

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)

FLEXOR 12 (712L, POWERTRAK 712), FLEXOR 13 (713L, 713G, POWERTRAK 713)), FLEXOR 4SH (790L, 790G, POWERTRAK 790), FLEXOR 4SP (730L, 730G, POWERTRAK 730)

Issued to

Alfagomma Hydraulic S.p.A.
Castellalto 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:
FLEXOR 12 (712L, POWERTRAK 712)	-40°C to +121°C	175 - 280 bar	DN10 to DN51
FLEXOR 13 (713L, 713G, POWERTRAK 713))	-40°C to +121°C	350 bar	DN19 to DN63
FLEXOR 4SH (790L, 790G, POWERTRAK 790)	-40°C to +100°C	250 - 420 bar	DN19 to DN51
FLEXOR 4SP (730L, 730G, POWERTRAK 730)	-40°C to +100°C	320 - 450 bar	DN6 to DN25

Issued at **Høvik** on **2018-11-15**

for **DNV GL**

This Certificate is valid until **2023-03-31**.

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.



Job Id: **262.1-016581-6**
 Certificate No: **TAP00001GK**

Product description

Alfagomma Type designation	Flexor 12	Flexor 13	Flexor 4SH	Flexor 4SP
Dunlop Hiflex Type designation	712 L 712 POWERTRAK	713 L 713 G 713 POWERTRAK	790L 790G 790 POWERTRAK	730 L 730 G 730 POWERTRAK
ARGUS Type designation	-	-	4SH	4SP
Design Standard	EN 856	R12	R13	4SH
	SAE J517	100R12	100R13	-
Tube	Oil resistant syntetic rubber compound			
Cover	Syntetic rubber compound, weather-, oil- and abrasion resistant			
Reinforcement: high tensile spiral steel wire	Four layers	Four or six layers	Four layers	Four layers

Coupling Material: Carbon Steel 11SMnPb30 according UNI EN 10277
 Stainless Steel AISI 304 - AISI 316

Manufacturing plants:

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

Hose size	Flexor 4SH, 790L 790G, 4SH, 790 POWERTRAK		
	Skive fittings	Interlock fittings	
Dash	DH Branding	AG Branding (INOX Version)	AG Branding (carbon Steel)
- 12	D190000-12	H3400200-12	H1400200-12
- 16	D190000-16	H3400200-16	H1400200-16
- 20	D190000-20	H3400200-20	H1400200-20
- 24	D190000-24	H3400200-24	H1400200-24
- 32	D190000-32	H3400200-32	H1400200-32

Hose size	Flexor 4SP, 730L 730G, 4SP, 730 POWERTRAK			
	Skive fittings			Interlock fittings
Dash	AG Branding	AG Branding (INOX Version)	DH Branding	AG Branding
- 04	H1100404-04	H3100404-04	D440000-04	-
- 06	H1100404-06	H3100404-06	D440000-06	H1400200-06
- 08	H1100404-08	H3100404-08	D440000-08	H1400200-08
- 10	H1100404-10	H3100404-10	D440000-10	H1400200-10
- 12	H1100204-12	H3100404-12	D440000-12	H1400200-12
- 16	H1100204-16	H3100404-16	D330000-16	H1400200-16

Hose size	Flexor 12, 712L, 712 POWERTRAK				
	Skive fittings			No Skive fittings	Interlock fittings
Dash	AG Branding	AG Branding (INOX Version)	DH Branding	AG Branding	AG Branding (carbon Steel)
- 06	H1100404-06	H3100204-06	D440000-06	H1200204-06	-
- 08	H1100204-08	H3100204-08	D330000-08	H1200204-08	H1400200-08
- 10	H1100204-10	H3100204-10	D330000-10	H1200204-10	H1400200-10
- 12	H1100204-12	H3100204-12	D330000-12	H1200204-12	H1400200-12
- 16	H1100204-16	H3100204-16	D330000-16	H1200204-16	H1400200-16
- 20	H1100204-20	H3100204-20	D330000-20	H1200204-20	H1400200-20
- 24	H1100204-24	H3100204-24	D330000-24	-	H1400200-24
- 32	H1100204-32	-	D330000-32	-	H1400200-32

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Hose size	Flexor 13, 713L 713G, 713 POWERTRAK		
	Skive fittings	Interlock fittings	
Dash	DH Branding	AG Branding (carbon Steel)	AG Branding (INOX Version)
- 12	D190000-12	H1400200-12	H3400200-12
- 16	D190000-16	H1400200-16	H3400200-16
- 20	D190000-20	H1400301-20	H3400301-20
- 24	D190000-24	H1400301-24	H3400301-24
- 32	D190000-32	H1400301-32	H3400301-32
- 32	-	H1T00600-32	H3T00600-32
- 40	D190000-40	H1T00600-40	-

