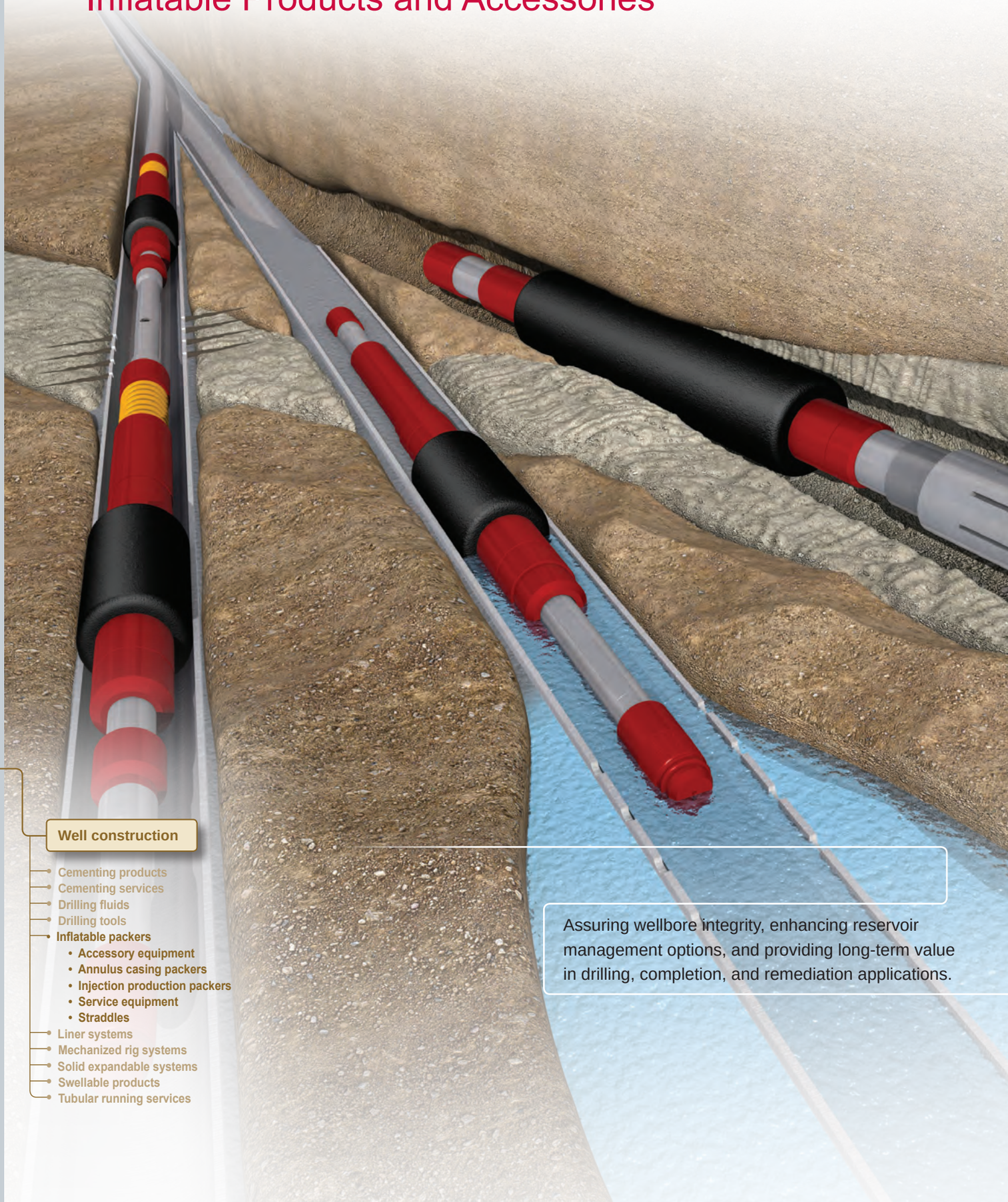
Weatherford®

Inflatable Products and Accessories



Drilling

Evaluation

Completion

Production

Intervention

Well construction

- Cementing products
- Cementing services
- Drilling fluids
- Drilling tools
- **Inflatable packers**
  - **Accessory equipment**
  - **Annulus casing packers**
  - **Injection production packers**
  - **Service equipment**
  - **Straddles**
- Liner systems
- Mechanized rig systems
- Solid expandable systems
- Swellable products
- Tubular running services

Assuring wellbore integrity, enhancing reservoir management options, and providing long-term value in drilling, completion, and remediation applications.

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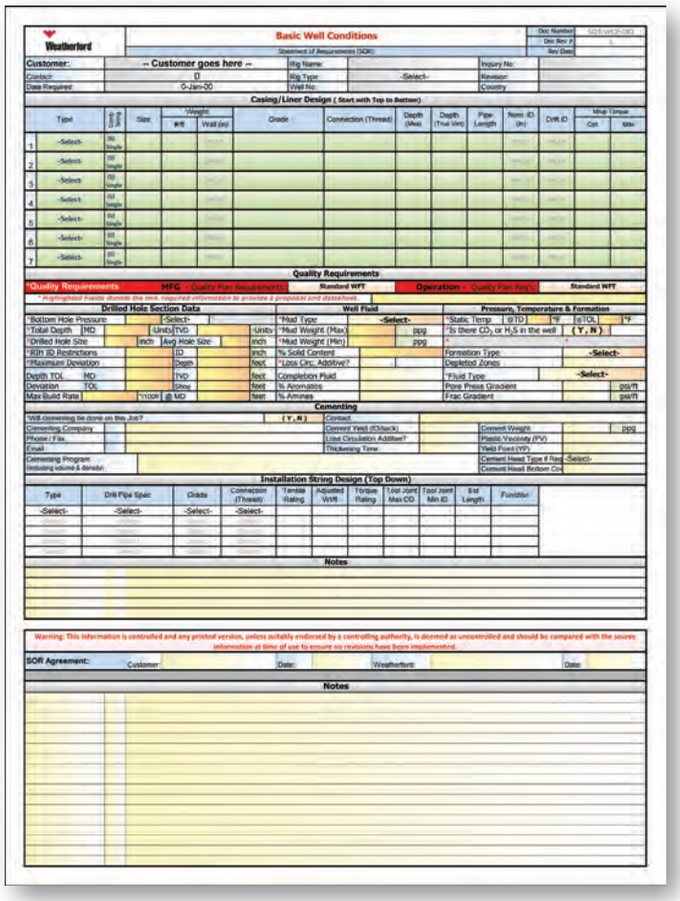
Introduction

Performance When it Counts

With a proven 40-year history of experience and expertise, Weatherford's inflatable packer technologies deliver strong performance when it counts.

Weatherford has amassed a portfolio of inflatable products designed to provide reliable zonal isolation for numerous applications including water/gas shutoff, production segmentation, openhole testing, selective stimulation and acidizing and plug and abandonment. We continually develop products and apply technologies to meet current operational environments, including deep water, shale, geothermal and gas storage. The industry's need to mitigate risks, improve well integrity and reduce well construction costs drives our investment in engineering, manufacturing and personnel.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Basic Well Conditions

Customer: -- Customer goes here --

Casing/Liner Design (Start with Top to Bottom)

Quality Requirements

Drilled Hole Section Data

Well Fluid

Pressure, Temperature & Formation

Cementing

Installation String Design (Top Down)

Notes

SOR Agreement:

Notes

Statement of Requirements (SOR) well path is input prior to each job to assure well specific job design.

Pre-Job Planning and Execution

Weatherford provides not just products, but complete operational and technical support. Our seasoned technical support group provides pre-job planning, written procedures and job installation services. We work with you to gather information, develop a well plan and coordinate the installation plan at the job site to ensure optimal results. Furthermore, we conduct a post-job assessment to verify we've met your objectives, logging your feedback into our Weatherford performance tracking system (WPTS) database to reinforce best practices.

Total System Compatibility

In addition to providing inflatable products and services, Weatherford offers highly complementary products which integrate into a complete system such as our liner hangers, sand screens, cementing tools, multilaterals and casing exits, and production equipment. This total system capability lowers risk and eliminates the hassle of dealing with multiple sources and incompatible components, leading to single-source efficiency and accountability.

Our Portfolio

Weatherford's inflatable packer technology is field proven and custom engineered for specific applications, providing superior zonal isolation and reducing well construction costs and risks.

Our comprehensive portfolios of inflatable packers and accessories are built to address quality-critical applications the world over.

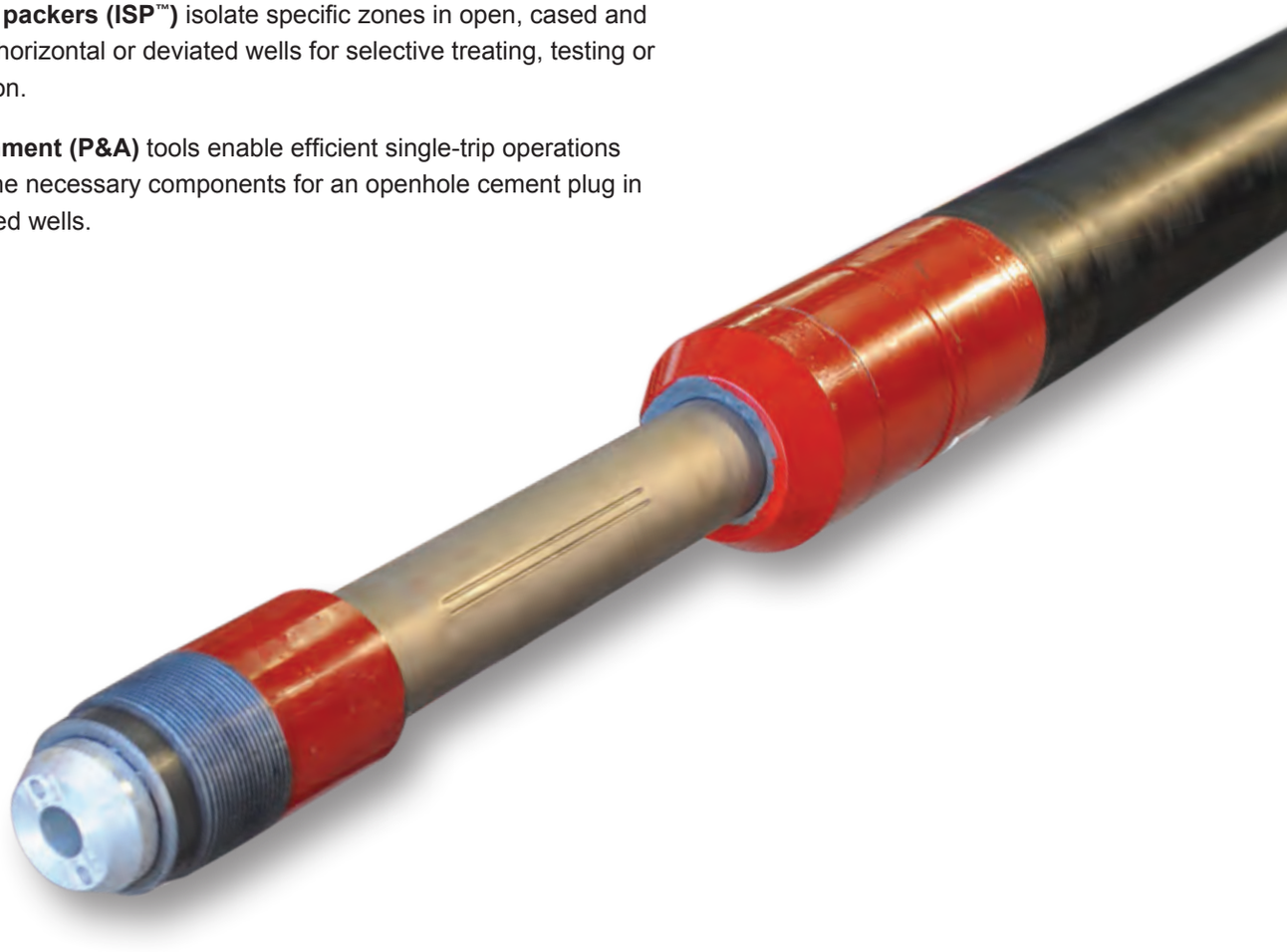
Annulus casing packers (ACP™) deliver a permanent, reliable high-pressure seal that provides immediate results to eliminate annular flow for the life of the well while maintaining casing integrity.

Stage cementing tools enable cementing of a casing string or liner in two or more stages, enhancing safety and efficiency, reducing costs and improving well construction integrity.

Injection production packers (IPP™) provide versatility for testing, remedial or abandonment applications while offering temporary or permanent zonal isolation with the largest expansion ratio of any packer type in the industry.

Inflatable straddle packers (ISP™) isolate specific zones in open, cased and perforated holes in horizontal or deviated wells for selective treating, testing or production evaluation.

Plug-and-abandonment (P&A) tools enable efficient single-trip operations by providing all of the necessary components for an openhole cement plug in horizontal or deviated wells.



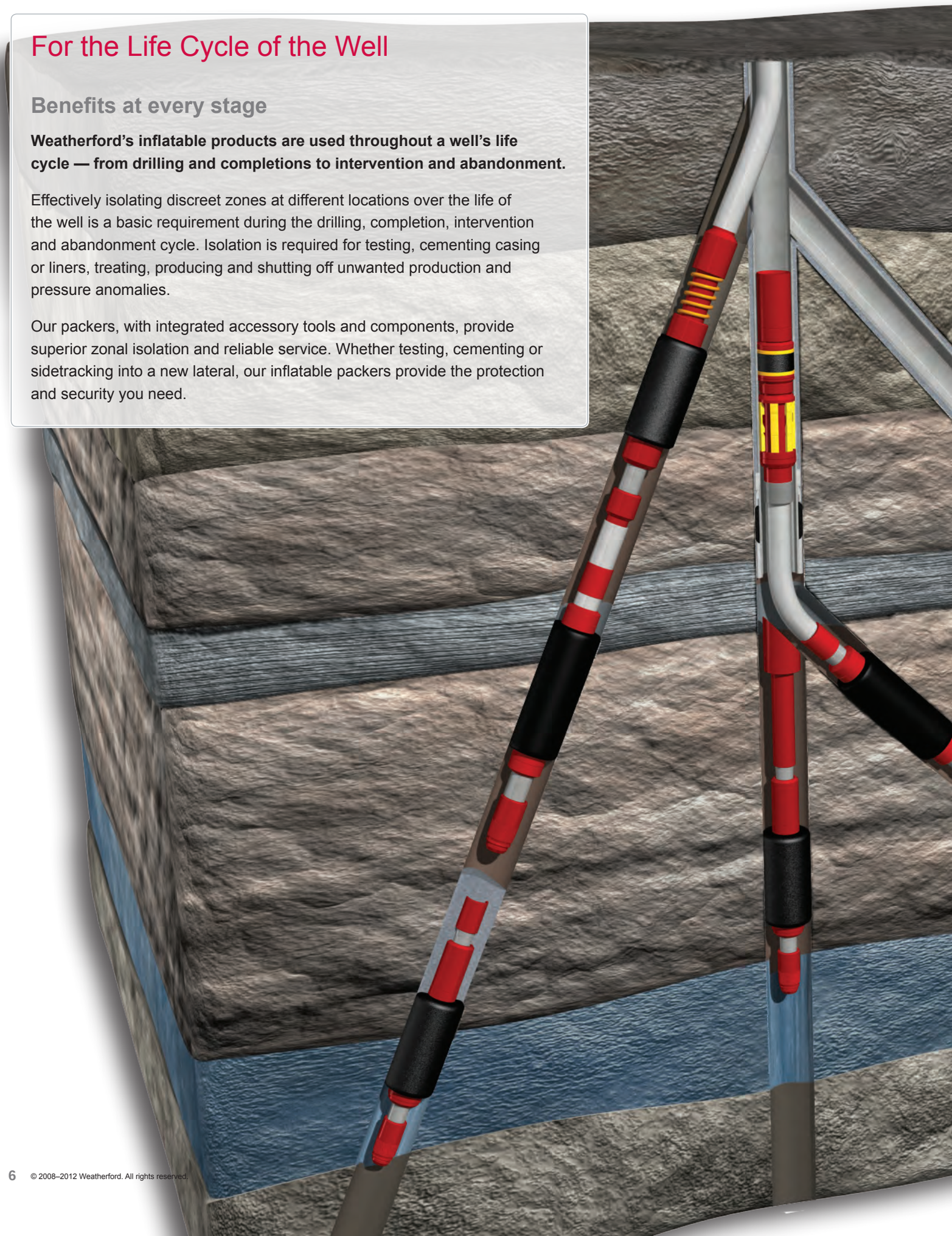
For the Life Cycle of the Well

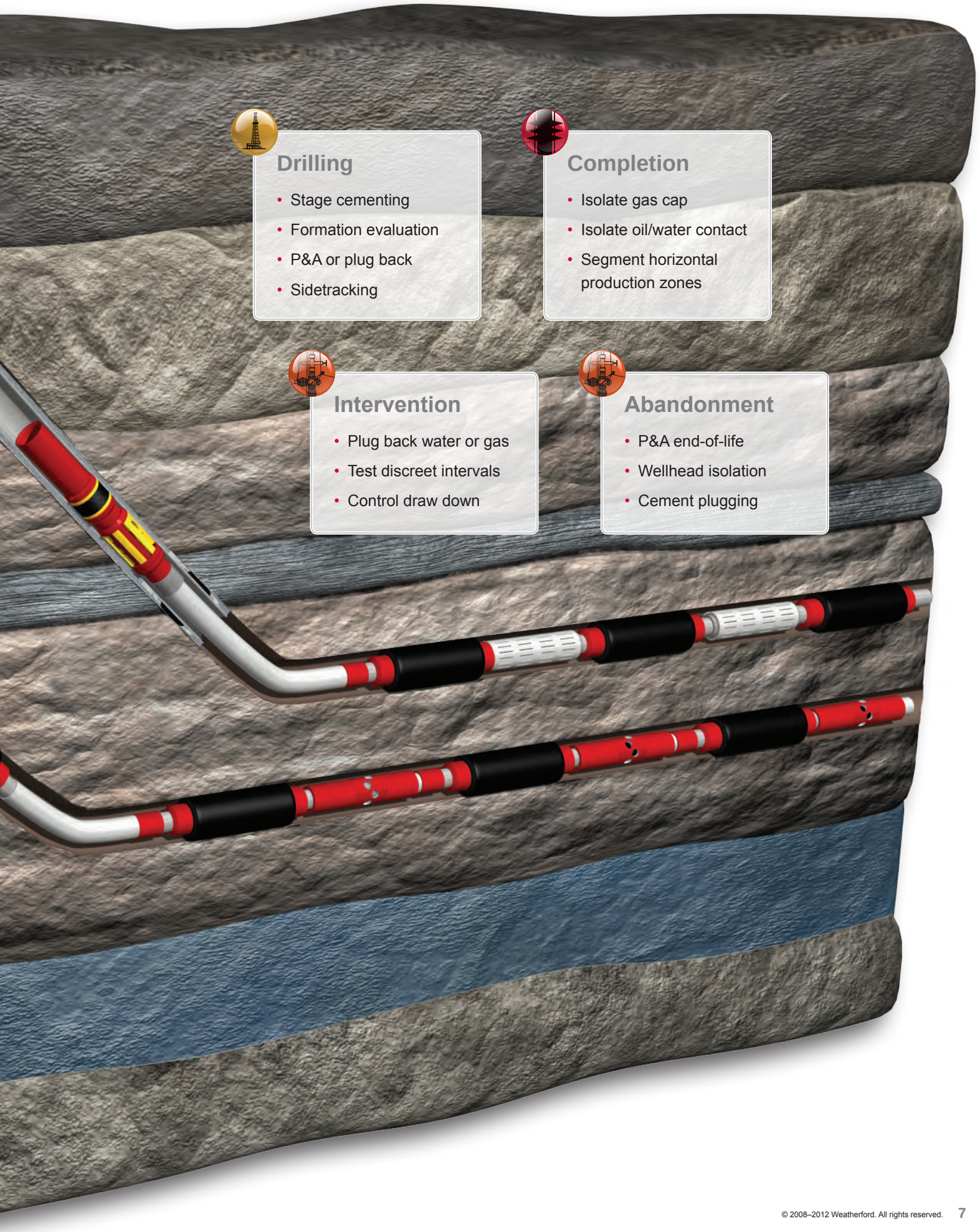
Benefits at every stage

Weatherford's inflatable products are used throughout a well's life cycle — from drilling and completions to intervention and abandonment.

Effectively isolating discreet zones at different locations over the life of the well is a basic requirement during the drilling, completion, intervention and abandonment cycle. Isolation is required for testing, cementing casing or liners, treating, producing and shutting off unwanted production and pressure anomalies.

Our packers, with integrated accessory tools and components, provide superior zonal isolation and reliable service. Whether testing, cementing or sidetracking into a new lateral, our inflatable packers provide the protection and security you need.





Drilling

- Stage cementing
- Formation evaluation
- P&A or plug back
- Sidetracking

Completion

- Isolate gas cap
- Isolate oil/water contact
- Segment horizontal production zones

Intervention

- Plug back water or gas
- Test discreet intervals
- Control draw down

Abandonment

- P&A end-of-life
- Wellhead isolation
- Cement plugging


EMPOWERING
EXCELLENCE
Weatherford

Annulus Casing Packers (ACP™)

Introduction

Weatherford's BULLDOG™ *ACP* annulus casing packers are built on a solid foundation of proven experience and expertise in packer engineering, manufacturing and operational services.

Continuous and discontinuous *BULLDOG ACP* systems include reliable, field-proven elements that provide consistent zonal isolation protection and security, even under the most severe conditions. The application-specific elements provide resistance to temperatures up to 375°F (191°C) and corrosive fluids and gases while maintaining excellent strength and elastomeric properties.

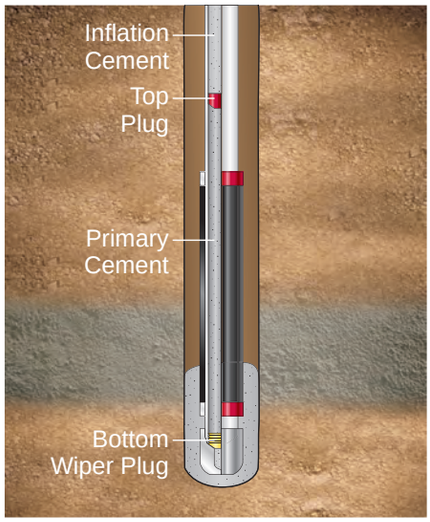
Our industry-exclusive, proprietary wire-locking design provides added durability that secures the valve assembly, sleeve and other components to the mandrel without any pressure-containing welds. Suitable for cased or open hole in horizontal and vertical applications, *BULLDOG ACP* inflatables offer cost-effective solutions to cementing, completion and production concerns. Typically built on a mandrel equivalent to well casing, *BULLDOG ACP* packers maintain burst, collapse and tensile integrity throughout the casing section.

Bulldog ACP systems can be inflated with water, cement, or drilling fluids.

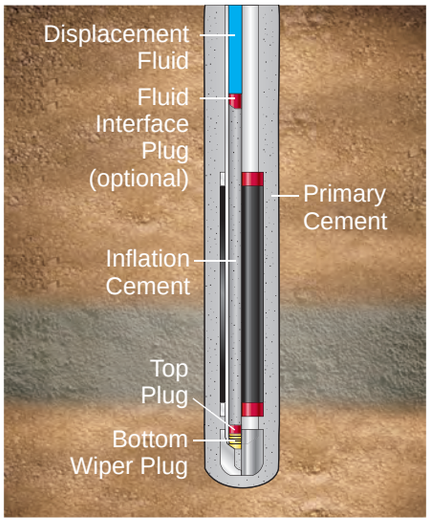
ACP Cement Inflation Sequence

BULLDOG™ *ACP* valve systems are controlled by a positive differential pressure from the casing that actuates the inflation valve. To apply pressure, a plug or dart is pumped through the casing following the primary cement until it reaches a pre-installed plug seat. If cement inflation is desired, cement would be spaced out to distribute a sufficient volume of cement across the inflation port. Once the plug lands into the seat, pressure can be increased at surface until the inflation valves are opened. Cement is then allowed to flow into the element. Once full, pressure is increased and the closing valve shuts off flow, trapping cement under pressure inside the element without rupturing.

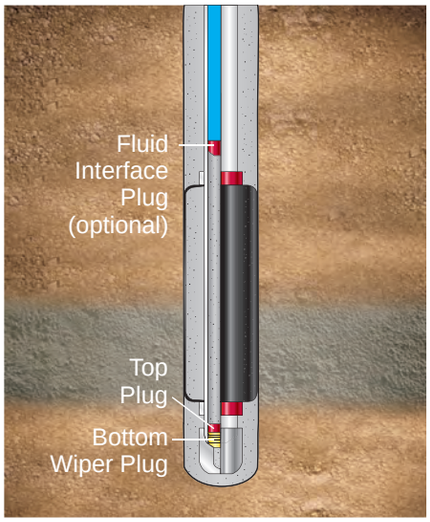
Alternatively, if no drillout is desired, an inner string can be run with an acid-wash treatment (AWT) inflation cup tool to selectively straddle the inflation port to control the cement inflation with a small specific volume. After the packer is inflated, excess cement is circulated to surface through the tubing annulus.



