Super Seal II® MR Valve Float Equipment (Mechanically Retained)

At a time when the global demand for oil and gas is on the rise, the industry is faced with meeting that demand by overcoming increasingly difficult challenges. Recovering hydrocarbon from new discoveries requires innovative solutions to overcome challenges such as ultra-high temperature in order to make drilling and production monetarily viable.

The Halliburton Cementing product service line is dedicated to making drilling and production economically viable. One of the ways that is exemplified is through Halliburton's casing equipment technology.

The SPE E&P glossary states that high temperature is where the undisturbed bottom hole temperature (at prospective reservoir depth or total depth) is greater than 300°F (150°C). At 500°F (260°C), ultra high temperature, the undisturbed bottom hole temperature exceeds the capabilities of most standard floating equipment.

Halliburton has designed a cementing float valve that can work in ultra-high temperature well environments. Utilizing the field proven technology of the Super Seal II® poppet valve engineering, Halliburton offers float valve options to meet 500°F (260°C) wells with valves capable of holding pressure of up to 10,000 psi (68.9 MPa).

High Temperature Aluminum Poppet Valve

The unique design feature of the high temperature aluminum Super Seal II® MR poppet valve is a mechanically retained sealing element custom molded for the target environment. The MR case body includes a sealed valve seat which increases pressure ratings at higher temperatures.

Applications
- High temperature well environments up to 500°F (260°C)
- High differential pressures under higher temperatures after landing displacement plugs
- Long strings
- Geothermal wells

Benefits
- Float equipment check valve offers cased well integrity in Ultra HPHT well environments
- Expands the opportunity to drill wells at deeper and higher temperatures with quality float equipment to support the well designs
- Provides shoe joint integrity

<table>
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<tr>
<th>Classifications</th>
<th>Borehole Temperature</th>
<th>Halliburton Float Valve Options</th>
<th>Valve Back-Pressure Rating</th>
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<tr>
<td>HP/HT</td>
<td>&gt;300°F (150°C) - 350°F (177°C)</td>
<td>Super Seal II® collars and shoes</td>
<td>10,000 psi</td>
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<tr>
<td>Extreme High Temperature / High Pressure</td>
<td>&gt;350°F (177°C) - 400°F (204°C)</td>
<td>Super Seal II® collars and shoes</td>
<td>10,000 psi</td>
</tr>
<tr>
<td>Ultra High Temperature / High Pressure</td>
<td>&gt; 400°F (204°C) and above</td>
<td>Super Seal II® HPHT collars and shoes</td>
<td>10,000 psi</td>
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<td></td>
<td></td>
<td>Super Seal II® MR Valve collars and shoes</td>
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Features

- Poppet Valve, Valve Stem, and Valve Body are made from high grade temperature resistant Aluminum
- Aluminum valve components allow for higher material strengths at higher temperatures and pressures
- Same flow areas and flow rates as Super Seal II float valves
- Rated up to 500°F (260°C)
- Available in 2 1/4-in., 2 3/4-in., and 4 1/4-in. valve designs
- Available in most casing grades and casing thread combinations
- Available for tubing and casing sizes 2 7/8-in. through 13 3/8-in.
- Available in matched float shoe and float collar designs
- Aluminum tapered and offset tapered aluminum noses available as float shoe nose options
- Double valve available in 7-in. and larger casing sizes
- O-ring seal in valve seat allows for pressure seal not reliant on just the concrete bond
- Auto-fill capability as an option
- PDC drillable
- Based on field proven Super Seal II Poppet Valve design

For more information on Super Seal II® MR Valve Float Equipment, contact your local Halliburton representative or email cementing@halliburton.com.