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 or below assembling locations:

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|--|--------------------|
| 1- Dunlop Hiflex Oy, Pirkkala, Finland | Except FLEXOR12,13 |
| 2- Dunlop Hiflex OY, Vantaa, Finland | Except FLEXOR12,13 |
| 3- Alfagomma Hydraulic France, Vendin, France | |
| 4- Dunlop Hiflex AB, Halmstad, Sweden | Except FLEXOR12 |
| 5- Dunlop Hiflex OY, Turku, Finland | Except FLEXOR12,13 |
| 6- Alfagomma Germany GmbH, Herne, Germany | |
| 7- Alfagomma Germany GmbH, Hamburg, Germany | Except FLEXOR12 |
| 8- Dunlop Hiflex AS, Stavanger, Norway | Except FLEXOR12 |
| 9- Dunlop Hiflex AS, Bergen, Norway | Except FLEXOR12 |
| 10- Dunlop Hiflex AS, Kristiansand, Norway | Except FLEXOR12 |
| 11- Dunlop Hiflex AS, Esbjerg, Denmark | Except FLEXOR12 |
| 12- Dunlop Hiflex AS, Kolding, Denmark | Except FLEXOR12 |
| 13- Alfagomma UK Ltd, Hydock, UK | Except FLEXOR12 |
| 14- Alfagomma Hydraulic S.P.A., Mangone, Italy | |
| 15- Alfagomma hydraulic S.P.A, Bellusco, Italy | |

Hose assemblies covered by this certificate may be used in:

Petroleum based (-40°C to +121°C), water based Hydraulic fluids (-40°C to +70°C) fluids, water and air (0°C to +70°C)

Maximum working pressure in bar:

Hose size			Flexor 12, 712L, 712 POWERTRAK	Flexor 13, 713L, 713G, 713 POWERTRAK	Flexor 4SH, 790L, 790G, 790 POWERTRAK	Flexor 4SP, 730L, 730G, 730 POWERTRAK
inch	DN	Dash				
1/4	6	-4	-	-	-	450
3/8	10	-6	280	-	-	445
1/2	12	-8	280	-	-	415
5/8	16	-10	280	-	-	350
3/4	19	-12	280	350	420	380
1	25	-16	280	350	380	320
1 1/4	31	-20	210	350	345	-
1 1/2	38	-24	175	350	290	-
2	51	-32	175	350	250	-
2 1/2	-	-40	-	350	-	-

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.

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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.

The cover of hoses for gaseous applications shall be pin-pricked.

Type Approval documentation

Test reports on Rubber hoses: Dimensional check, Cover adhesion, Cold flex.test, Ozone resistance test, and Oil resistance test

Alfagomma hose catalogue Edition November 2017

Alfagomma interlock fitting catalogue

Alfagomma INOX fitting catalogue

Ferrule Dimensions H1400200-, H1400301- H1100204- & H1100104- H1400200- and H1400301 and drawing for interlock coupling H1T00600-32 for R13 – 2"

LAPI fire test reports 274.0IS0110/05, 222.0IS0110/05, 159.0IS0110/05, 272.0IS0110/05,

221.0IS0110/05, 273.0IS0110/05, 223.0IS0110/05, 224.0IS0110/05, 275.0IS0110/05,

158.0IS0110/05, 276.0IS0110/05, 277.0IS0110/05,

Alfagomma Test report 25/2012, 153/2012 & 140/11A for R13 – 2" with coupling H1T00600-32

Renewal burst pressure test report numbers: 185, 186, 187, 188, 189, 190, 191, 192, 193, 194/2014 witnessed by DNV local station Milan

Renewal burst pressure test report numbers: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 37, 38, 41, 42, 45, 46, 51, 52, 53, 54, 57, 59, 64, 66, 67, 71, 72, 73, 79, 80, 81, 82, 101, 102, 112, 113, 123, 124, 129, 134, 135, 137, 142, 143, 147, 151, 152, 163, 166, 173, 174, 178, 170, 179, 185, 186/2018 witnessed by DNV GL local station Milan

Tests carried out

Dimensional Check Test, Change in Length Test, Burst Test, Cold Flexibility Test, Ozone Resistance Test, Impulse Test, Oil Resistance Test 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 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.