The bottom wiper plug has bumped and ruptured. Primary cement is starting to fill the annulus. Inflation cement immediately follows the primary cement.



The top-wiper plug has bumped, and all of the primary cement is in the annulus. The inflation cement is across the *ACP* inflation ports.



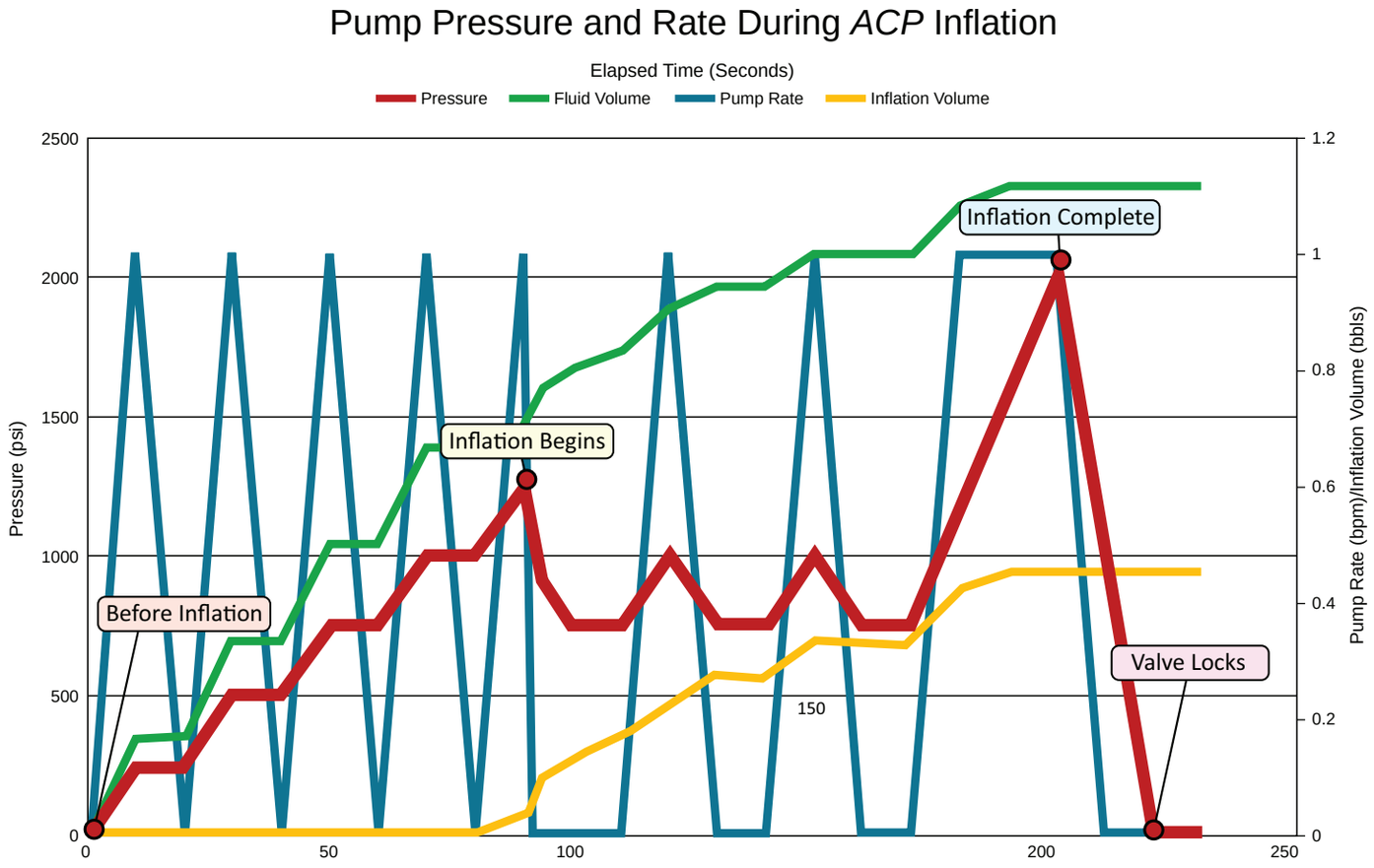
The *ACP* has been inflated with the inflation cement, permanently isolating the zone of interest. Casing can now be drilled out.

ACP Valve Operating Sequence

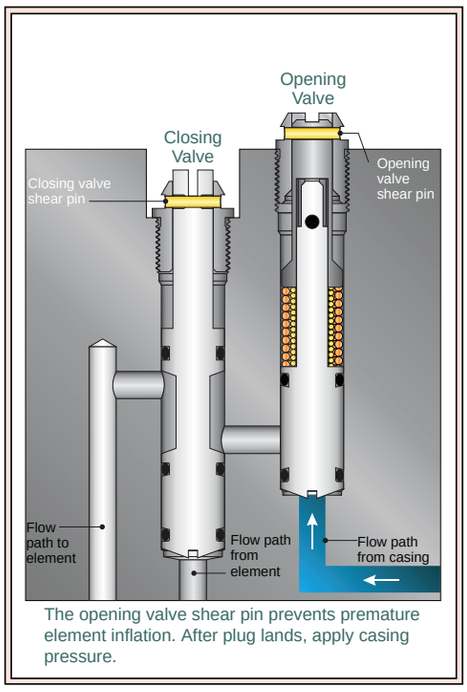
Continuous and discontinuous BULLDOG™ *ACP* systems include a differential-pressure-activated valve system that inflates elements with water, cement or drilling fluid. The system consists of pressure-activated opening and closing valves.

Pressure inside the casing string shears the opening valve, enabling fluid to enter the element. Upon inflation, pressure increases inside the element shearing the closing valve, preventing over inflation and rupture. When casing pressure is bled off, integral spring locks set the opening valve in the closed position, trapping the inflation pressure and preventing the valve from reopening.

BULLDOG ACP systems with element lengths of 20 ft (6 m) and longer include dual-valve systems which operate identically to single-valve systems.

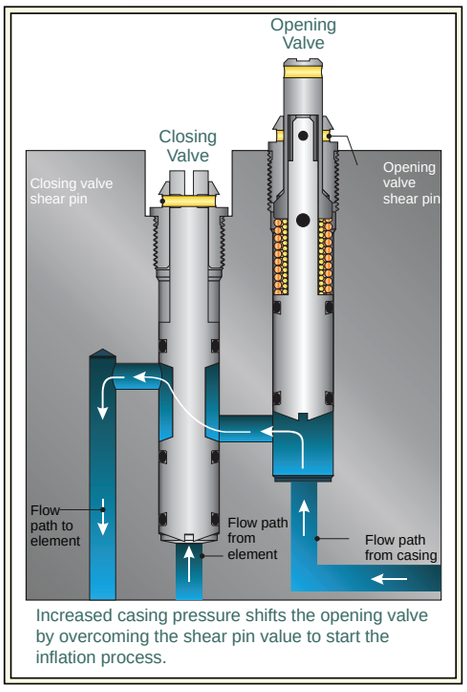


Before Inflation



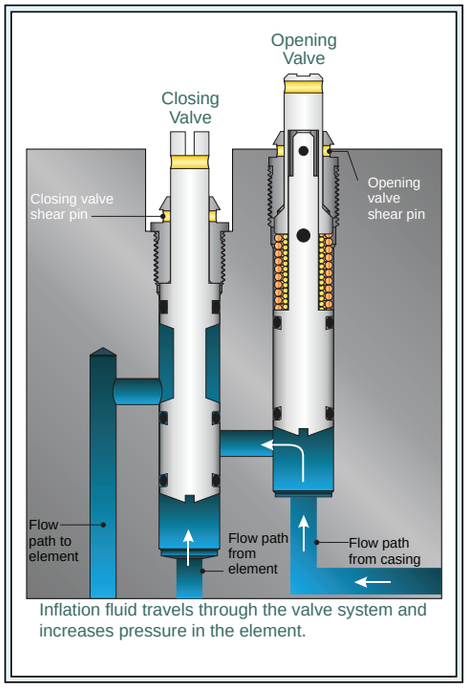
The opening valve shear pin prevents premature element inflation. After plug lands, apply casing pressure.

Inflation Begins



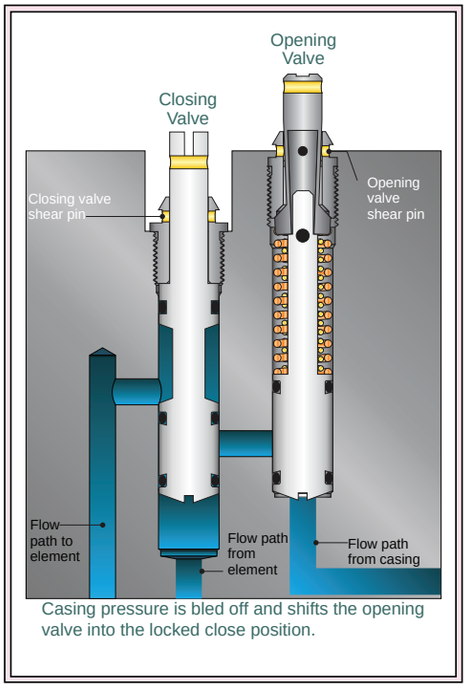
Increased casing pressure shifts the opening valve by overcoming the shear pin value to start the inflation process.

Inflation Complete



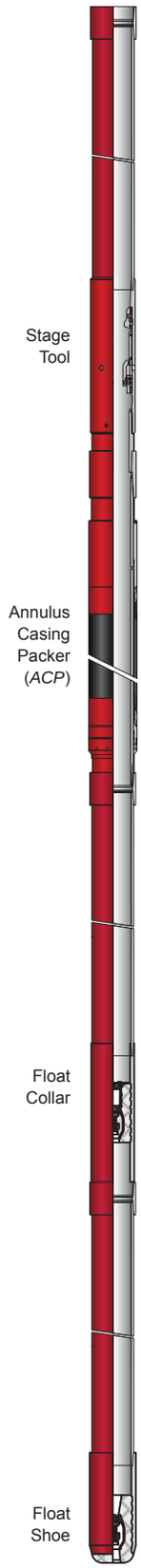
Inflation fluid travels through the valve system and increases pressure in the element.

Valve Locks



Casing pressure is bled off and shifts the opening valve into the locked close position.

Applying the BULLDOG™ Packers



Mitigate Risks Associated with Gas Migration: *ACP* System with Stage Tool

Cementing casing in place may prove challenging, especially in shallow gas zones. Conventional methodologies of displacing cement through the shoe and up to surface do not provide the immediate isolation necessary to shut off the gas zone. Instead, the time spent waiting for cement to cure can lead to gas migration through the “green” cement, creating permanent microannulus flow paths. These paths lead to positive casing pressure and often require costly well intervention to shut off the flow.

Running a *BULLDOG ACP* system with a stage cementing tool on the casing and installing it just above the shallow gas zone, the operator can inflate the *ACP* tool when the primary cement plug bumps and immediately shut off the gas zone, enabling the cement to cure unimpaired by gas invasion.

The stage tool positioned just above the *ACP* tool is opened after the packer is inflated. Cement is then circulated above the packer to surface, ensuring a good, void-free seal and long-term zonal isolation.

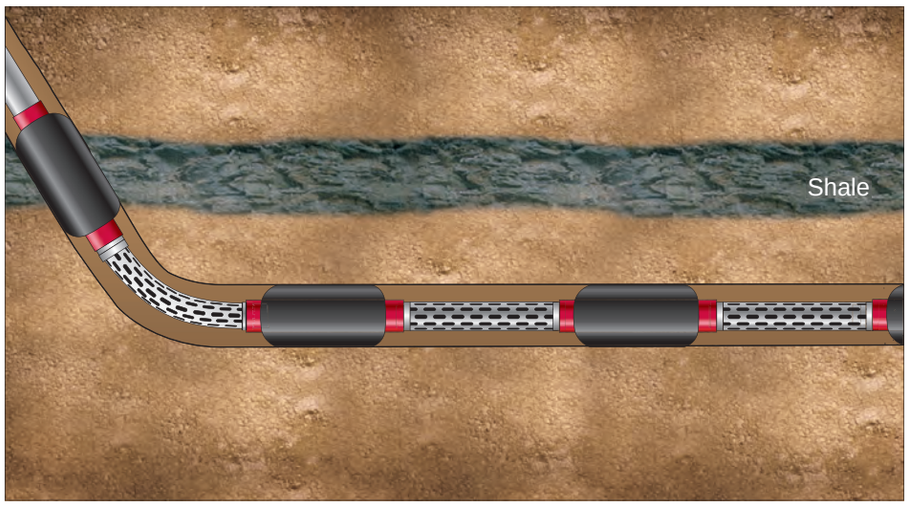
Position the *ACP* system just above the gas zone to isolate the gas and eliminate channeling.

Improve Production with Immediate Isolation: Multiple *ACP* Systems with SCIT

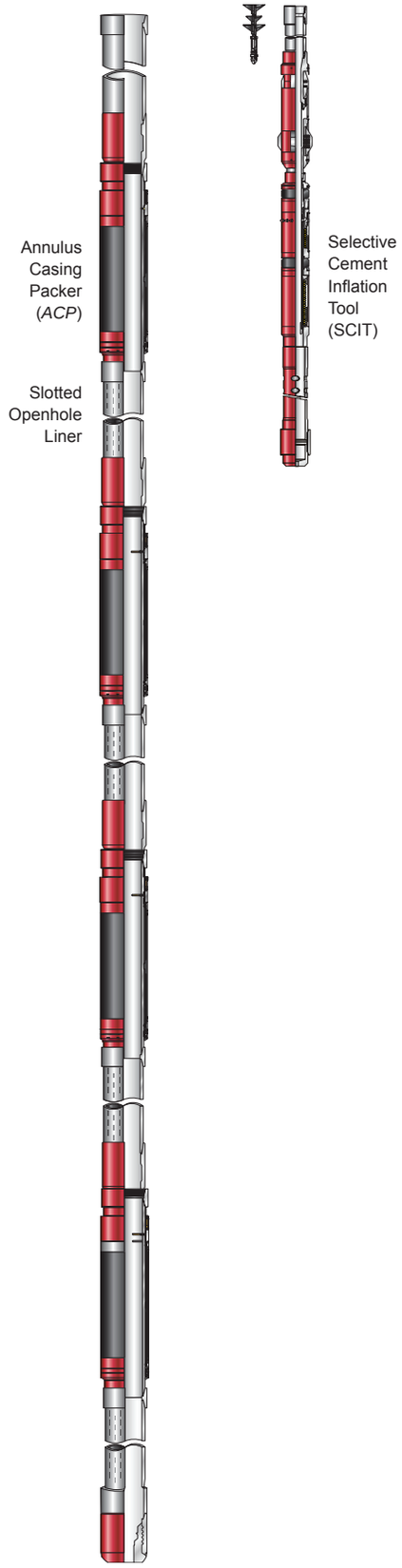
Running multiple BULLDOG™ *ACP* systems with slotted openhole liner can mitigate risks, deliver an immediate, permanent, reliable high-pressure seal and eliminate annular flow for the life of the well all while protecting the reservoir from skin damage caused by cementing. For inflation fluids, *BULLDOG ACP* systems can use water, cement or drilling fluid. Cement inflation provides a high-pressure, permanent annular barrier.

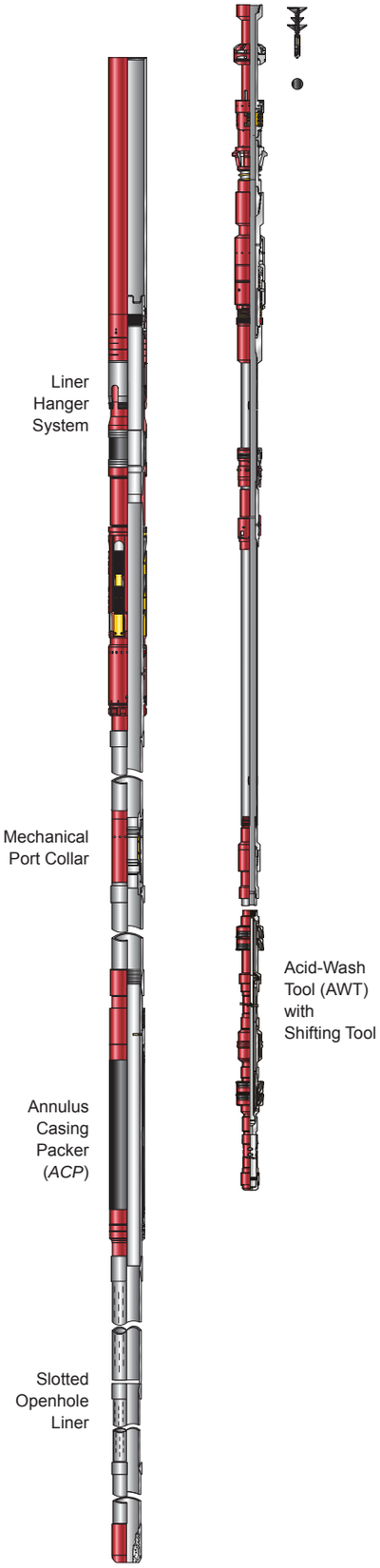
In this assembly, multiple packers are positioned between sections of slotted liners or screens to segment the lateral and isolate selective production intervals. Weatherford's selective cement inflation tool (SCIT) is then run to locate and cement inflate all of the packers in a single trip, saving significant time. Hydraulically activated, the SCIT's unique design provides a direct path for the cement to inflate the *ACP* systems without contaminating the liner. Once set with cement, the *BULLDOG ACP*s provide an immediate, reliable and permanent annular seal between the casing and the wellbore.

This assembly is an effective isolation method for a variety of applications including but not limited to segmenting production zones by use of inflow control devices, isolating lost circulation zones, preventing gas migration and reducing water production.



Particularly well suited for long, horizontal wells and/or shale applications, this assembly enables maximum reservoir optimization by effectively isolating individual horizontal zones and increasing the flexibility of future production operations such as selective treating, production and abandonment.

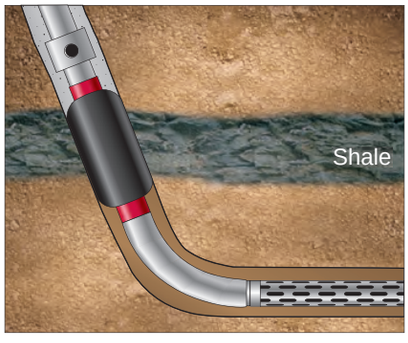




Providing Cased-Hole Integrity while Maximizing Openhole Production: Combination of Blank and Slotted Liner, BULLDOG™ *ACP* System, Mechanical Port Collar and Acid Wash Tool with Shifting Tool

Maximizing production without additional damage to the near wellbore is the primary objective when running an openhole-slotted or pre-perforated liner. At the same time, it is critical to properly isolate the build section with blank pipe and anchor the liner in the wellbore.

In this scenario, a *BULLDOG ACP* tool and mechanical port collar (MPC) are run just above the slotted section of liner. Since a liner-running tool is required to set the liner hanger, service tools can also be run in the same assembly to cement the top of the liner in the same trip. This process requires a Weatherford acid-wash tool (AWT) to selectively inflate the *ACP* system and a shifting tool that functions the MPC for purposes of cementing the build section of the liner. Once the liner hanger is set, pressure is increased to inflate the *ACP* system to isolate the production zone. The AWT with shifting tool is then moved up to engage and open the MPC. The pre-planned volume of cement is pumped through the open port into the annulus above the *ACP* system. The port in the MPC is then closed with the shifting tool. Finally, the liner-top packer is set and the running tools are pulled from the well. No cement drillout is required and the ID of the MCP is full bore to the liner.



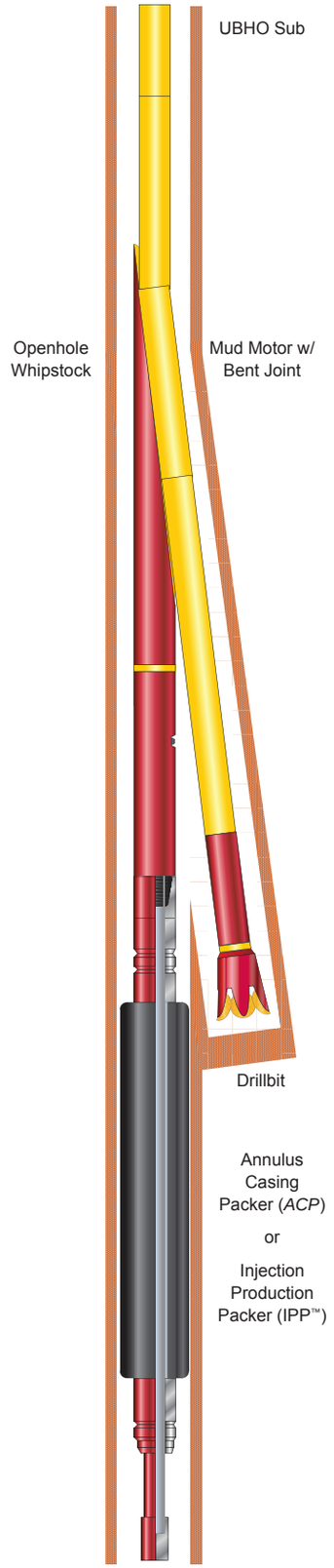
The strategic placement of the ACP in the well isolates the production zone below the shale barrier.

Sidetracking in Openhole Wells: *ACP* System with a Whipstock

Traditional openhole sidetracking operations involve either drilling off a cement plug or whipstock cemented in place, which can be a time-consuming and costly endeavor. The single-trip, whipstock-and-packer combination reduces rig time and risks by eliminating the need to set cement. With no depth limitations and few temperature restrictions, it can be deployed in any openhole wellbore, including ultradeep offshore wells.

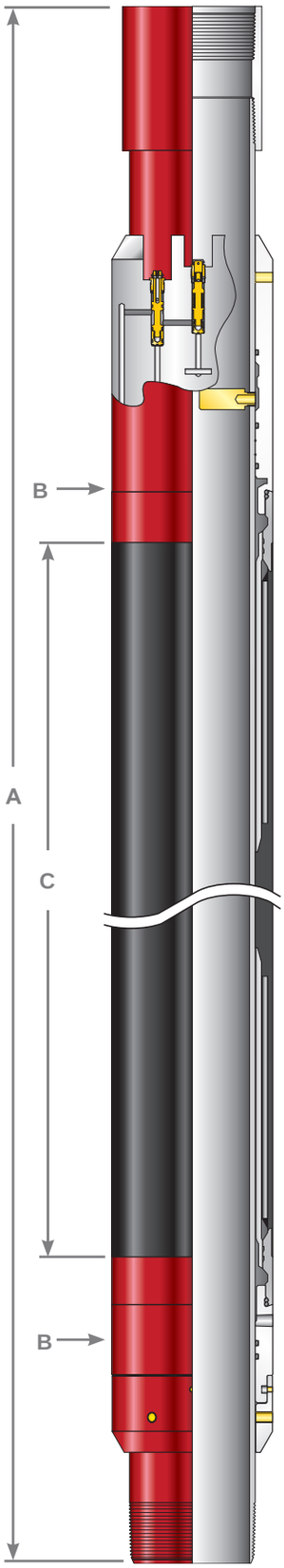
Run the BULLDOG™ *ACP* tool below the whipstock into the open hole. When properly inflated, the *BULLDOG ACP* system provides an anchor for the whipstock and effectively isolates the lower zone. The assembly allows pressure to be conveyed through the work string and whipstock to the inflatable packer. The same fluid used to drill the well is used to inflate the packer. Once the packer is inflated, the drillstring is lowered to shear the setting tool from the whipstock so that the setting tool can be tripped out of the hole. The well is now ready for sidetracking without waiting for the cement to set or attempting to set a balanced cement plug.

The *ACP* system can be run through a milled window. The packer is inflated and a cement job is performed above the packer to isolate the producing zone.



Run-in with Drilling Assy.

Discontinuous BULLDOG™ *ACP* Annulus Casing Packer



Weatherford's discontinuous *BULLDOG ACP* annulus casing packer is a discontinuous-rib premium inflatable assembly that runs as an integral part of the casing string. When inflated, the packer provides an annular seal between the casing and the wellbore or a previously installed casing string. For inflation, the packer uses water, cement, or a drilling fluid. Cement inflation provides a high-pressure, permanent annular barrier.

This annulus casing packer includes a reliable, field-proven element. The valve system has been redesigned with fewer parts and easy access to the shear pins for simpler, faster field dressing and maintenance. No special tools are needed.

The rubber element is reinforced by steel ribs only at the top and bottom. The nonreinforced portion of the element between the ribs enables maximized expansion of the element (up to 3-1/2 times the run-in diameter) for effective isolation in open holes, elliptical hole shapes, washouts, and soft or unconsolidated formations.

