

DSI

AN **SBO** COMPANY



**Reducing Your Drilling
Costs, Downtime, and Risks**





DSI: The Leader in Downhole Circulation Technology

With 30 years' expertise, DSI is a global leader in downhole circulation technology, specializing in solutions for drilling, completion, and workover operations. Our flagship product, the PBL® Multiple Activation Bypass System, is a simple yet ingenious patented technology that offers exceptional technical and safety benefits, ensuring enhanced functionality, flexibility, and reliability.

By combining DSI's extensive product specialization with decades of experience, we provide customers with unparalleled technical knowledge and expertise. This offers increased confidence in the security and reliability of our products and services.

The DSI team also leverages the global network of SBO, a premier supplier of tools and equipment for directional drilling and well completions applications. As the global market leader in manufacturing high-precision components from non-magnetic steel, SBO's metallurgical expertise and technological innovation ensure that DSI remains at the forefront of the industry.

Together with our innovative product offerings, we help reduce drilling costs and deliver long-term savings to our customers—over and over.

Commitment to Quality, Health, Safety, and Environment

DSI prioritizes our customers' satisfaction by delivering optimal performance, exceptional reliability, and maintaining a safe work environment. Our commitment to quality, health, safety, and environmental standards is achieved through a combination of key factors:

- A highly trained and experienced team
- Robust and reliable technology
- A strong global focus on service quality
- Comprehensive training for our agents and operators worldwide
- 24/7 technical support
- Proven operational efficiency, with the PBL® system achieving over 99% success rate globally
- Strict adherence to ISO standards, including ISO 9001 (Quality), ISO 14001 (Environment), ISO 45001 (Health and Safety), and ISO 22301 (Business Continuity)

These elements ensure that DSI continues to deliver outstanding service, reliability, and safety across all operations worldwide.

Commitment to Sustainability

DSI is dedicated to leading the energy sector with innovative and reliable solutions, enhancing global energy security while paving the way for a sustainable future. Building on our established core business, we are expanding into renewable energy, mirroring the success we've achieved in traditional energy sectors.

DSI is also at the forefront of sustainable practices, demonstrated by our transition to solar power. Our Dubai, UAE, facility was the first to implement solar panels, with additional installations for facilities in Saudi Arabia, Mexico, and Brazil.

In line with our commitment to reduce global emissions, we are actively expanding our presence in the Geothermal energy market. DSI is already involved in geothermal projects across Europe, Latin America, and Indonesia, driving cleaner energy solutions worldwide.

Our eco-friendly initiatives have not only reduced our environmental footprint but have also offered significant financial benefits. Since the commissioning of our solar panels, we've seen a remarkable 90% reduction in electricity costs by November 2023, and a complete 100% reduction by December 2023.

Efforts to minimize our carbon footprint have led to significant environmental achievements, including the reduction of 164.89 tons of CO² emissions. This is equivalent to saving 15,629 trees, a tangible impact that highlights our progress toward even more ambitious sustainability goals in the future. DSI is committed to driving innovation that helps secure the world's energy future while significantly reducing its environmental impact.

In 2024, we slashed
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We're not just talking about it. We've done it.

Master Your Performance With DSI Solutions

**PBL® Multiple Activation
Bypass System**

Split Flow PBL®

Geothermal PBL®

**Hydraflow®
Burst Disc Technology**

Slimhole PBL®

Booster Tool®

PBL® Patented Technology

The PBL® Multiple Activation Bypass System is the industry-leading circulating sub, designed to enhance operational efficiency with its simple yet reliable technology. This tool diverts 100% of the flow through side ports into the annulus, enabling higher circulation rates and increased Total Flow Area (TFA).

Our patented technology maximizes efficiency across a wide range of operations, including drilling, completion, workover, through-tubing, and decommissioning. The PBL® tool addresses various drilling challenges, such as:

- Displacing high concentrations of Lost Circulation Material (LCM) and Cement to cure drilling fluid loss to the formation without POOH
- Increasing hole-cleaning capacity by boosting AV, particularly when circulation rates are limited, or annular velocities are low

With its proven performance, the PBL® tool is a versatile solution for optimizing drilling operations and overcoming common obstacles in the field.



