

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**with type designation(s)
GH781, GH793, 2781

Issued to

**Eaton Germany GmbH
Baden-Baden Baden-Württemberg, Germany**

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

Type:	Temperature range:	Max. working press.:	Sizes:
GH781	-40°C up to +126°C	Up to 448 bar. Refer to certificate.	DN 6 up to 51.
GH793	-40°C up to +126°C	Up to 448 bar. Refer to certificate.	DN 6 up to 51.
2781	-40°C up to +100°C	Up to 400 bar. Refer to certificate.	DN 6 up to 51.

This Certificate is valid until **2021-09-04**.Issued at **Hamburg** on **2018-02-20**DNV GL local station: **Augsburg**for **DNV GL**Approval Engineer: **Andrii Pishchanskyi**

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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.

Job Id: **262.1-021645-2**
Certificate No: **TAP00000DM**
Revision No: **2**

Product description

Fire resistance of non-metallic hose assemblies according to ISO 15540.

Hose assembly	GH781	2781	GH793
Hose	Type 2SC as per EN 857. Synthetic rubber inner tube, two wire braid reinforcement and synthetic rubber cover.	Type 2ST as per EN 853. Synthetic rubber inner tube, double wire braid reinforcement and synthetic rubber cover per SAE 100 R2A.	Type 2SN as per EN 853. Synthetic rubber inner tube, double wire braid reinforcement and synthetic rubber cover with rating per the manufacturers specification.
Hose end fitting	Global TTC fittings and Global braided nipples (only size -4 up to -20) with 1SB sockets.	Global TTC fittings and Global braided nipples with 1SB sockets.	Global TTC fittings and Global braided nipples with 1SB sockets.

Production places of hoses, hose end fittings and hose assemblies

Hose end fittings

- Eaton Germany GmbH, Dr.-Reckeweg-Straße, 176532 Baden-Baden Germany;
- Eaton Corporation, 1225 W. Main Street, Van Wert, Ohio 45891-0389 USA.

Hoses

- Eaton Germany GmbH, Auefeld 1, 34346 Hann. Münden, Germany;
- Eaton Corporation, 1830 Highway 201 South Spur, Mountain Home, Arkansas 72653 USA;
- Eaton Corporation, 860 Blankenship Road, Newbern, Tennessee 38059 USA;
- Eaton Corporation, 45 Tuas View Circuit, 63766 Singapore;
- POLİMER KAUCUK SAN. VE PAZ. A.Ş., Çerkezköy Organize Sanayi Bölgesi, Karaağaç mah. 6. Sok No:3, Kapaklı / TEKİRDAĞ TURKEY.

Hose assemblies

- Eaton Germany GmbH, Dr.-Reckeweg-Str. 1, 76532 Baden-Baden Germany;
- Eaton Corporation, 1225 W. Main Street, Van Wert, Ohio 45891-0389 USA.

This type approval is valid also for assemblers at Eaton Corporation worldwide. Same procedures, equipment tolerances and quality procedures shall be used. The hose assemblies covered by this type approval may be assembled and delivered by other than the certificate holder under the following conditions:

1. The assembler is authorised by a written authorization from the certificate holder. The certificate holder shall keep record of all assembler authorizations;
2. 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;
3. 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.

Application/Limitation

The hoses are approved for:

1. Fuel oil, lubricating oil and hydraulic oil systems
2. Bilge and seawater systems
3. Fresh and seawater cooling systems
4. Compressed air systems (pin prick cover is required for air or gas applications above 17 [bar]).

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Max allowable working pressure (M.A.W.P.)

Part No.	Hose I.D. (inch)	2781		GH781		GH793	
		(bar)	(psi)	(bar)	(psi)	(bar)	(psi)
4	0.25	400	5800	448	6500	448	6500
5	0.31	350	5100	350	5100	350	5100
6	0.36	345	5000	400	5800	400	5800
8	0.50	295	4250	345	5000	345	5000
10	0.62	250	3600	276	4000	276	4000
12	0.75	215	3100	241	3500	241	3500
16	1.00	175	2500	207	3000	207	3000
20	1.25	155	2200	172	2500	172	2500
24	1.50	125	1800	138	2000	138	2000
32	2.00	90	1300	110	1600	110	1600

Each hose assembly shall be hydraulic pressure tested with 1.5 times the maximum working pressure before delivery and be delivered with a pressure test report with reference to the type approval certificate. Hose assemblies delivered from an authorized assembler shall in addition be delivered with a copy of the written authorization stamped by DNV GL.

They are not to be used where fixed piping is possible/required.

Hoses used for continuous operation at temperatures higher than 100°C will have their lifetime reduced. In such cases more frequent inspections and planned exchange should be a part of the maintenance program.

The hoses 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.

It must be possible to shut off from the system all flexible hoses used in systems for compressed air, lubrication oil, fuel oil and petroleum base hydraulic oil.

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

Type Approval documentation

Tests carried out

Marking of product

For traceability to this type approval the products are to be marked with:

- Manufacturers name or trade mark
- Type designation

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Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor. The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered. Main scope of the assessment:

- verification of the production and quality control system;
- review of quality control documentation of recent deliveries;
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application;
- verification of the product marking.

Periodical assessment is to be performed after 2 years and 3.5 years. A renewal assessment will be performed at renewal of the certificate.

In connection with the renewal assessment, a surveyor shall witness / review test reports with respect to the following tests on every 3rd size appropriate test reports to be submitted:

- dimensional check;
- change in length test;
- pressure test with 1.5 times M.A.W.P.;
- burst test (witnessed by DNV GL surveyor).