The packer consists of an opening valve and a closing valve with a dual-valve system standard on elements of 20 ft (6 m) or longer. Pressure applied inside the casing shears open the opening valve, enabling fluid to enter the element. Pressure from inside the element shears the closing valve closed, preventing rupture and overinflation. The opening valve also provides redundancy to the closing valve by locking closed when pressure is released.

Multiple *BULLDOG* packers can be installed on a single casing string or liner. The packer uses proprietary rubber compounds in standard service of 275°F (135°C) and hostile environment elements in temperatures above 375°F (191°C). Differential pressure ratings vary by packer size relative to hole size with a maximum differential of 5,000 psi (34 MPa).

The *BULLDOG ACP* annulus casing packer is available in tubing or casing sizes from 2-3/8 to 20 in. (60.33 to 508.00 mm) and all casing grades. Standard threads are API 8rd or buttress, box x pin, with premium threads also available. Discontinuous elements are available in 10-ft, 20-ft, and 40-ft (3.1-m, 6.1-m, and 12.2-m) lengths (40 ft elements are available through special order). Slimline designs are available for close-tolerance, run-in clearance applications.

Applications

- Prevention of squeeze cementing
- Isolation of lost-circulation zones during cementing
- Isolation of lower zones during stage cementing
- Prevention or reduction of water production
- Prevention of gas migration
- Reduction of the gas or oil ratio
- Isolation of differentially pressured zones
- Shutoff of openhole sections as a one-trip plug-and-abandon or retainer packer

Features, Advantages and Benefits

- Larger, longer packer lengths are suitable for running through severe doglegs and high hole inclinations, providing application flexibility.
- The packer includes a field-proven element system, providing consistent reliability.
- Shear pins in the redesigned valve system are easily accessible for field dressing and do not require special tools, contributing to efficiency and time savings.
- A patented wire-locking design secures the valve and end sleeve to the mandrel with threaded connections on all components, eliminating welding and providing faster, more cost-effective assembly.
- The valve sleeve contains a shoulder, protecting the valve from damage during run-in.
- The top-mounted, locking valve system senses the true hydrostatic pressure above the packer, enabling reliable inflation of the element.
- Elastomers and metals are designed for standard and severe service, making the packer suitable for a wide variety of applications.

Options

- Premium connections and special sizes are available through special order.

Packer length (ft/*m*)	**10** ***3***	**20** ***6***	**40**[a] ***12***
A Overall length (ft/*m*)	15.56 *4.74*	25.56 *7.79*	45.56 *13.89*
C Inflatable element length (ft/*m*)	10.00 *3.05*	20.00 *6.10*	40.00 *12.19*
Set of opening and closing valves	1	2	

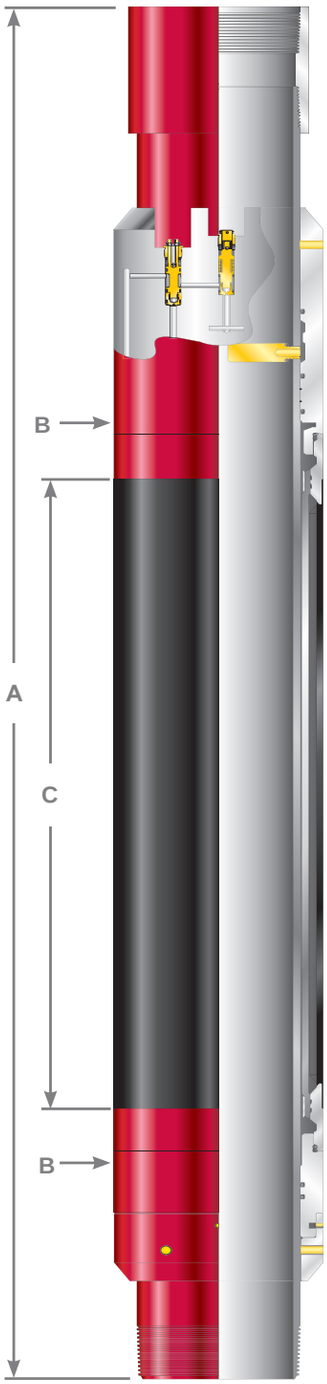
[a] Available through special order

Casing Size (in./*mm*)	**B Maximum Standard OD**[a] **(in./*mm*)**	**B Maximum Slim-line OD**[b] **(in./*mm*)**
2-3/8 *60.33*	3.63 *92.08*	3.39 *86.11*
2-7/8 *73.03*	4.25 *107.95*	3.75 *92.71*
3-1/2 *88.90*	4.75 *120.65*	4.40 *111.80*
4-1/2 *114.30*	5.75 *146.05*	5.50 *139.70*
5 *127.00*	—	5.95 *151.13*
5-1/2 *139.70*	7.00 *177.80*	6.50 *165.10*
6-5/8 *168.28*	7.94 *201.68*	7.63 *193.80*
7 *177.80*	8.25 *209.55*	8.00 *203.20*
7-5/8 *193.68*	9.00 *228.60*	8.75 *222.25*
8-5/8 *219.08*	10.25 *260.35*	10.00 *254.00*
9-5/8 *244.48*	11.25 *285.75*	11.00 *279.40*
10-3/4 *273.05*	12.75 *323.85*	12.00 *304.80*
11-3/4 *298.45*	13.38 *33.85*	—
13-3/8 *339.73*	15.50 *393.70*	14.75 *374.65*
16 *406.40*	18.25 *463.55*	18.00 *457.20*
18-5/8 *473.08*	—	20.50 *520.70*
20 *508.00*	23.00 *584.20*	22.00 *558.80*

[a] 1-1/8 to 3 in. (28.58 to 76.20 mm) larger than the OD of the casing.

[b] 5/8 to 2 in. (15.88 to 50.80 mm) larger than the OD of the casing for greater clearance in running in tight holes or through wellhead restrictions; may have less pressure capabilities than the standard OD packers.

Continuous BULLDOG™ *ACP* Annulus Casing Packer



Weatherford's continuous *BULLDOG ACP* annulus casing packer is a continuous-rib inflatable assembly that runs as an integral part of the casing string. Continuous-rib annulus casing packers are intended to be set inside a casing or in gauge, competent open holes. When inflated, the packer provides an annular seal between the casing and the wellbore or a previously installed casing string. For inflation, the packer uses water, cement, or drilling fluid. Cement inflation provides a high-pressure, permanent annular barrier.

This annulus casing packer includes a reliable, field-proven element system. The valve system has been redesigned with fewer parts and easy access to the shear pins for simpler, faster field dressing and maintenance. No special tools are needed.

The packer consists of an opening valve and a closing valve. Pressure applied inside the casing shears open the opening valve, enabling fluid to enter the element. Pressure from inside the element shears the closing valve closed, preventing rupture and overinflation. The opening valve also provides redundancy to the closing valve by locking closed when pressure is released. Multiple *BULLDOG* packers can be installed on a single casing string or liner.

The packer uses proprietary rubber compounds in standard service of 275°F (135°C) and hostile environment elements in temperatures above 375°F (191°C). Differential pressure ratings vary by packer size relative to hole size with a maximum differential of 4,000 psi (28 MPa).

The *BULLDOG ACP* annulus casing packer is available in tubing or casing sizes from 2-3/8 to 13-3/8 in. (60.33 to 339.73 mm) and all casing grades. Sizes from 16 to 20 in. (406.40 to 508.00 mm) are available through special order. Standard threads are API 8rd or buttress, box × pin, with premium threads also available. Inflatable elements are available in 4-ft and 10-ft (1.2-m and 3.1-m) lengths. Slimline designs are available for close-tolerance, run-in clearance applications.

Applications

- Prevention of squeeze cementing
- Isolation of lost-circulation zones during cementing
- Isolation of lower zones during stage cementing
- Protection of formations from cement invasion
- Protection of cement from invasion by well fluids
- Prevention of gas migration
- Isolation of differentially pressured zones
- Openhole in a consolidated formation with a gauge-packer seat

Features, Advantages and Benefits

- The packer includes a field-proven element system, providing consistent reliability.
- Shear pins in the redesigned valve system are easily accessible for field dressing and do not require special tools, contributing to efficiency and time savings.
- A patented wire-locking design secures the valve and end sleeve to the mandrel with threaded connections on all components, eliminating welding and providing faster, more cost-effective assembly.
- The valve sleeve contains a shoulder, protecting the valve from damage during run-ins.
- The top-mounted, locking valve system senses the true hydrostatic pressure above the packer, enabling reliable inflation of the element.
- Elastomers and metals are designed for standard and severe service, making the packer suitable for a wide variety of applications.

Options

- Premium connections and special sizes are available through special order.

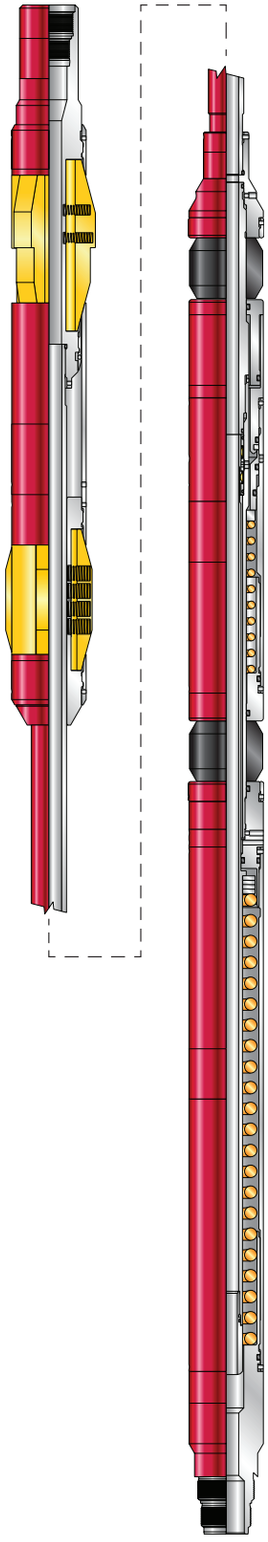
Packer length (ft/*m*)	**10** ***3***	**20** ***6***
A Overall length (ft/*m*)	8.56 *2.61*	14.59 *4.45*
C Inflatable element length (ft/*m*)	3.34 *1.02*	10.00 *3.05*

Casing Size (in./*mm*)	**B Maximum Standard OD[a] (in./*mm*)**	**B Maximum Slimline OD[b] (in./*mm*)**
2-3/8 *60.33*	3.63 *92.08*	3.39 *86.11*
2-7/8 *73.03*	4.25 *107.95*	3.75 *92.71*
3-1/2 *88.90*	4.75 *120.65*	4.40 *111.80*
4-1/2 *114.30*	5.75 *146.05*	5.50 *139.70*
5 *127.00*	—	5.95 *151.13*
5-1/2 *139.70*	7.00 *177.80*	6.50 *165.10*
6-5/8 *168.28*	7.94 *201.68*	7.63 *193.80*
7 *177.80*	8.25 *209.55*	8.00 *203.20*
7-5/8 *193.68*	9.00 *228.60*	8.75 *222.25*
8-5/8 *219.08*	10.25 *260.35*	10.00 *254.00*
9-5/8 *244.48*	11.25 *285.75*	11.00 *279.40*
10-3/4 *273.05*	12.75 *323.85*	12.00 *304.80*
13-3/8 *339.73*	15.50 *393.70*	14.75 *374.65*
16 *406.40*	18.25 *463.55*	18.00 *457.20*
18-5/8 *473.08*	—	20.50 *520.70*
20 *508.00*	23.00 *584.20*	22.00 *558.80*

[a] 1-1/8 to 3 in. (28.58 to 76.20 mm) larger than the OD of the casing.

[b] 3/4 to 1-1/4 in. (19.05 to 31.75 mm) larger than the OD of the casing for greater clearance in running in tight holes or through wellhead restrictions; may have less pressure capabilities than the standard OD packers.

Selective Cement Inflation Tool (SCIT)



Weatherford's selective cement inflation tool (SCIT) is a hydraulically activated tool specifically designed to locate and inflate Weatherford's *ACP* annulus casing packers with cement in a single trip. The tool features spring-loaded locating dogs that help locate *ACP* packers, once engaged in the locator sub, and an integral inflation port that provides cement a direct path to inflate the *ACP* packers without contaminating the liner.

The SCIT is run on the work string that is deployed inside a screened, slotted, or predrilled liner, running *ACP* packers. The tool is lowered to just above the lowest *ACP* packer, until the locator dogs engage into the locator sub just above the *ACP* packer, confirming location. A reset dart is then pumped from the surface down through the work string until the dart is seated inside the dart-landing plug seat. Surface pressure actuates the setting of the two packing elements integrated on the SCIT. Additional surface pressure opens the integral inflation port, which directs surface pressure to act on the *ACP* inflation port, opening the valve to begin the inflation sequence. Upon inflation, surface pressure is released and the integral inflation port closes, the packing elements relax, and the SCIT is picked up above the next *ACP* packer and lowered, repeating the process until all *ACP* packers on the liner are inflated.

When used with Weatherford's selective rotating cementing packer (SRCP), the SCIT can reverse circulate excessive inflate cement out of the work string to prevent pulling a wet string to surface.

Applications

- Openhole completions that require zonal isolation
- Inflating single or multiple *ACP* packers in a single trip
- Inflating the *ACP* packer in slotted, preperforated, or sand-screen liners
- Wells using inner washdown systems

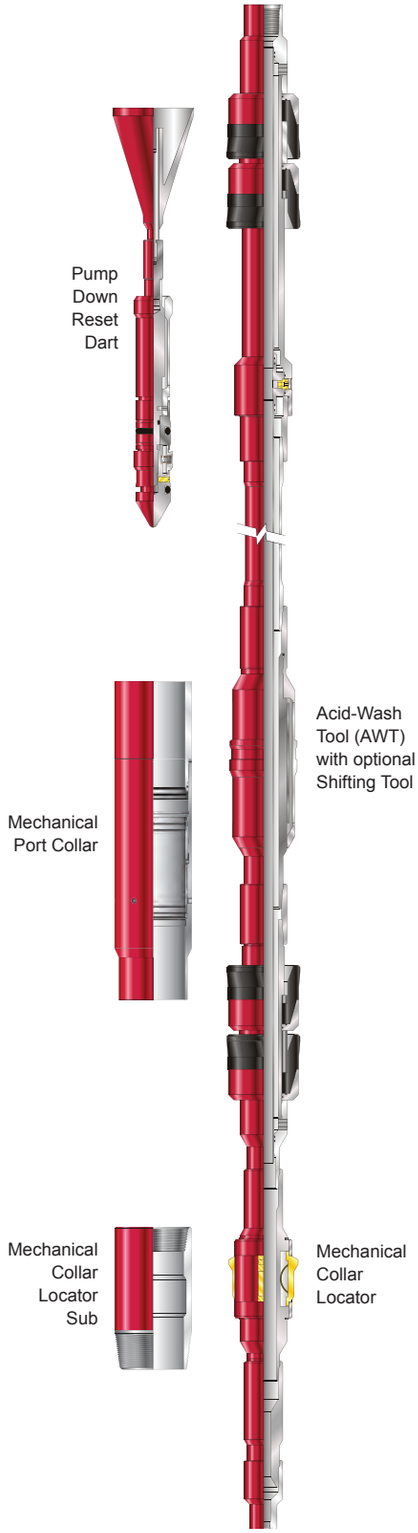
Features, Advantages and Benefits

- The design of the spring-loaded locating dogs matches a profile that is machined into the wall of the locating sub, enabling the dogs to extend fully into the sub, preventing further workstring movement and providing a positive indication of the *ACP* packer location.
- The integral inflation port is positioned near the inflation port of the *ACP* packer, which provides the cement a direct path to inflate the *ACP* packer, reducing liner contamination.
- Dual seal elements reduce the run-in OD, which eliminates the need for a bypass area, providing operational flexibility.
- The SCIT is hydraulically activated, enabling the *ACP* packer to be located and inflated without requiring workstring weight, providing application flexibility in most wellbore geometries.
- Hydraulic pressures are field-adjustable, enabling the pressures to be based on real time wellbore hydrostatics to meet specific well requirements.
- Locating dogs can recess to allow bidirectional movement, enabling the tool to return downhole after the inflation process has begun.

Specifications

Size (in.)	**4-1/2**	**5-1/2**	**7**
Thread type	2 3/8-in. PH-6	2 7/8-in. PH-6	3 1/2-in. PH-6
Maximum OD (in./*mm*)	3.69 *93.6*	4.00 *101.6*	5.75 *146.0*
Minimum ID (in./*mm*)	1.12 *28.5*	1.43 *36.3*	1.82 *46.2*
OAL (in./*mm*)	198.00 *5,029.2*	203.00 *5,156.2*	203.00 *5,156.2*
Tensile yield (lb/*kg*)	6,000 *25,401.0*	88,000 *39,916.0*	327,000 *148,325*
Maximum working pressure (psi/*MPa*)	5,000 *34.4*	5,000 *34.4*	5,000 *34.4*

AWT Inflation Cup Tool



Weatherford's acid-wash treatment (AWT) inflation cup tool is a packer-cup isolation tool used for injecting fluids into selected intervals. The tool is designed primarily for selective acidizing treatments, but is appropriate for many other types of treatments and fluids.

The AWT can also be used to inflate *ACP* annulus casing packers with mud or cement when pressurizing the casing is either impossible or not necessary.

Applications

- Acidizes in intervals when selective injection is necessary
- Isolates and inflates annulus casing packers
- Isolates and cements through mechanical port collars
- Inflates annulus casing packers and opens, cements, and closes a mechanical port collar in the same run

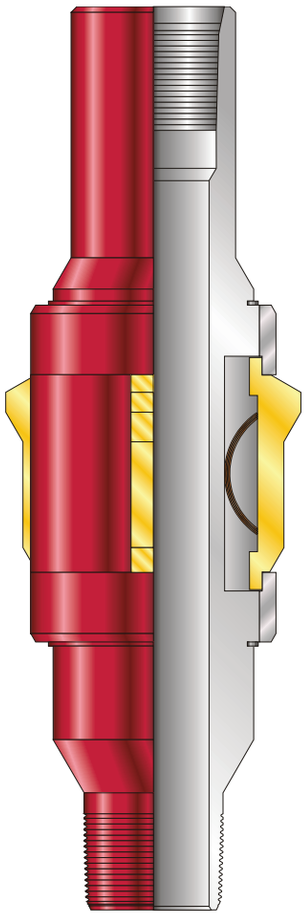
Features, Advantages and Benefits

- The AWT does not have moving parts, providing a simple and reliable operation.
- The AWT does not use casing slips, enabling the tool to provide a reliable operation in corroded or damaged casing, reducing stress to weaker casing.
- The large, internal bypass system offers several advantages and benefits:
  - As the AWT is deployed, the bypass decreases the surge pressure on the formation, reducing the potential for formation damage and costly mud or fluid loss.
  - The bypass provides fluid circulation, enabling the AWT to be run at a higher speed with no hydraulic lock.
  - The bypass system prevents swabbing of formation fluid into the wellbore, keeping the wellbore clean of debris and minimizing well-control issues.
- Premium packer cups enable the packer to achieve high-squeeze pressures, making the AWT suitable for deep wells.
- The AWT does not have a setting-weight requirement, enabling operation in shallow depths and horizontal wells.
- The double-cup system provides redundant sealing, ensuring reliable performance.

Specifications

Casing		Tool		Dart	
OD (in./*mm*)	Weight (lb/ft, *kg/m*)	Maximum OD (in./*mm*)	Minimum ID (in./*mm*)	Sealing OD (in./*mm*)	Neck OD (in./*mm*)
3.500 *88.9*	9.2 to 9.3 *1.3 to 1.3*	2.875 *73.0*	0.438 *10.8*	0.625 *15.8*	1.187 *30.1*
4.000 *101.6*	11.0 *1.5*	3.250 *82.5*	0.438 *10.8*	1.125 *28.5*	1.187 *30.1*
4.500 *114.3*	12.6 to 13.5 *1.7 to 1.8*	3.750 *95.3*	1.125 *28.5*	1.125 *28.5*	1.187 *30.1*
	9.5 to 11.6 *1.3 to 1.6*				
5.000 *127.0*	18.0 to 20.3 *2.4 to 2.8*	4.000 *101.6*	1.125 *28.5*	1.125 *28.5*	1.187 *30.1*
	15.0 to 18.0 *2.0 to 2.4*	4.125 *104.8*			
	13.0 to 15.0 *1.7 to 2.0*	4.250 *108.0*			
5.500 *139.7*	17.0 to 20.0 *2.3 to 2.7*	4.641 *117.9*	1.500 *38.1*	1.625 *41.2*	1.187 *30.1*
	15.5 to 17.0 *2.1 to 2.3*				
	13.0 to 14.0 *1.7 to 1.9*	4.781 *121.4*			
7.000 *177.8*	32.0 to 35.0 *4.4 to 4.8*	5.821 *147.9*	1.500 *38.1*	1.625 *41.2*	1.187 *30.1*
	26.0 to 29.0 *3.5 to 4.0*	5.968 *151.6*			
	23.0 to 26.0 *3.1 to 3.5*	6.078 *154.6*			
	17.0 to 20.0 *2.3 to 2.7*	6.266 *159.2*			
7.625 *193.6*	29.7 to 33.7 *4.1 to 4.6*	6.672 *169.5*	1.500 *38.1*	1.625 *41.2*	1.187 *30.1*
	24.0 to 26.4 *3.3 to 3.6*				
9.625 *244.4*	47.0 to 53.0 *6.5 to 7.3*	8.350 *212.1*	2.600 *66.0*	1.625 *41.2*	1.187 *30.1*
10.750 *273.0*	32.7 to 55.5 *4.5 to 7.7*	9.500 *241.3*	1.500 *38.1*		
13.375 *339.7*	54.5 to 72.0 *7.5 to 9.9*	12.000 *304.8*	2.600 *66.0*		

Mechanical Collar Locator



Weatherford's mechanical collar locator is a special tubing sub with indexing drag blocks that indicate casing collar locations as the sub is run into or out of the hole. The tool enables accurate depth determination when used with straddle acidizing tools and collar logs for placing packers, plugs, and cement retainers.

Applications

- Provides a simple, reliable method of locating casing collars with the tubing string for correlation purposes
- Can be used with a mechanical collar locator sub in horizontal and vertical well applications with premium thread connections

Features, Advantages and Benefits

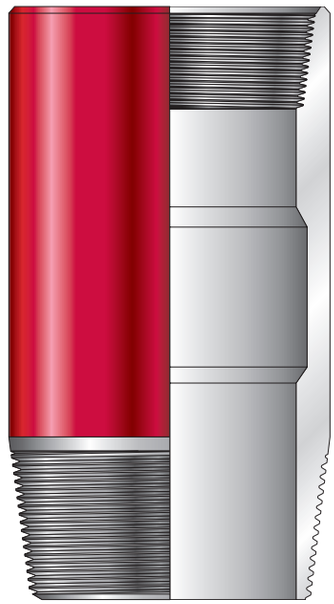
- The locator can be configured to indicate collars as it is run into or out of the hole, providing operational flexibility.
- Rugged construction gives the locator adequate strength to withstand side loadings and indicate collar location, proving reliability even in high-angle and horizontal wells.
- The mechanical collar locator shows positive service-tool positioning in relation to the ports of an inflatable packer or a mechanical port collar, enabling proper inflation or cementing.

Specifications

Casing				Indicator Block Travel		Tool Body		
OD (in./*mm*)	Weight (lb/ft, *kg/m*)	Minimum OD (in./*mm*)	Maximum OD (in./*mm*)	Minimum (in./*mm*)	Maximum (in./*mm*)	Maximum OD (in./*mm*)	Minimum ID (in./*mm*)	Standard Thread Connections (in.)
4-1/2 *114.30*	9.5 to 13.5 *4.3 to 6.1*	3.920 *99.57*	4.090 *103.89*	3.750 *95.25*	4.240 *107.70*	3.750 *95.25*	2.000 *50.80*	2-3/8 (EU 8rd)
5 *127.00*	11.5 to 18.0 *5.2 to 8.1*	4.276 *108.61*	4.560 *115.82*	4.040 *102.62*	4.690 *119.13*	3.750 *95.25*	2.000 *50.80*	2-3/8 (EU 8rd)
5-1/2 *139.70*	13.0 to 23.0 *5.8 to 10.4*	4.670 *118.62*	5.044 *128.12*	4.440 *112.78*	5.320 *135.13*	4.120 *104.65*	2.000 *50.80*	2-3/8 (EU 8rd)
7 *177.80*	17.0 to 38.0 *7.7 to 17.2*	5.920 *150.37*	6.538 *166.07*	5.500 *139.70*	6.630 *168.40*	5.500 *139.70*	2.500 *63.50*	2-3/8 (EU 8rd)

Mechanical Collar Locator Sub

Weatherford's mechanical collar locator profile sub is a special casing sub that enables accurate depth determination when used with straddle acidizing tools and collar logs for placing packers, plugs, and cement retainers. The sub is designed to make up a standard API-threaded casing or premium-threaded casing.