PBL®: Unique Design Features

The PBL® Multiple Activation Bypass System is engineered for optimal performance in extreme onshore and offshore environments, including high-temperature and high-pressure (HPHT) conditions.

Extreme Environment Compatibility: The PBL® tool is designed for use in challenging environments, including high concentrations of CO² and H₂S, offering unmatched versatility.

Ball or Dart Activation: The tool can be easily activated using a ball or dart, eliminating the need for dedicated personnel on-site, streamlining operations.

Larger Side Ports: The PBL® provides significantly larger side ports compared to other circulating subs on the market, enabling superior LCM capabilities and improved operational performance.

Robust and Simple Design: With fewer moving parts, the PBL® tool offers a rugged and simple design, enhancing reliability and reducing the risk of mechanical failure.

HPHT Seals: Equipped with seals rated for up to 392°F (200°C), the PBL® ensures reliability under extreme HPHT conditions. Higher ratings up to 500°F (260°C) are available upon request.

Safety Feature: The tool's side ports automatically close when pumps are turned off, which eliminates U tubing, and assures well integrity.

These features make the PBL® tool the most reliable, efficient, and robust circulating sub available, delivering superior performance in the harshest drilling environments.



Split Flow PBL[®]

Enhanced Hydraulics with the PBL[®] Dart System

The DSI Split Flow PBL[®] offers precise fluid management during drilling and completion operations. This system allows a pre-calculated portion of drilling or completion fluid to pass through the Split Flow PBL[®] to the bottomhole assembly (BHA), while the remaining fluid is diverted through the tool's side ports.

This design provides:

- Ideal flow rates through sensitive components such as the MWD/LWD, rotary steerable systems, or drilling motors
- Reduced wellbore erosion and steering difficulties since excessive hydraulic power (HSI) is minimized around the bit
- Increased annular velocities and better hole cleaning
- Improved total flow rate during circulating
- Maximum safety because the tool's side ports automatically close when pumps are turned off, which eliminates U tubing, and assures well integrity

The simplicity and reliability of the Split Flow PBL[®] not only improves control over available hydraulics but also helps reduce nonproductive time (NPT), saving valuable rig time and lowering operational costs.



Geothermal PBL®

Harnessing Sustainable Energy

Unlike other renewable energy sources like wind or solar, geothermal energy provides a stable and reliable power source, unaffected by weather fluctuations. Additionally, geothermal installations have minimal visual impact and produce no emissions, making them an important option.

To help harness this sustainable energy source, the DSI Geothermal PBL® Multiple Activation Bypass System is specifically developed for geothermal drilling operations. This tool retains the design simplicity, reliability, and robust performance of the renowned DSI PBL® Multiple Activation Bypass System while incorporating advanced high-temperature-rated elastomer and lubricant technologies to meet the unique demands of geothermal wells.

Available in a wide range of standard sizes from 4¾ to 9½ inches, the Geothermal PBL® can also be customized for larger or smaller sizes based on specific project requirements. The tool is currently offered in multiple temperature categories:

- Standard temperature applications (up to 392°F/200°C)
- Custom high-temperature solutions for operations exceeding 500°F/260°C, tailored to specific client needs

With its proven track record and geothermal-specific enhancements, the Geothermal PBL® is positioned to support cleaner, more efficient energy production while reducing both operational challenges and environmental impacts.

Slimhole PBL®

Tailored for Coiled Tubing and Through-Tubing Applications

The Slimhole PBL® tool is specifically designed for coiled tubing and through-tubing operations, offering all the capabilities of the Standard PBL® tool in a more compact form. Featuring a three-port configuration, it delivers industry-leading TFA for superior hole cleaning, whether in conventional or unconventional applications such as the plug-and-perf technique.

By enhancing hole-cleaning efficiency in scenarios where pump rates are constrained by high pressure, the PBL® tool eliminates the need for short trips. This not only reduces fatigue on coiled tubing and saves rig time but also significantly extends its operational life, making it an ideal choice for demanding wellbore conditions.

