

# DIFFUSER™ SUB ASSEMBLY

**Patent-pending Diffuser Blade Technology that Ultimately Reduces the Expenditure of LCM and Mud**



Drilling Tools International's (DTI) patent-pending Diffuser Blade Technology has met the challenge of diffusing aggregations of lost circulation materials ( LCM ) during the drilling process, protecting the MWD from damage or failure during the process, and reducing the expenditure of costly LCM and mud.

Designed to stay in the drill string on every run, DTI's external and internal DSAs place blades/cutters into the fluid path. They process high-flow rates and heavy concentrations of LCM while effectively filtering the drilling mud, enabling accurate mud pulse telemetry communications, and reducing the risk of failing MWD/LWD/RSS components.

## Advantages of External DSA

- Higher flow rates than other standard internal and external filters
- Channels the mud flow externally through the diffuser blades across the screen, exiting through the ID of the filter
- Caged bottom screen can withstand the highest flow rates based on CFD analysis
- Extra filter length provides long-lasting filtering benefits
- 2-3x more storage capacity prior to bypassing through the ID
- Filter gauge is 2x thicker than competitors' filter across all sizes
- Made of high strength stainless steel

## Advantages of Internal DSA

- Builds on the industry standard downhole filter design by including our *patent pending Diffuser Blade Technology*
- Mud flow enters the filter ID, internally, and is forced through a series of offset blade configurations
- Effectively breaks up clumps of LCM, cement, pipe scale and other foreign material
- Robust filter body easily withstands standard flow rates for long hours even with high solids content, high mud weight or high LCM concentrations
- Internal diffuser element comes in two (2) sizes, 24" and 36" lengths, both utilizing the same filter sub design

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## SPECIFICATIONS

| EXTERNAL DSA                         |                       |                       |                  |                  |
|--------------------------------------|-----------------------|-----------------------|------------------|------------------|
| Sub OD/ID (in)                       | 9.5 x 3.0             | 8.25 x 3.0            | 6.75 x 2.813     | 4.75 x 2.0       |
| Flow Limits (GPM)                    | 1,600                 | 1,600                 | 950              | 600              |
| Sub Dimensions (in)                  | 9.5 OD x 120 L        | 8.25 OD x 120 L       | 6.75 OD x 120 L  | 4.75 OD x 88 L   |
| Connections                          | 7 7/8 Reg – Box x Pin | 6 7/8 Reg – Box x Pin | NC50 – Box x Pin | NC38 – Box x Pin |
| Make-up Torque (ft/lbs)              | 88,580                | 50,704                | 32,277           | 9,987            |
| Torsional Yield (ft/lbs)             | 141,728               | 81,126                | 63,050           | 17,577           |
| Tensile Strength (lbs)               | 2,661,823             | 1,748,938             | 1,535,789        | 816,783          |
| Bending Strength Ratio               | 2.815                 | 2.989                 | 2.367            | 1.802            |
| Diffuser Screen Length (in)          | 55                    | 55                    | 55               | 45               |
| Screen Mesh (in)                     | 0.250                 | 0.250                 | 0.250            | 0.187            |
| Diffuser Capacity (in <sup>3</sup> ) | 418                   | 418                   | 351              | 101              |
| Sub Capacity (in <sup>3</sup> )      | 735                   | 735                   | 541              | 182              |
| Flow Area – Sub (in <sup>2</sup> )   | 5.94                  | 5.94                  | 2.54             | 1.43             |
| Bypass Flow Area (in <sup>2</sup> )  | 2.4                   | 2.4                   | 2.4              | 1.32             |
| INTERNAL DSA                         |                       |                       |                  |                  |
| Sub OD/ID (in)                       | 9.5 x 3.0             | 8.25 x 3.0            | 6.75 x 2.813     | 4.75 x 2.0       |
| Flow Limits (GPM)                    | 1,600                 | 1,600                 | 950              | 600              |
| Sub Dimensions (in)                  | 9.5 OD x 92 L         | 8.25 OD x 92 L        | 6.75 OD x 92 L   | 4.75 OD x 88 L   |
| Connections                          | 7 7/8 Reg – Box x Pin | 6 7/8 Reg – Box x Pin | NC50 – Box x Pin | NC38 – Box x Pin |
| Make-up Torque (ft/lbs)              | 88,580                | 50,704                | 32,277           | 9,987            |
| Torsional Yield (ft/lbs)             | 141,728               | 81,126                | 63,050           | 17,577           |
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| Bending Strength Ratio               | 2.815                 | 2.989                 | 2.367            | 1.802            |
| Diffuser Screen Length (in)          | 36                    | 36                    | 36 and 24        | 36 and 24        |
| Screen Mesh (in)                     | 0.313–0.250           | 0.313–0.250           | 0.313–0.250      | 0.250            |
| Diffuser Capacity (in <sup>3</sup> ) | 130                   | 130                   | 130 / 90         | 50 / 35          |
| Sub Capacity (in <sup>3</sup> )      | 540                   | 540                   | 398 / 276        | 176 / 123        |
| Flow Area – Sub (in <sup>2</sup> )   | 7.1                   | 7.1                   | 6.21             | 3.14             |
| Bypass Flow Area (in <sup>2</sup> )  | 2.4                   | 2.4                   | 2.4              | 1.32             |

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Drilling Tools International, Inc. is a leading provider of downhole tools to the land and offshore drilling markets. For more than 30 years our company has been guided by the principals of Strength, Innovation and Performance. We consistently deliver world class customer service while providing quality products that meet the demanding drilling applications of today's market.

Our Quality Management System is certified in compliance to ISO 9001, and API Spec Q1 and our manufacturing is licensed to API Spec 7-1. Our Quality Management System governs all of our processes from planning, to process control, to delivery. This ensures that we consistently manufacture products that not only meet API standards but also meet the ever-changing needs of our customers.