

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)

**Flexor1ST,1A,1SN,1AT / Greenline122T,122G/ARGUS 1SN, Flexor2ST,2A,2AT,2SN/
Greenline222T,222G/ ARGUS 2SN, Flexopak2/Super Slimline 241T, Flexopak2SC HF/
Slimline221T,221G / ARGUS 2SC, Flexopak 1SC/Slimline 121T/ ARGUS 1SC**

Issued to

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

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018
DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses

Application :

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

Type:	Temperature range:	Max. working press.:	Sizes:
Flexor1ST,1A,1SN,1AT / Greenline122T,122G/ARGUS 1SN	-40°C to +100°C	40 to 225 bar	DN6 to DN51
Flexor2ST,2A,2AT,2SN/ Greenline222T,222G/ ARGUS 2SN	-40°C to +100°C	80 to 400 bar	DN6 to DN51
Flexopak2/Super Slimline 241T	-40°C to +100°C	70 to 420 bar	DN6 to DN76
Flexopak2SC HF/ Slimline221T,221G / ARGUS 2SC	-40°C to +100°C	165 to 400 bar	DN6 to DN25
Flexopak 1SC/Slimline 121T/ ARGUS 1SC	-40°C to +100°C	88 to 225 bar	DN6 to DN25

Issued at **Høvik** on **2018-02-22**

for **DNV GL**

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

DNV GL local station: **Milan**

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.



Product description

Five types of Hose assemblies:

Type designations	Type 1	Type 2
	Skive/Non-Skive	Non-Skive
Alfagomma (AG)	Flexor 1ST – 1A/ Flexor 1SN – 1AT	Flexopak 1 SC
Dunlop Hiflex (DH)	Greenline 122T/ Greenline 122G	Slimline 121T
ARGUS	ARGUS 1SN	ARGUS 1SC
Construction standard	EN853 – 1SN SAE J517 100R1	EN857 – 1SC

Design:	Flexible rubber hoses reinforced by one steel wire braid.
Tube:	Oil resistant synthetic rubber compound
Cover:	Synthetic rubber compound, weather-, oil- and abrasion resistant

Type designations	Type 3	Type 4	Type 5
	Skive/ Non-Skive	Skive	Non-Skive
Alfagomma	Flexor 2ST – 2A/ Flexor 2SN – 2AT	Flexopak 2	Flexopak 2SC HF
Dunlop Hiflex	Greenline 222T/ Greenline 222G	Super Slimline 241T, 241G	Slimline 221T, 221G
ARGUS	ARGUS 2SN	-	ARGUS 2SC
Construction standard	EN853 – 2SN SAE J517 100R2	EN857 – 2SC SAE J517 100R16	

Design:	Flexible rubber hoses reinforced by two steel wire braids
Tube:	Oil resistant synthetic rubber nitrile
Reinforcement:	Two high tensile steel wire braids
Cover:	Synthetic rubber compound, weather-, oil- and abrasion resistant

Coupling designations for each type/size:

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

Hose size	Flexor 1ST, 1A, 1SN, 1AT / Greenline 122T, 122G				
	Skive fittings		No Skive fittings		
Dash	AG Branding	DH Branding	AG Branding		DH Branding
-04	H1100204-04	D330000-04	H1200102-04	H1200AD1-04	D110000-04
-05	H1100204-05	D330000-05	H1200202-05	H1200AD1-05	D110000-05
-06	H1100204-06	D330000-06	H1200202-06 H1200212-06	H1200AD1-06	D110000-06
-08	H1100204-08	D330000-08	H1200202-08 H1200212-08	H1200AD1-08	D110000-08
-10	H1100204-10	D330000-10	H1200202-10	H1200AD1-10	D110000-10
-12	H1100204-12	D330000-12	H1200202-12	H1200AD1-12	D110000-12

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-16	H1100204-16	D330000-16	H1200202-16	H1200AD1-16	D110000-16
-20	H1100104-20	-	H1200102-20	H1200AD1-20	D110000-20
-24	H1100104-24	-	H1200202-24	H1200AD1-24	D110000-24
-32	H1100104-32	-	H1200202-32	H1200AD1-32	D110000-32

Hose size	Flexor 2ST, 2A, 2SN, 2AT / Greenline 222T, 222G				
	Skive fittings		No Skive fittings		
Dash	AG Branding	DH Branding	AG Branding		DH Branding
-04	H1100204-04	D330000-04	H1200102-04	H1200AD2-04	D220000-04
-05	H1100204-05	D330000-05	H1200202-05	H1200AD2-05	D220000-05
-06	H1100204-06	D330000-06	H1200202-06 H1200212-06	H1200AD2-06	D220000-06
-08	H1100204-08	D330000-08	H1200202-08 H1200212-08	H1200AD2-08	D220000-08
-10	H1100204-10	D330000-10	H1200202-10	H1200AD2-10	D220000-10
-12	H1100204-12	D330000-12	H1200202-12	H1200AD2-12	D220000-12
-16	H1100204-16	D330000-16	H1200202-16	H1200AD2-16	D220000-16
-20	H1100204-20	D330000-20	H1200202-20	-	D220000-20
-24	H1100204-24	D330000-24	H1200202-24	-	D220000-24
-32	H1100204-32	D330000-32	H1200202-32	-	D220000-32

