Hydraulic RED - Remotely Operated Equalizing Device
Saves time and helps reduce risk by removing interventions from well operations

Overview
The Hydraulic RED valve is a retrievable well barrier that is deployed in the closed position and subsequently opened by remote command.

It is run below a lock or bridge plug and is capable of containing pressures of up to 10,000 psi in either direction until opened. It is suitable for use in virtually any type of well operation where a temporary downhole barrier is required.

By remotely opening the Hydraulic RED valve, an intervention is eliminated from the operation reducing rig-time and all the associated risks.

Features and Benefits
- **Remote Single-Shot Activation**
  Run closed, then opened at any time by applying a predetermined pressure over a predetermined time - providing operational flexibility and saving time. Once opened, the device cannot be re-closed.

- **Hydraulic Mechanism**
  Can be left downhole virtually indefinitely before being opened. Ideal for operations where the well is abandoned for long periods.

- **Operates via Pressure Signals**
  Ideally suited to long reach and highly deviated wells where access or retrieval is difficult.

- **Repeated Tests to Maximum Pressure**
  Can be tested to the maximum pressure rating as often as required - without the risk of accidental activation.

- **Flexibility**
  Range of pressure testing does not need to be predetermined - ideal for operational program flexibility.

- **Flow-Through**
  Once opened, the large flow area allows the well to be brought on stream without the need to pull the device.

Operation
Key to the operation of the Hydraulic RED valve is the pressure discriminator mechanism. This effectively 'locks' the device until the predetermined pressure/time window is met, i.e., the command to open is applied.
The “command to open” pressure/time band is typically set between 2,000 - 2,500 psi and is held for 10 minutes (this may vary slightly depending on downhole conditions). When these conditions are met, the device will open. To prevent opening, the operator simply prevents the opening pressure/time combination from occurring.

In order to define the operating window, an overview of the well conditions (pressure differential across the device and well temperature) is required. This is done prior to the device leaving our workshop so no pre-installation set-up is required at the wellsite.

ISO V1 Qualification
The Hydraulic RED valve has been developed in accordance with procedures approved by ISO 9001/2000 and subjected to a comprehensive and extensive testing regime. Testing covered a wide range of simulated downhole conditions, and detailed performance characteristics were established and verified through multiple repeat testing.

**Applications**
The Hydraulic RED valve can be used in a wide range of differing applications:
- Shallow set for tree testing and change out
- Deep set for packer setting and tubing testing
- Zonal isolation
- Subsea plugging jobs where intervention costs are high
- Extended reach or horizontal wells where retrieval of carrying device may prove problematic
- Pressure testing of well prior to fracturing or stimulation operations being carried out
- Where the tubing test pressure should not be exceeded in order to open the equalizing device
- Plug and abandonment operations when the well is temporarily (indefinitely) shut in

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**Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Tool Size 1.800</th>
<th>Tool Size 3.250</th>
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</thead>
<tbody>
<tr>
<td>Tool Size in.</td>
<td>1.800</td>
<td>3.250</td>
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<tr>
<td>Max OD in. (mm)</td>
<td>1.800 (46)</td>
<td>3.250 (83)</td>
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<tr>
<td>Overall Length in. (mm)</td>
<td>74.25 (1,886)</td>
<td>66.62 (1,692)</td>
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<tr>
<td>Minimum Flow Through Area in² (cm²)</td>
<td>0.785 (5.06)</td>
<td>3.144 (20.28)</td>
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<tr>
<td>Max Working Pressure Differential psi (bar)</td>
<td>10,000 (689.48)</td>
<td>10,000 (689.48)</td>
</tr>
<tr>
<td>Operating Temperature Range °F (ºC)</td>
<td>32 - 302 (0 - 150)</td>
<td>32 - 302 (0 - 150)</td>
</tr>
<tr>
<td>Overbalance Handling psi (bar)</td>
<td>200 (13.79) or customer specified</td>
<td>1,200 (82.74) or customer specified</td>
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Due to the high number of design variables, the information given below is for guidance only. Your Halliburton representative will be able to provide further details.

**Primary Materials**

<table>
<thead>
<tr>
<th>Metallurgy</th>
<th>AISI 420 Modified (13% Chrome) Stainless Steel (or customer specified)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elastomers 1.8 Version</td>
<td>Viton RD90 (or customer specified)</td>
</tr>
<tr>
<td>Elastomers 3.25 Version</td>
<td>HNBR RD90 ED Resistant (or customer specified)</td>
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For more information about the Hydraulic RED, contact your local Halliburton representative or email completions@halliburton.com.

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