

## RESERVOIR DESCRIPTION TOOL (RDT™) FORMATION TESTER

## Dual-Port Straddle Section

## DUAL-PORT STRADDLE SECTION

A paradigm shift has occurred in medium to low-permeability environments using the Reservoir Description Tool (RDT™) formation tester combined with the Dual-Port Straddle Packer (SPS). In the past, dual packers were not considered the first choice for sampling in medium to low-permeability formations as the sample quality obtained was poor.

The RDT Dual-Port Straddle Section uses controllable screen ports positioned at the top and the bottom of the annular interval. This spacing allows for the interval to be drained to take full advantage of segregation in the annular volume and obtain clean samples. Producing true radial flow, the Dual-Port SPS is also the best choice for mini DST and microfrac operations.

## SEAMLESSLY COMBINED WITH RDT TOOL

When flexibility and versatility is required, the RDT tool will collect in a single deployment formation pressure, fluid ID, and samples. The Dual-Port SPS is one of the many options that can be combined as part of the RDT tool string and the combination of probes. It can be designed to cover all your pressure and sampling needs in a single run.

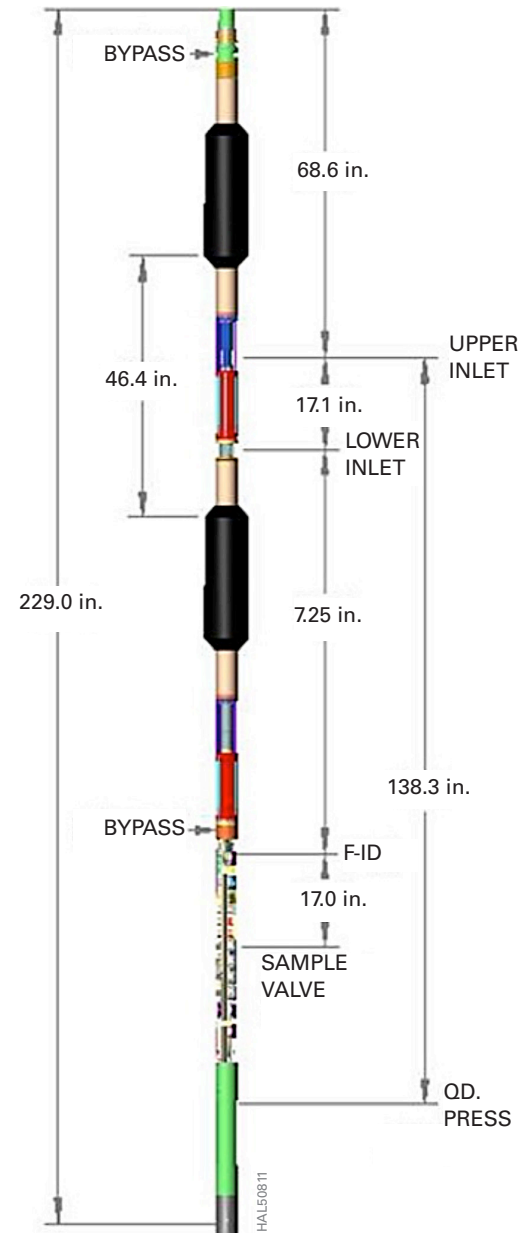
## LARGE FLOW AREA

The advantage of the Dual-Port SPS is the increased flow area which enables faster flow rates and the ability to sample in very low-permeability environments. Dual-Port SPS should be used to flow a low-permeability formation while minimizing the drop in formation pressure during sampling. With a standard 1-m and 3-m spacing with dual-port capability, the RDT straddle packer can straddle a desired interval and lower perm environments or fractured or laminated zones.

## DUAL-PORT SAMPLING

Dual-port sampling opens up a new opportunity for sampling with straddle packers. The control of the flow from the upper and lower annular interval enables the mud and contamination to be drained to the bottom of the interval and the upper port to sample the segregated fluid. In the case of immiscible fluids, such as oil or gas sampling in water-based mud where the heavier phase is the contamination, the ability to sample high-quality hydrocarbon samples is possible in a very short period of time. In many cases, sampling using the Dual-Port SPS is faster than any other method for premium quality samples.

In a miscible system, such as oil, in oil-based mud, the Dual-Port SPS advantage improves the sample quality in low-permeability environments as it separates the mud in the sump from the desired fluid and improves contamination significantly.



## FOCUSED FLOW INTERVALS

Upper and lower sections of the borehole may be flowed sequentially or at the same time by full surface control of the port. Dual pump with industry-leading pump rates can flow from both the upper and lower interval on an isolated flow patch to generate a focused flow interval.

## FLOW CONTROL PUMP SECTIONS (FPS)

The total performance of a system is limited by the weakest link and collecting of clean fluid samples requires the best-in-class pump modules. The RDT flushing pumps are proven to be the most versatile with a full range of differential pressures and the highest horsepower and the fastest rates.

