DNV·GL

Certificate No:
TAP00000GA

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)
FC 310 corresponding to SAE 100R2A, FLAME RESISTANT HYDRAULIC HOSES IN ACC. WITH ISO 15540

Issued to
Eaton Germany GmbH
Baden-Baden Baden-Württemberg, Germany

is found to comply with
DNV GL rules for classification – Ships
DNV GL rules for classification – Yachts
DNV GL rules for classification – Offshore units

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Temperature range:	**-40 °C up to 100 °C, pneumatic* systems 70° max., * Rubber covered hose styles for use with gases above 17,5 bar must be**
Max. working press.:	**350 bar up to 140 bar**
Sizes:	**DN 5 up to DN 25**

This Certificate is valid until **2021-09-05**.

Issued at **Hamburg** on **2016-09-06**

for **DNV GL**

DNV GL local station: **Augsburg**

Approval Engineer: **Peter Gierhan**

Olaf Drews
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.

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Job Id: **262.1-021638-1**
Certificate No: **TAP00000GA**

Production Places

Hose manufacturers:

Eaton Germany GmbH Auefeld 1 D-34346 Hann. Münden Germany	POLİMER KAUÇUK SAN. VE PAZ. A.Ş. Çerkezköy Organize Sanayi Bölgesi Karaağaç mah. 6. Sok No:3 Kapaklı / TEKİRDAĞ TURKEY

Coupling manufacturer:

Eaton Germany GmbH Dr. Reckewegstrasse 1 D-76532 Baden-Baden Germany

Product description

Inner tube:	synthetic rubber
Reinforcement:	single wire braid
Cover:	synthetic rubber
Fittings:	skive sockets and nipples / TTC fittings
Size range:	DN 5 up to DN 25
Pressure range:	350 bar up to 140 bar
Temperature range:	-40 °C up to 100 °C, pneumatic* systems 70° max.

* Rubber covered hose styles for use with gases above 17 bar must be perforated.

Application/Limitation

AEROQUIP PART NUMBER Teilenummer	DN	I.D Innen–ø (mm)	O.D. Aussen–ø (mm)	WBOD Draht–ø (mm)	OPERATING PRESSURE Betriebsdruck (BAR)	PROOF PRESSURE Prüfdruck (BAR)	MIN. BURST PRESSURE min. Berst–druck (BAR)	MIN. BEND RADIUS min. Biege radius (mm)	WEIGHT Gewicht kg/m
FC310–03	5	4.8±0.25	11.8±0.3	9.85±0.25	350	700	1400	45	0.23
FC310–04	6	6.4 $^{+0.3}_{-0.2}$	14.0±0.5	11.6±0.25	345	690	1380	50	0.30
FC310–05	8	7.9±0.25	15.4±0.5	12.8±0.3	300	600	1200	60	0.32
FC310–06	10	9.5±0.25	17.0±0.5	14.8±0.3	275	550	1100	65	0.38
FC310–08	12	12.7±0.25	20.1±0.5	17.8±0.3	240	480	960	90	0.50
FC310–10	16	15.9±0.25	23.6±0.5	21.3±0.5	190	380	760	100	0.64
FC310–12	19	19.0 $^{+0.4}_{-0.25}$	27.4±0.5	25.1±0.5	155	310	620	120	0.77
FC310–16	25	25.4 $^{+0.4}_{-0.25}$	34.4±0.5	31.3±0.9	138	276	552	150	1.05

Range of Application

The a.m. hose sizes of FC 310 are approved for use in:

- Fuel oil, lubricating oil and hydraulic oil systems
- Bilge and seawater systems
- Fresh and seawater cooling systems
- Compressed air systems*

Pin prick cover is required for gas application above 17 bar.

All hose assemblies delivered under this type approval certificate shall be in compliance with an assembly procedure issued by the certificate holder.
Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure and shall be delivered with manufacturer's pressure test certificate.
Flexible hoses are only to be used 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 hoses must only be fitted in places where they are always accessible.
The hoses are not to be used for suction.
Flexible hoses of these types are not to be used in boiler fronts.
The hoses are to be mounted in accordance with the manufacturer's instructions.
It must be possible to shut off from the system all flexible hoses used in systems for petroleum base hydraulic oil. Hose assemblies with couplings made of carbon steel are not to be used at temperatures below -10°C unless the material is normalized.
The use of hose assemblies is not permitted in permanently pressurized starting air lines of diesel engines.
The hose assemblies covered by this type approval may be assembled and delivered by other than the certificate holder under the following conditions:

- The assembler is authorised by a written authorization from the certificate holder. The certificate holder shall keep record of all assembler authorisations.
- Hose assemblies are in accordance with an assembly procedure issued by the certificate holder and the assembler has proved their qualifications by burst testing of a selection of hose/coupling combinations.
- Selection of sizes and testing is to be performed in compliance with the DNVGL CP 0183 and the testing is to be witnessed by DNV GL.

Type Approval documentation

Test reports: FC310-3 up to FC310-16, dated: 2010-09-21 to 2012-03-21
Test reports: WDT 71 01/06, 02/07, 03/06, dated: 2006-01-10
Construction FC310_BAD, dated: 1996-06-05
Proof pressure test, Change in length test, Burst test, Pressure pulsation test, Fire test, Dimensional Check test, Cold Flexibility test, Oil Resistance test, Cover Adhesion test, Ozone resistance test.
DNV GL-Ref.-No.: 14-079503

Tests carried out

DNV GL class programme CP 0183 - Type Approval of flexible hoses non-metallic materials

Marking of product

For traceability to this type approval the products are to be marked with:
- Manufacturers name or trade mark
- Type designation

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey every second year, to verify that the conditions for the type approval are complied with and to witness the following tests on a selection of sizes:

- Dimensional check.
- Change in length
- Leakage test
- Burst test

The tests shall be performed in accordance with procedures given in DNV GL Type Approval Program "Type Approval of Flexible Hoses of Non-Metallic Material" or another recognized standard.
The tests are to be performed with the type of couplings fitted that are Type Approved with the hoses.

END OF CERTIFICATE