



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. D- 3352

This Certificate consists of 3 pages

This is to certify that the

Rotary Drilling Hoses

with type designation(s)

Mud and Cementing Equipment

Manufactured by

Gates Corporation

Englewood, Co - USA

is found to comply with

DNV's Offshore Standard DNV-OS-E101 "Drilling Plant" October 2006
and Det Norske Veritas' understanding of the implementation and interpretation of:
API Spec. 7K, 'Specification for Drilling and Well Servicing Equipment' 4th Edition,
Addendum 2, effective from October 2006

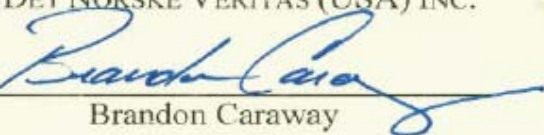
Application

See design limitations on page 2

This Certificate is valid until
30 September 2012

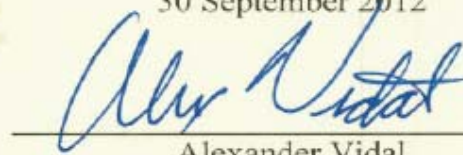
Place and date

Houston, 29 September 2008
DET NORSKE VERITAS (USA) INC.


Brandon Caraway
Senior Engineer



Local Office
DNV Houston


Alexander Vidal
Project Engineer

Notice: 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.

Det Norske Veritas shall not be liable for any loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. The maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Cert. No.: D-3352
File No.: 523.50
Job ID No.: 262.1-006
DNV Project No.: 47001011

Product description

2 ½", 3", 3 ½", 4" Gates Black Gold Drilling/Vibrator Hose Grade D Spec. 4774PE
2 ½", 3", 3 ½", 4" Gates Black Gold Drilling/Vibrator Hose Grade E Spec. 4773PE

Application/Limitation

Specification:	<u>4774PE</u>	<u>4773PE</u>
- Maximum Allowable Pressure	: 5,000 psi	7,500 psi
- Minimum Temperature	: - 4°F	
- Maximum Temperature	: 180°F	
- Service	: Standard	

Type Approval documentation

Drawings:

<u>Drawing No.</u>	<u>Rev.</u>	<u>Description</u>
D1-1564	A	Black Gold Rotary Drilling/Vibrator Hose (Spec: 4774PE)
D1-1565	A	Black Gold Rotary Drilling/Vibrator Hose (Spec: 4773PE)

Tests Carried Out

1. The 3 ½" hoses were tested in accordance with Gates Corporation's "Design Verification Testing of 3 ½ inch – 5,000 psi Grade D Rotary Drilling Hose" prepared by Southwest Research Institute, dated August 13, 2007
2. The 4" hoses were tested in accordance with Gates Corporation's "Design Verification Testing of 4 inch – 7,500 psi Grade E Rotary Drilling Hose" prepared by Southwest Research Institute, dated August 17, 2007

Marking of product

For traceability to this Type Approval Certificate the products are as a minimum to be marked as follows:

1. "NV D-3352"
2. All markings shall be in accordance with API 7K Addendum 2 dated October 2006.



Cert. No.: D-3352
File No.: 523.50
Job ID No.: 262.1-00
DNV Project No.: 4700101

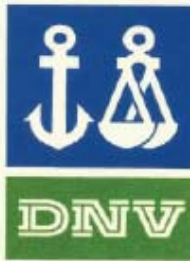
certificate retention survey

The arrangement is to be in accordance with Certification Notes No. 1.2, dated December 1996, paragraph 4.3.

documentation to be accompanied with each product/delivery

1. Data book index
2. Equipment name, number, purchaser, etc.
3. Manufacturer's statement of compliance
4. Assembly drawing
5. Actual material certificates as purchased and Charpy impact test records as applicable
6. Heat treatment records/charts when applicable
7. Load, pressure and performance test reports
8. DNV Product Certificate
9. DNV Type Approval Certificate

END OF CERTIFICATE



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. D- 3372

This Certificate consists of 3 pages

This is to certify that the

Cementing Hoses

with type designation(s)

Mud and Cementing Equipment

Manufactured by

Gates Corporation

Englewood, Co - USA

is found to comply with

DNV's Offshore Standard DNV-OS-E101 "Drilling Plant" October 2006
and Det Norske Veritas' understanding of the implementation and interpretation of:
API Spec. 7K, 'Specification for Drilling and Well Servicing Equipment' 4th Edition,
Addendum 2, effective from October 2006

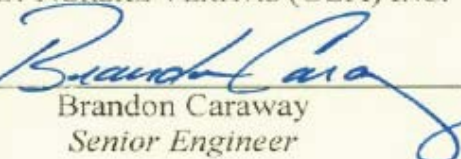
Application

See design limitations on page 2

Place and date

Houston, 29 September 2008

DET NORSKE VERITAS (USA) INC.

