

TYPE APPROVAL CERTIFICATE

Certificate No:
TAP000003S
Revision No:
5

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, M2T

Issued to

Gates UK Ltd

St. Neots, Cambridgeshire, United Kingdom

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

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.

Type:	Temperature range:	Max. working press.:	Sizes:
EFG3K	-40°C to +121°C	210 bar	-20 to -32
EFG4K	-40°C to +121°C	280 bar	-6 to -20
EFG5K	-40°C to +121°C	350 bar	-6 to -32
EFG6K	-40°C to +121°C	420 bar	-6 to -32
M3K	-40°C to +100°C	225 bar	-4 to -16
M4K	-40°C to +100°C	280 bar	-4 to -16
M5K	-40°C to +100°C	350 bar	-4 to -8
M6K	-40°C to +100°C	420 bar	-4
G1	-40°C to +100°C	41 to 225 bar	-4 to -32
G2	-40°C to +100°C	80 to 400 bar	-4 to -32
Megaflex CM2T	-40°C to +100°C	165 to 400 bar	-4 to -16
M2T	-40°C to +100°C	103 to 420 bar	-4 to -32

Issued at **Høvik** on **2021-11-01**

for **DNV**

This Certificate is valid until **2023-06-30**.

DNV local station: **Newcastle-upon-Tyne**

Approval Engineer: **Renata Rossi**

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 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 300,000 USD.



Product description

12 types of flexible hoses of non-metallic materials with permanently fitted couplings

Hose designation	EFG3K	EFG4K	EFG5K	EFG6K	M3K	M4K	M2T
Tube	NBR						
Reinforcement Wires	four wires		four (six for≥-20) wires		1 or 2 braids		2 braids
Cover (*)	CR				NBR/PVC		

Hose designation	M5K	M6K	G1	G2	Megaflex CM2T
Tube	NBR				
Reinforcement Wires	2 braids		1 braid	2 braids	2 braids
Cover ^(*)	NBR/PVC				SBR-based

^(*) In addition to standard covers as mentioned above, hoses can be delivered with the following covers:

- EFG3K, EFG4K, EFG5K, EFG6K, M5K, M4K, M3K and M2T: MegaTuff (MTF)
- EFG4K, EFG5K, M5K, M4K, M3K and M2T: XtraTuff (XTF)

Material of couplings: ASTM A108 Grade 1215 (20 according to GB/T 699-2015)

Coupling designations are to be according to the below tables (for each assembling location):

- Gates (U.K.) Ltd., St. Neots, Cambridgeshire, United Kingdom

Size		EFG3K	EFG4K	EFG5K	EFG6K	M3K	M4K	M5K	M6K	G1	G2	CM2T	M2T	M3K-MTF
Dash	DN													
-4	6	-	-	-	-	G	G	G	G	G	G	G	G/B-SS	G/GS
-5	8	-	-	-	-	G	G	G	-	G	G	G	G/B-SS	G/GS
-6	10	-	GS	GS	GS	G	G/GS	G	-	G	G	G	G/B-SS	G/GS
-8	12	-	GS	GS	GS	G	G/GS	G	-	G	G	G	G/B-SS	G/GS
-10	16	-	GS	GS	GS	G	G/GS	-	-	G	G	G	G/B-SS	G/GS
-12	19	-	GS	GS	GS	G	G/GS	-	-	G	G	G	G/B-SS	G/GS
-16	25	-	GS	GS	GS	G	GS	-	-	G	G	G	G/B-SS	G/GS
-20	31	GS	GS	GS	GS	-	-	-	-	G	G	-	G	-
-24	38	GSP	-	GSM	GSM	-	-	-	-	GS	GSP	-	GSP	-
-32	51	GSP	-	GSM	GSM	-	-	-	-	GS	GSP	-	GSP	-