Booster Tool

Enhanced Split-Flow Efficiency while Drilling

The Booster Tool is designed for split-flow applications, offering multiple nozzle configurations to direct part of the drilling fluid through the tool to the BHA, with the remainder flowing through side ports into the annulus.

This design enables:

- Ideal flow rates through sensitive components such as the MWD/LWD, rotary steerable systems, or drilling motors
- Prevention of excessive hydraulic power (HSI) around the bit, minimizing wellbore erosion and steering difficulties
- Lower surface pump pressure and ECD at the same flow rate
- Higher flow rates at same surface pump pressure
- Increased annular velocities and better hole cleaning
- Improved total flow rate while still circulating through and cooling sensitive BHA components

Field-interchangeable jetting nozzles are angled uphole from tool axis to boost annular fluid velocity, minimizing wellbore erosion and optimizing hole cleaning. The tool's fluted main body features a wear-resistant coating on exterior contact areas, increasing durability and reducing wellbore interaction and vibration.

These combined features make the Booster Tool a more reliable and robust solution, designed to withstand the demands of drilling operations while maximizing performance and durability. The Booster Tool provides operators with an effective method to improve fluid dynamics and enhance hole cleaning during drilling.



PBL[®] Multiple Activation Jetting Tool

Optimized Cleanout Efficiency

The PBL[®] Multiple Activation Jetting Tool is an innovative addition to the standard BHA, designed to streamline cleanout operations and minimize rig time. By incorporating this tool, operators can efficiently clean inside the blowout preventer (BOP) and riser without the need for additional trips, significantly reducing operational costs.

This tool features an outer spiral sleeve equipped with up to 30 nozzles, enabling high-velocity jetting with 360° coverage. This ensures thorough cleaning without the need to rotate the drillpipe, enhancing operational efficiency and making it a valuable addition to any BHA configuration.



PBL® Sliding Sleeve Big Bore [SSBB] System

Enhanced Retrievability and Versatility

The SSBB System is designed for drilling operations that require the retrievability of Radioactive (RA) sources from the BHA below the circulation sub. The System delivers all the functionality of the standard PBL® Tool with added versatility. A larger internal ID and the elimination of the ball catcher cage improve efficiency and reliability, enabling easy retrieval of components and unlimited open/close cycles for greater flexibility and control.

The SSBB System is the ideal solution for applications requiring both the reliability of the PBL® tool and the added capability of maintaining through-bore, making it a valuable asset in complex drilling environments.

HydraFlow®

The ‘Differential’ Makes the Difference

DSI's HydraFlow® is a cutting-edge, hydraulically activated tool, building on the legacy of the renowned PBL Through-Tubing multiple activation bypass tool. Designed for Coiled Tubing Drilling & Completion operations, HydraFlow® offers unlimited cycling without the need for balls, darts, RFID chips, or electronic pulses. Its differential activation and de-activation system ensures smooth, instant activation without any delay, while maintaining a full bore.

By bypassing 100% of the flow, the HydraFlow® tool ensures optimal hole cleaning by isolating flow through today's sophisticated downhole tools. This reduces the pressure loss in the BHA, achieved simply by cycling the pumps without the need for any activation medium. These versatile features make HydraFlow® an ideal solution for maximizing efficiency and performance in complex coil tubing operations.

PBL® Burst Disc Technology

Ensuring Circulation and Well Control

Integrating the HPHT Burst Disc into the lower section of the PBL® Multiple Activation Bypass System provides an additional layer of protection during drilling operations. Positioned in the lower section of the tool, the Burst Disc is designed to address common challenges such as BHA or bit pack-off, offering extreme differential pressure capability on both sides.

In the event of a pack-off or circulation loss, the Burst Disc creates an alternate flow path, restoring circulation. The operator can then regain full control of the well through the activation of the PBL® tool.

Activation Options

Tailored for Operational Needs

We offer multiple activation mechanisms to meet varying operational requirements. For most applications, the patented ball activation method is the simplest and most reliable solution, providing easy and efficient tool operation.