## MINI DST AND MICROFRAC

The RDT Dual-Port SPS can perform using true radial flow-extended buildup for mini DST and microfrac operations. The Dual-Port SPS has a wide range of applications for more extensive test programs and opens up new design possibilities.

## Dimensions and Ratings

|                        |                      |
|------------------------|----------------------|
| <b>Max Temperature</b> | 350°F (177°C)        |
| <b>Max Pressure</b>    | 20,000 psi (138 MPa) |
| <b>Min OD*</b>         | 4.75 in. (12.07 cm)  |
| <b>Length**</b>        | 19.08 ft (5.82 m)    |
| <b>Weight</b>          | 858 lb (389 kg)      |

\* Tool OD Depending on Packer

\*\* Length for Standard Configuration

## Borehole Conditions

|                                  |   |   |   |   |
|----------------------------------|---|---|---|---|
| <b>Borehole Fluids</b>           | Salt <input checked="" type="checkbox"/>        | Fresh <input checked="" type="checkbox"/> | Oil <input checked="" type="checkbox"/> | Air <input checked="" type="checkbox"/> |
| <b>Recommended Logging Speed</b> | Stationary                                      |   |   |   |
| <b>Tool Positioning</b>          | Centralized <input checked="" type="checkbox"/> |   |   |   |

## Hardware Characteristics

|                               |   |
|-------------------------------|---|
| <b>Inlet Ports</b>            | Upper/Lower (Screened and Controlled)   |
| <b>Inlet Spacing</b>          | 17.1 in. (Standard) 88.0 in. (Optional Extenders)   |
| <b>Packer Spacing</b>         | 46.4 in. (Standard) 117.3 in. (Optional Extenders)  |
| <b>Packer Hole Size</b>       | 5 <sup>7</sup> / <sub>8</sub> in. to 14 in. (14.9 cm to 35.6 cm) Packer Element Selection |
| <b>Packer Hydraulic Fluid</b> | Filter Mud  |

Measurement

| Quartz Gauge Pressure Transducers |                     |
|-----------------------------------|---------------------|
| Accuracy                          | Resolution          |
| +/- 0.02% full scale              | 0.01 psi (0.07 KPa) |
| Strain Gauge Pressure Transducers |                     |
| Accuracy                          | Resolution          |
| +/- 0.1% full scale               | 0.2 psi (1.4 KPa)   |
| Fluid Resistivity                 |                     |
| Accuracy                          | Resolution          |
| 10% full scale                    | 0.02 ohm-m          |
| Fluid Temp                        |                     |
| Accuracy                          | Resolution          |
| 3% full scale                     | 0.02°F              |

Physical Strengths

| Hardware    | Tool Joints             |
|-------------|-------------------------|
| Tension     | 200,000 lb (90,719 kg)* |
| Compression | 200,000 lb (90,719 kg)* |
| Torque      | 600 ft-lb (813 N-m)*    |

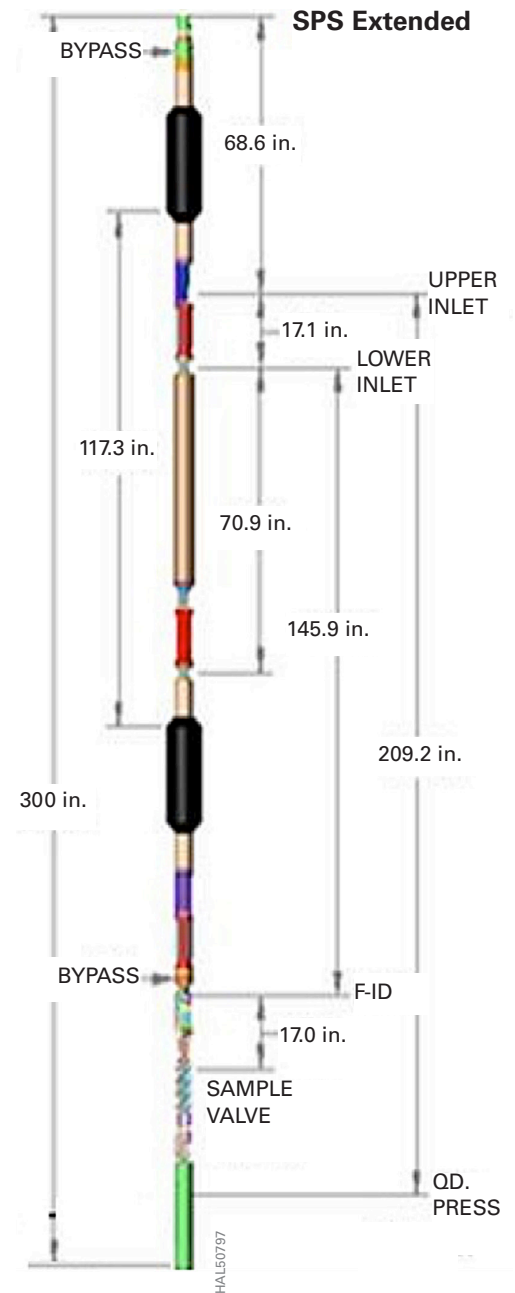
\* Strengths apply to new tools at 70°F (21°C) and 0 psi.