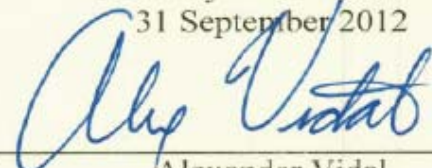

Brandon Caraway
Senior Engineer



Local Office
DNV Houston

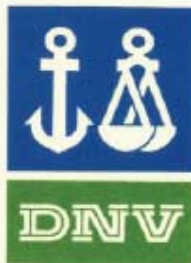
This Certificate is valid until

31 September 2012


Alexander Vidal
Project Engineer

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The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

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Cert. No.: D-3372
File No.: 523.50
Job ID No.: 262.1-0062
DNV Project No.: 47001011

Product description

- 2 ½", 3", 3 ½", 4" Gates Black Gold Cementing Hose Spec. 4774PE
- 2 ½", 3", 3 ½" Gates Black Gold Cementing Hose Spec. 4773PE

Application/Limitation

Specification:	<u>4774PE</u>	<u>4773PE</u>
- Maximum Allowable Pressure	: 5,000 psi	10,000 psi
- Minimum Temperature	: - 4°F	
- Maximum Temperature	: 180°F	
- Service	: Standard	

Type Approval documentation

Drawings:

<u>Drawing No.</u>	<u>Rev.</u>	<u>Description</u>
D1-1566	A	Black Gold Cementing Hose (Spec:4774PE)
D1-1567	A	Black Gold Cementing Hose (Spec: 4773PE)

Tests Carried Out

1. The 2 ½" hoses were tested in accordance with Gates Corporation's "2.5 Grade E Rotary (Serial # 6RT-172A)" prepared by Stress Engineering 6/8/2007.
2. The 3" hoses were tested in accordance with Gates Corporation's "3 Grade E Rotary (Serial #L23172)" prepared by Stress Engineering 9/29/2004.
3. The 3 ½" hoses were tested in accordance with Gates Corporation's "3.5 Grade E Rotary (Serial #L4RT-078)" prepared by Stress Engineering 9/29/2004.

Marking of product

For traceability to this Type Approval Certificate the products are as a minimum to be marked as follows:

1. "NV D-3372"
2. All markings shall be in accordance with API 7K Addendum 2 dated October 2006.



Cert. No.: D-3372
File No.: 523.50
Job ID No.: 262.1-0062
DNV Project No.: 47001011

Certificate retention survey

The arrangement is to be in accordance with Certification Notes No. 1.2, dated December 1996, paragraph 4.3.

Documentation to be accompanied with each product/delivery

1. Data book index
2. Equipment name, number, purchaser, etc.
3. Manufacturer's statement of compliance
4. Assembly drawing
5. Actual material certificates as purchased and Charpy impact test records as applicable
6. Heat treatment records/charts when applicable
7. Load, pressure and performance test reports
8. DNV Product Certificate
9. DNV Type Approval Certificate

END OF CERTIFICATE



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. D-3706

This Certificate consists of 3 pages

This is to certify that the

Mud and Cementing Equipment

with type designation(s)

2" Gates Black Gold Cementing Hoses

Manufactured by

Gates Corporation

Lola, Kansas - USA

is found to comply with

DNV's Offshore Standard DNV-OS-E101 "Drilling Plant" October 2006
and Det Norske Veritas' understanding of the implementation and interpretation of:
API Spec. 7K, 'Specification for Drilling and Well Servicing Equipment' 4th Edition,
Addendum 2, effective from October 2006

Application

See design limitations on page 2

Place and date

Houston, 15 September 2009

for DET NORSKE VERITAS (USA) INC.

Brandon Caraway
Senior Engineer



Local Office
DNV Houston

This Certificate is valid until
30 September 2013

Alexander Vidal
Project Engineer

Notice: 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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision 'Det Norske Veritas' shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Cert. No.: D-3706
File No.: 523.50
Job ID No.: 262.1-008485-1
DNV Project No.: EP008147

Product description

2" Gates Black Gold Cementing Hose Spec. 4651ZL
2" Gates Black Gold Cementing Hose Spec. 4651ZA

Application/Limitation

Specification:	<u>4651ZL</u>	<u>4651ZA</u>
- Maximum Allowable Pressure	: 5,000 psi	10,000 psi
- Minimum Temperature	: - 4°F	
- Maximum Temperature	: 180°F	
- Service	: Standard	

Type Approval documentation

Drawings:

<u>Drawing No.</u>	<u>Rev.</u>	<u>Description</u>
D1-1696	A	5,000 psi Black Gold Cementing Hose (Spec:4651ZL)
D1-1697	A	10,000 psi Black Gold Cementing Hose (Spec: 4651ZA)

Tests Carried Out

1. The 10,000 psi hose was tested in accordance with Gates Corporation's "API 7K Design Verification Testing of Gates Corporation Cementing Hose 2" Bore – 10,000 psi" SwRI Project # 18.14374, prepared by Matthew W. James, 11/4/2008.
2. The 5,000 psi hose was tested in accordance with Gates Corporation's "API 7K Design Verification Testing of Gates Corporation Cementing Hose 2" Bore – 5,000 psi" SwRI Project # 18.14374, prepared by Matthew W. James, 11/4/2008.

