

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Flexible Hoses of Non-Metallic Material with Permanently Fitted Couplings**

with type designation(s)

EFG3K, EFG4K, EFG5K, EFG6K, M3K, M4K, M5K, M6K, G1, G2, Megaflex CM2T

Issued to

**Eifeler Maschinenbau GmbH
Euskirchen Nordrhein-Westfalen, Germany**

is found to comply with

**Det Norske Veritas' Rules for Classification of Ships Pt.4, Ch.6 "Piping Systems"
Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment
Det Norske Veritas' Rules for Classification of High Speed and Light Craft.
Det Norske Veritas' Standards for Certification 2.9 No. 5-791.70****Application :****May be used for: Fuel oil, lubricating oil, hydraulic oil, fresh water cooling, sea water cooling, sanitary and compressed air systems****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

Type:	Temperature range:	Max. working press.:	Sizes:
EFG3K	-40°C to +121°C	21,0 MPa	-20 to -32
EFG4K	-40°C to +121°C	28,0 MPa	-6 to -20
EFG5K	-40°C to +121°C	35,0 MPa	-6 to -32
EFG6K	-40°C to +121°C	42,0 MPa	-6 to -32
M3K	-40°C to +100°C	22,5 MPa	-4 to -16
M4K	-40°C to +100°C	28,0 MPa	-4 to -16
M5K	-40°C to +100°C	35,0 MPa	-4 to -8
M6K	-40°C to +100°C	42,0 MPa	-4
G1	-40°C to +100°C	4,2 to 22,5 MPa	-4 to -32
G2	-40°C to +100°C	8,0 to 40,0 MPa	-4 to -32
Megaflex CM2T	-40°C to +100°C	16,5 to 40,0 MPa	-4 to -16

This Certificate is valid until **2018-06-30**.Issued at **Høvik** on **2015-09-10**for **DNV GL**DNV GL local station: **Essen**Approval Engineer: **Simon Ratcliffe**

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.

Product description

EFG3K: Inner tube of NBR reinforced by four alternating layers of wire, outer cover of CR

EFG4K: Inner tube of NBR reinforced by four alternating layers of wire, outer cover of CR

EFG5K: Inner tube of NBR reinforced by four (six for ≥ -20) alternating layers of wire, outer cover of CR

EFG6K: Inner tube of NBR reinforced by four (six for ≥ -20) alternating layers of wire, outer cover of CR

Couplings all types: Gates GlobalSpiral™ Non-skive (GS/GSH/GSM/GSP) PCM skived

M3K: Tube of NBR reinforced by 1 braid (-4, -5, -6, and -8), 2 braids (-10, -12 and -16) of high-tensile steel wire. Cover of NBR/PVC according to SAE 100 R 17.

Couplings: Gates type G.

M4K: Tube of NBR reinforced by 2 high-tensile steel wire braids. Cover of NBR/PVC according to SAE 100 R 19.

Couplings: Gates type G & GS

M5K: Tube of NBR reinforced by 2 high-tensile steel wire braids. Cover of NBR/PVC according to Gates proprietary standard.

Couplings: Gates type G

M6K: Tube of NBR reinforced by 2 high-tensile steel wire braids. Cover of NBR/PVC according to Gates proprietary standard.

Couplings: Gates type G

G1: Tube of NBR reinforced by 1 braid of high-tensile steel wire. Cover of NBR/PVC according to SAE 100 R1AT/EN 853 1 SN.

Couplings: Gates type G for dash sizes 4 to 20 and type GSP for dash sizes 24 and 32

G2: Tube of NBR reinforced by 2 high-tensile steel wire braids. Cover of NBR/PVC according to SAE 100 R2AT/EN 853 2SN.

Couplings: Gates type G for dash sizes 4 to 20 and type GSP for dash sizes 24 and 32

Megaflex CM2T: NBR-based tube with 2 wire braid reinforcement, SBR-based cover all according to EN 857 2SC/ISO 11237-1.

Couplings: Gates type G, PCK/GB

Hose and couplings may be assembled at the below locations. In all cases the responsibility remains with the Type Approval holder named on page 1.

