

**Particulars of Design**

Manufacturer:	<b>Drilltools Limited</b>
Location:	<b>Broxburn, United Kingdom</b>
Purchase order no:	<b>53</b>
Id No:	<b>P5994</b>
Archive no:	<b>PP161899</b>
Regulatory body:	<b>Unknown</b>

This is to verify that the design of:

**7.0" DT Surface Flapper Safety Valve (Drwg. No: 1-0101-7000-01)**

has been reviewed and found to comply with:

[1] DNV GL's Offshore Standard DNVGL-OS-E101 "Drilling Plant", July 2015.

**The verification is based on the following****A. Design Codes/Standards Used as References**

- API Spec 7NRV- "Specification for Drillstring Non-Return Valves", 1st Edition, December 2012
- API RP 7G - "Recommended Practice for Drill Stem Design and Operating Limits", 16th Edition, December 1998

**B. Design Limitations**

<u>Design Parameter</u>	<u>Value</u>	<u>(Equivalent)</u>
Design (Working) Pressure	15,000 psi	103.5 MPa
Design Temperature (Min/Max)	-4/+374 °F	-20/+190 °C
Corrosion Allowance	See comment (1174)	
Service	Standard	
Make Up Torque (Top Sub/Bottom Sub)	33,750 ft-lbs	

**Load Cases**

<u>Temperature</u>	<u>Tensile Yield (lbs)</u>	<u>Torsional Yield (ft-lbs)</u>
20°C	1,619,881	67,500
150°C	1,538,887	64,125
190°C	1,457,893	60,750

**C. Design Specifications****Principal Documents**

<u>Drwg./Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
1-0101-7000-01	A	7.0" DT Surface Flapper Safety Valve	AC
1-0101-7000-10	A	Cartridge Housing Assembly	AP
1-0101-7000-80	A	Assembly Tool	AP
1-0101-7000-81	A	API Drift Bar	AP
2-0101-7000-01	A	Top Sub	AP

<u>Drwg./Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
2-0101-7000-02	A	Grapple Body	AP
2-0101-7000-03	A	Mid Sub	AP
2-0101-7000-04	A	Main Body	AP
2-0101-7000-05	A	Bottom Sub	AP
2-0101-7000-06	A	Lock Open Sleeve	AP
2-0101-7000-07	A	Grapple Sleeve	AP
2-0101-7000-08	A	Upper Spring Spacer	AP
2-0101-7000-09	A	Lower Spring Spacer	AP
2-0101-7000-10	A	Cartridge Housing	AP
2-0101-7000-11	A	Flapper	AP
2-0101-7000-12	A	Spring Flange	AP
2-0101-7000-13	A	Latch Ring	AP
2-0101-7000-14	A	Lug	AP
2-0101-7000-15	A	Spring Spacer	AP
2-0101-7000-16	A	Sealing Cartridge	AP
5-0101-7000-50	A	Grapple Spring	FI
5-0101-7000-51	A	CV Spring	FI

### Supporting Documents

<u>Drwg./Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
TS-0001D	A	Detectability Ranking Table	FI
TS-0001O	A	Occurrence Probability Ranking Table	FI
TS-0001RPN	A	Risk Priority Number Ratings	FI
CS-0101	A	Coating Specification	FI
-	-	DT Flapper Safety Valve - Built Sheet	FI
TS-0001S	A	Severity Ranking Table	FI
-	-	Functional Specification	FI
HTS-0201	A	Heat Treatment Specification (Quench Polish Quench)	FI
M-0101-7000	B	Tool Manual - DT Surface Flapper Safety Valve	FI
MA-001	B	Standard Service Material Specification	FI
-	-	Tool Specification - DT Safety Valve	FI
TS-0001	-	DT Flapper Safety Valve Risk Assessment	FI
TS-0001	A	Technical Risk Assessment Standards	FI
M-010-7000	A	DT Surface Flapper Safety Valve - Testing Protocol	FI

### D. Calculations

<u>Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
-	-	Pressure and Torque Calculation	FI
-	-	Cartridge Sealing Calculation	FI
-	A	Design Analysis - Flow Simulation	FI
-	-	Flapper Simulation	FI

AC = Approved with Comments, AP = Approved; FI= For Information Only

### E. Material Specifications

Materials are to be as defined on components drawings, engineering bill of materials etc and in accordance with the referenced materials specifications along with any supplementary requirements specified within DNVGL-OS-E101.

