

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Mud and Cementing Equipment

with type designation(s)
Continuous Metering System

Issued to

**Halliburton Energy Services
Duncan OK, USA**

is found to comply with
DNVGL-OS-E101 – Drilling plant, Edition July 2015

Application :

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

Issued at **Houston** on **2017-12-21**

This Certificate is valid until **2022-12-20**.

DNV GL local station: **Houston - Systems & Components**

for **DNV GL**

Approval Engineer: **Kairy Otero**

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**Nick Prokopuk
Team Lead**

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: **262.1-014236-2**
Certificate No: **TAD00000VT**

Product description

Continuous Metering System 4 Pump 3 Base Zone II, PN 102116012 Rev F
Continuous Metering System 4 Pump 4 Base Zone II, PN 102103343 Rev D
Vertical Continuous Metering System Zone II, 4 Pump, PN 102129187 Rev E
Vertical Continuous Metering System Zone II, 5 Pump, PN 102126359 Rev D

Application/Limitation

- Minimum Design Temperature	: 0 °C (32°F)
- Maximum Design Temperature	: 45 °C (113 °F)
- Service	: Cementing
- Hazardous Area Classification when specified	: Zone II, Group IIB, Temp. T3
- Dynamic Operating Conditions	: 0.1g pitch, 0.1g roll, 1.1g heave w/Tanks Full
- Dynamic Survival Conditions	: 0.2g pitch, 0.2g roll, 1.2g heave w/Tanks Empty

Note:

1. Vertical CMS units do not support tanks. Other CMS sections may mount (support) a tank. Tanks must be pinned in place when mounted. Tank contents must not exceed a specific gravity of 1.4.
2. Tank capacity is 1000 gallons or 549 gallons. The 1000 gallon tank is approximately 42" wide x 67" long by 95" tall. The 549 gallon tank is approximately 42" wide x 48" long x 71" tall.
3. Tanks must be empty during survival conditions.
4. Lifting of equipment skids is not included in this certificate.

Type Approval documentation

Tests carried out

Test unit in accordance with Halliburton test procedure.

Marking of product

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

1. "TAD00000VT"
2. Serial Number
3. Manufacturer's name and trademark
4. Maximum Working Pressure

Certificate Retention Survey

For retention of the Type Approval, DNV GL's surveyor shall perform a survey every 2nd year in accordance with DNVGL-CP-0338.

Other Conditions/Comments

1. The tanks are not a part of this certification.
2. Since the cabling and the unit will be completely dismantled after the FAT, a final inspection shall be performed after installation on-board to confirm the cabling, termination and the over-all installation.
3. Final approval of the over-all system is based on the successful testing on-board after installation and is up to the satisfaction of the attending site surveyor.
4. The approval of all Ex equipment installed is up to the satisfaction of the attending site surveyor. The hazardous area components shall be reviewed on each system during the FAT and also all components shall match the hazardous area register.
5. All Ex equipment shall be installed as per the manufacturer's recommendations and any special conditions specified in the Ex certificate shall be complied with which shall be verified by the site surveyor.
6. Specific vessel requirements may apply depending on the requirements from shelf state, flag state, coast guard etc which shall be dealt with on a case by case basis and is not covered under this Type Approval.
7. The equipment is to be installed in space where IP rating ensures sufficient protection level.



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8. All software changes done shall be logged and easily traceable (as per the instructions in DNVGL-RP-D201, Sec 4) and DNVGL shall be notified on any major software changes.

END OF CERTIFICATE