Applications

- Setting of predetermined depth correlations
- Horizontal and vertical well applications with premium-thread connections (when used with a mechanical collar locator)

Features, Advantages and Benefits

- The sub enables accurate depth determination, providing a simple and reliable method for setting predetermined depth correlations.
- The ID of the profile sub matches that of the casing, eliminating an ID restriction to hinder life-of-the-well intervention operations.
- The profile sub is located with a mechanical collar locator, enabling weight to be set down for positive depth correlation of service tools and ensure intervention success.
- Multiple profile subs can be run in a single casing string, enabling the operation of multiple pieces of equipment (such as other inflatable packers or mechanical port collars).

Specifications

Assembly Size (in./*mm*)	Maximum OD (in./*mm*)	Minimum ID (in./*mm*)	Profile ID (in./*mm*)	Overall Length (in./*mm*)
4-1/2 *114.30*	5.00 *127.00*	According to casing weight	4.38 *111.25*	16.50 *419.00*
5 *127.00*	5.56 *141.22*	According to casing weight	4.69 *119.13*	17.50 *444.50*
5-1/2 *139.70*	6.05 *153.67*	According to casing weight	5.31 *134.87*	19.00 *482.60*
7 *117.80*	7.66 *194.56*	According to casing weight	6.63 *168.50*	19.50 *495.30*

Options

- Connectors are available with standard API or premium casing thread for use in various applications.

Stage Cementing Tools

Introduction

Weatherford offers BULLDOG™ ACP™ tools and accessories that can be run in conjunction with cementing tools to assist cementing of a casing string or liner in two or more stages. Stage tools are usually run above the *ACP* tool, enabling a lower section to remain uncemented and preventing cement from falling downhole. Providing system compatibility means greater efficiency with significant rig-time savings, reduced risk exposure, enhanced safety and improved wellbore integrity.

	Multistage Cementing Tools				
	Stage Tools			**Port Collars**	
	754	**751**	**752**	**761**	**RPC**
Opening Method	Hydraulic Pressure	Free Fall Opening Cone	Free Fall Opening Cone	AWT / Shifting of Inner Sleeve	Rotation of Inner Sleeve
Closing Method	Closing Plug	Closing Plug	Closing Plug	AWT / Shifting of Inner Sleeve	Rotation of Inner Sleeve
Size(s) Available	2-7/8 in. to 20 in.	4-1/2 in. to 24 in.	2-7/8 in. to 24 in.	4-1/2 in. to 18-5/8 in.	—
Max. # of Stages	2	2	3	No Limit	No Limit
Well Deviation	<90°	<60°	<60°	<90°	<60°
Drill-out	Yes (PDC or Tri-cone)	Yes	Yes	None	None
Liner Applications	Yes (with 854 plug set)	No	No	Yes	Yes
Casing Applications	Yes	Yes	Yes	Yes	Yes

Applying Stage Cementing

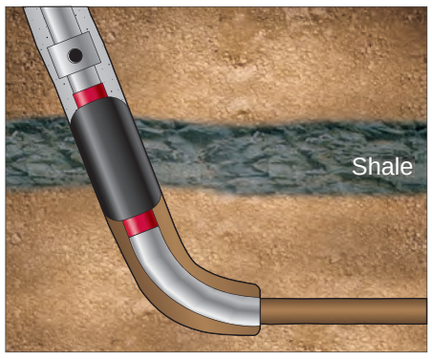
Cementing with Port Collars

Stage cementing is a technique used to effectively isolate certain sections of the wellbore. This method is used for lost circulation zones, water pressure, low formation pressure, and high-pressure gas zones that need selective cementing. Using an ACP™ tool in the stage-cementing assembly ensures the cement slurry is displaced to precise depths around the casing string in stages and provides long-term isolation.

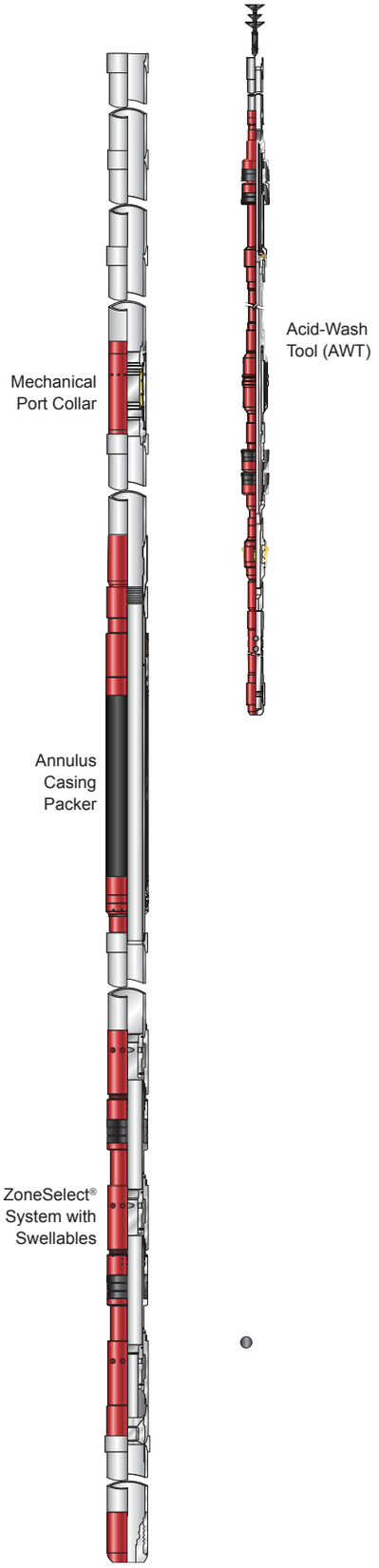
This type of cement job is accomplished by pumping first- and second-stage cement with either stage or port collars placed in the pipe above the *ACP* tool. These tools have ports that open and close during the cementing process to insure placement of the second-stage cement slurry above the *ACP* tool. Stage collars can be activated hydraulically or mechanically and require drillout after the cement job.

Alternatively, port collars may be used to accomplish the same objective with no drillout. Generally, in these applications, no first-stage cement is placed in the well. The second-stage cement isolates zones above the *ACP* tool from the open hole below, typically the production zone.

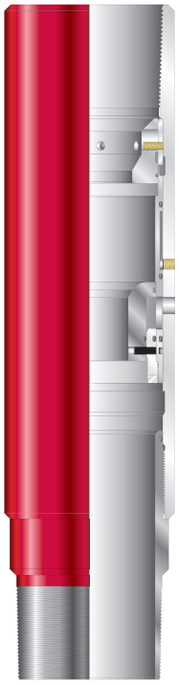
Run the BULLDOG™ *ACP* tool on the casing string directly below the mechanical cementing port (MPC) collar. Using a work string with a shifting tool, the MPC is opened using reciprocation or rotation. The work string also has a ported cup tool that isolates the ID of the *ACP* tool and MPC from the rest of the pipe. When the ported cup tool is adjacent to the *ACP* tool, the packer is inflated. The shifting tool is manipulated to open the MPC port. Once open, cement is pumped through the work string where it is diverted through the ported cup tool, out the MPC ports and up the annulus above the inflated *ACP* tool. When all the second-stage cement has been displaced, manipulating the shifting tool closes the ports on the MPC and the work string is retrieved, leaving the casing full bore with no drillout required.



Stage cementing enables effective cement placement.



Hydraulic Stage Tools – Model 754PD



Model 745
Hydraulic Stage Tool

Closing Plug

First Stage
Shut-Off Plug

Landing Baffle

Weatherford's reliable, field-proven Model 754PD stage tool meets the challenges of cementing holes at any angle with a hydraulically opened port system. Designed specifically for horizontal completion in today's complex formations, the multistage cementing tool can be placed anywhere in the casing string.

Model 754PD is PDC-drillable and equipped with removable, field-adjustable shear pins, enabling operators to choose opening pressures suitable for specific well requirements on the rig. Hydraulically opened by internal casing pressure, the stage tool eliminates the need for—and cost of—a free-fall plug. During displacement, the closing plug is released and lands on a closing seat connected to the unitary sleeve. Increased pressure shears a set of pins, allowing the unitary sleeve to move down across the ports, closing the tool. A snap ring locks the sleeve in position, ensuring the stage tool remains closed

The stage tool can be used with Weatherford's BULLDOG™ annulus casing packers (ACP™) to ensure cement slurry is displaced to precise depths around the casing string in stages and provide long-term isolation. When the first-stage shut-off plug lands on the baffle collar, the *ACP* inflates, isolating weak formations below from hydrostatic pressures above.

To conduct three-stage cementing operations, Weatherford offers a 754TP Model to be used as a lower stage tool with a Model 751E Eliminator® stage tool on top. The 754TP features a flexible closing plug that is necessary to close the lower stage tool during displacement.

Applications

- Primary cementing in vertical or highly deviated horizontal-well conditions not conducive to free-fall opening plugs
- Reduction of total hydrostatic pressure on a weak zone to prevent lost circulation during cementing activities
- Selective formation cementing or treating-fluid placement
- Reduction of total pumping pressure in long casing strings
- Operations in which alternative fluid paths above inflated casing tools or seals may be needed
- Strings with ACP™ packers that require additional hydrostatic isolation

Features, Advantages and Benefits

- Tool functionality is independent of hole angle or mud properties, ensuring tool durability and reliability in most applications.
- Clear surface indications of opening and closing accommodate the well's hydraulic conditions for safer and more efficient operations.
- The absence of an opening cone, along with antirotational features and PDC-drillable materials accelerates drillout, saving costly rig time.
- Opening pressure can be adjusted at the rigsite to meet specific well requirements, providing operational flexibility.

Options

- HNBR seals are standard and are API RP2 rated to resist hydrogen sulfide and carbon dioxide. Other seals can be requested to meet well conditions.
- An optional free-fall opening cone is available for use when casing pressure cannot be generated to open the tool.
- Stage tools and running accessories are available and can be ordered to perform three-stage cementing operations.
- Alternative grades of steel and threads are available for casing-string compatibility.

Hydraulic Stage Tools – Model 754PD

Specifications

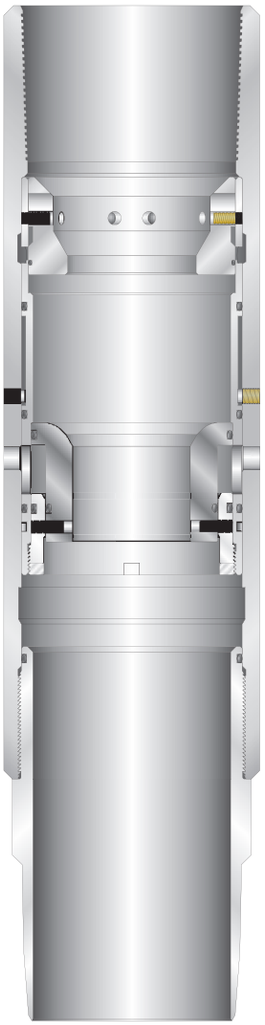
Size (in./*mm*)	Grade	Weight Range (lb/ft, *kg/m*)	Max OD (in./*mm*)	Max Drill-out ID (in./mm)	Overall Length (in./*mm*)			Hydraulic Sleeve ID (in./*mm*)	Closing Seat ID (in./*mm*)	Opening Pressure* (psi/*bar*)		Safeload Below Tool SF = 1.5 (1,000 lb /*1,000kg*)		Max Pressures SF = 1.2		HNBR Seal Temp Limits** (°F/°*C*)
					8 RND		BTC		754PD	Per Screw	Range	8 RND	BTC	Int (psi/*MPa*)	Ext (psi/*MPa*)	
4-1/2 *114.3*	N80	9.5 to 13.5 *14.1 to 20.1*	5.562 *141.3*	3.975 *101.0*	STC	28.2 *716.3*	30.5 *774.7*	2.500 *63.5*	3.187 *80.9*	700 *48.3*	700 to 4,200 *48.3 to 289.8*	151 *68*	203 *92*	8,550 *58.95*	8,140 *56.12*	350° *176°*
	P110	11.6 to 15.1 *17.1 to 22.4*		3.885 *98.7*	LTC	29.2 *741.7*						242 *110*	311 *141*	11,760 *81.08*	12,340 *85.08*	
5 *127.0*	N80	11.5 to 15.0 *17.1 to 22.4*	6.090 *154.7*	4.445 *112.9*	STC	29.0 *736.6*	31.5 *800.1*	3.000 *76.2*	3.750 *95.3*	600 *41.4*	1,200 to 3,600 *41.4 to 248.4*	175 *79*	238 *108*	8,220 *56.67*	8,100 *55.85*	350° *176°*
	P110	15.0 to 18.0 *22.3 to 26.8*		4.293 *109.0*	LTC	29.7 *754.4*						321 *146*	395 *179*	10,800 *74.46*	10,500 *72.39*	
5-1/2 *139.7*	N80	14.0 to 17.0 *20.8 to 25.3*	6.625 *168.3*	4.897 *124.4*	STC	29.5 *749.3*	31.5 *800.1*	3.000 *76.2*	4.062 *103.2*	440 *30.3*	880 to 3,520 *60.6 to 242.4*	209 *95*	263 *119*	7,250 *49.99*	6,900 *47.53*	350° *176°*
	N80	15.5 to 20.0 *23.0 to 29.7*		4.835 *122.8*	STC	29.5 *749.3*						232 *105*	288 *131*	8,170 *56.33*	7,780 *53.64*	
	P110	17.0 to 23.0 *25.3 to 34.2*		4.777 *121.3*	LTC	29.7 *754.4*						365 *166*	445 *202*	11,850 *81.70*	11,300 *77.91*	
7 *177.8*	N80	20.0 to 26.0 *29.7 to 38.7*	8.200 *208.3*	6.341 *161.1*	STC	31.2 *792.5*	32.5 *825.5*	3.750 *95.3*	5.000 *127.0*	340 *23.4*	680 to 3,400 *43.8 to 234.0*	276 *125*	391 *177*	5,600 *38.61*	5,340 *36.82*	350° *176°*
	N80	26.0 to 32.0 *38.7 to 47.6*		6.161 *156.5*	LTC	32.1 *815.3*						404 *183*	491 *223*	8,380 *57.78*	7,880 *54.33*	
	P110			6.161 *156.5*	LTC	32.1 *815.3*						548 *249*	653 *296*	10,120 *69.77*	9,640 *66.46*	
7-5/8 *193.7*	N80	26.4 to 29.7 *39.3 to 44.2*	8.875 *225.4*	6.854 *174.1*	STC	36.3 *922.0*	38.4 *975.4*	4.500 *114.3*	5.875 *149.2*	600 *41.4*	1,200 to 3,600 *82.8 to 248.4*	356 *161*	493 *224*	6,440 *44.40*	6,140 *42.33*	350° *176°*
	P110	29.7 to 39.0 *44.2 to 193.7*		6.760 *171.7*	LTC	37.2 *944.9*						605 *274*	732 *332*	9,790 *67.50*	9,160 *63.15*	
8-5/8 *219.1*	K55	24.0 to 32.0 *35.7 to 47.6*	10.125 *257.2*	7.982 *202.7*	STC	36.9 *937.3*	39.2 *995.7*	5.500 *139.7*	6.625 *168.3*	700 *48.3*	1,400 to 4,200 *96.6 to 289.8*	311 *141*	467 *212*	5,500 *37.92*	3,980 *27.44*	350° *176°*
	P110	40.0 to 44.0 *59.5 to 65.5*		7.610 *193.3*	LTC	38.0 *965.2*						804 *365*	961 *436*	9,630 *66.40*	7,680 *52.95*	
9-5/8 *244.5*	N80	32.3 to 40.0 *48.1 to 59.5*	11.125 *282.6*	8.855 *224.9*	STC	37.3 *947.4*	38.8 *985.5*	6.125 *155.6*	7.750 *196.9*	600 *41.4*	1,200 to 3,600 *82.8 to 248.4*	417 *189*	616 *279*	5,270 *36.34*	5,440 *37.51*	350° *176°*
	N80	40.0 to 47.0 *59.5 to 70.0*		8.689 *220.7*	LTC	38.7 *983.0*						590 *268*	742 *337*	7,080 *48.81*	6,110 *42.13*	
	P110	43.5 to 53.5 *64.7 to 75.9*		8.609 *218.7*	LTC	38.7 *983.0*						878 *398*	1,072 *486*	9,320 *64.26*	7,470 *51.50*	
10-3/4 *273.1*	N80	40.5 to 51.0 *67.7 to 75.9*	12.312 *312.7*	9.904 *251.6*	STC	36.2 *919.5*	38.8 *985.5*	7.250 *184.2*	8.875 *225.4*	630 *43.4*	1,260 to 3,780 *86.8 to 260.4*	493 *224*	748 *339*	4,990 *34.40*	3,790 *26.13*	350° *176°*
	P110	51.0 to 60.7 *75.9 to 90.4*		9.704 *246.5*								853 *387*	1,226 *556*	7,640 *52.68*	4,250 *29.30*	
13-3/8 *339.7*	K55	61.0 to 72.0 *90.8 to 107.2*	15.000 *381.0*	12.375 *314.3*	STC	36.4 *924.6*	38.8 *985.5*	9.250 *235.0*	11.000 *279.4*	500 *34.5*	1,000 to 3,000 *69.0 to 207.0*	502 *228*	902 *409*	4,110 *28.34*	2,120 *14.62*	350° *176°*
	P110			12.375 *314.3*								906 *411*	1,442 *654*	5,860 *40.40*	2,250 *15.51*	

*The operator, cementer, or a trained Weatherford field technician can easily adjust opening pressure in the field to precisely match well requirements.

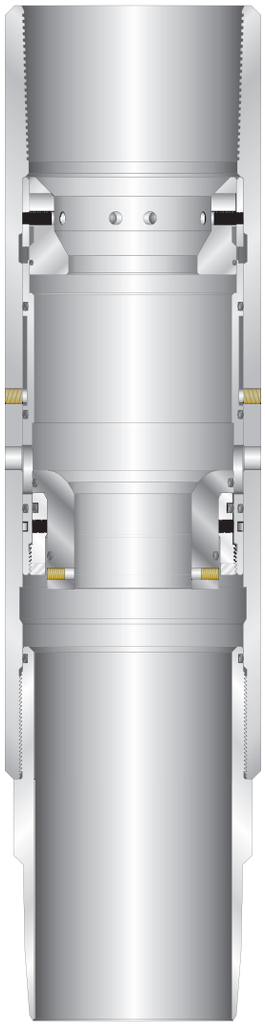
**Temperature limits are for HNBR seals (standard). Limits for Viton® seals (used in L-80 grade or by special request) are 400°F (*204°C*).

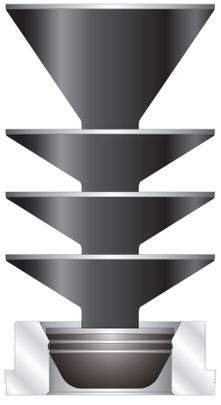
Viton is a registered trademark of DuPont Dow Elastomers L.L.C

Operational Sequence

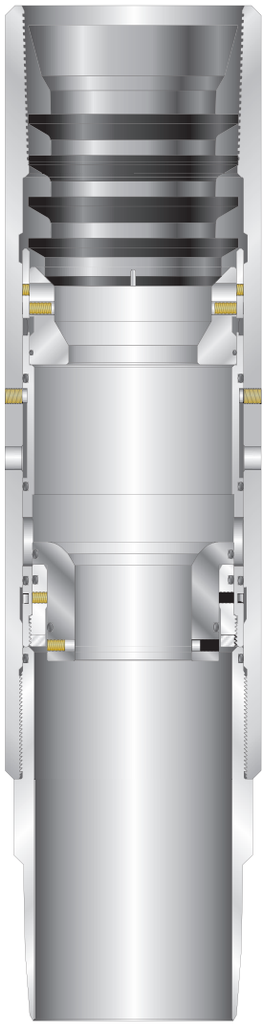


Running-in-Hole





Open: Cementing



Closed:
Cementing Complete

Eliminator® Series Stage Tools – Models 751E, 752E, 751PD and 752PD

Eliminator
Stage Tool

Weatherford's *Eliminator* stage tools allow cementing of casing string in either two or three stages. These tools set the standard for reliability, cost effectiveness, and ease of use with outstanding built-in features and quality. They are the tools of choice when drilling requirements call for proven technology and low risk.

Model 751E is used for two-stage cementing. Model 752E is used for three-stage cementing. Models 751PD and 752PD, respectively, are the PDC-drillable versions of Models 751E and 752E.

Applications

- Reduce total pumping pressure in long casing strings
- Reduce total hydrostatic pressure on a weak zone to prevent lost circulation
- Enable selective cementing of formations

Features, Advantages and Benefits

- The compact, simple design minimizes the number of moving parts and makes the tools easier to handle.
- The tool's clear opening and closing indications at the surface accommodate the hydraulic conditions of the well for safer, more efficient operations.
- Locking and anti-rotation devices accelerate drillout to save rig time while the tool's greater wall thickness provides superior strength.
- The smaller-OD models create a larger fluid bypass area during circulation and displacement, minimizing the effect of pressure on sensitive formations.
- The internal sleeves increase reliability and prevent premature opening from formation restrictions or applied pressures.
- The unitary sleeve opens and closes the tool, which eliminates pressure traps and increases reliability.

Options

- All 751 two-stage tools are furnished with first-stage plug, 751E free-fall opening cone, and 751E closing plug, unless otherwise specified. All 752 three-stage tools are furnished with 752E free-fall opening cone (color blue) and 752E flexible closing plug (color blue), unless otherwise specified. Optional plug sets available:
  - 751E-2C, for pumpdown opening or continuous two-stage cementing, consisting of bypass plug and 751E pumpdown opening plug
  - 751E-2B, for two-plug first-stage system, consisting of bypass plug, shut-off plug and baffle
  - 752E-3C, for three-stage, pumpdown opening or continuous lower-stage cementing, consisting of bypass plug and 752E pumpdown opening plug (color blue)
  - 751E-2D for two-stage cancellation cone (color black)

Specifications

Size (in./*mm*)	Grade	Weight Range (lb/ft, *kg/m*)	Max OD (in./*mm*)	Max Drillout ID (in./*mm*)	Overall Length (in./*mm*)			Seat ID				Safeload Below Tool SF = 1.5 (1,000 lb/*1,000 kg*)		Max Pressures SF = 1.2		Nitrile Seal Temp Limits* (°F/°C)
								Model 751E Two-Stage (in./*mm*)		Model 752E Three-Stage (Lower Tool) (in./*mm*)				Int (psi/*bar*)	Ext (psi/*bar*)	
					8 RND		BTC	Opening	Closing	Opening	Closing	8 RND	BTC			
4-1/2 *114.3*	N80	9.5 to 13.5 *14.1 to 20.1*	5.562 *141.3*	3.975 *101.0*	STC	27.7 *703.6*	30.1 *764.5*	3.000 *76.2*	3.187 *80.9*	2.500 *63.5*	2.750 *69.9*	151 *68*	203 *92*	8,550 *589.5*	8,140 *561.2*	275 *135*
	P110	11.6 to 15.1 *17.1 to 22.4*		3.885 *98.7*	LTC	28.7 *729.0*						242 *110*	311 *141*	11,760 *810.1*	12,340 *850.8*	
5 *127.0*	N80	11.5 to 15.0 *17.1 to 22.3*	6.090 *154.7*	4.445 *112.9*	STC	28.8 *731.5*	31.1 *789.9*	3.500 *88.9*	3.750 *95.3*	3.000 *76.2*	3.375 *85.7*	175 *79*	238 *108*	8,220 *566.7*	8,100 *558.5*	275 *135*
	P110	15.0 to 18.0 *22.3 to 26.8*		4.293 *109.0*	LTC	29.7 *754.4*						321 *146*	395 *179*	10,800 *744.6*	10,500 *723.9*	
5-1/2 *139.7*	N80	14.0 to 17.0 *20.8 to 25.3*	6.625 *168.3*	4.897 *124.4*	STC	29.1 *739.1*	31.1 *789.9*	3.750 *95.3*	4.062 *103.2*	3.000 *76.2*	3.375 *85.7*	209 *95*	263 *119*	7,250 *499.9*	6,900 *475.7*	275 *135*
		15.5 to 20.0 *23.0 to 29.7*		4.835 *122.8*								232 *105*	288 *131*	8,170 *563.3*	7,780 *536.4*	
	P110	17.0 to 23.0 *25.3 to 34.2*		4.777 *121.3*	LTC	29.7 *754.4*						365 *166*	*445* *202*	11,850 *817.0*	11,300 *779.1*	
7 *177.8*	N80	20.0 to 26.0 *29.7 to 38.7*	8.200 *208.3*	6.341 *161.1*	STC	30.2 *767.1*	32.1 *815.3*	4.500 *114.3*	5.000 *127.0*	3.750 *95.3*	4.125 *104.8*	276 *125*	391 *177*	5,600 *386.1*	5,340 *368.2*	275 *135*
		26.0 to 32.0 *38.7 to 47.6*		6.161 *156.5*	LTC	31.1 *789.9*						404 *183*	491 *223*	8,380 *577.8*	7,880 *543.3*	
	P110											548 *249*	653 *296*	10,120 *697.7*	9,640 *664.6*	

*Temperature limits are for Nitrile seals (standard). Limits for Viton® seals (used in L-80 grade or by special request) are 400°F (204°C).