- Gates Fluid Power Technologies (Changzhou) Co. Limited, Changzhou, China

Size		EFG3K	EFG4K	EFG5K	EFG6K	M3K	M4K	M5K	M6K	G1	G2	M2T
Dash	DN											
-4	6	-	-	-	-	G	G	G	G	G	G	G
-5	8	-	-	-	-	G	G	G	-	G	G	G
-6	10	-	GS	GS	GS	G	G	G	-	G	G	G
-8	12	-	GS	GS	GS	G	G	G	-	G	G	G
-10	16	-	GS	GS	GS	G	G	-	-	G	G	G
-12	19	-	GS	GS	GS	G	G	-	-	G	G	G
-16	25	-	GS	GS	GS	G	-	-	-	G	G	G
-20	31	GS	GS	GS	GS	-	-	-	-	G	G	G
-24	38	GSP	-	-	GSM	-	-	-	-	GSP	GSP	-
-32	51	GSP	-	-	-	-	-	-	-	GSP	GSP	-

Rubber hose manufacturers:

- 1) Gates Corporation, 1450 Montana Road, Iola Kansas 66749, USA (all types)
- 2) Gates India Private Limited, Ambala-Chandigarh Highway, PO Lalru 140501, Punjab, India (except M3K-MTF)
- 3) Gates de Mexico S.A de C.V., Calle 6 S/N, Parque Industrial Atlacomumco, Atlacomumco Estado De Mexico, 50450, Mexico (except M3K-MTF)
- 4) Gates Fluid Power Technologies (Changzhou) Co. Limited, 11 Kohler Road, National Hi-Tech District, 213022 Changzhou, China (except M3K-MTF)
- 5) Gates Polska Sp. z o.o. ul. Jaworzyńska 301, 59-220 Legnica, Poland (except M3K-MTF)

End fittings manufacturers:

- 1) Gates Karvina Fluid Power Plant, Karvina, Czech Republic.
- 2) Gates Corp, Versailles, MO, USA
- 3) Gates India Private Limited, Punjab, India
- 4) Gates Fluid Power Technologies (Changzhou) Co., Ltd., Changzhou, China

Application/Limitation

This certificate is valid for the specific assembly of hose and coupling type as specified, assembled and delivered by below assembling locations:

- Gates (U.K.) Limited, 5 Alpha Drive, Eaton Socon, St. Neots, Cambridgeshire, United Kingdom (all types)
- Gates Fluid Power Technologies (Changzhou) Co. Limited, 11 Kohler Road, National Hi-Tech District, 213022 Changzhou, China (except M3K-MTF)

Hose assemblies covered by this certificate are approved to be used in the following media and temperature range:

Hose types	EFG3K, EFG4K, EFG5K, EFG6K	M3K, M4K, M5K, M6K, G1, G2, CM2T, M2T
Petroleum based hydraulic fluids	-40°C to +121°C	-40°C to +100°C
Water based hydraulic fluids and Air	-40°C to +85°C	-40°C to +70°C
Fresh Water	0°C to +85°C	0°C to +70°C

Maximum working pressure (in bar):

Size		EFG3K	EFG4K	EFG5K	EFG6K	M3K	M4K	M5K	M6K	G1	G2	CM2T	M2T
Dash	DN												
-4	6	-	-	-	-	225	280	350	420	225	400	400	420
-5	8	-	-	-	-	225	280	350	-	215	350	350	380
-6	10	-	280	350	420	225	280	350	-	179	330	330	350
-8	12	-	280	350	420	225	280	350	-	160	280	275	296
-10	16	-	280	350	420	225	280	-	-	131	250	250	262
-12	19	-	280	350	420	225	280	-	-	105	214	215	241
-16	25	-	280	350	420	225	280	-	-	90	165	165	172
-20	31	210	280	350	420	-	-	-	-	63	125	-	159
-24	38	210	-	350	420	-	-	-	-	50	90	-	140
-32	51	210	-	350	420	-	-	-	-	41	80	-	103

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure and delivered with a test report with reference to this certificate.

