

Particulars of Design

Manufacturer:	Drilltools Limited
Location:	Broxburn, UNITED KINGDOM
Purchase order no:	249
Installation:	Unknown
Id No:	P5994
Archive no:	PP182284-2
Regulatory body:	Unknown

This is to verify that the design of:

4-3/4" Surface Flapper Safety Valve w/o LOS (H₂S) (Drwg. No. 1-0101-4750-02h)

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	10,000 psi	69.0 MPa
Design Temperature (Min/Max)	+25/+374 °F	-4/+190 °C
Corrosion Allowance	See comment (1174)	
Service	Sour	
Make Up Torque (Top Sub/Bottom Sub)	10,000 ft-lbs	

Loadcases

<u>Temperature</u>	<u>Tensile Yield (lbs)</u>	<u>Torsional Yield (ft-lbs)</u>
20°C	619,339	16,969
150°C	588,372	16,120
190°C	557,405	15,272

C. Design Specifications

Principal Documents

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



<u>Drwg./Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
2-0101-4750-06h	B	Flapper	AP
2-0101-4750-07h	A	Spring Flange	AP
2-0101-4750-08h	B	Latch Ring	AP
2-0101-4750-09h	A	Lug	AP
2-0101-4750-10h	A	Spring Spacer	AP
2-0101-4750-11h	A	Torque Spacer 0.438	AP
2-0101-4750-12h	A	Torque Spacer 1.0	AP
2-0101-4750-13h	A	Load Collars	AP
2-0101-4750-14h	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
1-0101-4750-82h	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>
TS-0001S	A	Severity Ranking Table	FI
-	-	DT FSV Buildsheet	FI
-	A	Functional Specification - DT 4.75-FSV (H ₂ S) Tool	FI
HTS-0201	A	Heat Treatment Specification	FI
M-0101-4750h	A	Tool Manual - DT 4-3/4" Flapper Safety Valve	FI
MA-002	B	Sour Gas (H ₂ S) Material Specification	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

D. Calculations

<u>Doc. No.</u>	<u>Rev.</u>	<u>Title</u>	<u>Status</u>
-	C	Basic Calculations - DT 4.75 FSV (H ₂ S) Tool	FI

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 4140	80 ksi	100 ksi	42J@-60°C
Top Sub	AISI 4140	80 ksi	100 ksi	42J@-60°C
Main Body	AISI 4140	80 ksi	100 ksi	42J@-60°C
Bottom Sub	AISI 4140	80 ksi	100 ksi	42J@-60°C
Flapper	AISI 4140	80 ksi	100 ksi	42J@-60°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, 2017-05-08

for DNV GL UK Ltd



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