eRED® - Electronic Remote Equalizing Device

SAVES TIME AND HELPS REDUCE RISK BY REMOVING INTERVENTIONS FROM WELL OPERATIONS

OVERVIEW
The eRED® valve is a retrievable, computer-controlled ball valve that can be repeatedly opened and closed by remote command. Neither connections to the surface or interventions are required to communicate with and operate the valve.

It is deployed below either a lock or bridge plug and can be used as a downhole barrier or flow control device. With each use of the eRED valve, an intervention is eliminated from the operation dramatically reducing rig-time and associated risks.

HOW THE eRED VALVE WORKS
The eRED valve has integrated pressure and temperature sensors to monitor the well conditions and is pre-programmed to either open or close whenever a specified condition (known as a trigger) is detected.

The triggers use a variety of well parameters including ambient pressure, temperature, time or surface-applied pressure. Each time a trigger is detected, the eRED valve will react by either opening or closing as per its instructions. This process can be repeated time-and-time again without any form of intervention.

Controlling the eRED Valve by Remote Command
By applying a defined pressure for a defined time at surface, the operator can activate the Pressure Window Trigger. This allows direct communication to the eRED valve so it can be remotely operated. For example, applying between 1,000 - 1,500 psi for 10 minutes could instruct the eRED valve to open.

Any pressure applied outside the defined values will be ignored by the eRED valve. This means that pressure can be applied to the tubing (for tubing integrity tests or packer setting, etc.) without risk of inadvertent activation.

FEATURES
» Remotely operated time-after-time
» Long battery life
» Run open or closed
» Extensive run history
» No dedicated personnel required

BENEFITS
» Removes multiple wireline runs from operations - saving time, money and helping reduce risk
» Operational for at least 10 months - for use in temporary abandonment operations or as a flow control device
» Provides flexible deployment options and well control
» Extremely reliable, field-proven technology, used by the world’s major oil producers
» Reduces the number of operations personnel - saving costs and helping reduce risk
Onboard data analysis allows the eRED valve to distinguish its own commands from other external factors such as naturally fluctuating hydrostatic or reservoir pressure. This enables the eRED valve to behave as planned, even if the downhole conditions change unexpectedly.

**The eRED Valve Can Also Operate Independently**

A range of other triggers consisting of ambient well pressure, ambient well temperature and a timer are also available. These triggers are used to provide a pre-programmed sequence for the eRED valve to follow without input from the surface.

All the different trigger types can be used independently or in conjunction with each other to build more elaborate instructions. For example, the eRED valve could be set to close when it detects bottomhole flowing pressure lower than 1,000 psi, but only after 100 days downhole.

In addition the Pressure Window Trigger can be used to manually cancel or override any trigger or permanently lock the eRED valve in its current position.

**APPLICATIONS**

Any application where a wireline plug is used can be replaced by an eRED valve, achieving the same results but without repeated interventions, saving on rig-time and associated costs and risks. Often, more than one eRED valve is deployed in a single operation multiplying the benefits.

- Packer setting device
- Deep-set barrier in extended reach or horizontal wells
- Shallow-set for tree testing and change out
- Completion deployment as the annulus short string plug
- Liner deployment with external swellable elastomer
- Barrier in temporary abandonments or light well intervention operations
- Barrier in TCP gun firing and stimulation operations
- Self-actuating flow control device
- Shut-in tool for pressure build-up tests with reduced interventions

**Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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<tbody>
<tr>
<td>Available Sizes (OD)</td>
<td>2.250&quot;, 3.250&quot;, 4.250&quot;</td>
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<tr>
<td>Maximum Differential Across Ball</td>
<td>10,000 psi (689 bar)</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>0 - 140˚C (32 - 284˚F)</td>
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<tr>
<td>Maximum Differential Pressure While Opening</td>
<td>6,000 psi (414 bar)</td>
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The eRED valve is available in a range of sizes and specifications. Due to the high number of design variables, the information given above is for guidance only.

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com