The hoses shall not to be used where fixed piping is possible/required and must only be fitted in places where they are always accessible.

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

Flexible hoses covered by this certificate shall not be installed in systems subject to pressure below atmospheric or vacuum conditions.

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.

The cover on hoses for gaseous applications shall be pinpricked.

Production testing

Each hose assembly is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure and delivered with a test report with reference to this certificate.

Type Approval documentation

- Gates Hydraulics Catalogue (35093 1/2015)
- Dimensional check test, leakage, burst pressure test, cold flexibility test, cover adhesion test, ozone resistance, oil resistance, impulse test reports from each rubber hose manufacturing location
- Fire test reports:
CM2T: WTD71 test reports numbers 31/07, 32/07, 33/07, 34/07, 35/07, 36/07, 004/11. (DN10 to DN25)
EFG3K: WTD71 test reports number 101/10 (DN 31 – coupling GS)
EFG4K: WTD71 test reports number 33/10 (DN19 – coupling GS)
EFG5K: Southwest research institute test report numbers 01.16918.01.802b and 01.16918.01.802d[1] (DN38 and DN51 with GSM couplings)
EFG6K: WTD71 test reports number 37/10 and Southwest research institute test report number 01.16918.01.806a (DN10 GS coupling and DN51 GSM coupling)
G1: WTD71 test reports numbers 64/00, 73/00, 68/00, 08/11, 15/08, 14/08 and Southwest research institute test report number 01.20535.001h (DN10 to DN25 – G couplings)

G2: WTD71 test reports numbers 63/00, 69/00, 72/00, 02/11, 18/08 and Southwest research institute test report number 01.20535.01.001i (DN10 to DN25 – G couplings)

M3K: WTD71 test reports numbers 61/00, 67/00, 71/00, 07/11 and Southwest research institute test report numbers 01.019577.01.802f, 01.20535.01.001c, 01.20535.01.001j and 01.20535.01.001x (DN10 to DN25 – G couplings)

M4K: WTD71 test reports numbers 90/00, 70/00, 05/11 and Southwest research institute test report numbers 01.20535.01.001d and 01.20535.01.001dd (DN10 to DN16 – G couplings)

M5K: WTD71 test reports number 62/00 (DN10 – G couplings)

- Document named Submission For DNV Type Approval Flexible Hose of Non-Metallic Material with Permanently Fitted Couplings M2T dated 2014-10-22 containing manufacturer catalogue, coupling drawings, dimensional check test, oil resistance test and impulse test reports
- Oil resistance test report dated 2015-02-19
- Burst and change in length test dated 2015-02-18 witnessed by DNV surveyor
- Impulse test report dated 2015-02-18
- Cold flexibility test report dated 2015-02-18 witnessed by DNV surveyor
- Cover adhesion test report dated 2015-02-18 witnessed by DNV surveyor
- Ozone resistance test report dated 2015-02-18 witnessed by DNV local surveyor
- Fire test report 01.16919.01.102 dated 2012-03-22 for 4M 2T, 8M2T & 16M2T with couplings types G & SS done by Southwest research institute.
- Fire test report 01.20535.01.001y dated 2014-08-27 for 32M2T with couplings types G & SS done by Southwest research institute.
- Fire test reports witnessed by DNV dated 2019-01-09 and 2019-02-19
- Renewal burst pressure test reports dated 2018-12-19 & 2019-12-17
- Ozone resistance, Cold flexibility, Oil resistance and Cover adhesion test reports from Gates India Private Limited dated 2020-05-18
- Ozone resistance, Cold flexibility, Oil resistance and Cover adhesion test reports from Gates Fluid Power Technologies (Changzhou) Co. dated 2020-05-12
- Ozone resistance, Cold flexibility, Oil resistance and Cover adhesion test reports from Gates Corporation (Iola, US) dated 2020-05-01
- Ozone resistance, Cold flexibility, Oil resistance and Cover adhesion test reports from Gates Mexico COHISA dated 2020-05-12

