



Marine & Offshore

Certificate number: 01435/G5 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

Vendin-Le-Vieil - FRANCE

for the type of product

NON-METALLIC HOSES (FLEXIBLE PIPES) ASSEMBLIES

ALFAGOMMA & DUNLOP Hoses

Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships
- BUREAU VERITAS Rules for the Classification of Offshore Units

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: 04 Jun 2020

For Bureau Veritas Marine & Offshore,

At BV VALENCIENNES, on 11 Jul 2019,

Lucien Fratini



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.

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This certificate consists of 6 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

ALFAGOMMA & DUNLOP Hoses Types:

R1A, 1ST, R1AT, 1SN, 122, TEMP TECH 1SN, R2A, 2ST, R2AT, 2SN, 222, 1SC, 121, 2SC, 221, 241 (241T & 241X), 4SP, 730, 4SH, 790, R13, 713 (713G & 713X), SP33, 3SPT, R4, 605AA, ALFABIOTECH (POWERFLEXBIO) 3000, 4000, 5000, 5000 PLUS, 6000

1.1 Ratings

Hose type SAE 100 R1A - EN 853 1ST and SAE 100 R1AT - EN 853 1SN - 122

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

Temperature range -40°C to +100°C

Hose type TEMP TECH 1SN - EN 853 1SN - SAE 100 R1AT

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

Temperature range -40°C to +150°C

Hose type SAE 100 R2A - EN 853 2ST and SAE 100 R2AT - EN 853 2SN - 222

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

Temperature range -40°C to +100°C

Hose type - EN 857 1SC - 121

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

Temperature range -40°C to +100°C

Hose type - EN 857 2SC - 221

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

Temperature range -40°C to +100°C

Hose type - EN 856 4SP - 730

| | | | | | | |
|--------------------------------|-----|-----|-----|-----|-----|-----|
| Diameter (mm) | 6 | 10 | 12 | 16 | 19 | 25 |
| Maximum working pressure (bar) | 450 | 445 | 415 | 350 | 380 | 320 |

Temperature range -40°C to +100°C

Hose type EN 856 4SH - 790

| | | | | | |
|--------------------------------|-----|-----|-----|-----|-----|
| Diameter (mm) | 19 | 25 | 31 | 38 | 51 |
| Maximum working pressure (bar) | 420 | 380 | 350 | 290 | 250 |

Temperature range -40°C to +100°C

Hose type SAE 100 R13 - EN 856 R13

| | | | | | |
|--------------------------------|-----|-----|-----|-----|-----|
| Diameter (mm) | 19 | 25 | 31 | 38 | 51 |
| Maximum working pressure (bar) | 350 | 350 | 350 | 350 | 350 |

Temperature range -40°C to +121°C

Hose type SAE 100 R4

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

Temperature range -40°C to +100°C

Hose type 605AA

| | | |
|--------------------------------|-----------|------------|
| Diameter (mm) | 19 to 127 | 133 to 152 |
| Maximum working pressure (bar) | 7,5 | 6 |

Temperature range -30°C to +80°C

Hose type ALFAGOMMA ALFABIOTECH 3000 - DUNLOP HIFLEX POWERFLEXBIO 3000

| | | | | |
|--------------------------------|-----|-----|-----|-----|
| Diameter (mm) | 32 | 38 | 51 | 76 |
| Maximum working pressure (bar) | 210 | 210 | 210 | 210 |

Temperature range -40°C to +121°C

Hose type ALFAGOMMA ALFABIOTECH 4000 - DUNLOP HIFLEX POWERFLEXBIO 4000

| | | | | | | |
|--------------------------------|-----|-----|-----|-----|-----|-----|
| Diameter (mm) | 13 | 19 | 25 | 32 | 38 | 51 |
| Maximum working pressure (bar) | 280 | 280 | 280 | 280 | 280 | 280 |