Marking of product

For traceability to this Type Approval Certificate the products are as a minimum to be marked as follows:

1. "NV D-3706"
2. All markings shall be in accordance with API 7K Addendum 2 dated October 2006.



Cert. No.: D-3706
File No.: 523.50
Job ID No.: 262.1-008485-1
DNV Project No.: EP008147

Certificate retention survey

The arrangement is to be in accordance with Certification Notes No. 1.2, dated December 1996, paragraph 4.3.

Documentation to be accompanied with each product/delivery

1. Data book index
2. Equipment name, number, purchaser, etc.
3. Manufacturer's statement of compliance
4. Assembly drawing
5. Load, pressure and performance test reports
6. DNV Product Certificate
7. DNV Type Approval Certificate

END OF CERTIFICATE



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **P-13422**

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

with type designation(s)
M3K, M4K, M5K and M6K

Manufactured by
Gates Europe NV
AALST, Belgium

is found to comply with
Det Norske Veritas' Rules for Classification of Ships
Det Norske Veritas' Standards for Certification 2.9 No. 5-791.70

Application

May be used for fuel oil, lubrication oil, hydraulic, compressed air (75°C max), fresh water and sea-water systems(85°C max)

Temperature range:	-40°C to +100°C
Max. working press.:	420 bar
Sizes:	1/4" to 1"

Høvik, 2010-02-25
for Det Norske Veritas AS


Helge Drange
Head of Section



DNV local office:
Antwerp

This Certificate is valid until
2013-12-31


Øyvind Skåra
Surveyor

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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Certificate No.: P-13422
File No.: 791.70
Job Id.: 262.1-007049-1

Product description

Hose types: M3K, M4K+, M5K and M6K

M3K:

Tube of NBR reinforced by 1 (dash sizes 4, 5, 6, and 8) braid or 2 braids (dash size 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

The hoses are manufactured at:

Gates Europe N.V.
Dr Carlierlaan 30
B-9320 Erembodgem
BELGIUM

The Gates Rubber Company
999 Michigan Avenue
Iola, KS 66749
USA

Gates India Private Limited
Ambala-Chandigarh Highway
P.O. Lalru
140 501 Punjab
INDIA

Gates Mexico Cohisa
Conexiones Hidraulicas. SA. De CV.
Calle 6 S/N
Parque Industrial Atlacomulco
Atlacomulco, Estado de México 50450
MEXICO

The couplings are manufactured at:

Tomkins Karvina Fluid Power Plant, Karvina, Czech Republic
Gates Corporation, Versailles, MO, USA



Certificate No.: P-13422
File No.: 791.70
Job Id.: 262.1-007049-1

Application/Limitation

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

M3K		M4K		M5K		M6K	
Size	MWP	Size	MWP	Size	MWP	Size	MWP
-4	21,0	-4	28,0	-4	35,0	-4	42,0
-5	21,0	-5	28,0	-5	35,0	*	*
-6	21,0	-6	28,0	-6	35,0	*	*
-8	21,0	-8	28,0	-8	35,0	*	*
-10	21,0	-10	28,0	*	*	*	*
-12	21,0	-12	28,0	*	*	*	*
-16	21,0	-16	28,0	*	*	*	*

Temperature range: -40° to +100°C constant, 120°C intermittent.
+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 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.
- One sample of each hose type is to be burst tested and the testing is to be witnessed by DNV. This testing is to be performed at least once a year.

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.

Flexible hoses are only to be used in short lengths (up to 2 m) where it is necessary due to vibrations or flexible mounting of the machinery.

The hoses must only be fitted in places where they are always accessible.

The hoses are to be mounted in accordance with the manufacturer's instructions.

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



Certificate No.: P-13422
File No.: 791.70
Job Id.: 262.1-007049-1

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

Each hose is to be hydraulic pressure tested to 1.5 times the working pressure.

No product certificate will be required.

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

Type Approval documentation

- Manufacturer's catalogue E2/50080 ED 2007 Gates Hydraulics Hose, Couplings and equipment
- Manufacturers faxes dated 00/08/03 and 00/11/21
- Manufacturer's Proof and burst and impulse tests dated 21.6.00 and 26.10.00
- DNV witnessed Flame test from Wehrtechnische Dienststelle für Schiffe und Marinewaffen (WTD 71) in Kiel dated 2000.08.07 and 2000.09.26
- Manufacturer's doc. for 12M4K+, dated 15/03/2004
- Manufacturer's doc. for 8M5K, dated 16/03/2004
- Manufacturer's doc. for M4K

Tests carried out

Dimensional check test, Change in length test, Cold flexibility test, Oil resistance test, Ozone resistance test, Fire test, Impulse test and Burst test

Marking of product



dash size hose type

Certificate Retention Survey

For retention of the Type Approval, DNV 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 Det Norske Veritas' Standard for Certification No. 2.9 Type Approval Programme 5-791.70, "Type Approval of Flexible Hoses of Non-Metallic Material".

The tests are to be performed with the type of couplings fitted that is Type Approved with the hoses.