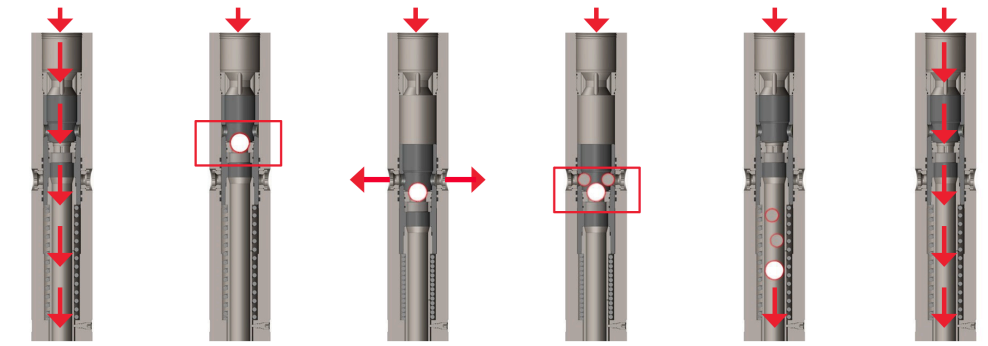
PBL® Multiple Activation Autolock Bypass System

The PBL® Multiple Activation Bypass System is a simple, reliable tool that can assist operators in reducing drilling costs associated with different types of hole conditions. Originally developed to enable the aggressive pumping of Lost Circulation Material (LCM) and to increase circulation rates for enhanced hole cleaning, the PBL® has evolved to benefit many Oil & Gas and Geothermal applications in the drilling, completion, and work over phases of a well such as:

- Pumping all types of LCM pills, including aggressive pills and cement squeezes
- Increasing circulation rates for improved hole cleaning resulting in reduced torque and drag, thereby increasing ROP
- Increasing annular velocity in highly deviated and horizontal wellbores where removal of cutting beds and hole cleaning is problematic
- Fluid displacements
- Sub-sea riser/BOP jetting
- Acidizing and stimulation treatments
- Coring applications

FEATURES AND BENEFITS

- The PBL® tool will close when the pumps are shut down minimizing a U-tubing effect, or possible well control issues that can occur in other tools
- The Auto-lock option, which allows for pulling a dry work-string or filling the drill-string while tripping in the hole. The Auto-lock option also provides an option to reverse circulate if necessary
- 100% bypass and split-flow capabilities
- Activate or deactivate at any angle
- The PBL® can be cycled numerous times in a single trip
- The ball shearing pressure can be set to the operator's preference
- The main body and the catcher sub can be placed in different sections of the BHA to optimize work-string operations
- Full five cycles as standard; extended cycle tools available on request



Drilling Mode FLOW to BIT | Vinyl Activation ball Seated | Open Position FLOW THRU PORTS | Steel De-Activation balls dropped and pumped down PRESSURE UP | Activation ball sheared thru seat De-Activation balls follow, Tool Reset | Drilling Mode FLOW to BIT

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CERTIFIED ISO 9001 ISO 14001 ISO 45001 ISO 22301

NS-1 LEVEL 2 DESIGN

DSI A COMPANY OF SCHOELLER-BLECKMANN

Technical Specifications

Tool Sizes (in.)	4 3/4	5 1/4	6 1/4	6 1/2	6 3/4 [8]	7	8	8 1/4 [9]	9 1/2	9 ½ HF	12
Number of ports	2	2	2	2	2	2	2	2	2	2	2
Minimum tool ID (in.) When no balls are in tool [1]	1.27 to 1.40	1.27 to 1.40	1.27 to 1.80	1.27 to 1.80	1.27 to 1.80	1.27 to 1.80	1.50 to 2.27	1.50 to 2.27	1.50 to 2.27	1.50 to 2.65	1.50 to 2.27
EHD (in.)	1.46	1.46	1.93	1.93	1.93	1.93	2.42	2.42	2.42	2.73	2.42
Drift ID (in.) When balls are in tool	NO DRIFT	NO DRIFT	NO DRIFT	NO DRIFT	NO DRIFT	NO DRIFT	NO DRIFT	NO DRIFT	NO DRIFT	NO DRIFT	NO DRIFT
Maximum OD (in.)	4.75	5.25	6.25	6.5	6.75	7	8	8.25	9.5	9.5	12
PBL® tool end connections (Box x Pin) [2]	NC 38 (3 ½"IF)	XT 39	NC 46 (4 ½"XH)	NC 50 (4 ½"IF) / NC 46 (4 ½"XH)	NC 50 (4 ½"IF)	XT57 / XTM57	6 5/8 REG	6 5/8 REG	7 5/8 REG	7 5/8 REG	8 5/8 REG
PBL® tool mid connection [3]	NC 38 (3 ½"IF)	XT 43	NC 46 (4 ½"XH)	NC 50 (4 ½"IF)	NC 50 (4 ½"IF)	XT57	6 5/8 REG	6 5/8 REG	7 5/8 REG	7 5/8 REG	8 5/8 REG
Activation ball size (in.)	1 1/2	1 1/2	2	2	2	2	2 ½	2 ½	2 ½	2 3/4	2 ½
Locking ball size (in.)	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8
Steel Deactivation ball size (in.)	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4
No. of Balls needed to activate the tool	1	1	1	1	1	1	1	1	1	1	1
No. of Balls needed to deactivate the tool	2	2	2	2	2	2	2	2	2	2	2
Number of cycles [4]	5	4	5	5	5	5	5	5	5	5	5
Number of Cycles remaining w/ Fast Dart in tool	3	2	3	3	3	3	3	3	3	3	4
Flow area through tool (in.2)	1.67	1.67	2.92	2.92	2.92	2.92	4.6	4.6	4.6	5.85	4.6
Port diameter (in.) [5]	1.1	1.1	1.1	1.1	1.1	1.1	1.35	1.35	1.35	1.35	1.35
TFA when tool is open (in.2)	1.901	1.901	1.901	1.901	1.901	1.901	2.863	2.863	2.863	2.863	2.863
Weight (lbs)	380	380	800	880	880	900	1000	1525	1800	1800	2750
Length (ft) [6]	10	9	10	10	10	10	10	10	10	10	10
Tensile strength main body (lbs)	716,000	957,137	1,473,900	1,666,823	1,834,800	2,083,799	2,478,314	2,948,000	4,213,192	4,213,192	7,909,315
Tensile strength connection (lbs)	565,510	909,562	1,181,926	1,195,576	1,196,800	1,620,438	1,369,402	1,476,860	2,248,905	2,248,905	3,284,231
Torsional strength main body (ft-lbs)	28,350	85,047	152,633	175,982	68,653	229,109	333,968	201,433	621,969	621,969	1,365,374
Torsional strength connection (ft-lbs)	35,010	76,089	90,329	91,545	46,340	183,022	127,054	136,310	224,979	224,979	356,199

[1] Standard ID listed, larger IDs are available to accommodate coring balls, reamer balls, and wireline accessories. Minimum tool ID could vary if Activation ball or Dart is used

[2] Alternative PBL® tool end connections may be available on request

[3] Between main body and ball catcher sub

[4] Extended length cages may be available on request

[5] Larger port diameter available on request

[6] The length could vary slightly according to any connection network

[7] 4 ¾ tool with smaller activation ball size (1 ¼ in.) available on request

[8] 6 ¾ tool with smaller activation ball size (1 7/16 in.) available on request

[9] 8 ¼ HF tool with larger ID (2.65 in.) available on request

[10] 3 ¼" HF port tool available on request