



Weatherford[®]

**Cement Plug
Placement and Integrity**
Mechanical Cementing Service



Technology, Technique, Trust

When it becomes necessary to plug and abandon a well or sections of the wellbore with multiple cement barriers, Weatherford offers you reliable and cost-effective methods. Each component of our comprehensive portfolio of products and solutions is designed for safe and economical placement of high-integrity cement plugs.

P&A integrity for lasting peace of mind requires:

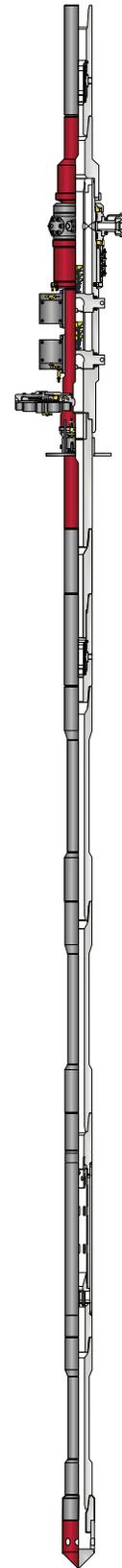
- A competent cement plug
- Reliable barriers for zonal isolation
- Successful execution and placement of a cement plug on the first attempt

Complete Solutions, Total Confidence

The Weatherford mechanical, total-systems approach to cement-plug placement combines our top-drive cementing head, superior dart catcher tool, uniquely designed darts, and diverter shoe for the ultimate cement plug package. With this system, you can not only meet the challenge of correct placement of high-quality cement, but also reduce the number of trips required to set multiple cement plugs in the same wellbore, while avoiding cement contamination.

Reasons to choose our total-systems approach to P&A:

- The top-drive cement head can launch multiple darts that enable isolation of cement from displacement fluids to prevent cement contamination.
- Pipe rotation during the cementing operation improves placement of cement plugs.
- Pressure spikes at the surface give a clear indication of fluid placement.
- The diverter shoe is designed to optimize mud removal and cement placement in the wellbore.



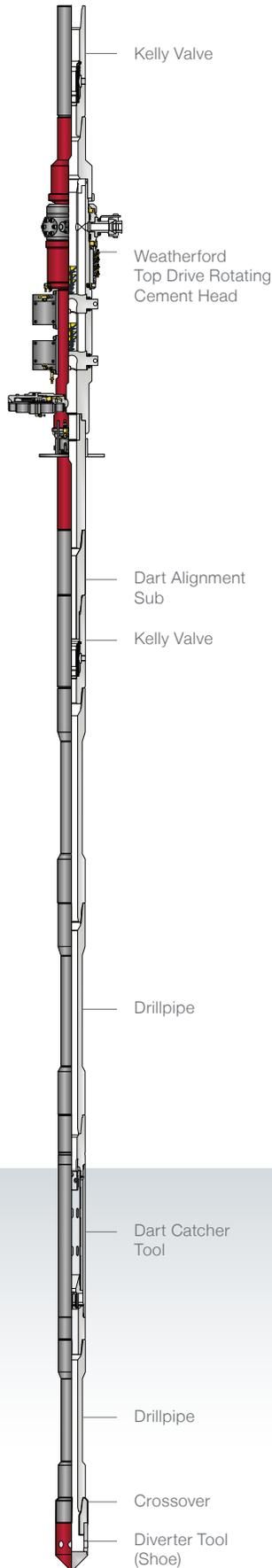




METHOD 1

Multiple, Cement-Plug System

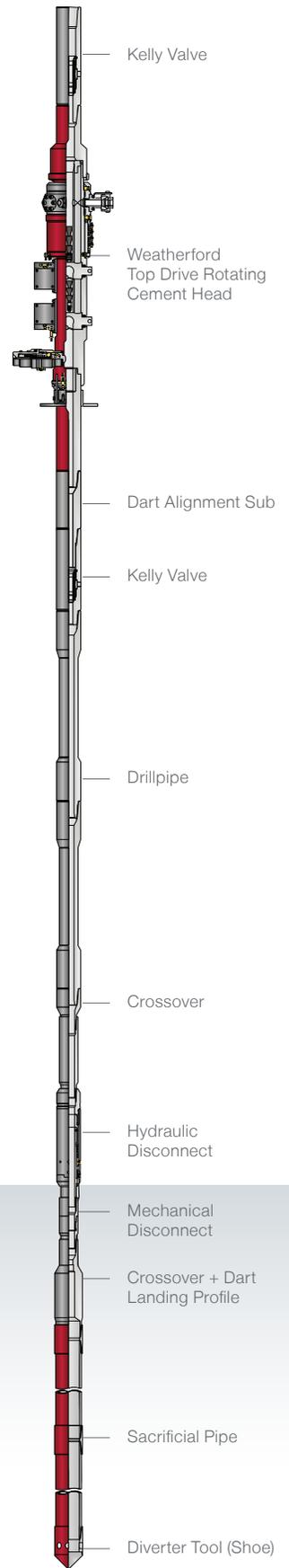
The Weatherford mechanical, total-systems approach is ideal for setting a single cement plug or multiple cement plugs in open hole or cased hole using a surface-dart launcher, a subsurface dart catcher capable of catching up to six darts, and a diverter tool. To minimize the swabbing effect after the cement-plug placement, Weatherford uses a tail pipe longer than the required length of the cement plug below the dart catcher.