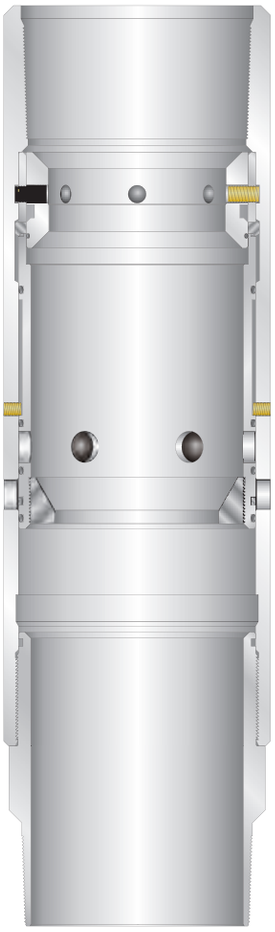
Eliminator® Series Stage Tools – Models 751E, 752E, 751PD and 752PD

Specifications *(continued)*

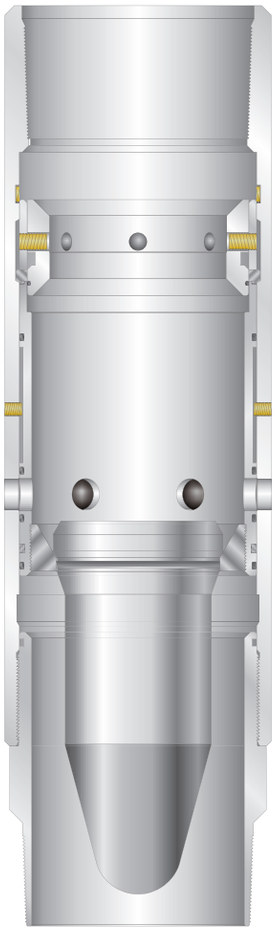
Size (in./*mm*)	Grade	Weight Range (lb/ft, *kg/m*)	Max OD (in./*mm*)	Max Drill-out ID (in./*mm*)	Overall Length (in./*mm*)			Seat ID				Safeload Below Tool SF = 1.5 (1,000 lb/*1,000 kg*)		Max Pressures SF = 1.2		Nitrile Seal Temp Limits* (°F/°C)
								Model 751E Two-Stage (in./*mm*)		Model 752E Three-Stage (Lower Tool) (in./*mm*)				Int (psi/*bar*)	Ext (psi/*bar*)	
					8 RND		BTC	Opening	Closing	Opening	Closing	8 RND	BTC			
7-5/8 *193.7*	N80	26.4 to 29.7 *39.3 to 44.2*	8.875 *225.4*	6.854 *174.1*	STC	33.9 *861.1*	36.1 *916.9*	5.500 *139.7*	5.875 *149.2*	4.500 *114.3*	5.000 *127.0*	356 *161*	493 *224*	6,440 *444.0*	6,140 *423.3*	275 *135*
	P110	29.7 to 39.0 *44.2 to 193.7*		6.760 *171.7*	LTC	34.8 *883.9*						605 *274*	732 *332*	9,790 *675.0*	9,160 *631.6*	
8-5/8 *219.1*	K55	24.0 to 32.0 *35.7 to 47.6*	10.125 *257.2*	7.982 *202.7*	STC	34.4 *873.8*	36.8 *934.7*	6.125 *155.6*	6.625 *168.3*	5.500 *139.7*	5.875 *149.2*	311 *141*	467 *212*	5,500 *379.2*	3,980 *274.4*	275 *135*
	P110	40.0 to 44.0 *59.5 to 65.5*		7.610 *193.3*	LTC	35.6 *904.2*						804 *365*	961 *436*	9,630 *663.9*	7,680 *529.5*	
9-5/8 *244.5*	N80	32.3 to 40.0 *48.1 to 59.5*	11.125 *282.6*	8.855 *224.9*	STC	34.9 *886.5*	36.5 *927.1*	7.250 *184.2*	7.750 *196.9*	6.125 *155.6*	6.750 *171.5*	417 *189*	616 *279*	5,270 *363.4*	5,440 *375.1*	275 *135*
		40.0 to 47.0 *59.5 to 70.0*		8.689 *220.7*	LTC	36.3 *922.0*						590 *268*	742 *337*	7,080 *488.1*	6,110 *421.3*	
	P110	43.5 to 53.5 *64.7 to 75.9*		8.609 *218.7*								878 *398*	1,072 *486*	9,320 *642.6*	7,470 *515.0*	
10-3/4 *273.1*	N80	40.5 to 51.0 *67.7 to 75.9*	12.312 *312.7*	*9.904* 251.6	STC	33.8 *858.5*	36.5 *927.1*	8.250 *209.6*	8.875 *225.4*	7.250 *184.2*	7.750 *196.9*	493 *224*	748 *339*	4,990 *344.0*	3,790 *261.3*	275 *135*
	P110	51.0 to 60.7 *75.9 to 90.4*		9.704 *264.5*								853 *387*	1,226 *556*	7,640 *526.8*	4,250 *293.0*	
13-3/8 *339.7*	K55	61.0 to 72.0 *90.8* to *107.2*	15.000 *381.0*	12.375 *314.3*	STC	34.4 *873.8*	36.5 *927.1*	10.250 *260.4*	11.000 *279.4*	8.250 *209.6*	9.250 *235.0*	502 *228*	902 *409*	4,110 *283.4*	2,120 *146.2*	275 *135*
	P110											906 *411*	1,442 *654*	5,860 *404.0*	2,250 *155.1*	
16 *406.4*	N80	84.0 *125.0*	17.875 *454.0*	15.010 *381.3*	BTC	38.5 *977.9*		13.000 330.2	13.625 346.1			964 *437*		3,610 *248.9*	1,230 84.8	275 *135*
	P110	97.0 *144.4*		14.820 *376.4*	HTG Boss	48.5 *1,231.9*						1,940 *880*		6,420 *442.6*	4,000 275.8	
18-5/8 *473.1*	N80	87.5 to 136.0 *130 to 202.4*	20.75 527.1	17.439 443.0	BTC	46.0 1168.4		15.500 393.7	16.125 409.6			1,242 *563*		3,700 *255.1*	1,840 *126.9*	275 *135*
	P110	87.5 to 139.0 *130 to 206.9*		17.755 *450.9*								1,823 *827*		4,860 *335.1*	1,880 *129.6*	
20 *508.0*	K55	113.0 *168.2*	21.00 533.4	18.750 *476.3*	XLF	48.0 *1,219.2*		16.375 *415.9*	17.175 *436.2*			1,157 *524.8*		2,560 *176.5*	1,080 *74.5*	275 *135*
24 *609.6*	X42	171.3 *254.9*	25.125 *638.2*	22.250 *565.2*	Butt-weld	44.5 *1,130.3*		17.250 *438.2*	19.960 *507.0*			1,361 *617.3*		1,688 *116.4*	864 *59.6*	275 *135*
	X56	189.0 to 201.1 *281.3 to 299.3*										1,963 *890.4*		2,450 *168.9*	1,160 *81.0*	

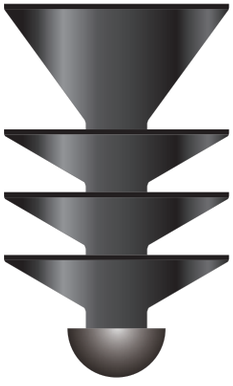
*Temperature limits are for Nitrile seals (standard). Limits for Viton® seals (used in L-80 grade or by special request) are 400°F (204°C).

Operational Sequence

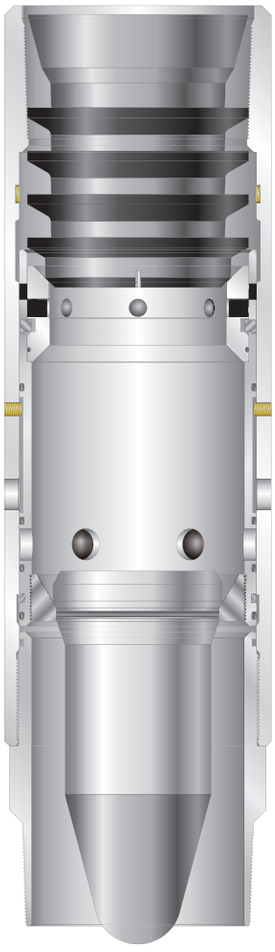


Running-in-Hole





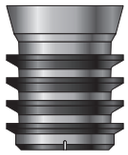
Open: Cementing



Closed:
Cementing Complete

POST™ Pack-Off Stage Tool – Model 781

POST Tool with Inflatable Element



Shut-Off Plug

Second Stage Opening Cone

First Stage Shut-Off Plug

Weatherford's *POST* pack-off stage tool is a potent combination of the Eliminator® stage tool and the continuous ribbed element system. *Eliminator* tools set the industry standard for reliability, cost effectiveness, and ease of use. The integral BULLDOG™ casing packer isolates and protects the producing formation from cement.

Applications

- Isolation of weak or sensitive formations from the effects of increased hydrostatic pressures
- Areas where cement can be detrimental to the producing formation, such as above slotted liners
- High-angle and horizontal holes, when used with the pumpdown opening option
- Two-stage cement jobs with the Model 781 alone
- Three-stage jobs, using the Model 782 as the lower tool and the Model 781 as the upper tool

Features, Advantages and Benefits

- With its outstanding strength, expansion, and centralization capability, the *BULLDOG* inflatable packer provides a positive, high-pressure seal in oversized, irregular, and elliptical holes in the most severe conditions.
- The packer element cannot be prematurely set by applying internal pressure. The free-fall opening cone or the pumpdown-opening plug must land on the opening seat and shift the inner sleeve before inflation.
- An externally adjustable opening sleeve enables the secondary opening and packer inflation pressure to be optimally set, based on hole conditions, immediately before running in the hole.
- The packer is inflated through the cementing ports, which eliminates additional holes through the stage tool body and enhances its integrity.
- Locking and anti-rotation devices accelerate drillout and save rig time.

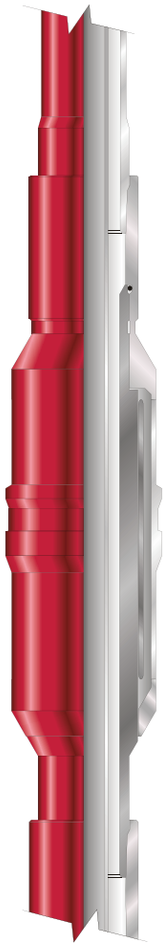
Specifications

Size (in./*mm*)	Maximum OD (in./*mm*)	Available Packer Length (ft/*m*)	Seat ID Closing/Opening				Nitrile Seal Temperature Limits* (°F/°C)
			Model 781 Two-Stage (in./*mm*)		Model 782 Three-Stage (Lower Tool) (in./*mm*)		
5.500 *139.7*	7.250 *184.2*	4.00 and 10.00 *1.219 and 3.048*	3.750 *95.3*	4.062 *103.2*	3.000 *76.2*	3.375 *85.7*	250 *121*
7.000 *177.8*	8.250 *209.6*	4.00 *1.219*	Model 789 5.00 *127.0*	Model 789 4.500 *114.3*	NA	NA	375 *191*
9.625 *244.5*	11.750 *298.5*	4.00, 7.00 and 10.00 *1.219, 2.134 and 3.048*	7.250 *184.2*	7.750 *196.9*	6.125 *155.6*	6.750 *171.5*	250 *121*
13.375 *339.7*	15.500 *393.7*	4.00, 7.00 and 10.00 *1.219, 2.134 and 3.048*	10.250 *260.4*	11.000 *279.4*	8.250 *209.6*	9.250 *235.0*	250 *121*
18.625 *473.1*	21.625 *549.3*	4.00 and 10.00 *1.219 and 3.048*	15.500 *393.7*	16.125 *409.6*	NA	NA	250 *121*

*Temperature limits are for peroxide cured Nitrile seals (standard). Alternate sizes, weights, and threads may be available. Contact your Weatherford representative for details.

Mechanical Cementing Port Collar – Model 761

Mechanical Cement
Port Collar – Model 761



Axial
Shifting Tool

Weatherford's mechanical cementing port collar, model 761, is made up and run in the well on either the casing or liner. The collar is a fullbore cementing valve that is opened and closed with axial workstring movement and requires no drillout after use. The model 761 mechanical cementing port collar requires no plugs or seats, and leaves the ID clean of excess cement after closure.

An internal sleeve is opened and closed by engaging a collet-shifting tool made up on the work string. The collet is usually placed between opposed cups on a service tool. When the shifting tool is lowered into the well and the collets engage the sleeve, the sleeve can shift to the open position.

With the sleeve open, a full primary cement job can be performed by pumping down the work string, out the service tool, through the open port collar, and into the annulus behind the casing or liner. On completion of the cement job, axial movement in the opposite direction closes the sleeve and seals the port collar closed. The service tool is then retrieved from the well, leaving the ID of the port collar full bore to the casing or liner ID and free of cement or other debris.

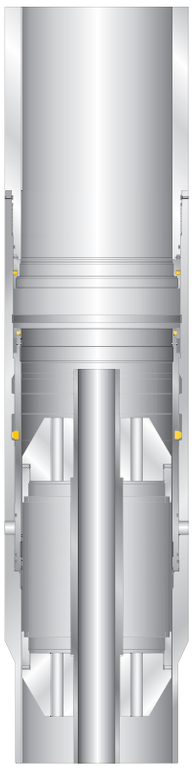
Applications

- Stage-cementing jobs with an ACP™ packer
- Cementing above screens or slotted pipe
- Single-trip liner systems with screens or slotted pipe
- Wash-down liner systems requiring cement above screens or slotted pipe
- Surface and intermediate two-stage cementing jobs in which lengthy drillout times of conventional stage equipment can occur

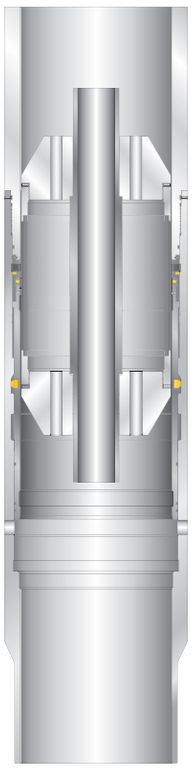
Features, Advantages and Benefits

- Multiple large-diameter ports enable the cement slurry to displace the drilling fluid, promoting quicker and more efficient operation.
- The internal sliding sleeve is pressure-balanced, providing a reliable opening and closing operation.
- High-strength, outer steel shell matches or exceeds casing burst and collapse specifications, providing tool reliability.
- Viton® fluoroelastomer seal assemblies are compatible with sour service, providing application flexibility.
- The port collar does not require rotation to locate or operate the tool, helping to provide easy functionality and making the tool suitable for deviated and horizontal wellbores.
- Pin x pin design enables the tool to be oriented to open and close, or vice versa, offering operational flexibility.

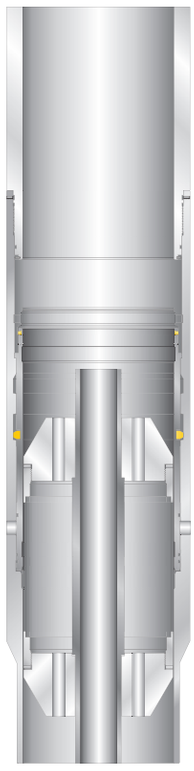
Operational Sequence



Run in the Hole with the Shifting Collet



Shifted Open



Locked Closed

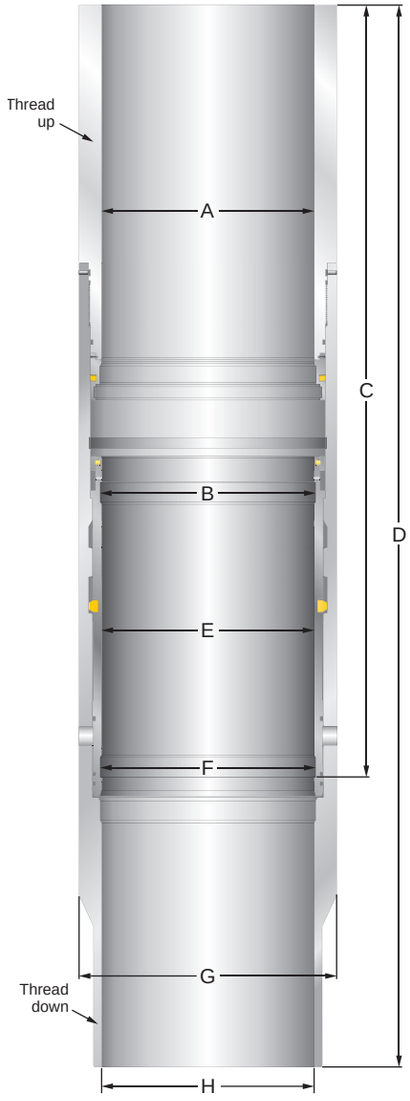
Viton is a registered trademark of DuPont Dow Elastomers L.L.C.

Mechanical Cementing Port Collar – Model 761

Specifications

Collar size (in./*mm*)	**4-1/2** ***114.30***	**5-1/2** ***139.70***	**7** ***177.80***	**8-5/8** ***219.20***	**10-3/4** ***273.00***	**13-3/8** ***339.70***	**18-5/8** ***473.10***
A (in./*mm*)	3.92 *99.57*	4.89 *124.20*	6.34 *161.06*	7.98 *202.70*	9.90 *251.50*	12.38 *314.33*	17.69 *449.33*
B (in./*mm*)	4.17 *105.92*	5.10 *129.50*	6.50 *165.10*	6.50 *165.10*	10.06 *255.52*	12.54 *318.52*	18.05 *458.47*
C (in./*mm*)	31.44 *798.58*	30.55 *775.97*	31.47 *799.34*	31.06 *788.92*	30.03 *762.76*	36.11 *917.19*	31.41 *797.81*
D (in./*mm*)	44.61 *1,133.09*	43.43 *1,103.12*	44.61 *1,133.09*	44.61 *1,133.09*	44.61 *1,133.09*	57.34 *1,456.44*	45.81 *1,163.60*
E (in./*mm*)	3.92 *99.57*	4.98 *126.54*	6.34 *161.06*	7.98 *202.70*	9.90 *251.50*	12.38 *314.33*	17.69 *449.33*
F (in./*mm*)	4.17 *105.92*	5.10 *129.50*	6.50 *165.10*	8.18 *207.78*	10.06 *255.52*	12.54 *318.59*	18.05 *458.47*
G (in./*mm*)	5.56 *141.22*	6.63 *168.40*	8.00 *203.20*	10.00 *254.00*	12.00 *304.80*	15.00 *381.00*	20.50 *520.70*
H (in./*mm*)	3.92 *99.57*	4.89 *124.20*	6.34 *161.06*	7.98 *202.70*	9.90 *251.50*	12.38 *314.33*	17.69 *449.33*
Single port diameter (in./*mm*)	0.75 *19.05*					0.88 *22.35*	1.13 *28.70*
Number of ports	6						
Total port flow area (in.^{2}/*mm*^{2})	2.65 *1,709.67*					3.07 *1,980.64*	5.96 *3,845.15*
Casing weight range (lb/ft, *kg/m*)	11.60 to 13.60 *17.30 to 20.20*	15.50 to 17.00 *7.00 to 7.70*	20.00 to 26.00 *29.80 to 38.70*	24.00 to 32.00 *10.80 to 14.50*	40.50 to 50.00 *18.30 to 22.60*	68.00 to 72.00 *101.20 to 107.10*	78.00 to 94.50 *116.10 to 140.60*
Burst pressure rating[1] (psi/*kPa*)	5,000 *34,473*		6,655 *45,885*	5,740 *39,575*	4,350 *29,992*	3,750 *25,855*	3,250 *22,408*
Collapse pressure rating[1] (psi/*kPa*)			5,410 *37,300*	5,360 *36,956*	4,065 *28,027*	2,250 *15,513*	1,000 *6,895*
Tensile ration[1] (lb/*kg*)	307,000 *139,253*	421,000 *190,962*	604,000 *273,969*	759,000 *344,276*	945,000 *428,644*	1,400,000 *635,029*	2,416,000 *1,095,879*
Standard box uphole buttress thread (in./*mm*)	4-12 *114.30*	5-1/2 *139.70*	7.00 *177.80*	8-5/8 *219.20*	10-3/4 *273.00*	13-3/8 *339.70*	18-5/8 *473.10*
Standard pin downhole buttress thread (in./*mm*)							

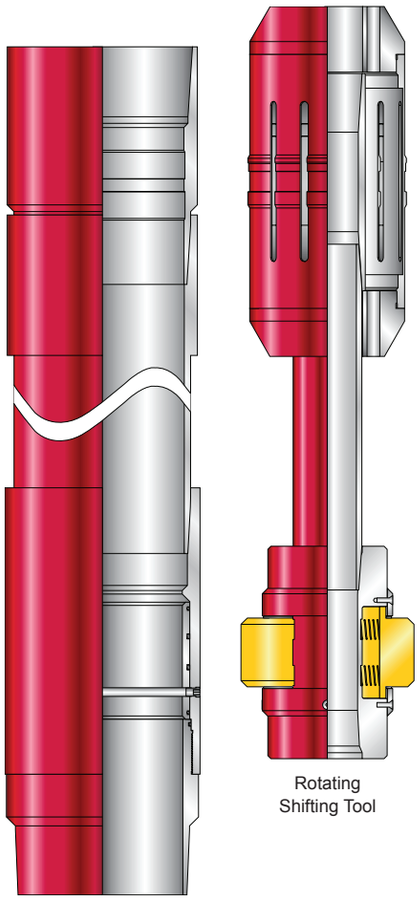
[1]Based on 80,000-psi (552-MPa) minimum yield-strength material



Options

- Standard connections are 8rd or buttress.
- Premium connections are available through special order.
- A locking ring is available if required.

Rotating Cementing Port Collar



Rotating Cement Port Collar

Rotating Shifting Tool

Weatherford's rotating cementing port collar is a work string activated cementing valve that is made up and run in the well on either casing or liner. The full-bore cementing valve opens and closes with rotational work string movement, requires no plugs or seats, eliminates cement drillout, and leaves the ID clean of excess cement.

The rotating cementing port collar opens and closes using a rotating shifting tool that is made up on the work string. The shifting tool incorporates spring-loaded dogs that engage a rotation-activated internal sleeve of the port collar, sliding it to the open position with rotation to the right. With the sleeve open, large diameter ports are exposed, enabling a full primary cement job to be performed by pumping cement down the work string, out of the service tool, through the open ports, and into the annulus behind the casing or liner. Upon completion of the cement job, rotating the shifting tool to the left closes the sleeve and seals the port collar closed. The shifting tool is then retrieved from the well, leaving the ID of the port collar full-bore to the casing or liner ID and free of cement or other debris.

When run with the compatible Weatherford mechanical collar locator and locator profile sub, the rotating port collar ensures the shifting tool is quickly located, saving rig time.

Applications

- Stage-cementing jobs using Weatherford's ACP™ annulus casing packers
- Cementing above screens or slotted pipe
- Single-trip liner systems with screens or slotted pipe
- Washdown liner systems that require cementation above screens or slotted pipe

Features, Advantages and Benefits

- The high-strength outer steel casing is equipped with threads, tensile strength, and yields that meet or exceed casing or liner requirements, providing application flexibility.
- Multiple large-diameter ports enable high displacement rates, eliminating the need for drillout after the cementing job, saving associated costs.
- The internal valve sleeve is isolated from workstring rotation, preventing accidental opening and closing of the port collar.
- Pressure-balanced, internal sliding sleeve exposes the ports when the shifting tool is rotated to the right, enabling a full primary cement job to occur.
- The shifting tool is equipped with spring-loaded dogs that engage the internal sleeve, enabling rotation of the work string to transmit through the shifting tool to the sleeve, sliding the sleeve open and closed as required.