Hose size	Flexopak 2 - Super Slimline 241T, 241G				
	SKIVE		NO SKIVE	NO SKIVE	SKIVE
Dash	AG Branding	DH Branding	DH Branding	AG Branding	AG Branding
- 04	H1100204-04	D330000-04	D110000-04	H1200AD1-04	H1100SK1-04
- 05	H1100204-05	D330000-05	D110000-05	H1200AD1-05	H1100SK1-05
- 06	H1100204-06	D330000-06	D110000-06	H1200AD1-06	H1100SK1-06
- 08	H1100204-08	D330000-08	D110000-08	H1200AD1-08	H1100SK1-08
- 10	H1100204-10	D330000-10	D110000-10	H1200AD1-10	H1100SK1-10
- 12	H1100204-12	D330000-12	D110000-12	H1200AD1-12	H1100SK1-12
- 16	H1100204-16	D330000-16	D110000-16	H1200AD1-16	H1100SK1-16
- 20	H1100104-20	-	-	H1200AD1-20	H1100404-20
-24	-	-	-	H1200AD1-24	-
-32	-	-	-	H1200AD1-32	-
-40	-	-	-	H1200TX2-40	-
-48	-	-	-	C122XXXXX-48	-

Couplings: Alfagomma and Dunlop Hiflex series of inserts and ferrules (Carbon Steel 11SMnPb30 according UNI EN 10277 / Stainless Steel AISI 304 - AISI 316)

Manufacturing plants	
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)
	Alfagomma-Mardec SDN BHD PLO 344, Jalan Perak 4, Pasir Gudang Ind. Estate, Pasir Gudang, 81707 Johor Malaysia (for Flexor 1SN and Flexor 2SN)

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.

Hose assemblies covered by this certificate may be used in petroleum based (-40°C to +100°C) and water based Hydraulic fluids (-40°C to +70°C) fluids.

Flexor 1ST – 1A/1SN – 1AT, Greenline 122T/122G, ARGUS 1SN (Type 1) sizes 1/4" to 3/4" may be used in CO2 systems.

Size			Maximum working pressure (bar)				
inch	DN	DASH	Flexor 1ST,1A,1SN,1AT 122T, 122G	Flexor 2ST,2A,2AT,2SN 222T, 222G	Flexopak2 / Super Slimline 241T	Flexopak 2SC HF 221T,221G	Flexopak 1SC
¼	6	- 04	225	400	420	400	225
5/16	8	- 05	215	350	375	350	215
3/8	10	- 06	180	330	350	330	210
½	12	- 08	160	275	310	275	160
5/8	16	- 10	130	250	280	250	130
¾	19	- 12	105	215	240	215	105
1	25	- 16	88	165	210	165	88
1 ¼	31	- 20	63	125	140	-	-
1 ½	38	-24	50	90	125	-	-
2	51	-32	40	80	100	-	-
2 ½"	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.

All hose assemblies delivered under the DNV GL 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 the type approval certificate.

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.

Type Approval documentation

Test reports on Rubber Compounds: Cold flex.test, Ozone resistance test, and Oil resistance test
 Quality control manual dated 2008-12-05

Test reports dated 03.07.2000

Alfagomma hose catalogue – 2018 revision

"Hose / fitting combinations", "Fitting drawings list", and "Crimping table"

"ALFAGOMMA S.P.A. HYDRAULIC HOSE DIVISION HYDRAULIC PRODUCT TRAINING MANUAL" issue 1 dated 07/04/1998.

Insert Dimensions For Braid Hose

LAPI fire test reports: 156/05, 216/05 and 217/05 dated 11.02 and 2005-03-07 & 157/05, 218/05, 219/05, 220/05,270/05 and 271/05 dated 16.02, 07.03 and 2005-01-27 & 444.0IS0110/08, 443.0IS0110/08, 442.0IS0110/08 & 525/04, 527/04 and 528/04 dated 2004-06-21

Test reports: 01-06/2008, 84-89/2009 and 103/2009, Impulse test reports: 66/03, 65/03, 66/06, 59/07A,63/03,64/03,59/07

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Specifications: Dunlop Hiflex Super Slimline
Qualification test results dated July 2004
Burst test report 95-0263 witnessed by DNV surveyor
Burst test reports dated 2009-10-12 and 2008-06-19 witnessed by DNV surveyor
Impulse test reports dated 2007-02-21, 2006-04-03, 2008-11-20
Alfagomma test reports dated 2009-10-23, 2010-06-16, 2009-10-16, 2010-05-15
LAPI fire test reports dated 2009-11-09
Test report dated 2014-03-05 witnessed by DNV local station Milan (acc. to ISO 1402)
Survey report MIL-14-0455-6 dated 2014-03-06 signed and stamped by DNV local station Milan
LAPI Fire test reports: 2741.0IS0110/17, 2742.0IS0110/17, 2743.0IS0110/17, 2744.0IS0110/17, 2745.0IS0110/17, 2746.0IS0110/17, 2747.0IS0110/17, 2748.0IS0110/17, 2749.0IS0110/17

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, Burst test at - 60°C qualifying 122T and 122G: 3/16" to 3/4" for CO₂

Marking of product

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

- Manufacturer's name or trade mark
- Type designation
- Maximum working pressure
- Size

Periodical assessment

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

Renewal assessment

During renewal assessment, in addition to the burst pressure tests, pin pricking procedure and endurance test as described in DNVGL-CP-0183 shall be submitted.