METHOD 2

Cement-Plug System with Sacrificial Tail Pipe System

Our cement plug system with a sacrificial tail pipe is for setting a single cement plug with a planned disconnect from the sacrificial/drillable tail pipe or other tubulars. This system should be considered for use in extreme downhole conditions requiring minimal disturbance of the cement plug after placement.

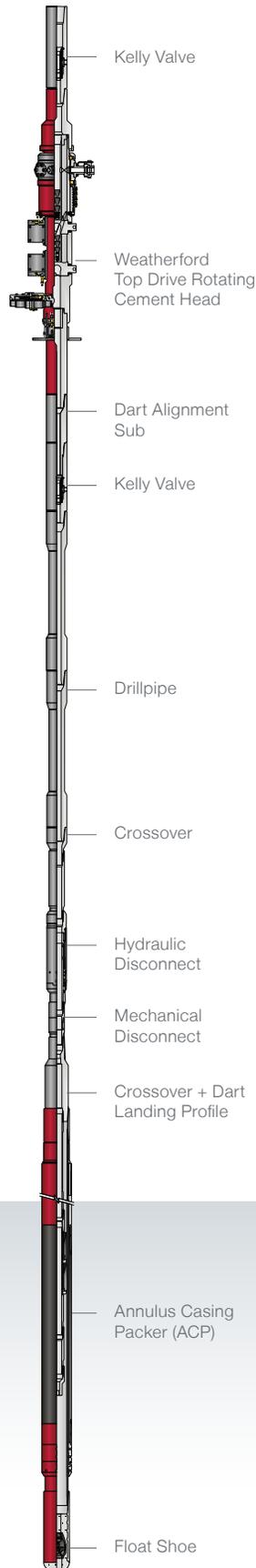




METHOD 3

Permanent Isolation Barrier System

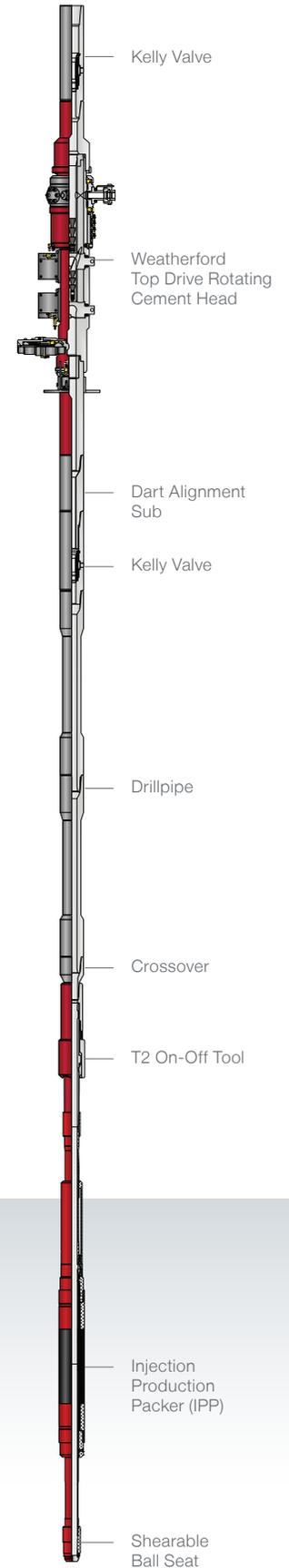
This system is for setting a single cement plug or multiple cement plugs after deployment of the Annulus Casing packer (ACP) in an open hole or cased hole. The first planned cement plug placement will be run after deploying an ACP either as a hydraulic-set openhole plugback to set the cement plug on top of the packer, or as a hydraulic-set cased-hole packer used as an inflatable bridge plug/cement retainer. Additional plugs could be set conventionally if required.



