

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Mud and Cementing Equipment

with type designation(s)

PCS-621B DOUBLE PUMP CEMENTING SKID

Issued to

SJS Limited

Jingzhou City Hubei, China

is found to comply with

DNVGL-OS-E101 – Drilling plant, Edition July 2015

Application :

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This Certificate is valid until **2021-12-14**.

Issued at **Houston** on **2016-12-15**

DNV GL local station: **Wuhan CMC**

Approval Engineer: **M. Kevin Mandeville Jr.**

for **DNV GL**

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.

The following codes and standards were used as a reference:

API Specification 7K, *Specification for Drilling and Well Servicing Equipment*, 5th Edition

Product description

PCS-621B Double Pump Cementing Skid, with options of water or air cooling.

Application/Limitation

Design Parameter	Value	Equivalent
Minimum Working Temperature	-20°C	-4°F
Maximum Working Temperature	50°C	122°F
Maximum Pressure (High Pressure Side)	105 MPa	15,000 psi
Hydraulic System Pressure Rating	28 MPa	4,000 psi
High Pressure Manifold Parts PSL	3	
High Pressure Manifold Parts PR	1	
Area Classification	Non-Hazardous	
Accelerations		
Transverse	≤3.0m/s ²	
Longitudinal	≤3.0m/s ²	
Vertical	≤5.0m/s ²	

Type Approval documentation

[illegible]



[illegible]

Procedures related to fabrication, welding, and NDE shall be reviewed and approved by the local DNV GL Surveyor.

Job Id:
Certificate No: **TAD00000JK**

Tests carried out

Type Test carried out on test subject SN: W1604957.001 per PCS-621B Test Manual. Test witnessed on 2016-11-30 by DNV GL surveyor Dun Hai Lang

Marking of product

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

1. Serial Number
2. Manufacturer's name or trademark
3. Additional Marking at the manufacturer's discretion

Certificate Retention Survey

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

Other Comments and Conditions

1. The pump fluid ends are to be provided with their own product certificate, and the design is certified under Type Approval Certificate D-6109. Other Category I items not named in the drawing section above should also be purchased with a product certificate.
2. Skid frame is reviewed for installation lift only.
3. Scope of certificate does not include flexible cement hoses for discharge.
4. Skid can be used in emergency well kill operations, provided the skid remains in a non-hazardous area. Per DNVGL-OS-E101, Chapter 2, Section 5, Part 7.3.7, facilities for transferring mud to the cementing system shall be provided.
5. HAZLOC Ex documentation (where applicable) shall be submitted to DNV GL surveyor at site. For EX certificates with certificate number that is ending with 'U' or 'X', a document stating compliance with the special conditions given in the certificate shall be presented and demonstrated to local DNV GL Surveyor.
6. The CAT C15 diesel engines, centrifugal pumps, and other Category II items shall be delivered with a works certificate prepared by the manufacturer.
7. Factory Acceptance Testing of the completed skid must be completed and witnessed by a DNV GL surveyor prior to the issuance of a Product Certificate.
8. DNVGL Project Ref. PP162252

END OF CERTIFICATE