Document M3K-MTF DNV dated 16 January 2015 containing (from previous TA TAP00001TS):

Product information

Relevant part of manufacturer's catalogue

Prototype test data (dimensional check test, Impulse test, Cover adhesion test, Ozone resistance test, Cold flexibility test, Oil resistance test)

Type G Coupling drawings: 7100-1008 rev.A (6G), 7100-0011 rev.B (8G), 7100-0023 rev.A (10G), 7100-0016 rev.A (12G), 7100-0020 rev.A (16G)

Type B-SS Coupling drawings: 7362-0027 rev.B (6 B-SS Stem), 7362-5142 rev.A (6 B1F-1SS Ferrule), 7362-0029 rev.B (8 B-SS Stem), 7362-5143 rev.A (8 B1F-1SS Ferrule), 7362-0128 rev.A (10 B-SS Stem), 7362-5147 rev.A (10 B1F-1SS Ferrule), 7362-0032 rev.B (12 B-SS Stem), 7362-5150 rev.A (12 B1F-1SS Ferrule), 7362-0035 rev.B (16 B-SS Stem), 7362-5186 rev.A (16 B1F-1SS Ferrule)

Type GS Coupling drawings: 39-10922 (6 GS Stem), 7347-0287 rev.A (6 GS1F-1 Ferrule), 39-10537 (8 GS Stem), 7347-0295 rev.A (8 GS1F-2 Ferrule), 39-10586 (10 GS Stem), 7347-0296 rev.A (10 GS1F-2 Ferrule), 39-10601 (12 GS Stem), 39-10366 rev.F (12 GS1F-2 Ferrule), 39-10377 (16 GS Stem), 7347-0298 rev.A (16 GS1F-2 Ferrule)

Fire test reports done by Southwest research institute:

- SwRI Report 01.20535.04.001i (6M3K-MTF with G couplings) dated 2015-02-19
- SwRI Report 01.20535.03.001m (6M3K-MTF with GS couplings) dated 2014-11-13
- SwRI Report 01.20535.04.001h (6M3K-MTF with B-SS couplings) dated 2015-02-19
- SwRI Report 01.20535.04.001d (10M3K-MTF with G couplings) dated 2015-02-02
- SwRI Report 01.20535.03.001k (10M3K-MTF with GS couplings) dated 2014-10-02
- SwRI Report 01.20535.03.001p (10M3K-MTF with B-SS couplings) dated 2014-10-03
- SwRI Report 01.20535.03.001c (16M3K-MTF with G couplings) dated 2014-09-30
- SwRI Report 01.20535.03.001j (16M3K-MTF with GS couplings) dated 2014-10-02
- SwRI Report 01.20535.03.001l (16M3K-MTF with B-SS couplings) dated 2014-10-02

Burst test report witnessed by DNV local station dated 2015-02-19 (6M3K-MTF and 12M3K-MTF with G, GS & B-SS couplings)

Change in length test report LO-23610 dated 2015-02-17

Cold flexibility test (@-40°C) report LO-23609 dated 2015-02-17

Oil resistance test report LO-23609 dated 2015-02-19

Cover adhesion test report LO-23609 dated 2015-02-18

Ozone resistance test report dated 2015-02-19

Impulse test reports: LO-23690 dated 2015-02-14 (8M3K-MTF with G couplings), LO-23695 dated 2015-02-16 (8M3K-MTF with GS couplings), LO-23547 dated 2015-02-09 (8M3K-MTF with B-SS couplings), LO-23692 dated 2015-02-17 (12M3K-MTF with G couplings), LO-23696 dated 2015-02-16 (12M3K-MTF with GS couplings), LO-23405 dated 2014-12-23 (12M3K-MTF with B-SS couplings)

Fire test report witnessed by DNV (4M3K-MTF) dated 2019-06-04

Burst pressure test report witnessed by DNV dated 2019-07-12

Tests carried out

Dimensional check, 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 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

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.