Gates Hydraulics Cambridgeshire
5 Alpha Drive
St Neots
Cambridgeshire
PE19 8JJ
UK

Gates Hortum Sanayi Ve Ticaret Ltd. Sti.
Adliye Mahallesi 1520. Sokak No.18
54580 Arifiye
Sakarya Turkey

Application/Limitation

Max Working Pressure (MWP), MPa, depending on dash size:

Hose type

EFG3K		EFG4K		EFG5K		EFG6K	
Dash Size	MWP MPa	Dash Size	MWP MPa	Dash Size	MWP MPa	Dash Size	MWP MPa
-20	21,0	-6	28,0	-6	35,0	-6	42,0
-24	21,0	-8	28,0	-8	35,0	-8	42,0
-32	21,0	-10	28,0	-10	35,0	-10	42,0
-	-	-12	28,0	-12	35,0	-12	42,0
-	-	-16	28,0	-16	35,0	-16	42,0

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-	-	-20	28,0	-20	35,0	-20	42,0
-	-	-	-	-24	35,0	-24	42,0
-	-	-	-	-32	35,0	-32	42,0

Temperature range: -40°C to +121°C constant
 +75°C for air
 +93°C for water

Max Working Pressure (MWP), MPa, depending on dash size:
 Hose type

M3K		M4K		M5K		M6K	
Dash Size	MWP MPa	Dash Size	MWP MPa	Dash Size	MWP MPa	Dash Size	MWP MPa
-4	22,5	-4	28,0	-4	35,0	-4	42,0
-5	22,5	-5	28,0	-5	35,0	-	-
-6	22,5	-6	28,0	-6	35,0	-	-
-8	22,5	-8	28,0	-8	35,0	-	-
-10	22,5	-10	28,0	-	-	-	-
-12	22,5	-12	28,0	-	-	-	-
-16	22,5	-16	28,0	-	-	-	-

Temperature range: -40°C to +100°C constant, 120°C intermittent.
 +75°C for air
 +85°C for water

Max Working Pressure (MWP), MPa, depending on dash size:
 Hose type

G1		G2	
Dash Size	MWP MPa	Dash Size	MWP MPa
-4	22,5	-4	40,0
-5	21,5	-5	35,0
-6	18,0	-6	33,0
-8	16,0	-8	27,5
-10	13,0	-10	25,0
-12	10,5	-12	21,5
-16	9,0	-16	16,5
-20	6,4	-20	12,5
-24	5,0	-24	9,0
-32	4,2	-32	8,0

Temperature range: -40° to +100°C constant, 120°C intermittent.
 +75°C for air
 +85°C for water

Max Working Pressure (MWP), depending on nominal inner diameter (ID):
 Hose type

CM2T	
Dash Size	MWP MPa
-4	40,0
-5	35,0
-6	33,0
-8	27,5
-10	25,0

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-12	21,5
-16	16,5

Temperature range: -40°C to +100°C
+75°C for air
+85°C for water

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.

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.

Hose assemblies delivered from the certificate holder shall be delivered with the following documentation:
- Pressure test report with reference to the type approval certificate.

The hose assemblies covered by this type approval may be assembled and delivered by other than the certificate holder under the conditions as stated in DNV type approval programme 5-791.70

The hoses can be used for ordinary machinery purposes in the systems mentioned on the front page. They are not to be used where fixed piping is possible/required.

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

For use with compressed air or gases above 16 MPa, the cover of the hose has to be pin pricked.

The Rules Pt.4 Ch.6 Sec.6D and the respective Government Authorities Regulations to be complied with.

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.

Type Approval documentation

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Tests carried out

Impulse, Ozone resistance, Abrasion resistance, Cold bend, Adhesion, Change in length, Oil resistance, Burst, Fire Resistant.

Marking of product

For traceability to this type approval the final hose is at least to be marked with:

- Manufacturer's name or trade mark
- Type designation

Periodical assessment

For retention of the Type Approval, 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 from all bulk hose manufacturing plants:

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

The tests shall be performed in accordance with procedures given in Det Norske Veritas' Certification Notes no. 2.9 – 5-791.70, "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.