Specifications

Rotating Cement Port Collar		
Size (in./*mm*)	13.38 *339.8*	
Length (in./*mm*)	30.32 *770.1*	
OD (in./*mm*)	15.00 *381.0*	
ID (in./*mm*)	12.29 *312.1*	
Weight range (ppf/*N•m*)	68 to 72 *92.1 to 97.6*	
Burst pressure rating* (psi/*MPa*)	5,750 *39.6*	
Collapse pressure rating* (psi/*MPa*)	2,930 *20.2*	
Tensile rating* (lb)	1,488,000	
Threads	Uphole	13 3/8-in. buttress box
	Downhole	13 3/8-in. buttress pin

* Ratings based on 80k MYS

Shifting Tool	
Size (in./*mm*)	13.38 *339.8*
Length (in./*mm*)	44.36 *1,126.7*
Weight (ppf/*N•m*)	23 to 25 *31.1 to 33.8*
Burst pressure rating* (psi/*MPa*)	10,560 *72.8*
Collapse pressure rating* (psi/*MPa*)	8,900 *61.3*

* Ratings based on L-80 material

Flow area through ports	13.38
Total flow area	3.53
Number of ports	2
Port diameter	1.5


Weatherford

Injection Production Packers (IPP™)

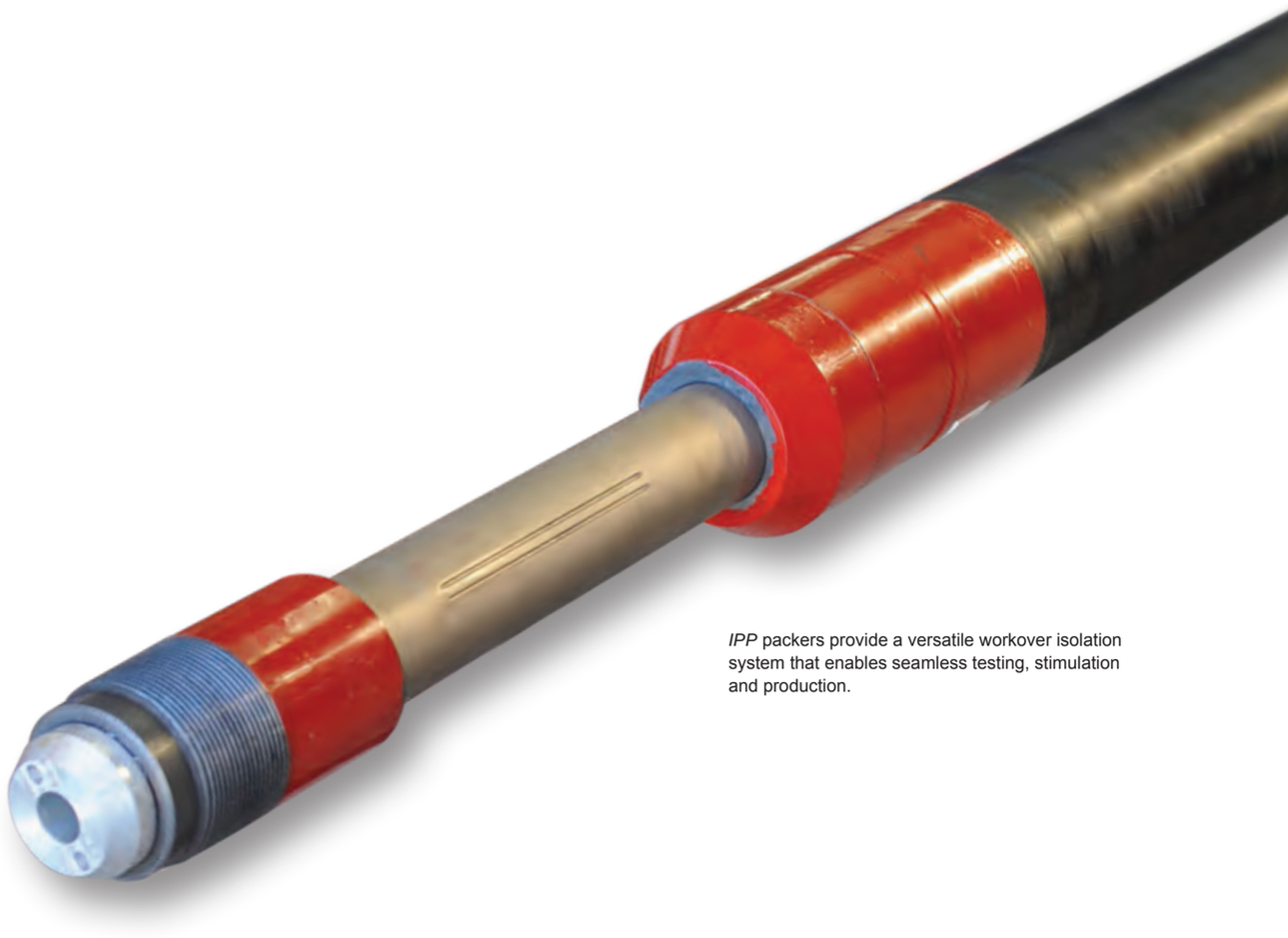

Weatherford

Introduction

Weatherford injection production packers (*IPP*) provide a positive, pressure-tight seal for annular isolation between the work string and casing or in an open hole to assist in remedial or abandonment applications during drilling and production. Field-proven and extremely versatile, *IPP* systems offer a temporary or permanent seal and are available in multi-set and single-set models. Multi-set models are designed to be inflated and deflated several times per run while single-set models are for inflating and deflating once per run.

IPP systems have a relatively small OD; enabling the systems to be run through restricted ID's and set in larger openings. Each element is custom-manufactured from application-specific elastomers, providing resistance to high temperatures and corrosive fluids and gases. The robust elements are constructed with steel-rib reinforcement (fully covered or partially exposed) or fully covered with cable reinforcement.

We offer a wide range of accessory equipment such as disconnects, retrieving tools, sliding sleeves, tubing drains and circulating valves, extending the usefulness of *IPP* systems in any application.



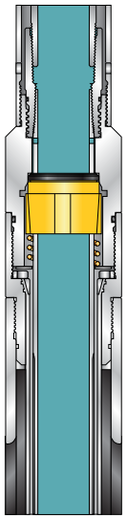
IPP packers provide a versatile workover isolation system that enables seamless testing, stimulation and production.

IPP Valve Operating Sequence

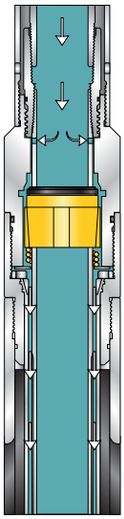
All *IPP* systems are inflated using the same process, although when deflated, the procedure differs among pull-release and rotate-release systems.

For inflation, *IPP* systems incorporate an internal spring-compressed poppet valve that opens to allow fluids to inflate the packer and closes, trapping the inflation pressure within the element. Workstring pressure compresses the spring within the poppet valve, allowing inflation fluid to flow into the element and inflate it. Once the element reaches the preferred pressure, workstring pressure is released at surface, or by shearing a seat at the bottom of the work string. Released workstring pressure decompresses the spring, trapping the pressure within the element.

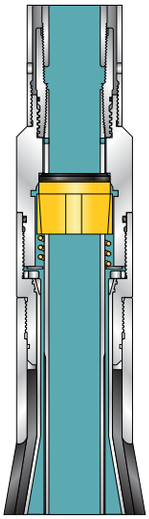
For deflation of rotate-release *IPP* systems, the work string is pulled up and rotated to the right five times. On pull-release *IPP* systems the workstring is pulled up with an appropriate amount of force to shear the releasing pins. The upward movement of both systems pulls the slots on the mandrel up under the poppet seals and the seals the lower part of the packer, allowing pressure between the element and the annulus to equalize. An additional pull causes the packer to deflate completely, enabling retrieval.



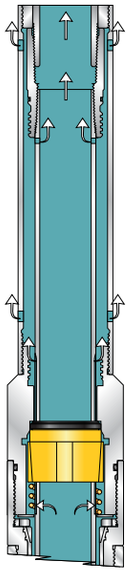
Run in hole



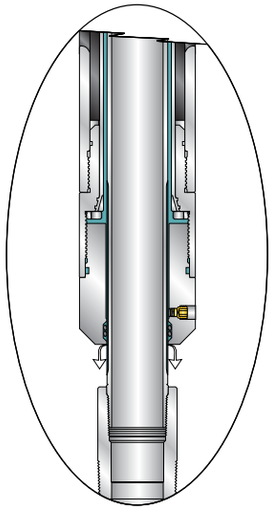
Isolate tubing pressure, increased tubing pressure opens poppet for inflation



Element inflates, release tubing pressure to close poppet and hold element pressure



Upward mandrel movement moves slots on mandrel up, deflating element



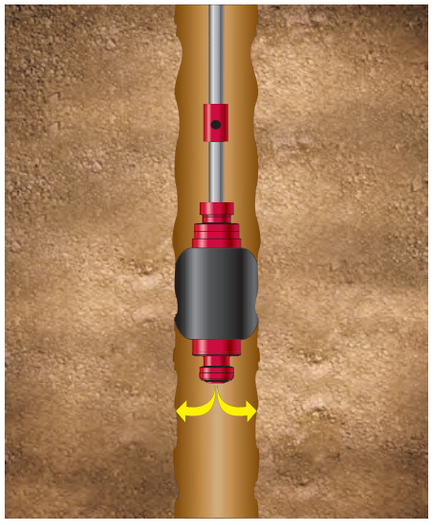
Slots on the bottom of the mandrel pass under the seals at the bottom of the IPP, providing fluid communication to deflate element

Applying the *IPP* Packers

Openhole Testing: *IPP* System

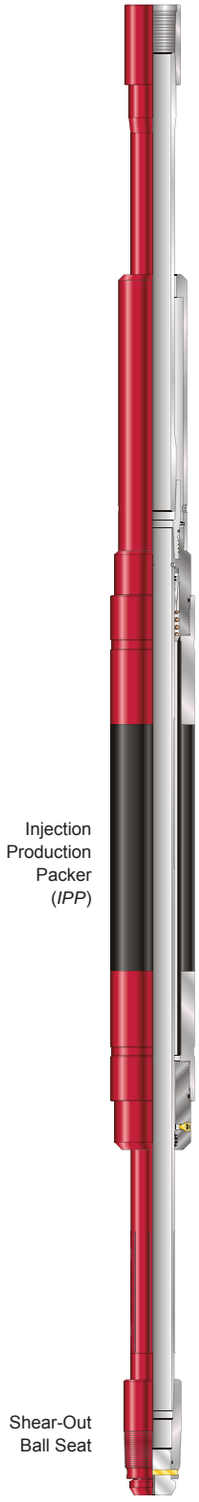
Typically applied in exploration wells, openhole testing is performed by isolating a discreet section of open hole and performing injectivity or flowback tests that yield valuable information about the reservoir. Weatherford's *IPP* system is a simple, cost-effective and reliable means of isolating various zones and selectively testing the reservoir.

In this assembly the packer is run on drillpipe into a predrilled hole to the required depth. Once at setting depth, the reset dart is dropped. As the pressure increases, the *IPP* packer is inflated to isolate the test zone. Following inflation, pressure is increased to shear the reset dart into the dart catcher. Next, the operator can perform production testing and flowback tests as required. Deflate the packers and repeat the procedure in the next zone as required.



The *IPP* packer can isolate specific sectors to perform injectivity tests.

IPP Single-Set Rotation Release



Weatherford's single-set rotation-release injection production packer (*IPP*) is a field-proven and extremely versatile, downhole service tool that can be installed in either cased or open hole, on a temporary or long-term basis. This packer is designed to be inflated, deflated, and retrieved one time per run; however, the packer can be redressed at the rigsite for additional runs.

The packer is run in the well on threaded pipe (drillpipe or work string) and requires only limited rotational movement to operate. With a relatively small OD, the packer can be run through restricted IDs and then set in larger openings. The standard elastomers are suitable for severe-service applications.

The packer is inflated with application of workstring hydraulic pressure. To deflate and retrieve the tool, the work string is pulled upward and then rotated five turns to the right, enabling pressure between the element and the annulus above the packer to equalize.

An additional pull causes the element to deflate into the tubing and annulus below the packer. When the element is completely deflated, the packer can be retrieved.

Applications

- Suitable for use in vertical, high-angle, or horizontal applications
- Useful for open- or cased-hole zonal isolation
- Capable of acting as a permanent or retrievable bridge plug
- Functional as a retainer for squeezing or treating formations below the tool
- Effective in locating casing or liner leaks
- Ideal for short-term production tests
- Useful for isolating casing patches

Features, Advantages and Benefits

- Relatively small OD permits the packer to pass through tight restrictions, enabling the packer to be inflated and set in larger openings where mechanical packers and bridge plugs cannot be used.
- Hydraulically activated inflation valve enables the packer to be set without manipulation, providing reliability.
- Versatile design enables the packer to be run in open or cased hole, providing application flexibility.
- Elements can be inflated with cement for permanent installation, saving the cost of additional runs.
- The packer can be redressed at the rigsite for additional runs, saving time.
- Elements are manufactured from application-specific elastomers, providing resistance to high temperatures, corrosive fluids and gases.
- Elements are adaptable to different mandrel sizes, making the packer suitable for use in a variety of applications.

Specifications

Dimensions and Element Types			
Element OD (in./*mm*)	**Mandrel OD (in./*mm*)**	**Element Seal Length (in./*mm*)**	**Element Type Cable/Strip**
3.50 *89*	1.25 *32*	48 *1,219*	C/S
4.25 *108.0*	2.00 *51*		C/S
4.350 *110.5*	2.00 *51*		S
4.63 *117.0*	2.00 *51*		C/S
	2.50 *64*		
5.00 *127.0*	2.00 *51*		S
5.50 *140.0*	2.00 *51*		C/S
	2.50 *64*		
6.25 *159.0*	2.00 *51*		C
	2.50 *64*		
6.75 *171.0*	2.00 *51*		C
	2.50 *64*		

Dimensions and Element Types			
Element OD (in./*mm*)	**Mandrel OD (in./*mm*)**	**Element Seal Length (in./*mm*)**	**Element Type Cable/Strip**
6.88 *175.0*	2.00 *51*	48 *1,219*	S
	2.50 *64*		
7.00 *177.8*	2.50 *64*		C
7.50 *190.0*	2.50 *64*		C
9.00 *229.0*	2.50* *64*		S
9.25 *235.0*			C
10.50 *267.0*			S
13.25 *336.6*	2.50** *64*		S
13.88 *352.4*			
15.00 *381.0*			
17.75 *450.8*			

* Can be run on standard 2 1/2-in. (63.5-mm) ID chassis or heavy-duty 2 1/2-in. chassis.

** Run on 2 1/2-in. (63.5-mm) heavy-duty chassis only.

IPP Single-Set Rotation Release

Specifications *(continued)*

Corresponding Chassis and Element Sizes		
IPP Chassis ID (in./*mm*)	**Element Size (in./*mm*)**	**Connections (in.)**
1-1/4 *31.8*	3.50 *88.9*	2-3/8 × 2-3/8 (EUE box up × EUE pin down)
2 *50.8*	4.25 to 6.75 *108.0 to 171.5*	2-3/8 × 2-7/8 (EUE box up × EUE pin down)
2-1/2 *63.5*	4.63 to 10.50 *118.0 to 266.7*	2-7/8 × 3-1/2 (EUE box up × EUE pin down)
Heavy duty	7.50 and larger *191.0 and larger*	3-1/2 × 3-1/2 (API IF box up × EUE pin down)

Options

- Elements are available in a variety of sizes, ranging from 3 1/2- to 10 1/2-in. (89.9- to 266.7-mm) OD, and can be changed to fit various hole sizes. (Weatherford also offers elements, ranging from 13 1/4- to 18 5/8-in. (336.5- to 472.4-mm) OD, for use with the heavy-duty version of this packer.)
- Elements can be constructed with fully covered or partially exposed steel-rib reinforcement (strip) or fully covered cable reinforcement. Strip elements can incorporate an exposed rib section to provide anchoring in the wellbore when required.
- A delayed opening feature, available for some sizes, enables the packer to be run where other hydraulic events occur first.
- Weatherford provides a variety of complementary tools for use with this packer such as circulating valves, disconnects with overshots and plugs.

IPP Single-Set Pull Release

Weatherford's single-set pull-release injection production packer (*IPP*) is a field-proven and extremely versatile, downhole service tool that can be installed in either cased or open hole, on a temporary or long-term basis. This packer is designed to be inflated, deflated, and retrieved one time per run, but can be redressed at the rigsite for additional runs.

The packer is run in the well on coiled tubing or threaded pipe (drillpipe or work string) and requires only axial movement to operate. With a relatively small OD, the packer can be run through restricted IDs and then set in larger openings. The standard elastomers are suitable for severe-service applications.

The packer is inflated with an application of workstring hydraulic pressure. To deflate and retrieve the tool, the work string is pulled upward to shear the releasing pin. Axial tension is then reduced on the work string, which enables the pressure between the element and the annulus to equalize. An additional pull causes the element to deflate. When the element is completely deflated, the packer can be retrieved.

Applications

- Suitable for deviated or horizontal applications
- Useful in open- or cased-hole zonal isolation
- Capable of acting as a permanent or retrievable bridge plug
- Functional as a retainer for squeezing or treating formations below the tool
- Effective in locating casing or liner leaks
- Ideal for short-term production tests
- Useful for isolating casing patches

IPP Single-Set Pull Release

Features, Advantages and Benefits

- Relatively small OD permits the packer to pass through tight restrictions, enabling the packer to be inflated and set in larger openings where mechanical packers and bridge plugs cannot be used.
- Hydraulically activated inflation valve enables the packer to be set without manipulation, providing reliability.
- Only axial workstring movement is required to equalize and deflate the tool, enabling easy retrieval.
- Versatile design enables the packer to be run in open or cased hole, providing application flexibility.
- Elements can be inflated with cement for permanent installation, saving the cost of additional runs.
- The packer can be redressed at the rigsite for additional runs, saving operations time.
- Elements are manufactured from application-specific elastomers, providing resistance to high temperatures, corrosive fluids, and gases.
- Elements are adaptable to different mandrel sizes, making the packer suitable for use in a variety of applications.

Specifications

Dimensions and Element Types			
Element OD (in./*mm*)	**Mandrel OD (in./*mm*)**	**Element Seal Length (in./*mm*)**	**Element Type Cable/Strip**
3.50 *89.0*	1.25 *32*	48 *1,219*	C/S
4.25 *108.0*	2.00 *51*		C/S
4.35 *110.5*	2.00 *51*		S
4.63 *117.0*	2.00 *51*		C/S
	2.50 *64*		
5.00 *127.0*	2.00 *51*		S
5.50 *140.0*	2.00 *51*		C/S
	2.50 *64*		
6.25 *159.0*	2.00 *51*		C
	2.50 *64*		

Dimensions and Element Types			
Element OD (in./*mm*)	**Mandrel OD (in./*mm*)**	**Element Seal Length (in./*mm*)**	**Element Type Cable/Strip**
6.75 *171.0*	2.00 *51*	48 *1,219*	C
	2.50 *64*		
6.88 *175*	2.00 *51*		S
	2.50 *64*		
7.00 *177.8*	2.50 *64*		C
7.50 *190.0*	2.50 *64*		C
9.00 *229.0*	2.50* *64*		S
9.25 *235.0*			C
10.50 *267.0*			S
13.25 *336.6*	2.50** *64*		S
13.88 *352.4*			
15.00 *381.0*			
17.75 *450.8*			

*Can be run on standard 2 1/2-in. (63.5-mm) ID chassis or heavy-duty 2 1/2-in. (63.5-mm) chassis.

** Run on 2 1/2-in. (63.5-mm) heavy-duty chassis only.

Specifications *(continued)*

Corresponding Chassis and Element Sizes		
IPP Chassis ID (in./*mm*)	**Element Size (in./*mm*)**	**Connections (in.)**
1-1/4 *31.8*	3.50 *88.9*	2-3/8 × 2-3/8 (EUE box up × EUE pin down)
2 *50.8*	4.25 to 6.75 *108.0 to 171.5*	2-3/8 × 2-7/8 (EUE box up × EUE pin down)
2-1/2 *63.5*	4.63 to 10.50 *118.0 to 266.7*	2-7/8 × 3-1/2 (EUE box up × EUE pin down)
Heavy duty	7.50 and larger *191.0 and larger*	3-1/2 × 3-1/2 (API IF box up × EUE pin down)

Options

- Elements are available in a variety of sizes, ranging from 3 1/2- to 10 1/2-in. (89.9- to 266.7-mm) OD, and can be changed to fit various hole sizes.
- Elements can be constructed with fully covered or partially exposed steel-rib reinforcement (strip) or fully covered cable reinforcement. Strip elements can incorporate an exposed rib section to provide anchoring in the wellbore when required.
- A delayed opening feature, available for some sizes, enables the packer to be run where other hydraulic events occur first.
- Weatherford offers a full complement of accessory tools to use with the packer, including disconnects with retrieval overshoots, circulating valves, and plugs.

IPP MultiSet Rotation Release

Injection Production Packer (*IPP*)

Shear-Out Ball Seat

Weatherford's multiset rotation-release injection production packer (*IPP*) is a downhole service packer that offers field-proven, reliable, and extremely versatile performance in a variety of applications. This packer can be inflated, deflated, retrieved multiple times per run, and enable installation in cased or open hole, on a temporary or long-term basis.

With a relatively small OD, the packer can be run through restricted IDs and then set in larger hole sizes. Elastomers are suitable for standard or severe-service applications.

The multiset *IPP* tool runs in the well on threaded pipe (drillpipe or work string) and requires rotation and axial movement to operate. Once in the hole, the packer is inflated with hydraulic pressure. Deflation and retrieval simply require that the work string be rotated five times at the packer, and then pulled up. When the element is completely deflated, the packer can be repositioned and reset, or pulled from the well if the job is complete.

Applications

- Can be used in vertical, high-angle, and horizontal applications
- Provides excellent openhole or cased-hole zonal isolation
- Can function as a permanent or retrievable bridge plug
- Acts as a retainer for squeezing or treating formations below the tool
- Can locate casing or liner leaks
- Is ideal for short-term production tests

Features, Advantages and Benefits

- The packer runs on threaded tubing or drillpipe in either open or cased hole, and is suitable for standard or severe-service conditions, providing a versatile packer with application flexibility.
- Hydraulically activated inflation valve enables inflation of the packer multiple times per trip, helping to save costly rig time.
- The packer requires rotation and straight pull to deflate the element into the tubing, providing easy retrieval.
- Elements come fully reinforced with strip or cable and are readily adaptable to different mandrel sizes, providing extra durability. (For cased-hole anchoring, the strip element can be partially exposed.)
- Packers can be redressed on location for additional runs, resulting in fewer costly delays.
- Relatively small element OD allows passage through restricted ID and inflation in relatively large wellbores, reliably handling difficult downhole conditions.

Specifications

Dimensions and Element Types			
Element OD (in./*mm*)	**Mandrel OD (in./*mm*)**	**Element Seal Length (in./*mm*)**	**Element Type Cable/Strip**
3.50 *89*	1.25 *32*	48 *1,219*	C/S
4.25 *108*	2.00 *51*		C/S
4.63 *117*	2.00 *51*		C/S
	2.50 *64*		S
5.00 *127*	2.00 *51*		C/S
5.50 *140*	2.00 *51*		C/S
	2.50 *64*		
6.25 *159*	2.00 *51*		C
	2.50 *64*		
6.75 *171*	2.00 *51*		C
	2.50 *64*		
6.88 *175*	2.00 *51*		S
	2.50 *64*		
7.50 *190*	2.50 *64*		C/S
7.88 *200*			C
9.00 *229*			S
9.25 *235*			C
10.50 *267*			S

Corresponding Chassis and Element Sizes		
IPP Chassis ID (in./*mm*)	**Element Size Minimum (in./*mm*)**	**Connections (in.)**
1-1/4 *31.8*	3.50 *88.9*	2-3/8 × 2-3/8 (EUE box up × EUE pin down)
2 *50.8*	4.25 and larger *108.0 and larger*	2-3/8 × 2-7/8 (EUE box up × EUE pin down)
2-1/2 *63.5*	4.63 and larger *118.0 and larger*	2-7/8 × 3-1/2 (EUE box up × EUE pin down)

Options

- Elements can be constructed with fully covered or partially exposed steel-rib reinforcement (strip) or fully covered cable reinforcement. Strip elements can incorporate an exposed rib section to provide anchoring in the wellbore when required.
- A delayed opening feature, available for some sizes, enables the packer to be run where other hydraulic events occur first.
- Elements are available in a variety of sizes, ranging from 3 1/2- to 10 1/2-in OD and can be changed to fit various hole sizes. (Weatherford also offers elements, ranging from 13 1/4- to 18 5/8-in. OD for use with the heavy-duty, single-set rotation release version of this packer.
- Weatherford provides a variety of complementary tools for use with this packer such as circulating valves, disconnects with overshoots, and plugs.

IPP Heavy-Duty Rotation Release

Weatherford's heavy-duty rotation-release injection production packer (*IPP*) is a field-proven and extremely versatile, downhole service tool that can be installed in either cased or open hole, on a temporary or long-term basis. This packer is designed to be inflated, deflated, and retrieved one time per run, but can be redressed at the rigsite for additional runs.

The packer is run in the well on threaded pipe (drillpipe or work string) and requires only limited rotational movement to operate. With a relatively small OD, the packer can be run through restricted IDs and then set in larger openings. The standard elastomers are suitable for severe-service applications. The packer is inflated with the application of workstring hydraulic pressure. To deflate and retrieve the packer, the work string is pulled upward and then rotated five turns to the right, enabling pressure between the element and the annulus above the packer to equalize.

