

Hydraulic Remote Equalizing Device

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

OVERVIEW

The Hydraulic Remote Equalizing Device (Hydraulic RED) is typically run as an integral part of a plugging assembly, such as a wireline lock or retrievable bridge plug. This intelligent equalization device allows the operator to perform any number of pressure tests above or below the device up to its maximum rating, with the added ability to remotely open at any time when desired, providing maximum flexibility in fixed or changing conditions.

Deployed closed, typically below a carrier device, such as a lock, bridge plug or retrievable packer, the Hydraulic RED acts as a pressure-retaining barrier capable of containing pressures of 10,000 psi in either direction until opened. Once opened, the device cannot be re-closed.

Applying a predetermined pressure for a predetermined time opens the device — if pressure/time conditions are outside the prescribed window, the Hydraulic RED remains closed.

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

OPERATION

Key to Hydraulic RED operation is the pressure discriminator mechanism, which 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/timeband is typically set between 2,000 and 2,500 psi and held for 10 minutes (this pressure/timeband might vary slightly depending on downhole conditions). When these conditions are met, the device opens. To prevent opening, the operator simply prevents the opening pressure/time combination from occurring. To define the operating window, an overview of the well conditions (i.e., pressure differential across the device and well temperature) is required. The operating window is defined and the device programmed before it leaves the workshop, so no pre-installation set-up is required at the rig site.

ISO V1 QUALIFICATION

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



Hydraulic RED

APPLICATIONS

The Hydraulic RED 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 the carrying device might prove problematic
- » Well pressure testing prior to fracturing or stimulation operations
- » Where the tubing test pressure should not be exceeded to open the equalizing device
- » Plug and abandonment operations when the well is temporarily (indefinitely) shut in

BENEFITS

- » Remotely open at any time, providing program flexibility and time savings
- » Run-in closed and can remain downhole virtually indefinitely before opening
- » Range of pressure testing does not need to be predetermined, providing operational program flexibility
- » Once opened, the large flow-through area allows well production to begin without pulling the device
- » Adaptable to changing well conditions
- » Remote operation helps reduce wireline runs and save time, resulting in advanced production revenue
- » Ideally suited to conditions where sand/debris accumulation is expected above, helping eliminate intervention risks

FEATURES

- » Remote activation by applying a predetermined pressure over a predetermined time
- » Hydraulic mechanism
- » Repeated tests to maximum pressure without premature activation risk
- » Operational flexibility
- » Large flow-through area
- » Debris tolerant

Specifications

Tool Size in.	Maximum OD in. (mm)	Overall Length in. (mm)	Minimum Flow-Through Area in. ² (cm ²)	Max Working Pressure Differential psi (bar)	Operating Temperature Range °F (°C)	Overbalance Handling psi (bar)
1.800	1.800 (46)	74.25 (1886)	0.785 (5.06)	10,000 (689.48)	32–302 (0–150)	200 (13.79) (or customer specified)
3.250	3.250 (83)	66.62 (1692)	3.144 (20.28)	10,000 (689.48)	32–302 (0–150)	1,200 (82.74) (or customer specified)

Due to the high number of design variables, the information provided is for guidance only. Detailed information is available upon request.

Primary Materials

Metallurgy	Elastomers 1.8 Version	Elastomers 3.25 Version
AISI 420 modified (13% Chrome) stainless steel (or customer specified)	Viton™ * RD90 (or customer specified)	HNBR RD90 explosive decompression (ED) resistant (or customer specified)

*Viton™ is a trademark of The Chemours Company FC, LLC.

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