The Express™ circulating valve is a full-opening, annulus pressure-operated, recloseable circulating valve for use in cased holes. This tool is operated by repeatedly cycling annulus pressure up to a predetermined value and then releasing this pressure. A specific annulus pressure sequence moves the tool from the well testing position to the circulating position when necessary. The Express circulating valve consists of several major systems. The nitrogen section includes a gas-charged accumulator that stores the operating pressure used to shift the tool. The amount of nitrogen in the tool depends on well hydrostatic pressure (fluid weight and depth) and downhole temperature. This information is necessary to properly prepare the tool for operation.

The upper hydraulic section controls the transition of the tool from the well testing position to the circulating position. The operating and control mechanisms are contained in a closed oil system that is used to isolate these mechanisms from well fluids and to transmit applied annulus pressure to the nitrogen section.

The circulating ports and ball valve work together to isolate the formation while spotting or reversing out fluid through the circulating valve. The circulating ports cannot open until the ball valve closes. A blank position is interposed between the well testing and circulating positions.

**Features and Benefits**

- Permits fluid circulation and pressure testing of the string in conjunction with testing tools
- Allows an unlimited number of pressure cycles on the annulus without shifting out of the well test position (unless a specific annulus pressure sequence is applied)
- Allows additional annulus pressure operated tools to be operated without interfering with the position of the Express circulating valve
- Imposes no cycle limitation on the well test program
- Decreases the time required to move from the well testing position to the circulating position and return to the test position
- Allows an unlimited number of pressure cycles
**Operation**

The Express™ circulating valve is operated by cycling the annulus pressure whereby a pressure increase to a specified value is followed by a pressure decrease of that same value. While the Express circulating valve is in the well test position, application of annulus pressure at intervals of time greater than a specified period will not move the tool out of the well test position. Moving out of the well test position is accomplished by applying annulus pressure twice within a specified period. Once the tool has shifted out of the well test position, it requires only a minimum waiting period between annulus pressure cycles until it returns to the test position. The sequence can be repeated as often as desired.

### Express™ Circulating Valve

<table>
<thead>
<tr>
<th>Nominal Tool Size in.</th>
<th>OD in. (cm)</th>
<th>ID in. (cm)</th>
<th>Thread Connections</th>
<th>Service Temperature* °F (°C)</th>
<th>Length in. (cm)</th>
<th>Tensile Rating** lb (kg)</th>
<th>Working Pressure*** psi (bar)</th>
<th>Circulating Flow Area in.² (cm²)</th>
<th>Number of Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 7/8</td>
<td>3.90 (9.91)</td>
<td>1.80 (4.57)</td>
<td>2 7/8 CAS</td>
<td>450 (204)</td>
<td>438.66 (1114.20)</td>
<td>175,000 (79380)</td>
<td>15,000 (1034)</td>
<td>3.61 (23.29)</td>
<td>4</td>
</tr>
<tr>
<td>5.00</td>
<td>5.00 (12.7)</td>
<td>2.28 (5.79)</td>
<td>3 7/8 CAS</td>
<td>450 (204)</td>
<td>371.65 (944.00)</td>
<td>.371,458 (168493)</td>
<td>15,000 (1034)</td>
<td>3.61 (23.29)</td>
<td>6</td>
</tr>
</tbody>
</table>

Meets requirements of NACE-0175 (>175°F)

*Service temperature up to 450°F (dressed with 600 series o-rings and PEEK™ backup seals)

**The values of tensile, burst, and collapse strength are calculated with new tool conditions, Lame's formulas with Von-Mise's Distortion Energy Theory for burst and collapse strength, and stress area calculations for tensile strength.

***Pressure rating is defined as the differential pressure at the tool. (Differential pressure is the difference in pressure between the casing annulus and the tool ID.)

Note: Operational characteristics of other annulus pressure responsive tools run in conjunction with the Express™ Circulating Valve should be considered.

These ratings are guidelines only. For more information, consult your local Halliburton representative.

PEEK is a trademark of ICI Americas, Inc. Poly-Ether-Ether-Ketone.

---

For more information on the Express™ Circulating Valve contact your local Halliburton representative or email us at welltesting@halliburton.com

© 2012 Halliburton. All rights reserved. Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.