.5 - Flexible hoses assemblies for essential services or containing either flammable or toxic media are not to exceed 1.5 meters in length.

4.6 - Not to be used as Cargo transfer hose.

4.7 - Not to be used in high pressure fuel oil injection systems in accordance with the relevant requirements stated in *NR 467, Pt C, Ch 1, Sec 10 [2.6.3]* and corresponding requirements in *NR 445* and *NR 486.*

4.8 - When approved fire resistant type is required by the Bureau Veritas Rules, installation on board remains subject to case by case approval.

4.9 - Taper threaded end connections are not to be used for oil circuits in engine rooms nor any place containing an ignition source unless otherwise suitably screened at the Society's Surveyor satisfaction.

4.10 - The use of metallic material is restricted according to Bureau Veritas Rules *NR 467, Pt C, Ch 1, Sec 10, Table 5* and corresponding requirements in *NR 445* and *NR 486.*

4.11 - Restriction on the fire resistance of 604/634/605 hoses. If fire resistance is required, fire protection must be used.

4.12 - Not to be used in case of high level of vibrations where fitted to engines, pumps, compressors and other sources of high vibrations.

4.13 - Not to be used as suction hose.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 - The products are to be supplied by **ALFAGOMMA FRANCE SAS** in compliance with the type and the requirements described in this certificate.

5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note *NR 320*.

5.3 - The hose bulks and end fittings are manufactured by ALFAGOMMA (Italy).

5.4 - Each hose with end fittings is to be hydraulically pressure tested to 1.5 times the maximum working pressure and provided with the manufacturer's pressure test report and conformity of production.

5.5 - Bureau Veritas product certificate is required.

5.6 - For information, **ALFAGOMMA FRANCE SAS** has declared to Bureau Veritas the following production sites:

- ALFAGOMMA FRANCE SAS: Rue de la république, ZA Le Château, 59496 Salome (France)

- DUNLOP HIFLEX AB: Box 53, Besöksadress, Seldonsvägen 2, 302 62 Halmstad (Sweden)

- DUNLOP HIFLEX OY: Orikedonkatu 8, 20380, Turku (Finland)

- DUNLOP HIFLEX OY: Jasperintie 320, 33960 Pirkkala, FINLAND

- DUNLOP HIFLEX AS: Burasen 7, 4636, Kristiansand (Norway)

- ALFAGOMMA CHINA: No.1 Ci Southeast Avenue, Cixi Binhai Economic Development Zone, Zhejiang, Ningbo, CHINA

- HI-FLEX Italia SRL: Via Romena, 12 - Porrena, 52014 Poppi (Italy)

- ALFAGOMMA HYDRAULIC S.P.A: 12 Via dell' Industria, 20882 Bellusco (Italy)

- ALFAGOMMA PACIFIC PTE LTD: 19 JOO KOON CRESCENT, SINGAPORE 629017, SINGAPORE

- DUNLOP HIFLEX AS: Godviksvingene 178, 5179 GODVIK, NORWAY

6. MARKING OF PRODUCT

Each hose shall be clearly and indelibly marked with at least:

- Manufacturer name or logo: "ALFAGOMMA" or "DUNLOP HIFLEX"
- Type designation
- Date of manufacture
- Pressure rating
- Temperature rating
- Nominal diameter
- Bureau Veritas Mark

7. OTHERS

It is **ALFAGOMMA FRANCE SAS**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

This certificate supersedes Type Approval Certificates N° 01435/I0 BV issued by the Society.

***** END OF CERTIFICATE *****