This flexibility ensures operators can select the activation option best suited to their specific needs, enhancing the versatility and performance of the tools across a wide range of drilling applications



Standard Ball

Reliable Activation for Multiple Tools

The standard ball used for activation is designed for most applications, withstanding temperatures of up to 260°C (500°F). The suitability of the ball may vary based on the specific PBL® tool size, so it is recommended to contact a DSI representative for further details. The ball has a density of 1.34 sg (11.2 ppg), making it compatible with various operational environments.

The Standard Ball allows the activation of the following products:

- Booster Tool
- Multiple Activation Jetting Tool
- PBL® Multiple Activation Bypass System



Fast Ball

For Challenging Applications

The Fast Ball is a denser activation ball, specifically designed for use in high-angle well applications where high mud weights and high temperatures are present. With a density of 2.50 sg (20.9 ppg) and a temperature resistance of up to 260°C (500°F), the Fast Ball is ideal for more demanding drilling environments.

The Fast Ball allows the activation of the following products:

- Booster Tool
- Multiple Activation Jetting Tool
- PBL® Multiple Activation Bypass System



Fast Dart

High Mud Weight and Packed-Off Situations

The heavy, gravity-activated Fast Dart is used in demanding drilling environments, such as when high mud weights and/or packed-off situations prevent circulation. It allows for rapid activation through a gravity drop, reducing activation time compared to standard balls. The Fast Dart can descend by gravity alone in wells with an inclination of up to 55°. For wells with an inclination up to 90°, the dart can be pumped down, making it a versatile solution for various well conditions.

The Fast Dart allows activation of the following products:

- Multiple Activation Jetting Tool
- PBL® Multiple Activation Bypass System



Split Flow Dart

Optimized Fluid Management

The Split Flow Dart allows drilling fluid to be directed both through the BHA and into the annulus, providing a customizable fluid split based on operational needs. The percentage of fluid directed to the BHA and annulus can be adjusted using in-house hydraulic modeling software, tailored to meet customer-specific requirements.

Whether enhancing hole cleaning while cooling the BHA or drilling with improved ECD management, the Split Flow Dart ensures greater control over fluid distribution during operations.

The Split Flow Dart allows activation of the following product:

- Split Flow PBL®



Wireline Retrievable Dart

Unlimited Activation and Retrievability

The Wireline Retrievable Dart is an advanced activation option that eliminates the need for a ball catcher cage, allowing for unlimited activation and deactivation cycles. This dart is particularly useful in operations where retrieval of RA sources or probes from the BHA below the tool is required, offering enhanced flexibility, and operational control.

The WRD allows activation of the following product:

- Sliding Sleeve Big Bore System

You Name It, We Have Done It!

Proven Applications of Our Industry-Leading Tools in Drilling, Completion, and Intervention Applications

- LCM cement and/or any aggressive pill displacement
- Wellbore cleanout
- Increased flow rates beyond critical limits
- Fluid displacement during workover and completion
- Slimhole and through-tubing applications
- Stuck pipe scenarios
- Acidizing and stimulation
- Underbalanced drilling (UBD)
- Managed pressure drilling (MPD)
- Openhole jetting
- Special application coring techniques
- Fixed cutter/bi-center bits or hole enlargement applications (underreaming)
- Subsea riser, wellhead, and BOP jetting
- Tripping dry pipe
- Autofilling drillstring while RIH
- Reverse circulation
- Plug and perforate
- Shocking pipe to remove scale and debris
- Split the flow while cleaning
- Split the flow while drilling

Reliable Support, Every Step of the Way

From well-planning to completions, we are here to assist with any circulation-related queries, whether it's within our portfolio or not. Our efficient R&D team is ready to provide customized solutions tailored to your specific needs. With 24/7 technical and operational support, you can rely on us to keep your operations running smoothly.



Worldwide Service

The DSI team is available to help service customers' needs worldwide. With offices in Europe, Africa, the Middle East, Asia, and the Americas, we are available to meet to discuss your applications and drilling problems, providing you with custom solutions. In addition, we can access the global network of SBO.



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