

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)
Aeroquip GH663, Aeroquip GH466, Aeroquip GH506

Issued to
OLEODINAMICA TOSCANA S.R.L.
Serravalle Pistoiese PT, Italy

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

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:
Aeroquip GH663	-40 to + 120°C	see certificate	-3 to -32
Aeroquip GH466	-40 to + 120°C	see certificate	-20, -24, -32
Aeroquip GH506	-40 to + 120°C	see certificate	-16, -20, -24

Issued at **Høvik** on **2020-08-24**

for **DNV GL**

This Certificate is valid until **2025-06-29**.
 DNV GL local station: **Italy FIS**

Approval Engineer: **Andreas Hansen**

Zeinab Sharifi
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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.



Job Id: **262.1-011225-4**
Certificate No: **TAP00000HZ**
Revision No: **1**

Product description

Three type of hose assemblies:

GH663:

Hose: Synthetic rubber tube, single wire braid reinforcement and synthetic rubber cover.
End fittings: Stainless steel Type "1S" with socket type "1SA"

GH466:

Hose: Synthetic rubber tube, 6-heavy spiral wire reinforcement, synthetic rubber cover.
End fittings: Stainless steel Type "1W" with socket type "1WB"

GH506:

Hose design: Synthetic rubber tube, 4-heavy spiral wire reinforcement, synthetic rubber cover.
End fittings: Stainless steel Type "1W" with socket type "1WA"

Hoses are manufactured by: Eaton Fluid Power GmbH - Münden - Germany
End fittings are manufactured by: Oleodinamica Toscana - Italy

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.

Maximum working pressure (in bar):

Size		GH663	GH466	GH506
DN	DASH			
5	-03	250	-	-
6	-04	225	-	-
8	-05	225	-	-
10	-06	180	-	-
12	-08	175	-	-
16	-10	140	-	-
19	-12	125	-	-
25	-16	90	-	420
31	-20	65	420	350
38	-24	50	420	300
51	-32	40	420	-

Hose assemblies covered by this certificate are approved to be used in petroleum base and water base hydraulic fluids in temperature range of -40°C to $+120^{\circ}\text{C}$. Below type/sizes are approved to be used in systems conveying flammable fluids (petroleum bases hydraulic fluids):

- GH663: DN 51 (-32)
- GH466: DN 31 and DN51 (-20 & -32)
- GH506: DN25 and DN38 (-16 & -24)

All hose assemblies delivered under this type approval certificate shall be in compliance with an assembly procedure issued by the certificate holder.

Flexible hoses are only to be used in short lengths where it is necessary due to vibrations or flexible mounting of the machinery. They shall not be used where fixed piping is possible/required.

The hose assemblies must only be fitted on places where they are always accessible for inspection and shall be mounted according to the manufacturer's instructions.

Flexible hoses of these types are not to be used in boiler fronts.

Hose assemblies with couplings made of carbon steel are not to be used at temperatures below -10°C unless the material is normalized.

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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 DNVGL-RU-SHIP Pt.4 Ch.6 Sec.9 [5.6.2] to be followed.
- If these outer ends are going to be part of a mechanical joint as covered by DNVGL-RU-SHIP Pt.4 Ch.6 Sec.9 [Table 10], then they shall be separately type approved.

Production testing

Each hose assembly shall be hydrostatically tested at a pressure of 1.5 times the maximum working pressure and shall be delivered with the pressure test report with reference to the type approval certificate.

Type Approval documentation

Oleodinamica Toscani project documentation for GH663 and GH466
Eaton-Aeroquip catalogues EA005J and EA011H
Eaton assembly specification AGN600 for GH663 and GH466
Burst test report no. SPS/0058/11 performed by OMECO srl on GH466-20
Burst test report no. SPS/0059/13 performed by OMECO srl dated 22/03/2013 on GH506
Burst test report no. SPS/0045/11 performed by OMECO srl on GH663-32
Fire test report no. 305/11/AC performed by LAPI spa on GH466-20
Fire test report no. 306/11/AC performed by LAPI spa on GH466-24
Fire test report no. 307/11/AC performed by LAPI spa on GH663-32
Fire test reports nos. 341.0ISO110/13 and 342.0ISO110/13 performed by LAPI spa on 15/03/2013 on GH506
Impulse test no. 20130328-01 performed by the manufacturer on GH506 dated 28/03/2013
Impulse test no. 20110202-05 performed by Venturi sas on GH466-20
Impulse test no. 20110202-06 performed by Venturi sas on GH663-32
Burst test report Doc. No. A0876739 witnessed, dated 2020-06-05

Tests carried out

Burst pressure, fire test, impulse pressure test, cover adhesion, cold flexibility, ozone resistance, oil resistance, change in length, dimensional check test, vacuum test

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
- Additional marking at manufacturer's option

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a 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.