DNV·GL

Certificate No:
TAD00000HF

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Valve

with type designation(s)
3 1/16"-15K Magnum Subsea Hydraulic

Issued to
Worldwide Oilfield Machine, Inc. (WOM)
HOUSTON TX, United States
PUNE, India

is found to comply with
DNVGL-OS-E101 – Drilling plant, Edition July 2015
DNVGL-SI-0166 - Verification for Compliance with Norwegian shelf regulations - Ch.2 Sec.7 DRILL(N), July 2015

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

THIS CERTFICATE IS A RENEWAL OF D-5755.
This Certificate is valid until **2021-10-17**.

Issued at **Houston** on **2016-10-18**

for **DNV GL**

DNV GL local station: **Approval CMC – Houston**

Approval Engineer: **Xiangwen (Maggie) Wang**

Christian Nilsen
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: **262.1-018056-2**
Certificate No: **TAD00000HF**

Product description

- 3 1/16'' – 15,000 psi Magnum Sub-Sea Hydraulic Valve F.S.

Reference standards

- API 6A, 'Specification for Wellhead and Christmas Tree Equipment', 20th Edition
- API 17D, 'Design and Operation of Subsea Production Systems – Subsea Wellhead and Tree Equipment, 2nd Edition
- NACE MR0175/ISO 15156, 'Petroleum and Natural Gas Industries – Materials for Use in H_2S – Containing Environments in Oil and Gas Production, 2nd Edition

Application/Limitation

- Max. Working Pressure: 15,000 psi
- Design Temperature: -20 °F to 350 °F
- Max. Hyd. Working Pressure: 3,000 psi
- Hyd. Design Temperature: -20 °F to 300 °F
- Service: H_2S
- API 6A Material Class: DD, EE
- API 6A PSL: 3
- API 6A PR: 2
- Max. Water Depth: 10,000 ft
  Note: DNV GL surveyor to check materials used in each project for Material Class trim.

Type Approval documentation

Drawings:

Drawing No.	Rev.	Description	WOM's MS
M4061	2	Valve, 3 1/16"-15k 'Magnum' sub-sea hyd. F.S., fail-open w/ 4 1/16"-15K F.E.	Assy.
M5255	2	Valve, 3 1/16"-15k 'Magnum' sub-sea hyd. F.S., fail-open w/ 3 1/16"-15K F.E.	Assy.
M4061(PH)T(EE-NL)	0	Valve, 3 1/16"-15k 'Magnum' sub-sea hyd. F.S., fail-open w/ 4 1/16"-15K F.E. (3.06" bore)	Assy.
M4062	3	Valve, 3 1/16"-15k 'Magnum' sub-sea hyd. F.S., fail-open w/ 3 1/16"-15K F.E.	Assy.
M4186	0	Valve, 3 1/16"-15k 'Magnum' sub-sea hyd. F.S., fail-open w/ 3 1/16"-15K F.E.	Assy.
M4062(PH)T(EE-NL)	0	Valve, 3 1/16"-15k 'Magnum' sub-sea hyd. F.S., fail-open w/ 3 1/16"-15K F.E.	Assy.
M1111-1	0	Body	4.6.11
M3595-1	1	Body	4.6.11
M0897-9	0	Flange	4.6.10/11
M0897-5	1	Balance stem	4.6.41/15
WM1921	12	Seat	4.6.135/140
WM1924	14	Seat retainer	4.6.119/6/60
CM1919H	4	Gate	4.6.133/138
WM1917	3	Gasket	4.6.13
M0901-5	0	Stem protector	4.6.10/11
M0965-FO	4	Actuator assy., 3 1/16"-15m sub-sea hydraulic failsafe	Assy.
M0656-15	6	Bonnet	4.6.11
M0656-18	0	Packing gland	4.6.10/11
M0656-28	3	Operating stem	4.6.60/6
M0965-22	5	Cylinder	4.6.10
M0656-24	2	Piston	4.6.10/11/28
M0656-32	5	Driving stem	4.6.10
M0965-21	2	Actuator housing assy.	Assy.