An additional pull causes the element to deflate into the tubing and annulus below the packer. When the element is completely deflated, the packer can be retrieved.

Applications

- Suitable for use in vertical, high-angle, or horizontal applications
- Useful for open- or cased-hole zonal isolation
- Capable of acting as a permanent or retrievable bridge plug
- Functional as a retainer for squeezing or treating formations below the tool
- Effective in locating casing or liner leaks
- Ideal for short-term production tests
- Useful for isolating casing patches

Features, Advantages and Benefits

- The packer is equipped with robust connections, making it suitable for heavy-duty service.
- Relatively small OD permits the packer to pass through tight restrictions, enabling the packer to be inflated and set in larger openings, where mechanical packers and bridge plugs cannot be used.
- Versatile design enables the packer to be run in open or cased hole, providing application flexibility.
- Elements can be inflated with cement for permanent installation, saving the cost of additional runs.

Features, Advantages and Benefits *(continued)*

- Packer can be redressed at the rigsite for additional runs, saving rig time.
- Hydraulically activated inflation valve enables the packer to be set without manipulation, proving reliability.
- Elements are manufactured with application-specific elastomers, providing resistance to high temperatures, corrosive fluids, and gases.
- Elements are adaptable to different mandrel sizes, making the packer suitable for various applications.

Specifications

Dimensions and Element Types			
Element OD (in./*mm*)	**Mandrel ID (in./*mm*)**	**Element Seal Length (in./*mm*)**	**Element Type (Cable/Strip)**
7.50 *190*	2.50* *63.5*	48.00 *1,219.0*	C
9.25 *235*			
10.50 *267*			S
13.25 *337*	2.50** *63.5*		
15.00 *381*			

* Can be run on standard 2 1/2-in. (63.5-mm) ID chassis or heavy-duty 2 1/2-in. chassis.

** Run on 2 1/2-in. (63.5-mm) heavy-duty chassis only.

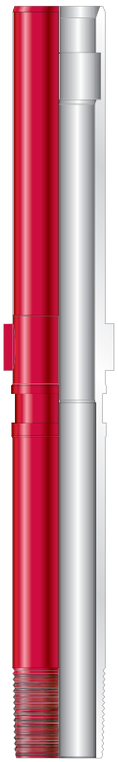
IPP Chassis ID (in./*mm*)	Element Size (in./*mm*)	Connections (in.)
2-1/2 *63.5*	7.50 and larger *191.0 and larger*	3-1/2 × 3-1/2 (API IF box up × EUE pin down)

Data remains the same for standard and heavy-duty chassis.

Options

- Weatherford offers a full complement of accessory tools to use with the *IPP*, including disconnects with retrieval overshoots, circulating valves, and plugs.
- Tool chassis, available with 2 1/2-in. (63.5-mm) ID, comes in various element sizes.
- The chassis is ideal for larger element sizes, ranging from 7 1/2- to 15-in. (190.5- to 381-mm) OD, and can be adapted to fit various hole sizes.
- Elements can be constructed with fully covered or partially exposed steel-rib reinforcement (strip) or fully covered cable reinforcement. Strip elements can incorporate an exposed rib section to provide anchoring in the wellbore when required.
- A delayed opening feature, available for some sizes, enables the packer to be run where other hydraulic events occur first.

T-2 On-Off Tool



Weatherford's T-2 on-off tool enables the tubing string to be disconnected 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.

The tool has two basic components: the overshot mounted on the tubing string and the stinger mounted on the packer. The overshot disengages with either a standard left release or an optional right quarter-turn release. The washover shoe on the overshot cuts through debris, allowing for easy engagement of the stinger. The seals in the tool are retrieved with the overshot to enable redressing at the surface.

Available with all common wireline profiles, the stinger works with industry-standard blanking plugs, standing valves, and regulators.

Applications

- Mechanical-, hydraulic-, or wireline-set packer completions
- Zonal isolation above the packer
- Temporary abandonment of lower zones
- Tubing retrieval without disturbing the packer

Features, Advantages and Benefits

- The tool enables the packer to be used as a bridge plug for zonal isolation or the temporary abandonment of lower zones to save rig costs.
- The tool can be full-pressure tested at the surface to save rig time.
- If specified at time of order, the tool can be pinned in a shear-up or shear-down position, providing compatibility with the packer setting and retrieving style.
- The standard left or optional right quarter-turn release provides simple operation on the rig.
- Bonded seals enable multiple disconnections without costly retrieval.
- The rugged, dependable design enables tubing retrieval without disturbing the packer.
- The washover shoe cuts through debris to release stuck equipment in the wellbore.

Specifications

Overshot

Casing (in./*mm*)	Washover Shoe OD (in./*mm*)	Standard Tubing Connection (in.)	Release Direction	Product	
				Overshot	Overshot 10K
3-1/2 *88.9*	2.775 *70.49*	1.9 HYDCS[a]	Left	510-35-002	—
		1-1/2 EUE[b] 10 RD[c]		510-35-000	
4-1/2 *114.3*	3.750 *95.25*	2-3/8 EUE 8 RD	Left	—	512-45-010
					512-45-011
				512-45-0HNBR	—
				512-45-000	
5-1/2 *139.7*	4.516 *114.71*	2-3/8 EUE 8 RD	Left	512-55-000	—
			Right	—	512-55-010
			Left		512-55-011
7 *177.8*	5.875 *149.23*	2-7/8 EUE 8 RD	Left	512-70-00HSN	—
		2-3/8 EUE 8 RD		512-71-000	
				—	512-71-010
		2-7/8 EUE 8 RD			512-70-010
				512-70-0HNBR	—
				512-70-005	
		3-1/2 EUE 8 RD	Right	512-73-0NB	
7-5/8 *193.7*	6.391 *162.33*	2-7/8 EUE 8 RD	Left	512-75-000	—
9-5/8 *244.5*	8.255 *209.68*	2-7/8 EUE 8 RD	Left	512-95-000	—
	8.265 *209.93*	4-1/2 EUE 8 RD		510-96	

[a]Hydril Type CS joint
[b]External upset end
[c]Round

T-2 On-Off Tool

Specifications *(continued)*

Stinger

Standard Tubing Connection (in.)	Full Opening (in./*mm*)	Wireline Profile								Stinger
		WF (in./*mm*)	WR (in./*mm*)	WN (in./*mm*)	WX (in./*mm*)	WXN (in./*mm*)	VX (in./*mm*)	VF (in./*mm*)	VOR (in./*mm*)	
1.66 NU[a] 10 RD	1.250 *31.75*	—	—	—	—	—	—	—	—	510-35-701
	—	1.250 *31.75*	—	—	—	—	—	—	—	510-35-125SB
1.9 HYDCS	1.250 *31.75*	—	—	—	—	—	—	—	—	510-35-125HYD
2-3/8 EU[b] 8 RD	—	—	—	—	—	—	1.500 *38.10*	—	—	510-20-150X
	—	—	—	—	—	—		—	—	510-20-150XWL
	—	—	—	—	—	—	—	1.750 *44.45*	—	510-20-175FH
	—	—	—	—	—	—	—	1.781 *45.24*	—	510-20-178FWL
	—	1.781 *45.24*	—	—	—	—	—	—	—	510-20-181FWL
	—	1.780 *45.21*	—	—	—	—	—	—	—	510-20-178
	—	—	—	—	—	—	—	—	1.781 *45.24*	510-20-1781WL
	—	1.810 *45.97*	—	—	—	—	—	—	—	510-20-181SB
	—	—	1.810 *45.97*	—	—	—	—	—	—	510-20-181R
	—	1.810 *45.97*	—	—	—	—	—	—	—	510-20-181
	—	1.870 *47.50*	—	—	—	—	—	—	—	510-20-187
	—		—	—	—	—	—	—	—	510-20-187FWL
	—	—	—	—	1.870 *47.50*	—	—	—	—	510-20-187XWL
	—	—	—	—		—	—	—	—	510-20-187X99
	—	—	—	—	—	1.870 *47.50*	—	—	—	510-20-187XN
	—	—	—	—	—		—	—	—	510-20-187XNWL
	—	—	—	—	—	—	1.870 *47.50*	—	—	510-20-187XWLH
	—	—	—	1.875 *47.63*	—	—	—	—	—	510-20-187N
	2.000 *50.80*	—	—	—	—	—	—	—	—	510-20-712
		—	—	—	—	—	—	—	—	510-20-210WL

[a]Nonupset
[b]External upset

Specifications *(continued)*

Stinger

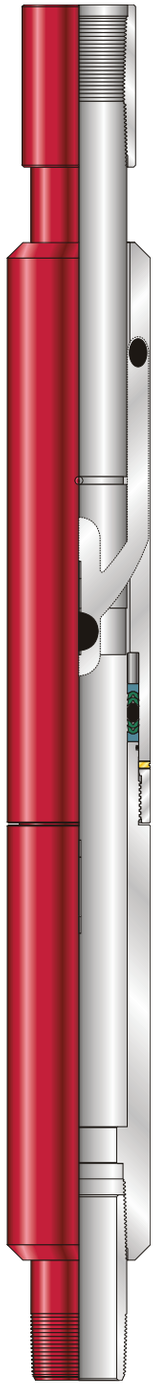
Standard Tubing Connection (in.)	Full Opening (in./*mm*)	Wireline Profile								Stinger
		WF (in./*mm*)	WR (in./*mm*)	WN (in./*mm*)	WX (in./*mm*)	WXN (in./*mm*)	VX (in./*mm*)	VF (in./*mm*)	VOR (in./*mm*)	
2-7/8 EU[a] 8 RD	—	1.430 *36.32*	—	—	—	—	—	—	—	510-25-143
	—	1.780 *45.21*	—	—	—	—	—	—	—	510-25-178
	—	—	—	—	—	—	—	1.870 *47.50*	—	510-25-187SB
	—	—	—	—	1.870 *47.50*	—	—	—	—	510-25-187XWL
	—	2.250 *57.15*	—	—	—	—	—	—	—	510-25-225FWL
	—		—	—	—	—	—	—	—	510-25-225
	—	—	—	—	—	—	—	2.301 *58.45*	—	510-25-231FWL
	—	—	—	—	2.301 *58.45*	—	—	—	—	510-25-231XSB
	—	2.301 *58.45*	—	—	—	—	—	—	—	510-25-231
	—	2.313 *58.75*	—	—	—	—	—	—	—	
	—	—	—	—	—	2.313 *58.75*	—	—	—	510-25-231XN
	—	—	—	—	2.313 *58.75*	—	—	—	—	510-25-231X
	—	—	—	—		—	—	—	—	510-25-231X99
	—	—	—	—		—	—	—	—	510-25-231XWL
	—	2.875 *73.03*	—	—	—	—	—	—	—	510-25-711
	2.500 *63.50*	—	—	—	—	—	—	—	—	510-25-715
		—	—	—	—	—	—	—	—	510-25-714
3-1/2 EU 8 RD	—	—	—	—	—	—	2.313 *58.75*	—	—	510-37-231NB
	3.000 *76.20*	—	—	—	—	—	—	—	—	510-35-715HT
		—	—	—	—	—	—	—	—	510-35-715
4-1/2 EU 8 RD	—	—	—	—	—	—	3.813 *96.85*	—	—	510-96-381X

[a]External upset

Options

- The tool is available in a variety of materials.
- An optional right quarter-turn release is available for the overshot disengagement.
- The stinger is available with all common wireline profiles.

J-Circulating Valve



Weatherford's J-circulating valve is used to open the work string downhole so that fluids can be circulated, reversed, equalized, or spotted. This reliable and effective valve is designed for use with Weatherford's *IPP* injection production packers, but can also be used with other tools. The valve can be located at any appropriate point in the work string.

The left-hand-open, automatic-close valve has shear screws to prevent unintentional opening while running in the hole.

Applications

J-circulating valve is used above the *IPP* or cased-hole packers for spotting treating fluids, swabbing, testing drillstems, equalization, and similar operations.

Features, Advantages and Benefits

- The simple design enables reliable performance, providing a low-risk option.
- Shear screws keep the J-circulating valve in a closed position, preventing premature openings.
- Multiple openings make the valve suitable for spotting acid and testing and treating multiple zones, contributing to time and cost savings.
- Lug-and-slot mechanism opens and closes the valve with reciprocation and minimum torque, enhancing overall reliability.
- The J-circulating valve meets the burst-and-collapse ratings of 2 3/8-in., 4.6-lb/ft L80 casing, providing workstring integrity.

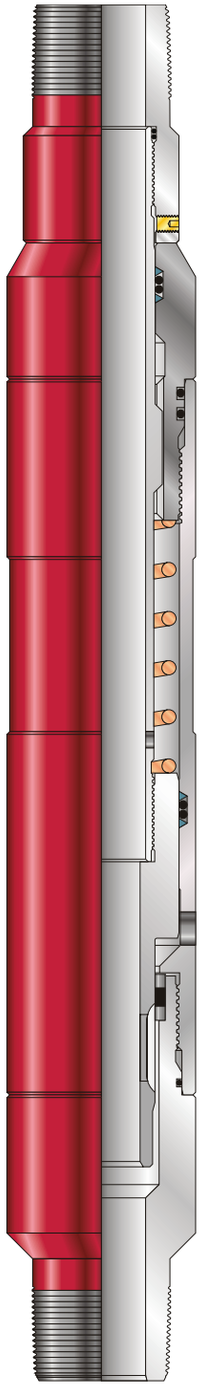
Specifications

Nominal Size (in./*mm*)	OD (in./*mm*)	ID (in./*mm*)	Length (ft/*m*)	Stroke (in./*mm*)	Connections (in.)	
					Pin	Box
1.25 *31.75*	Available on request					
2.00 *50.80*	3.63 *92.20*	2.00 *50.80*	3.43 *1.04*	12.00 *304.80*	2-3/8 (EU)	2-3/8 (EU)
2.50 *63.50*	4.63 *117.60*	2.44 *61.98*	3.70 *1.13*	9.00 *28.60*	2-7/8 (EU)	2-7/8 (EU)

Hydraulic Circulating Valve

Weatherford's hydraulic circulating valve (HCV) is typically run with the M2 inflatable straddle packer (ISP™) assembly above the upper packer. Ports on the HCV enable circulation of treatment fluid to the M2 *ISP* assembly after both packers have been set.

Pressure acting on a differential piston area in the HCV keeps the circulating ports closed while the packers are being inflated. After the packers are inflated, the tubing pressure is released, and an upward pull is applied to the assembly to check the packer seating and to open the HCV ports. Treatment fluid is then circulated down the tubing and displaced up the annulus, above the upper packer assembly. Finally, partial string weight is applied to the tools to close the HCV ports and open the flow ports in the M2 *ISP* assembly.



Applications

- Displacing fluid inside the tubing (when used above the top packer of the M2 *ISP* assembly)
- Spotting acid for an acid squeeze
- Pumping nitrogen to reduce the hydrostatic pressure for flow testing
- Use with any packer or in any situation where rotation is either infeasible or not needed

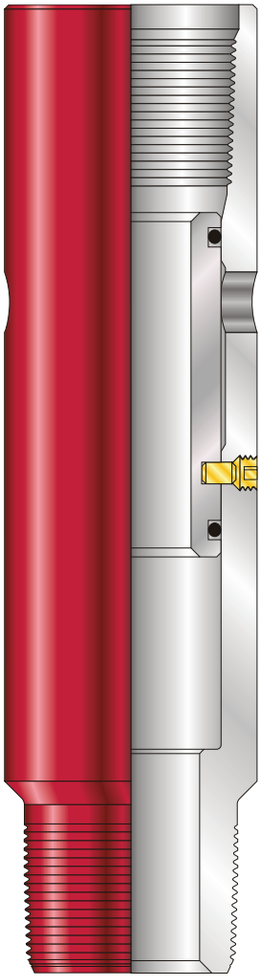
Features, Advantages and Benefits

- The hydraulic circulating valve only requires axial workstring movement to open the valve, ensuring easy operation of the tool.
- O-ring seals create a reliable seal, providing pressure integrity.

Specifications

Size (in./*mm*)	OD (in./*mm*)	ID (in./*mm*)	Overall Length (in./*mm*)	Pull Force Required to Open (lb/*daN*)	Stroke (in./*mm*)	Connections (in.)	
						Box	Pin
2-7/8 *73.03*	4.25 *107.95*	1.75 *44.45*	31.00 *787.40*	5,000 *2,224*	1.60 *40.64*	2-7/8 (8rd EUE)	

Ball/Bar-Type Circulating Valve



Weatherford's ball- or bar-circulating valve can be installed in the work string, above any downhole tool, to open the work string to the annulus and avoid pulling a wet work string. The 2 7/8-in. (73-mm) valve is used primarily above an *IPP* injection production packer to open the work string before pulling.

Shear screws hold the shear sleeve in the closed position. Dropping either a ball or a bar on the shear sleeve and applying pressure open the valve, which remains in the open position. With use, a shear bar can be fished out to reestablish the opening through the valve. The ball must be caught in a ball catcher below the packer or blown out into the open hole.

Applications

The circulating valve can be used above an *IPP* assembly or any downhole tool to open the work string to the annulus.

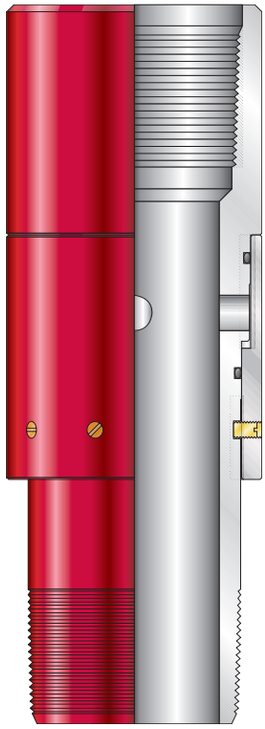
Features, Advantages and Benefits

- Shear sleeves prevent premature opening of the valve, providing workstring pressure integrity.
- The circulating valve cannot open until the ball or bar lands on the shear sleeve, providing workstring pressure integrity. Once opened, the valve remains open and cannot close.
- Bar-circulating valves can be fished out of the hole, reestablishing circulation through the valve.

Specifications

Size (in./*mm*)	Maximum OD (in./*mm*)	Minimum ID (in./*mm*)	Length (in./*mm*)	Shear Sleeve Seat ID (in./*mm*)	Required Ball Diameter (in./*mm*)	Connections (in.)	
						Box	Pin
2-7/8 *73.03*	3.67 *93.22*	1.75 *44.45*	14.06 *357.12*	1.75 *44.45*	2.00 *50.80*	2-7/8 (8rd EUE)	

Tubing Fluid Dump Valve



Weatherford's tubing fluid dump valve provides communication between the tubing and annulus to drain the annulus when the string is pulled out of the hole. The valve has an outside piston held in place with shear screws. Differential pressure in the annulus acts against the piston until the force shears the screws and pushes the piston down to expose the drain ports. After the valve opens, production fluid drains from the annulus.

Applications

- Rod-pump installations
- Retrievable and service completions

Features, Advantages and Benefits

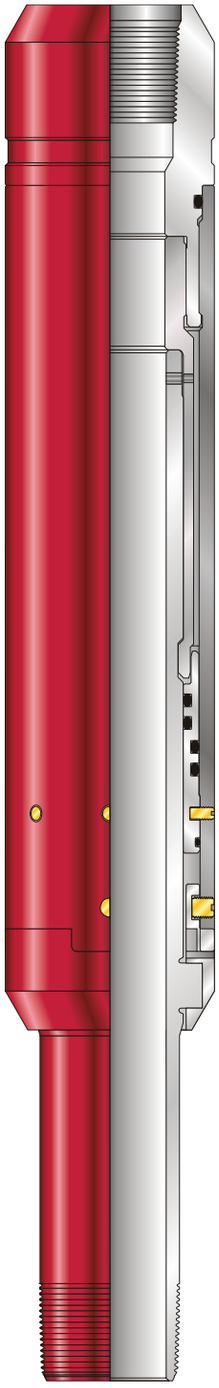
- The shear pins enable the shear value to be changed easily in the field to compensate for varying well conditions.
- The valve is activated by easy, conventional differential pressure, avoiding mechanical manipulation of the tubing string to open the valve.
- The sleeve completely uncovers drain ports in the body, eliminating fluid-cut valve damage.
- The valve drains fluid in the tubing to reduce hydrostatic pressure that can break the sucker-rod string, enabling safe retrieval of the standing valve and pump and avoiding costly repairs.

Specifications

Tubing (in./*mm*)	Valve				
	Maximum OD (in./*mm*)	Minimum ID (in./*mm*)	Standard Thread Connection (in.)	Shear Screws	Product
2-3/8 *60.3*	*3.063* *77.80*	*1.938* *49.23*	*2-3/8 EU[1] 8 RD[2]*	*10 at 600 psi (4,137 kPa) each*	*508-20-000*
2-7/8 *73.0*	*3.688* *93.68*	*2.500* *63.50*	*2-7/8 EU 8 RD*		*508-25-000*
3-1/2 *88.9*	*4.500* *114.30*	*3.000* *76.20*	*3-1/2 EU 8 RD*		*508-35-000*

[1] External upset
[2] Round

Hydraulic Disconnect



Weatherford's hydraulic disconnect is a reliable coupling used to disconnect the tubing from tools left downhole. This tool is used primarily with Weatherford's *IPP* injection production packer and plug-and-abandon assemblies.

Applications

The hydraulic disconnect is used in deviated or horizontal holes or any other situation in which the tool is appropriate to disconnect by applying hydraulic pressure rather than by rotating the tubing.

Features, Advantages and Benefits

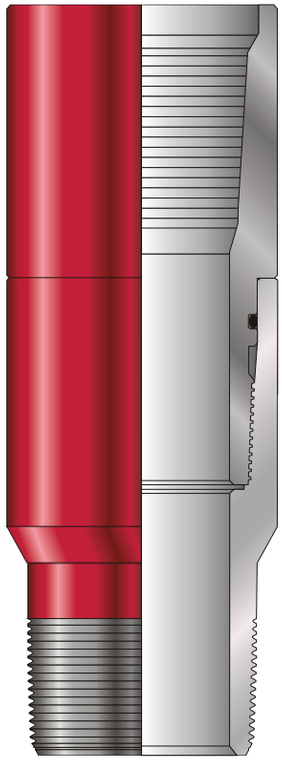
- Hydraulic activation eliminates the need for mechanical manipulation of the string, providing a simple and reliable operation.
- The ID of the tool is open to the full tubing ID, enabling intervention through the work string, if necessary.
- Multiple shear-value settings are compatible with other hydraulic tools in the string, enabling each hydraulic event to be set at a different pressure for surface identification.
- Workstring rotation is not required to disconnect from downhole tools, enabling the use of the hydraulic disconnect in deviated or horizontal wellbores.
- The incorporated lug enables rotation of the work string or downhole assemblies, overcoming tight spots when required.
- Pump-through capability permits circulation through the tool after release, permitting cement or a viscous plug to be seen and the string to be pulled dry.
- Secondary hydraulic-release mechanism enables release of the tool if the packer cannot hold pressure, enabling circulation to be reestablished.

Specifications

Size (in./*mm*)	OD (in./*mm*)	ID (in./*mm*)	Length (ft/*mm*)	Connections (in.)	
				Pin	Box
1-1/4 *31.75*	3.39 *85.85*	1.39 *35.31*	23.34 *719.84*	2-3/8 (EU)	2-3/8 (EU)
2 *50.80*	4.00 *101.60*	2.00 *50.80*	27.04 *686.82*		
2-1/2 *63.50*	4.63 *117.60*	2.44 *61.98*	31.95 *811.53*	2-7/8 (EU)	2-7/8 (EU)

Mechanical-Rotate Disconnect

Weatherford's mechanical-rotate disconnect is designed primarily for use above the plug-and-abandon inflatable ACP™ annulus casing packer. The tool is installed in the work string, above any tool that must be disconnected by rotation of the work string, and is normally used as a backup to the hydraulic disconnect in the event pressure integrity is lost or pressure cannot be applied. The disconnect consists of two parts, a top and a bottom sub, which can be configured for left- or right-hand rotation.



Applications

This mechanical-rotate disconnect is used above a plug-and-abandon *ACP* packer, or any tool that must be disconnected by rotation of the work string.

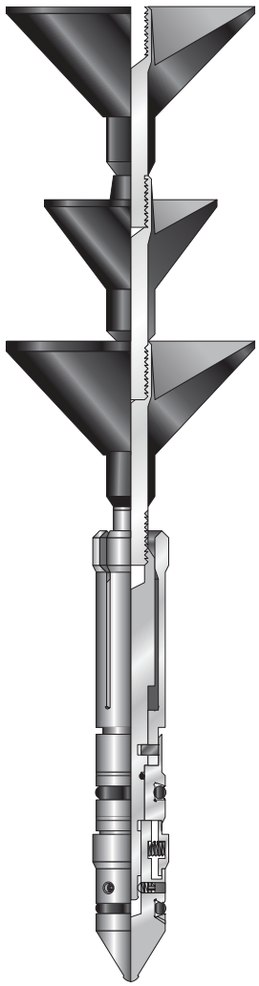
Features, Advantages and Benefits

- Simple mechanical design does not require hydraulic pressure to disconnect from the work string, providing easy operation.
- O-ring seal provides pressure integrity before rotation, preventing a potential leak path.
- Full tubing ID enables intervention through the work string, eliminating restrictions.

