

**Particulars of Design**

Manufacturer:	<b>Drilltools Limited</b>
Location:	<b>Broxburn, UNITED KINGDOM</b>
Purchase order no:	<b>249</b>
Installation:	<b>Unknown</b>
Id No:	<b>P5994</b>
Archive no:	<b>PP182284-1</b>
Regulatory body:	<b>Unknown</b>

This is to verify that the design of:

**4-3/4" Surface Flapper Safety Valve w/o LOS (Drwg. No. 1-0101-4750-02)**

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

**B. Design Limitations**

<u>Design Parameter</u>	<u>Value</u>	<u>(Equivalent)</u>
Design Pressure	15,000 psi	103.5 MPa
Design Temperature (Min/Max)	+25/+374 °F	-4/+190 °C
Corrosion Allowance	See comment (1174)	
Service	Standard	
Make Up Torque (Top Sub/Bottom Sub)	15,000 ft-lbs	

**Loadcases**

<u>Temperature</u>	<u>Tensile Yield (lbs)</u>	<u>Torsional Yield (ft-lbs)</u>
20°C	929,000	25,453
150°C	882,558	24,180
190°C	836,108	22,908

**C. Design Specifications**

**Principal Documents**

<u>Drwg./Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
1-0101-4750-02	A	4-3/4" Surface Flapper Safety Valve w/o LOS	AC
1-0101-4750-04	A	4-3/4" Cartridge Housing Assembly	AP
2-0101-4750-01	A	Top Sub	AP
2-0101-4750-02	B	Main Body	AP
2-0101-4750-03	A	Bottom Sub	AP



<u>Drwg./Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
2-0101-4750-06	B	Flapper	AP
2-0101-4750-07	A	Spring Flange	AP
2-0101-4750-08	B	Latch Ring	AP
2-0101-4750-09	A	Lug	AP
2-0101-4750-10	A	Spring Spacer	AP
2-0101-4750-11	A	Torque Spacer 0.438"	AP
2-0101-4750-12	A	Torque Spacer 1.0"	AP
2-0101-4750-13	A	Load Collars	AP
2-0101-4750-14	A	Locking Ring	AP
2-0101-4750-84	A	Assembly Tool Cartridge Stopper	AP
2-0101-4750-93	A	Assembly Sleeve	AP
2-0101-4750-94	A	Disassembly Sleeve	AP
1-0101-4750-82	A	Assembly Pulling Tool	FI
1-8001-1250-01	B	API Drift Rod Assembly	FI

### Supporting Documents

<u>Drwg./Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
-	-	DT FSV Buildsheet	FI
-	A	Functional Specification-DT 4.75-FSV Standard Tool	FI
HTS-0201	A	Heat Treatment Specification	FI
M-0101-4750-02/H	A	Tool Manual - DT 4-3/4" Flapper Safety Valve	FI
MA-001	B	Standard Material Specification - Rev B	FI
-	A	Tool Specification DT 4.75 Flapper Safety Valve	FI
TS-0001	A	Technical Risk Assessment Standards	FI
TS-0001D	A	Detectability Ranking Table	FI
TS-0001O	A	Occurrence Probability Ranking Table	FI
TS-0001RPN	A	Risk Priority Number Ratings	FI
TS-0001S	A	Severity Ranking Table	FI

### D. Calculations

<u>Drwg./Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
-	C	Basic Calculations - DT 4.75-FSV Standard tool	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.

<u>Component</u>	<u>Material</u>	<u>MSYS</u>	<u>UTS</u>	<u>Charpy Impact</u>
Cartridge Housing	AISI 4145	120 ksi	140 ksi	42J@-20°C
Top Sub	AISI 4145	120 ksi	140 ksi	42J@-20°C
Main Body	AISI 4145	120 ksi	140 ksi	42J@-20°C
Bottom Sub	AISI 4145	120 ksi	140 ksi	42J@-20°C
Flapper	AISI 4145	120 ksi	140 ksi	42J@-20°C

### F. Fabrication Procedures

Manufacturing, inspection and testing to be in accordance with DNVGL-OS-E101 and any supplementary requirements specified in accordance within API 7G and API 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, 2017-05-03

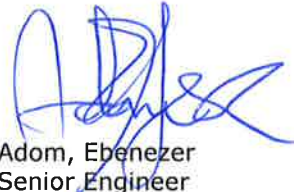
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