## F. Fabrication Procedures


Manufacturing, inspection and testing to be in accordance with DNVGL-OS-E101 and any supplementary requirements specified in accordance within API RP 7G and API Spec 7NRV.

## G. Comments

- 1174 The manufacturer has not specified a corrosion allowance for the wetted sections of the valve. However, a routine maintenance and inspection of valve is mandatory after every 500 circulating hours to ensure that the dimensions of the valve components are within tolerance and no corrosion and erosion has taken place. The end user should ensure the maintenance strategies highlighted in the tool manual are adhered to.
- 1175 The design review has only considered the above mentioned 'Design Limitations' and has not considered the effects dynamic/cyclic/fatigue loading. Equipment suitability, under these loading condition, shall be separately addressed by the end user.

Aberdeen 2016-10-27

for DNV GL UK Ltd

  
Fowlie, Martin  
Head of Section  
OBGGB357



Olalere, Ola  
Mechanical Approval Engineer



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CC: Drilltools Ltd

**CERTIFICATE**  
**FOR 7.0" DT SURFACE FLAPPER SAFETY VALVE**

Certificate No:  
**N141COMG**

**This is to certify**

that the product: **7.0" DT Surface Flapper Safety Valve**  
 Type designation: **Equipment Part No: 1-0101-7000-01**  
 Application/context:  
 Serial/tag no: **DT SFSV-004**

Has been found to comply with relevant requirements in:  
**OS :DNV GL Offshore Standards, OS-E101 :Drilling Plant July 2015**  
**Design Codes/Standards Used As Reference:**  
**API 7NRV Specification for Drill String Non-return Valves - 2012**  
**API RP 7G Recommended Practice for Drill Stem Design and Operating Limits 1998**

The product is intended for

Yard: -  
 Yard No: -  
 Name of vessel: **STOCK**  
 DNV GL Id No: -

**Particulars of Vendor and Purchaser**

Vendor: **Drilltools Limited**  
 Vendor reference: **PO - 132**  
 Purchaser:  
 Purchaser reference:

Issued at **Aberdeen Verification** on **2016-12-14**



for **DNV GL**

This document has been digitally signed and will therefore not have handwritten signatures

**Hay, Raymond**  
**Surveyor**



Certificate No: **N141COMG**

**Linked Plan Approvals:**

OBGGB357/OOLA/P5994-J-9338, Drilltools Limited, issued 2016-10-27

**Surveyor Supplementary information:**

DNV-GL Project Number: A0360932

Comments

1. The Design Temperature Range of the unit is limited by the operating temperature range of the elastomeric seals used.
2. The Manufacturer has not specified a corrosion allowance for the wetted sections of the valve. However, a routine maintenance and inspection of valve is mandatory after every 500 circulating hours to ensure that the dimensions of the valve components are within tolerance and no corrosion and erosion has taken place. The end user should ensure the maintenance strategies highlighted in the tool manual are adhered to.
3. The Design Review/Certificate has only considered the below mentioned design limitations and has not considered the effects of dynamic/cyclical/Fatigue loading. Equipment suitability under these loading conditions shall be separately addressed by the end user.

**Product parameters:**

Parameter name	Value	Unit
Design Working Pressure	15,000	psi
Design Temperature	-20 To +190 See comment 1	°C
Service	Standard	
Make Up Torque	33,750	ft-lbs
Corrosion Allowance	See Comment 2	

DT SFSV 004 Proof Test 12-Dec-2016

Transducer serial no. Z150141428 (logger 3091) calibrated 1-Aug-2016



Witnessed  
For DNV GL UK LTD

This document has been digitally signed and  
will therefore not have handwritten signatures

Raymond Hay  
Surveyor

