



# DET NORSKE VERITAS

## TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. D-2301 REV. 0

This Certificate consists of 4 pages

*This is to certify that the*  
**Centrifugal Pumps**  
*with type designation(s)*

**Series 2500 Supreme Centrifugal Pumps**

*Manufactured by*  
**National Oilwell**

**501 N George Nigh Expressway, McAlester, OK 74501 USA**

*is found to comply with*

DNV's Offshore Standard DNV-OS-E101, Drilling Plant  
DNV's Offshore Standard DNV-OS-E201, Hydrocarbon Production Plant  
United Kingdom. S.I. (1974) No. 289 and Department of Energy Notes.

*and Det Norske Veritas' understanding of the implementation and interpretation of*  
NPD's "Regulations relating to drilling and well activities and geological data collection in the  
petroleum activities", 7 February 1992. Last amended 25 March 1999.

NPD's "Regulations for production and auxiliary systems on production installations etc.,  
1980."

*Application*  
See Section "C"

*Place and date*

Houston, 2002-09-05

for DET NORSKE VERITAS

Richard Helmersson  
*Principal Engineer*



**HOUSTON**  
*Local Office*  
DNV Houston

*This Certificate is valid until*  
2006-09-31

Ricardo Hernandez Jr.  
*Engineer*

**Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.**

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-2301 Rev. 0  
File No.: 523.89  
DNV Project No.: 410-7-4717

#### A. Product description

- Series 2500 Supreme Centrifugal Pumps  
Model: 3x2x13, 4x3x13, 5x4x14, 6x5x11, 6x5x14, 8x6x11, and 8x6x14

#### B. The following design codes/standards were used as references:

- N.A.

#### C. Design limitations

- Service : Standard
- Minimum Design Temperature : 0 °C [32°F]

NOTE: Maximum discharge head, capacity and rpm are provided in National Oilwell 2500 Supreme Curve Booklet

#### D. Design specifications

Drawings:

<u>Drwg. No.</u>	<u>Rev.</u>	<u>Title</u>
- D/N H19203	-	Series 2500, 3x2x13 Casing
- D/N H19205	-	Series 2500, 4x3x13 Casing
- D/N H19222	-	Series 2500, 5x4x14 Casing
- D/N H19122	-	Series 2500, 6x5x11 Casing
- D/N H19123	-	Series 2500, 6x5x14 Casing
- D/N H19763	-	Series 2500, 8x6x11 Casing
- D/N H19117	-	Series 2500, 8x6x14 Casing

#### E. Material Specifications

<u>Components</u>	<u>Material</u>	<u>Minimum Yield</u>	<u>Charpy</u>
- Casing, Frame	ASTM A-48 Class 30	26,600 psi	N/A
- Impeller	ASTM A536 Gr. 80-55-06	55,000 psi	N/A



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## F. Calculations

<u>Doc. No.</u>	<u>Rev.</u>	<u>Title</u>
- D/N H19203	-	Series 2500, 3x2x13 Casing, National Oilwell Stress & Strain Calculations
- D/N H19205	-	Series 2500, 4x3x13 Casing, National Oilwell Stress & Strain Calculations
- D/N H19222	-	Series 2500, 5x4x14 Casing, National Oilwell Stress & Strain Calculations
- D/N H19122	-	Series 2500, 6x5x11 Casing, National Oilwell Stress & Strain Calculations
- D/N H19123	-	Series 2500, 6x5x14 Casing, National Oilwell Stress & Strain Calculations
- D/N H19763	-	Series 2500, 8x6x11 Casing, National Oilwell Stress & Strain Calculations
- D/N H19117	-	Series 2500, 8x6x14 Casing, National Oilwell Stress & Strain Calculations

## G. Fabrication procedures

Test Procedures:

1. HydroTest Procedure ES-101, dated June2, 1997.

NDE Procedures:

2. See Comments

Welding Procedures:

3. N.A.

## H. Prototype testing

1. N.A.





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## I. Comments

1. Traceability required on all pressure containing components.
2. All interpretation of NDE results shall be made by operator qualified to SNT-TC-1A level II or equivalent.
3. This document may be used as part of the documentation required to comply with European Union (EU) Directives referenced in NPD's Acts, regulations and provisions for the petroleum activities. It should however be noted that the scope covered by this document does not necessarily cover all aspects required to issue the EU Declaration of Conformity and to affix the CE-mark. It is the manufacturer's/operator's responsibility to ensure compliance with relevant EU Directives.
4. In conjunction with the listed performance standards, this certificate may be used to help the duty holder discharge their duties towards the verification scheme required by SI 913, The Offshore Installations and Wells (Design and Construction, etc.) Regulation 1996.

Note: This certificate replaced Type Approval Certificate D-1657

## J. Marking

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

- "NV-D-2301"
- Manufacturer's name and trademark
- Additional marking at manufacturer's option

## K. Certificate retention survey

1. To be carried out per DNV's Certification Notes 1.2.

## L. 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
6. Heat treatment records/charts when applicable
7. Pressure and performance test reports
8. DNV Product Certificate
9. DNV Type Approval Certificate

END OF CERTIFICATE