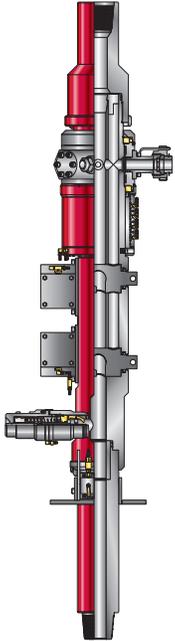
METHOD 4

Temporary or Permanent Isolation Barrier System

This system is for setting a single cement plug or multiple cement plugs after deployment of the IPP in an open hole or cased hole. The comparably smaller OD of this system allows for quicker downhole deployment. In addition, the IPP can go through tighter restrictions and provide higher pressure differential ratings when set. The first planned cement plug placement will be run after deploying an IPP either as a hydraulic-set openhole plugback to set the cement plug on top of the packer, or as a hydraulic-set cased-hole packer used as a temporary or permanent inflatable bridge plug/cement retainer. Additional plugs could be set conventionally down the work string if required.



Reliable components make for a reliable system



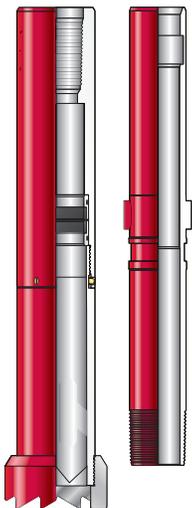
Weatherford Top Drive Rotating Cement Heads

Weatherford top drive cementing heads are available in a variety of configurations including remote control, high rpm capabilities, extreme tensile loading, and 6-dart launching capability. Remote-control activation allows you to release setting balls and drillpipe darts without breaking running-string connections or pausing cementing, rotation, or displacement operations. The ability to deploy multiple darts eliminates the need to lay down the dart-launching equipment to reload and reassemble into the work string. This functionality is especially significant when you plan to perform several cement-plug placements in a single trip.



Dart-Catcher Tool

Used during cementing operations, the Weatherford dart-catcher tool identifies the precise location of a cement plug displacement: When an indicating dart is pumped behind the cement slurry, it passes through a restriction inside the tool and creates a pressure increase, which is detected at the surface and enables precise cement control.



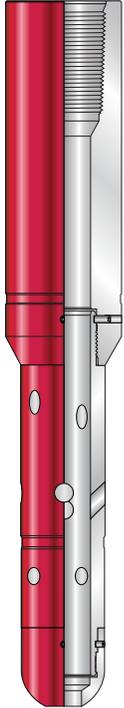
T-2 On-Off Tool

The T2 on-off tool enables users to disconnect the tubing string above a packer for zonal isolation, tubing retrieval, and temporary zone abandonment. The tool contains an internal lock profile for landing a wireline plug to provide zonal isolation below the packer.



Annulus Casing Packer

The Weatherford discontinuous Bulldog™ annulus casing packer (DBD) is designed to be run as an integral part of the casing string. This premium inflatable packer assembly provides an annular seal between the casing and the wellbore or a previously installed casing string. The DBD is inflatable with drilling mud, water, or cement; and the discontinuous ribbed element provides maximum expansion of up to 3-1/2 times the run-in diameter for effective isolation in washout, elliptical hole shapes, and soft or unconsolidated formations.



Diverter Shoe

The diverter shoe is designed to optimize mud removal and cement placement in the wellbore. Diversion of the fluid flow into the wellbore through multiple diverter ports allows for more effective mud removal and results in a high-integrity cement plug.



Hydraulic Disconnect

The Weatherford hydraulic disconnect is a reliable coupling used to disconnect the tubing from tools to be left downhole. It is used in deviated or horizontal holes or any other situation in which the coupling can be appropriately disconnected by applying hydraulic pressure rather than by rotating the tubing. Hydraulic activation eliminates the need for mechanical manipulation of the string and provides a simple and reliable operation.



Mechanical-Rotate Disconnect

When used in conjunction with the hydraulic disconnect, the mechanical disconnect provides redundancy in the release of inflatable packers or tail pipe, which ensures recovery of the work string. The mechanical disconnect requires rotational release, typically in wells with lower deviation.



Injection Production Packer Heavy-Duty Rotation Release

The Weatherford injection production packer (IPP) heavy-duty rotation release is a field-proven, extremely versatile, downhole service tool that can be installed in either cased or openhole wells on a temporary or long-term basis. Designed to be inflated, deflated, and retrieved one time per run, the IPP heavy-duty rotation release can be redressed at the rig site for additional runs.

Sacrificial Tail Pipe

After cement placement, the sacrificial pipe is released and left in place. Weatherford uses drillable fiberglass tubing or operator-supplied tubing string for the tail pipe when it will not be pulled from the cement plug.

To learn more about our plug-and-abandonment solutions, contact an authorized Weatherford representative or visit weatherford.com/cementing.



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