Drawing No.	Rev.	Description	WOM's MS
M0965-21A	4	Actuator housing	4.6.11
M0965-21B	0	½" SAE connection	4.6.10
M0965-21-1	3	Actuator housing weldment	Assy.
SW6979	0	Spring lifter	4.6.10
SW3173	4	Seat	Assy.
SW3173A	1	Seat skirtd	4.6.133
SW3074	7	Seat retainer	4.6.60
BX-153-04	1	Gasket	4.6.17
-	-	Bolt	4.6.18
*M4061	2	BOM, valve 3 1/16"-15K hyd.	-
*M0965-FO	4	BOM, actuator 3 1/16"-15K hyd. Failopen	-
*M5255	2	BOM, valve 3 1/16"-15k 'Magnum' sub-sea hyd.	-
*M4061(PH)T(EE-NL)	0	BOM, valve 3 1/16"-15k 'Magnum' sub-sea hyd.	-
*M4062	3	BOM, valve 3 1/16"-15k 'Magnum' sub-sea hyd.	-
*M4062(PH)T(EE-NL)	0	BOM, valve, 3 1/16"-15k 'Magnum' sub-sea hyd.	-
*M4186	1	BOM, valve, 3 1/16"-15k 'Magnum' sub-sea hyd.	-

*For Information Only

Note: Other part numbers or updated revisions may be acceptable under this Certificate provided critical aspects of the design remain the same. Changes shall be documented and approved (via Engineering Change Notice or similar) by the Manufacturer's Engineering and/or Quality department as appropriate. DNV GL's local surveyor shall verify the change before issuance of Product Certificate.

Calculations:

Document No.	Rev.	Description
TAC renewal – M4061	-	Design package submitted on Oct. 7th 2016

Materials:

Material Spec	Rev.	Description	Min. Yield Strength	Avg. Charpy @ MDT
4.6.10	11	Low alloy steel	60 ksi	20 ft-lbf
4.6.11	16	4130	75 ksi	20 ft-lbf
4.6.18	7	A193/A194 bolting	105 ksi	20 ft-lbf
4.6.28	10	Annealed low alloy steel	60 ksi	20 ft-lbf
4.6.41	5	410 S.S.	60 ksi	20 ft-lbf
4.6.60	6	Inconel 725	120 ksi	20 ft-lbf
4.6.119	2	410 S.S.	85 ksi	20 ft-lbf
4.6.133	1	AISI 4140	50 ksi	20 ft-lbf
4.6.135	1	AISI 4130	70 ksi	20 ft-lbf
4.6.138	1	AISI 410 S.S.	50 ksi	20 ft-lbf
4.6.140	1	AISI 410 S.S.	70 ksi	20 ft-lbf
4.6.6	7	Inconel 718	120 ksi	20 ft-lbf

Tests carried out

1. PR2 report for 3 1/16"-15M MAGNUM Hydraulic Valve P/N: M1251
2. ENG.TEST.ACT.002 PR-2 Report
3. Test Acceptance Certificate-API 17D, 3 1/16"-15K Sub-Sea Valve with Actuator (-20 to 350F)

Marking of product

For traceability the following marking is to be carried out on each product:

1. Serial No.
2. Manufacturer's name or trademark.
3. Marking shall be in accordance with DNVGL-OS-E101 and requirements of API 6A.

Periodical assessment

For retention of the Type Approval, DNV's surveyor shall perform a survey every second year in accordance with DNV GL's Class Programme DNVGL-CP-0338, Section 4.

Other conditions/comments

1. Procedures related to testing, welding, NDT, and other quality control requirements are to be reviewed/approved by DNV GL's local surveyor.
2. DNV GL ref.: Project No. PP150835-76

END OF CERTIFICATE