

DRILL LIKE A BEAR

BENEFITS

-  Significantly increases economic efficiency by reducing time per operation trips.
-  Restore circulation, bottom hole chemical treatments are possible without BHA additional tripping.
-  Up to 10 activations at one BHA trip (4/5 activations is standard).
-  Different options for deactivation pressures (2100psi, 3000psi, 4500psi).
-  Simple visual control of pressure drop.
-  No limitations for LCM type of materials to fight loss of circulation.
-  In case of circulation stop, the sub blocks the ports automatically to prevent cross flow of mud between annular space and the drilling string.
-  A "dump sub" function can be activated after pulling out of hole.
-  Sub has been successfully run in the harshest environments including CO₂ and H₂S.



BUILT DEEP. BUILT STRONG.

Technical Data Sheet Circulation Sub

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Subsidiary Companies



DEEPWELLS CIRCULATION SUB

Circulation sub is designed to allow diversion of mud flow into annulus whenever required and combat common drilling problems, such as lost circulation and limited circulating rates. Sub operation control does not require dedicated trips.

It is always recommended to include the circulation sub into BHA in following cases:

- » Acid, chemical and bridging agent treatments, which can be dangerous for below located BHA components.
- » Reaming during loss of circulation, full loss of circulation.
- » Wellbore cleanout required for acceleration of the flow in annular space by increase of mud flow.

The sub has several configurations, which differ by number of operation cycles and activation/deactivation pressures without need of pulling out of hole.

Features & Benefits

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- ▶ Different options for deactivation pressures (2100psi, 3000psi, 4500psi).
- ▶ Simple visual control of pressure drop.
- ▶ No limitations for LCM type of materials to fight loss of circulation.
- ▶ In case of circulation stop, the sub blocks the ports automatically to prevent cross flow of mud between annular space and the drilling string.
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- ▶ Sub has been successfully run in the harshest environments including CO₂ and H₂S.



Specifications (Imperial)

	CS475	CS675	CS825
Outer diameter d, (in)	4 ¾	6 ¾	8 ¾
The length of the Sub L, (in)	83.9	102.2	115.9
Weight (lb)	276	772	1124
Quantity of ports, piece	2	2	2
Activation ball OD (in)	1.5	2	2.25
Blocking ball OD (in)	1.13	1.13	1.37
Deactivation ball OD (in)	1.31	1.38	1.73
Port size (in)	1.02	1.12	1.36
Connecting threads	NC 38	NC 50	6 5/8 Reg
Operating Parameters			
Maximum flow rate (gpm)	396	713	1014
Pressure drop with direct circulation (with empty basket) (psi)	61	145	72.5
Pressure drop (circulation through side ports) (psi)	54	217.6	174
Make-Up torque (ft·lbs)	8,482 – 10,695	29,500 – 33,900	56,800 – 64,200
Number of cycles (std / ext)	5/10	5/10	5/10
Activation pressure (psi)	87	116	58
Deactivation pressure (psi)	2100	2103	2103
Blocking ball push-through pressure (psi)	1088	1088	1088
TFA (non-activated tool) (in.sq.)	1.7	2.97	3.78
Flow area when tool is activated (in.sq.)	0.99	0.99	1.45
Maximum tensile load (lb)	737,250	1,344,000	2,136,000
Torsional strength main body (ft·lb)	18,880	199,141	346,653



Specifications (Metric)			
	CS475	CS675	CS825
Outer diameter d, (mm)	120	172	210
The length of the Sub L, (mm)	2132	2596	2945
Weight (kg)	125	350	510
Quantity of ports, piece	2	2	2
Activation ball OD (mm)	38.1	50.8	57.1
Blocking ball OD (mm)	28.6	28.6	34.9
Deactivation ball OD (mm)	33.33	34.92	44.45
Port size (mm)	28.5	28.5	34.5
Connecting threads	NC 38	NC 50	6 5/8 Reg
Operating Parameters			
Maximum flow rate (l/s)	25	45	64
Pressure drop with direct circulation (with empty basket) (mpa)	0.42	1.0	0.5
Pressure drop (circulation through side ports) (mpa)	0.37	1.5	1.2
Make-Up torque (N·m)	11,500 – 14,500	40,000 – 46,000	77,000 – 87,000
Number of cycles (std / ext)	5/10	5/10	5/10
Activation pressure (mpa)	0.4	0.8	0.4
Deactivation pressure (mpa)	14.5	14.5	14.5
Blocking ball push-through pressure (mpa)	7.5	7.5	7.5
TFA (non-activated tool) (mm.sq.)	1095	1917	2440
Flow area when tool is activated (mm.sq.)	638	638	935
Maximum tensile load (kN)	2500	5980	9500
Torsional strength main body (N·m)	80,000	270,000	470,000