Temperature range -40°C to +121°C

Hose type ALFAGOMMA ALFABIOTECH 5000 - DUNLOP HIFLEX POWERFLEXBIO 5000

| | | | | | | | |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|
| Diameter (mm) | 16 | 19 | 25 | 32 | 38 | 51 | 63 |
| Maximum working pressure (bar) | 350 | 350 | 350 | 350 | 350 | 350 | 350 |

Temperature range -40°C to +121°C

Hose type ALFAGOMMA ALFABIOTECH 5000 PLUS - DUNLOP HIFLEX POWERFLEXBIO 5000 PLUS

| | | |
|--------------------------------|-----|-----|
| Diameter (mm) | 19 | 25 |
| Maximum working pressure (bar) | 380 | 380 |

Temperature range -40°C to +121°C

Hose type ALFAGOMMA ALFABIOTECH 6000 - DUNLOP HIFLEX POWERFLEXBIO 6000

| | | | | | | | | | |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Diameter (mm) | 06 | 10 | 13 | 16 | 19 | 25 | 32 | 38 | 51 |
| Maximum working pressure (bar) | 450 | 445 | 420 | 420 | 420 | 420 | 420 | 420 | 420 |

Temperature range -40°C to +121°C

Hose type SP33 - 3SPT

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

Temperature range -40°C to +100°C

Hose type 713 (713G and 713X)

| | | | | | |
|--------------------------------|-----------|---------|-------------|-------------|---------|
| Size (mm/inch) | 19 / 3/4" | 25 / 1" | 32 / 1 1/4" | 38 / 1 1/2" | 51 / 2" |
| Maximum working pressure (bar) | 350 | 380 | 350 | 350 | 350 |

Temperature range -40°C to +121°C

Hose type 241 (241T and 241X)

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

Temperature range -40°C to +100°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

| | |
|---------------|------------------------------------------------------------|
| Tube | Oil resistant synthetic rubber |
| Reinforcement | One/two/four/six high tensile steel braids/spirals |
| Cover | Abrasion, ozone and hydrocarbon resistant synthetic rubber |
| Fittings | As per manufacturer's catalogues |

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 hoses dated 09/05/2017
- ALFAGOMMA catalogue for fittings dated 09/05/2017
- ALFAGOMMA Technical Data Sheet - ALFABIOTECH 3000 Edition 0 dated 15/03/2012
- ALFAGOMMA Technical Data Sheet - ALFABIOTECH 6000 Edition 0 dated 03/02/2014
- ALFAGOMMA Technical Data Sheet - ALFABIOTECH 5000 Edition 0 dated 02/01/2017
- ALFAGOMMA Technical Data Sheet - ALFABIOTECH 4000 Edition 0 dated 28/03/2012
- ALFAGOMMA Technical Data Sheet - ALFABIOTECH 5000 PLUS Edition 0 dated 18/05/2012

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.OIS0110/09, 1414.OIS0110/09 and 1415.OIS0110/09 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).

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.II.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

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 The hose assemblies are to be installed according to manufacturer's instructions and Bureau Veritas Rules requirements. The hoses are not to be used on services when vibration test is required in the Society's Rules.

4.4 The hoses are to be limited to a length necessary to provide for relative movement between fixed and flexibly mounted items of machine/equipment or systems and are only to be used in lengths up to 2 m. The hoses are to be installed in clearly visible and readily accessible locations at all times.

4.5 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.

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

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 NR320.

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 twice the maximum working pressure and provided with the manufacturer's pressure test report and conformity of production.

5.5 BV product certificate is required.

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

- **ALFAGOMMA FRANCE SAS: Vendin-Le-Vieil (France)**
- **DUNLOP HIFLEX AS: Oslo (Norway)**
- **DUNLOP HIFLEX AB: Halmstad (Sweden)**
- **DUNLOP HIFLEX OY: Turku (Finland)**
- **DUNLOP HIFLEX OY: Jasperintie 320, 33960 Pirkkala, FINLAND**
- **ALFAGOMMA CHINA - Ningbo: 296 Kaiyuan Road, Investment Pioneering Centre, Jiangbei district Ningbo, 315022, CHINA**

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
- Society's brand as relevant

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/G4 BV issued by the Society.

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