

TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP00000YK
 Revision No:
7

This is to certify:

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

with type designation(s)

Flexopak2 & Flexopak2 Supertuff/Super Slimline 241T and Super Slimline 241X TUFLEX, Flexopak2SC HF/ Slimline Plus 221T,221G / ARGUS 2SC, Flexopak 1SC/Slimline Plus 121T/ ARGUS 1SC, Flexopak 1 SC, ALFATECH 3000

issued to

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

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021
DNV class programme DNV-CP-0183 – Type approval – Flexible non-metallic hoses

Application:

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

Type:	Temperature range:	Max. working press.:	Sizes:
Flexopak2 & Flexopak2 Supertuff/Super Slimline 241T and Super Slimline 241X TUFLEX	-40°C to +100°C	70 to 420 bar	DN6 to DN76
Flexopak2SC HF/ Slimline Plus 221T,221G / ARGUS 2SC	-40°C to +100°C	165 to 400 bar	DN6 to DN25
Flexopak 1SC/Slimline Plus 121T/ ARGUS 1SC	-40°C to +100°C	88 to 225 bar	DN6 to DN25
Flexopak 1 SC	-40°C to +100°C	88 to 225 bar	DN 16 to DN25
ALFATECH 3000	-40°C to +100°C	224 bar	DN 10

Issued at **Høvik** on **2024-05-30**

This Certificate is valid until **2028-03-31**.

for **DNV**

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

Approval Engineer: **Sarah Miller**

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 300,000 USD.



Product description

Type designations	Type 1	Type 2	Type 3
	Non-Skive	Skive	Non-Skive
Alfagomma (AG)	Flexopak 1 SC	Flexopak 2 / Flexopak 2 Supertuff	Flexopak 2SC HF
Dunlop Hiflex (DH)	Slimline Plus 121T	Super Slimline 241T, 241G	Slimline Plus 221T, 221G
ARGUS	ARGUS 1SC	-	ARGUS 2SC
Construction standard	EN857 – 1SC	EN857 – 2SC SAE J517 100R16	
Design: Flexible rubber hoses reinforced by:	One steel wire braid	Two steel wire braids	
Tube:	Oil resistant synthetic rubber compound		
Cover:	Synthetic rubber compound, weather-, oil- and abrasion resistant		

Coupling designations for each type/size:

Hose size		Flexopak 1SC – Slimline Plus 121T			Flexopak 2SC HF / Slimline Plus 221T, 221G	
		No skive fittings			Skive fittings	No skive fittings
Dash	DN	AG Branding		DH Branding	AG Branding	
-04	6	H1200103-04 H1200101-04	H1200AD1-04	-	H1100204-04	H1200102-04
-05	8	H1200103-05	H1200AD1-05	D110000-05	H1100204-05	H1200202-05
-06	10	H1200103-06	H1200AD1-06	D110000-06	H1100204-06	H1200202-06 H1200212-06
-08	12	H1200103-08	H1200AD1-08	D110000-08	H1100204-08	H1200202-08 H1200212-08
-10	16	H1200202-10	H1200AD1-10	D110000-10	H1100204-10	H1200202-10
-12	19	H1200202-12	H1200AD1-12	D110000-12	H1100204-12	H1200202-12
-16	25	H1200103-16	H1200AD1-16	D110000-16	H1100204-16	H1200202-16
-20	31	-	-	-	H1100104-20	-

Hose size		Flexopak 2 - Super Slimline 241T, 241G					
		SKIVE			No SKIVE		
Dash	DN	AG Branding	DH Branding	AG Branding	DH Branding	AG Branding	
- 04	6	H1100204-04	D330000-04	H1100SK1-04	H3100SK1-04	D110000-04	H1200AD1-04
- 05	8	H1100204-05	D330000-05	H1100SK1-05	H3100SK1-05	D110000-05	H1200AD1-05
- 06	10	H1100204-06	D330000-06	H1100SK1-06	H3100SK1-06	D110000-06	H1200AD1-06
- 08	12	H1100204-08	D330000-08	H1100SK1-08	H3100SK1-08	D110000-08	H1200AD1-08
- 10	16	H1100204-10	D330000-10	H1100SK1-10	H3100SK1-10	D110000-10	H1200AD1-10
- 12	19	H1100204-12	D330000-12	H1100SK1-12	H3100SK1-12	D110000-12	H1200AD1-12
- 16	25	H1100204-16	D330000-16	H1100SK1-16	H3100SK1-16	D110000-16	H1200AD1-16
- 20	31	H1100104-20	-	H1100404-20	H3100404-20	-	H1200AD1-20
-24	38	-	-	H1100SK1-24	H3100SK1-24	-	H1200AD1-24
-32	51	-	-	-	H3100404-32	-	H1200AD1-32
-40	63	-	-	-	-	-	H1200TX2-40 H3200TX2-40
-48	76	-	-	-	-	-	C122XXXXX-48 H3200TX2-48

