TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP000030K
Revision No:
1

This is to certify:

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

with type designation(s)
E5K EVOLUTION STEEL ARMOR

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 (Amended July 2025)
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.

Temperature range:	**-40°C to +121°C**
Max. working press.:	**350 bar**
Sizes:	**DN: 20, 25, 32, 38, 51**

Issued at **Høvik** on **2026-09-28**
This Certificate is valid until **2030-12-03**.
DNV local unit: **Italy/Malta CMC**

for **DNV**

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 USD 300 000.

Product description

E5K EVOLUTION STEEL AMOUR is rubber hoses with steel armour constructed of tensile steel spirals with permanently attached couplings constructed with the following design:

Tube	:	Oil resistant synthetic rubber and biodegradable hydraulic fluids
Cover	:	Steel armour cover made of AISI 316
Reinforcement	:	Four high tensile steel spirals up to DN32 and six spirals for sizes DN38 and DN51

End fittings material: Stainless steel AISI 316

Manufacturing locations:

Hoses and couplings : Alfagomma Hydraulic S.p.A., Via Enrico Mattei no.6,64020 - Castelnuovo Vomano (TE), Italy

Hose assembling location:
Alfagomma Australia Pty Ltd, 50 Honeycomb Drive, Eastern Creek NSW 2766, Australia
Dunlop Hiflex Oy, Jasperintie 320, FI-33960 Pirkkala, Finland
Dunlop Hiflex Oy, Orikedonkatu 8, FI-20380 Turku, Finland
Alfagomma Pacific Pte Ltd, 14 Tuas Ave 11, 639080 Singapore
Alfagomma (Ningbo) Co., Ltd., No. 1 Cixi Southeast Avenue, Cixi Binhai Economic Development Zone, Ningbo, Zhejiang, China

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 are approved to be used in:

- petroleum based hydraulic fluids (-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

Hose size			E5K EVOLUTION STEEL ARMOUR	Ferrule designation
inch	DN	Dash		
¾	20	-12	350 bar	H3700200-120000
1	25	-16		H3700200-160000
1 ¼	32	-20		H3700200-200000
1 ½	38	-24		H3700301-240000
2	51	-32		H3T00600-320000

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.

The hoses are to be mounted in accordance with the manufacturer's instructions.

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.

Materials chosen for the specific system shall be suitable for the intended medium and environmental conditions.

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 Table 10 DNV-RU- SHIP Pt.4 Ch.6 Sec.9, then they shall be separately type approved.

Production testing
All hose assemblies delivered under the DNV type approval scheme shall be hydrostatically tested to a pressure of 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, Leakage test, Burst Test, Cold Flexibility Test, Impulse 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
The certificate is only valid if required periodical assessments are carried out with satisfactory results.

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.

To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com.

Manufactured by:
Alfagomma Hydraulic S.p.A. Via E. Mattei, 6 ,64020 Castelnuovo Vomano (TE) Castellalto, Teramo, Italy