SPS Extended

|                     |                   |
|---------------------|-------------------|
| Length*             | 25.0 ft (7.62 m)  |
| SPS Spacer Length** | 70.9 in. (1.8 cm) |

\* Tool Length with One Spacer

\*\* Spacer Quantity is Unlimited



Dual-Port SPS Available Packer List

| Packer Name | OD (in.) | Min Run OD (in.) | Suggest Run OD (in.) | Max Temp (°F) | Target Hole Size (in.) | Min Hole (in.) | Max Hole (in.) |
|-------------|----------|------------------|----------------------|---------------|------------------------|----------------|----------------|
| 5.06HT      | 5.06     | 5.30             | 5.450                | 350           | 6.00                   | 5.7            | 7.25           |
| 5.06LT      | 5.06     | 5.30             | 5.7-6.5              | 250           | 6.00                   | 6.0            | 7.25           |
| 5.50HT      | 5.50     | 6.0              | 6.5-7.0              | 350           | 7.875                  | 6.0            | 8.0            |
| 5.50LT      | 5.50     | 6.0              | 6.5-7.0              | 250           | 7.875                  | 6.0            | 8.0            |
| 6.19HT      | 6.19     | 6.69             | 7.0-7.5              | 350           | 8.50                   | 7.0            | 9.0            |
| 6.19LT      | 6.19     | 6.69             | 7.0-7.5              | 250           | 8.50                   | 7.0            | 9.0            |
| 7.00HT      | 7.00     | 7.75             | 8.0-9.0              | 350           | 8.50                   | 8.0            | 10.5           |
| 7.00LT      | 7.00     | 7.75             | 8.0-9.0              | 250           | 8.50                   | 8.0            | 10.5           |
| 7x9HT       | 9.0      | 9.75             | 11.0-13.0            | 350           | 12.25                  | 10             | 13.5           |
| 7x10LT      | 10.0     | 11.0             | 11.25-13.5           | 250           | 12.25                  | 11.25          | 14.5           |
| 10HT        | 10.0     | 10.75            | 11.0-14              | 350           | 12.25                  | 11             | 14.5           |

Drawdown Pressure

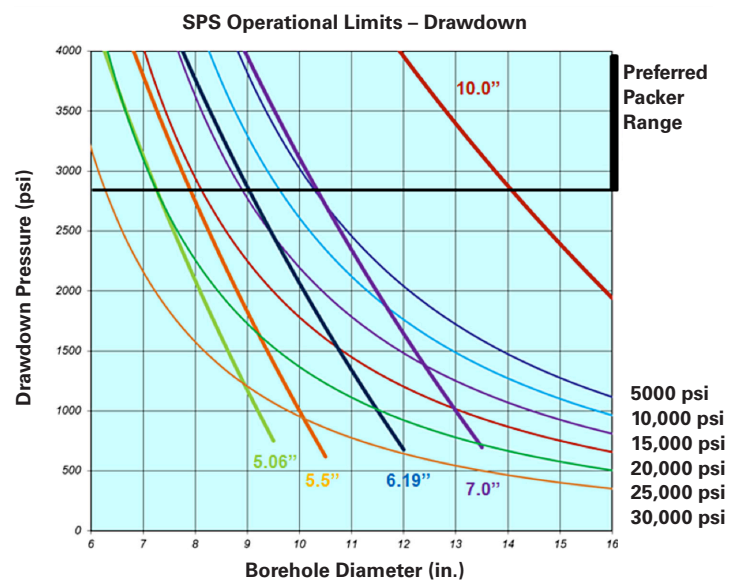
| Hole Size (in.) | Packer OD (in.) | Packer Limit | 5000 | 10000 | 15000 | 20000 | 25000 | 30000 |
|-----------------|-----------------|--------------|------|-------|-------|-------|-------|-------|
| 6               | 5.06            | 4324         |      |       |       |       |       | 3190  |
| 8½              | 6.19            | 3303         |      |       | 3154  | 2560  | 1965  | 1371  |
| 8½              | 7               | 4500         | 4343 | 3749  | 3154  | 2560  | 1965  | 1371  |
| 10⅝             | 9               | 3954         | 2718 | 2346  | 1974  | 1602  | 1230  | 858   |
| 12¼             | 9               | 2716         | 1953 | 1685  | 1418  | 1151  | 884   | 616   |
| 12¼             | 10              | 3670         | 1953 | 1685  | 1418  | 1151  | 884   | 616   |

Limit set at lowest value based on hydrostatic pressure

SPS Standoffs Selection According to Packer Size

| Packer Size (in.) | Standoffs Required |
|-------------------|--------------------|
| 5.06              | None               |
| 6.19              | 7 in.              |
| 7.00              | 7.5 in.            |
| 9.00              | 10 in.             |
| 10.0              | 11 in.             |

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