Hose size		Flexopak 2 - Super Slimline 241T, 241G		Flexopak 1 SC	ALFATECH 3000
		No SKIVE			
Dash	DN	AG Branding		Alfacrimp	Alfacrimp
- 04	6	H3200AD1-04	C12AXXXXX-04XXX	-	-
- 05	8	H3200AD1-05	C12AXXXXX-05XXX	-	-
- 06	10	H3200AD1-06	C12AXXXXX-06XXX	-	C12AXXXXX-06XXX
- 08	12	H3200AD1-08	C12AXXXXX-08XXX	-	-

- 10	16	H3200AD1-10	C12AXXXXX-10XXX	C12AXXXXX-10XXX	-
- 12	19	H3200AD1-12	H3200AD2-12 C12AXXXXX-12XXX	C12AXXXXX-12XXX	-
- 16	25	H3200AD1-16	H3200AD2-16 C12AXXXXX-16XXX C124XXXXX-16XXX	C12AXXXXX-16XXX	-
- 20	31	H3200AD1-20	-	-	-
-24	38	H3200AD1-24	-	-	-
-32	51	H3200AD1-32	-	-	-
-40	63	-	-	-	-
-48	76	-	-	-	-

Couplings: Carbon Steel 11SMnPb30 - UNI EN 10277 / Stainless Steel AISI 304 - AISI 316

Manufacturing locations:

Couplings: Alfagomma Hydraulic S.p.A., Area Industriale Piano Lago, 87050 Mangone (CS) – Italy
 Hoses: 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)

Assembling locations:

1. Alfagomma Hydraulic S.P.A., Mangone, Italy
2. Dunlop Hiflex Oy, Pirkkala, Finland
3. Dunlop Hiflex OY, Vantaa, Finland
4. Dunlop Hiflex AB, Halmstad, Sweden
5. Dunlop Hiflex OY, Turku, Finland
6. Alfagomma Hydraulic S.P.A, Bellusco, Italy- excluding type 2SC
7. Alfagomma Germany GmbH, Herne, Germany
8. Alfagomma Germany GmbH, Hamburg, Germany
9. Dunlop Hiflex AS, Stavanger, Norway
10. Dunlop Hiflex AS, Bergen, Norway
11. Dunlop Hiflex AS, Kristiansand, Norway
12. Dunlop Hiflex AS, Kolding, Denmark
13. Alfagomma UK Ltd, Hydock, UK
14. Alfagomma Korea Co, Ltd., Hwaseong-Si, Gyeonggi-do, Korea - only type FLEXOPAK 2SC HF& FLEXOPAK2
15. Alfagomma China, No.188 Ci Dong Avenue, Zheqiang Intelligent Logistics Park, Cixi Coastal Economic Development District, Ningbo, Zhejiang Province 315338, China

Application/Limitation

This certificate is valid for the hose assemblies as specified, assembled and delivered by the holder (named as manufacturer) of this certificate and in assembling locations listed.

Hose assemblies covered by this certificate are suitable for use with:

- hydraulic fluids in accordance with ISO 6743-4 with the exception of HFD R, HFD S, and HFD T at temperatures ranging from -40°C to +100°C;
- water based fluids at temperatures ranging from -40°C to +70°C;
- water temperatures ranging from 0°C to +70°C.

Size			Maximum working pressure (bar)		
inch	DN	DASH	Flexopak 2 / Super Slimline 241T	Flexopak 2SC HF / Slimline Plus 221T,221G	Flexopak 1SC / Slimline Plus 121T
¼	6	- 04	420	400	225
5/16	8	- 05	375	350	215
3/8	10	- 06	350	330	210
½	12	- 08	310	275	160
5/8	16	- 10	280	250	130
¾	19	- 12	240	215	105
1	25	- 16	210	165	88
1 ¼	31	- 20	140	-	-
1 ½	38	-24	125	-	-
2	51	-32	100	-	-

2 1/2"	63	-40	75	-	-
3"	76	-48	70	-	-

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 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 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 DNV-RU-SHIP Pt.4 Ch.6 Sec.9 [Table 8], then they shall be separately type approved.

Production testing

All hose assemblies under the DNV Type Approval scheme shall be subject to a pressure test at 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to this type approval certificate.

Type Approval documentation

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.

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);
- Designation type reference;
- Nominal diameter;
- Pressure rating;
- Temperature rating.

Periodical assessment

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.