Specifications

Tubing Size (in./*mm*)	Tool				Connections (in.)	
	OD (in./*mm*)	ID (in./*mm*)	Length (ft/*mm*)	Internal Threads	Box	Pin
2-3/8 *60.33*	3.06 *77.72*	2.00 *50.80*	10.19 *258.83*	Stub acme	2-3/8 (8rd EUE)	
2-7/8 *73.03*	3.68 *93.47*	2.38 *60.33*			2-7/8 (8rd EUE)	

Reset Dart Assembly



Weatherford's reset dart assembly is dropped or pumped through tubing or coiled-tubing string to activate many types of downhole tools that require pressure for operation or setting. The versatile reset dart works with inflatable packers, cased-hole packers, liner hangers, and openhole service tools, and is as reliable in horizontal wells as it is in vertical wells. Many reset darts as necessary can be used in the work string while the landing seat is maintained in or below the downhole tool.

Applications

- Used in horizontal and vertical wellbores
- Used with multiset *IPP* injection production packers
- Used with cased-hole packers, liner hangers, and openhole service tools

Features, Advantages and Benefits

- Multiple shear-value settings can be easily adjusted, enabling the tool to operate with other hydraulic equipment in the string.
- The dart seat remaining in the tool enables multisetting tools to remain in the well, eliminating the need to retrieve the tools and repin setting seats for multiple use. To actuate another tool, another dart is dropped.
- The dart accommodates fins of various sizes for use in a variety of workstring sizes, providing application flexibility.
- Incorporated fins are attached to the assembly, enabling the position of the dart during pump-down to be determined by displacement volume.
- The assembly permits any dart to be sheared and the work string pulled, enabling performance of another procedure without fluid losses from the tubing.

Specifications

Dart Size (in./*mm*)	Dart OD (in./*mm*)	Length (in./*mm*)	Number of Shear Pins*	Fin Thread (in.)
1.25 *31.75*	1.12 *28.45*	7.89 *200.41*	10	1/2 (13 UNC)
1.44 *36.58*	1.43 *36.32*	9.85 *250.19*		
2.00 *50.80*	1.81 *45.97*	10.21 *259.33*	12	
2.50 *63.50*	2.27 *57.66*	10.34 *262.64*		

*At 500 psi (3,447 kPa) each

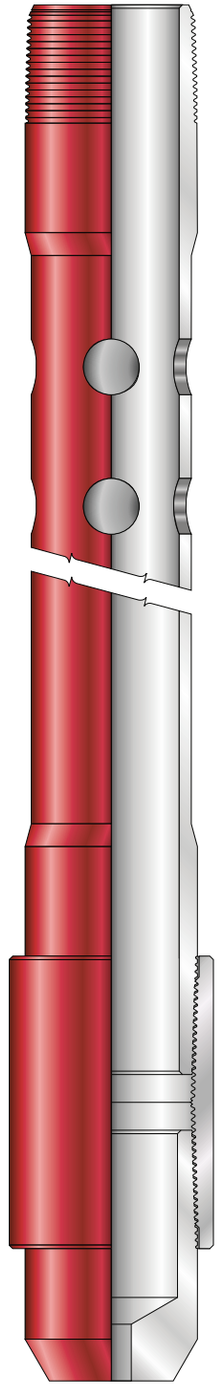
Aluminum Dart				
Dart Size (in./*mm*)	Dart OD (in./*mm*)	Length (in./*mm*)	Number of Shear Pins*	Fin Thread (in.)
1.25 *31.75*	1.12 *28.45*	8.75 *222.25*	10	1/2 (13 UNC)

*At 500 psi (3,447 kPa) each

Perforated Plug and Dart Catcher

Weatherford's perforated plug and dart catcher is used to catch Weatherford's reset dart, after the dart has been sheared, or a shear seat, a ball, or shear seat and ball after the seat has been sheared. The dart catcher consists of a 4- or 6-ft (1.2- or 1.8-m) pup joint of J-55 perforated tubing with a bull plug screwed onto the bottom.

The dart catcher is available in several sizes and is made up below the dart-landing sub on Weatherford's AWT inflation cup tool, on the bottom of Weatherford's injection production packer (*IPP*), or the selective cement inflation tool (SCIT).



Applications

- Used below the AWT inflation cup tool or the SCIT to shear and catch a reset dart
- Used below an *IPP* packer to catch a shear seat and/or ball

Features, Advantages and Benefits

- The body contains perforations, permitting fluid circulation after the dart is sheared.
- Fully opened ID enables the dart or seat to be caught without damage, eliminating the possibility of isolating tubing pressure.

Specifications

Plug Catcher							Connection	
OD (in./*mm*)	**Length (ft/*m*)**	**ID (in./*mm*)**	**Drift ID (in./*mm*)**	**Weight (lb/*kg*)**	**OD of Upset (in./*mm*)**	**OD of Coupling (in./*mm*)**	**Box**	**Pin**
2-3/8 *60.33*	4 *1.22* 6 *1.83*	1.995 *50.67*	1.901 *48.29*	4.7 *2.1*	2.594 *65.89*	3.063 *77.80*	8rd EUE	8rd EUE
2-7/8 *73.03*	4 *1.22* 6 *1.83*	2.441 *62.00*	2.347 *59.61*	6.5 *3.0*	3.094 *78.59*	3.668 *93.17*	8rd EUE	8rd EUE
3-1/2 *88.90*	4 *1.22* 6 *1.83*	2.992 *76.00*	2.867 *72.82*	9.3 *4.2*	3.750 *95.25*	4.500 *114.30*	8rd EUE	8rd EUE

Options

The catcher is available in several sizes to accommodate a wide variety of jobs.


Weatherford®
RIDGID

Inflatable Straddle Packers (ISP™)

Introduction

Weatherford's *ISP* inflatable straddle packers are designed to isolate specific zones in open, cased or perforated holes in horizontal or deviated wells. *ISP* packers are used for selective treating, testing or production evaluation and can be set multiple times per run to cost-effectively evaluate multiple zones or different segments of a specific zone.

ISP packers are fully operational by axial movement of the work string and applied surface pressure, enabling multiple packers to be installed on a single string for safe setting and release. To meet well-specific requirements, space out between inflatable elements can be adjusted and memory gauges can be placed above the top element, between elements and below the lower element to record all pressure and temperature fluctuations.

We offer a full complement of accessory tools, including fluid-control valves, circulating valves, plugs, darts and space-out assemblies to run with our reliable straddle packers.

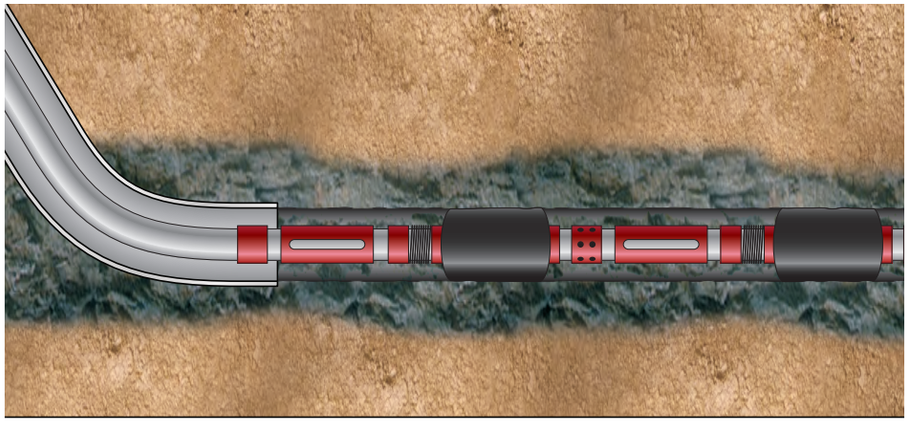
Applying the *ISP* Packers

Openhole Testing: Type M2 *ISP* Assembly

Weatherford's *ISP* type M2 is a simple, cost-effective assembly for successfully isolating multiple zones. In openhole applications, the M2 assembly seals the wellbore while maintaining well stability. Additionally, the packer's elements can be specifically designed to accommodate the temperature and potential corrosive fluids present in its operating environment.

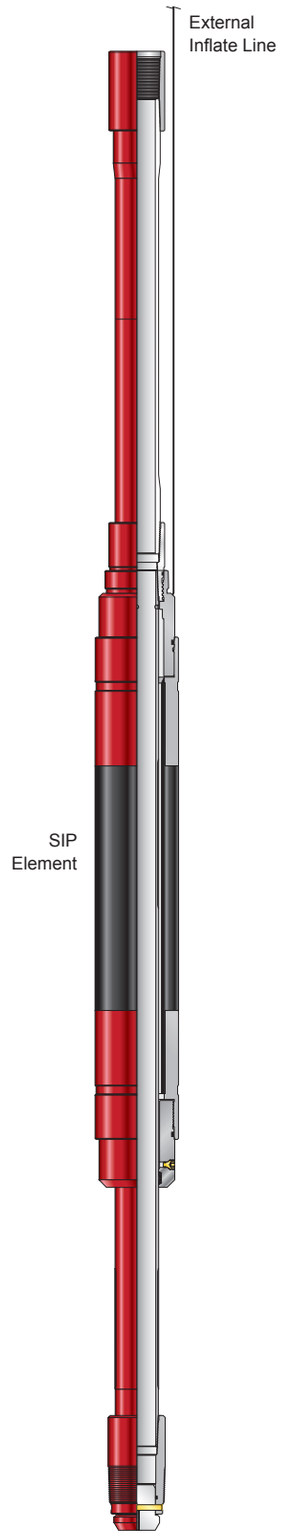
The assembly is run on regular or coiled tubing. Once at the required depth, drop and displace the reset dart into the landing seat located below the straddle assembly. Pressure up the work string to inflate the top and bottom packers. Set-down weight will open the valve between the packers enabling testing to begin.

Once completed, weight is taken off the string to begin the deflation sequence. After deflating when the packers have returned to their original run-in position, the assembly is ready to be moved to another interval. After the last set of tests is performed, the well is pressured up to shear the dart into the dart catcher and pull the entire assembly out of the hole.



The dual inflatable packers can be set multiple times per run to evaluate multiple zones or different segments of a specific zone.

Surface-Inflation Packer



Weatherford's surface-inflation packer (SIP) is an effective and reliable production packer that can be inflated and deflated multiple times per trip without workstring manipulation. An external pressure line, attached to the running string, is used to inflate the tool with fluid or gas.

The SIP can be used with ACP™ or IPP™ style elements. When used with *IPP* elements, the SIP incorporates the same rugged, high-differential-capability inflatable elements that other Weatherford *IPP* injection production packers use. When the SIP is used with *ACP* elements, it maintains a full casing ID through the tool.

Applications

SIP can be used in either cased or open hole.

Features, Advantages and Benefits

- Simple and economical design, without internal valves, is easy to operate, providing a reliable, cost-effective tool.
- The inflatable element is inflated by a control line that protects the element from tubing pressure, providing total inflation control.
- SIP does not require workstring manipulation, ensuring multiple SIPs can be installed on a single string and safely set and released, delivering application flexibility, especially when control lines are being used to actuate other downhole tools or data retrieval devices.
- SIP can be inflated and deflated multiple times per trip, providing considerable rig time savings.
- Each element is manufactured from application-specific elastomers, offering superior properties, strength, and resistance to high temperatures, corrosive fluids, and gases.
- SIP can be deflated in the annulus, providing easy retrieval.

Specifications

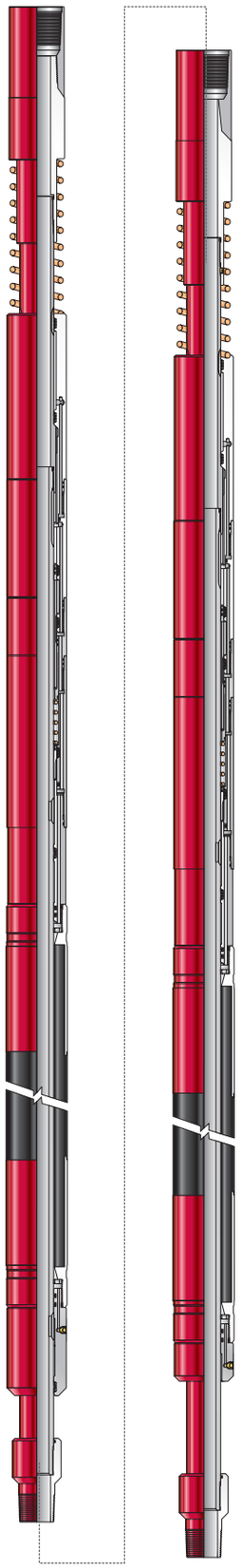
Sealing Element OD (in./*mm*)	Sealing Element Length (in./*mm*)
3.50 *89*	48 *1,219*
4.25 *108*	
4.38 *111*	
4.63 *117*	
5.00 *127*	
5.50 *140*	
6.25 *159*	
6.75 *171*	
6.88 *175*	
7.50 *191*	
7.63 *194*	
9.25 *235*	
10.50 *267*	
13.25 *337*	

Note: Mandrel ID, weight, grade, and thread are as specified by client.

***ACP* Style Element**		
Casing Size (in./*mm*)	**Sealing Element OD (in./*mm*)**	**Sealing Element Length (in./*mm*)**
7.63 *194*	9.00 *229*	48 *1,219*
	9.25 *235*	

Note: Mandrel ID, weight, grade, and thread are as specified by client.

M2 *ISP* Inflatable Straddle Packer Assembly



Weatherford's *ISP* inflatable straddle packer assembly (type M2) is designed to isolate specific zones in open or cased-and-perforated holes in horizontal or deviated wells for selective treating, testing, or production evaluation. The M2 assembly consists of dual inflatable packers, deployed on coiled tubing or threaded pipe, and can be set multiple times per run to cost effectively evaluate multiple zones or different segments of a specific zone.

The M2 assembly is operated by axial movement of the work string and applied surface pressure. Workstring rotation is not required to activate any tool function. The minimum space out between inflatable sealing elements is 3 ft (1 m). This distance can be adjusted according to specific well requirements. In addition, memory gauges can be placed above the top element, between the elements, and below the lower element to record all pressure and temperature fluctuations while the M2 assembly is in the well.

Applications

- Stimulation of multiple zones in one run
- Testing of multiple intervals in one run
- Short-term production testing of selected zones

Features, Advantages and Benefits

- Separate sealing elements enable adjustment of space out between elements, easily accommodating customer-specific well requirements.
- Memory gauges located above, between, or below the elements enable pressure and temperature recordings, providing zone-specific data.
- Only axial workstring movement is required to equalize and deflate the tool for retrieval, enabling the M2 assembly to be run on coiled tubing and conventional threaded pipe.
- The M2 assembly can be run in horizontal or deviated wells and open or cased holes, providing application flexibility.
- Elements are manufactured with application-specific elastomers, providing resistance to high temperatures, corrosive fluids, and gases.

Specifications

Tool body maximum OD (in./*mm*)	4.31 *109.47*	
Tool minimum ID (in./*mm*)	1.90 *46.26*	
Inflatable element maximum OD (in./*mm*)	4.25 *108.00*	5.50 *139.70*
Length of each element (in./*mm*)	66.00 *1,676.40*	
Element minimum space out (in./*mm*)	3.30 *83.82*	
Overall length per assembly (ft/*m*)	11.25 *3.43*	
Overall length, complete assembly (ft/*m*)	25.80 *7.86*	
Connections (in.)	2-3/8 or 2-7/8 (EUE 8rd box up)	

Options

- Weatherford offers a full complement of accessory tools to use with the M2 assembly, including the fluid-control valves, plugs, darts, and space-out assemblies.
- Sealing elements are available for standard service (275°F/135°C) and severe service (375°F/190°C).


Weatherford

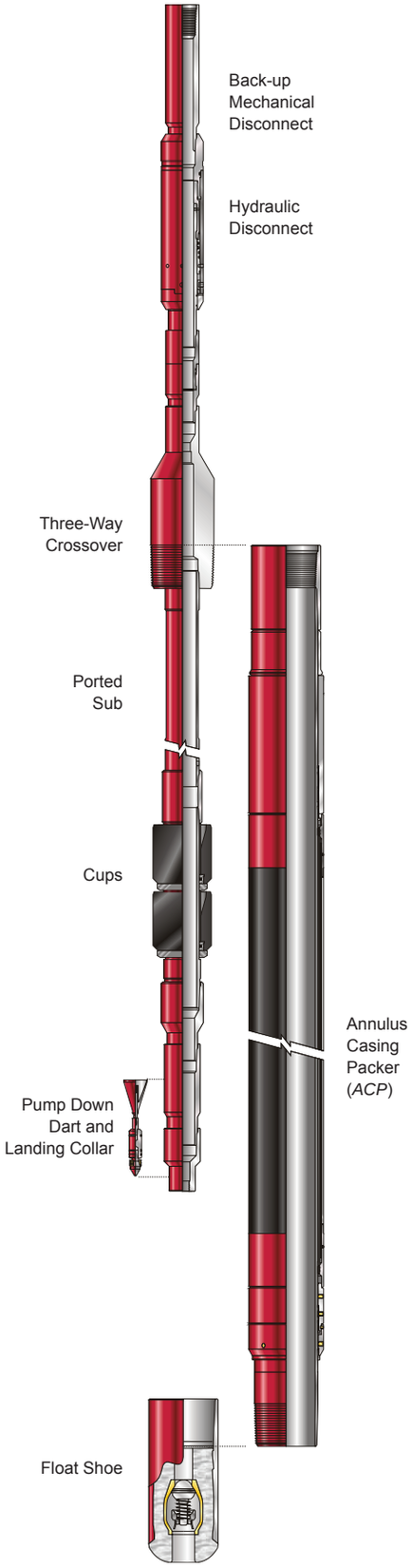
Plug-and-Abandonment (P&A)


Weatherford

Introduction

Weatherford's field-proven plug-and-abandonment (P&A) kits significantly reduce rig time by converting ACP™ or IPP™ systems into a one-trip, openhole cement plug for horizontal or deviated wellbores. When properly positioned and inflated, the P&A kits effectively shut off water, oil or gas zones. P&A kits are compatible with all standard *ACP* systems containing 10 ft (3 m) or longer seal elements and include all the required disconnects, crossovers, latch-down darts, landing seats, subs, float equipment and dump valves for proper installation.

Plug-and-Abandonment (P&A) Kit



Weatherford's plug-and-abandon (P&A) kit consists of field-proven hydraulic and mechanical disconnects that are made up to a conventional Weatherford annulus casing packer (ACP™) to enable an openhole cement plug to be set in a single trip. The conventional *ACP* tool, which is normally run on a casing or a liner, is crossed over to run on a drillpipe or work string for placement in the well.

When the assembly is run to the proper position in the well, a latch-down dart is pumped from the surface with cement behind it. When the dart lands below the disconnect and the *ACP* tool, surface pressure is applied to inflate the packer with the cement. After inflating the *ACP* tool, additional surface pressure is then applied to hydraulically disconnect the packer. The hydraulic disconnect is backed up by a mechanical-rotation disconnect for emergency release. After the *ACP* tool is inflated and disconnected, cement can be placed directly on top of the packer, or the excess inflation cement in the drillpipe or work string can be reverse-circulated out of the well. The end result is a single-trip plug set for horizontal or deviated wells.

Applications

- Can be used in any circumstance where a section of a hole requires abandoning and plugging of cement
- Can be applied in wells requiring proper placement of an *ACP* tool to shut off water, oil, or gas
- Provides a kickoff point after plugging back a directional hole drilled out of zone

Features, Advantages and Benefits

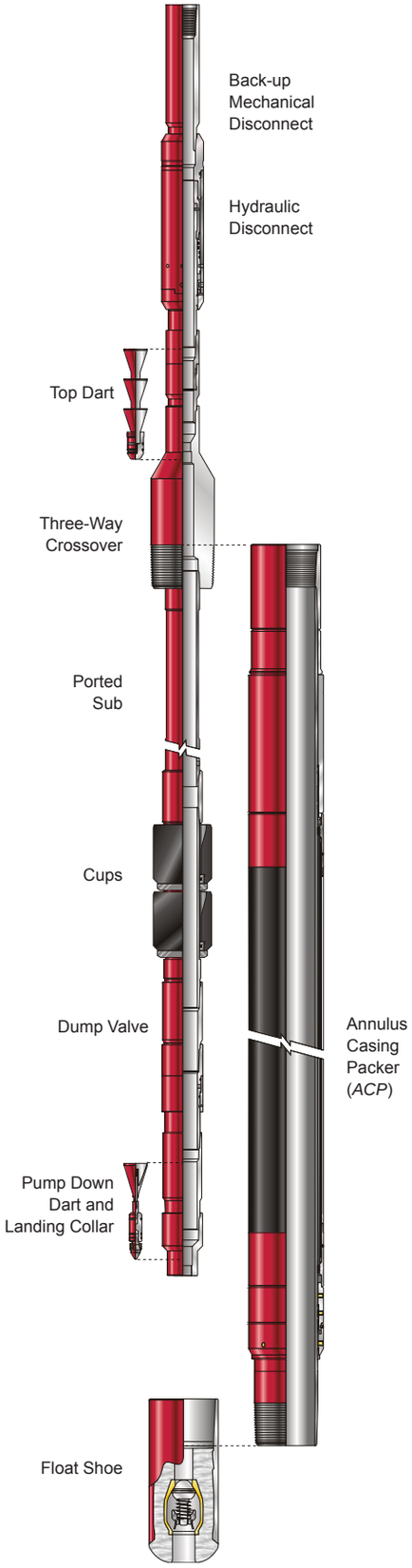
- The kit is compatible with all standard *ACP* assemblies with seal elements 10 ft (3 m) and longer, maximizing operational efficiency with minimized equipment inventory.
- Hydraulic-disconnect shear screws are field accessible, simplifying overall job setup.
- Float-shoe, latch-down, or combined float-shoe and latch-down darts prevent backflow after the disconnect, ensuring liner integrity.
- One-trip system balances the cement plugs when set in high-angle or horizontal openhole, significantly reducing rig time.
- The standard kit includes all required equipment, therefore no special *ACP* inventory is required.

Specifications

Packer Size (in./*mm*)	Top Connection Box (in.)	Overall Length			Minimum ID (in./*mm*)	Maximum OD Disconnect (in./*mm*)	Maximum Pull (lb/*kg*)	Pressure Required to Disconnect (psi/*MPa*)
		Kit Only (ft/*m*)	Complete Assembly (ft/*m*)					
			10-ft (*3-m*)	20-ft (*6-m*)				
2-3/8 *60.3*	2-3/8 (EUE)	4.0 *1.2*	21.3 *6.5*	31.8 *9.7*	1.000 *25.4*	3.375 *85.9*	104,340 *47,328*	500 or 1,000 *3.4 or 6.9*
2-7/8 *73.0*					1.185 *30.0*	4.000 *101.6*		
3-1/2 *88.9*	2-7/8 (EUE)	17.3 *5.3*	23.5 *7.2*	33.8 *10.3*	1.185 *30.0*	4.625 *117.6*	144,960 *65,753*	500 or 1,000 *3.4 or 6.9*
4-1/2 *114.3*	2-7/8 (EUE)	17.3 *5.3*	23.8 *7.3*	33.8 *10.3*	1.185 *30.0*	4.625 *117.6*	144,960 *65,753*	500 or 1,000 *3.4 or 6.9*
5-1/2 *139.7*								
7 *177.8*								
9-5/8 *244.5*								

Contact product line management for availability.

Plug-and-Abandon Retainer Kit



Weatherford's plug-and-abandon retainer kit consists of field-proven hydraulic- and mechanical-disconnect products and a hydraulically activated dump valve that make up to the conventional Weatherford annulus casing inflated packer (ACP™). These components enable the *ACP* tool to be set in an openhole and inflated with cement so that it can serve as a retainer. Immediately after inflation, additional cement can be squeezed into the open hole below the packer. The conventional *ACP* tool, which is normally run on a casing or liner, is crossed over to run on drillpipe or work strings for placement in the well.

When the assembly is run to the proper position in the well, a latch-down dart is pumped from the surface with cement behind it. A second dart is dropped behind the cement slurry. When the dart lands below the assembly, surface pressure is applied to inflate the packer with the cement. After the packer is inflated, additional surface pressure is applied to hydraulically open the dump valve, enabling cement to be squeezed below the inflated packer. Additional surface pressure is then applied to hydraulically disconnect the packer, aiding as an emergency release. Once the packer is disconnected, cement can be dumped directly on top of the *ACP* tool or reverse-circulated out of the well. The result is a plug set and cement squeeze in a single trip for horizontal or deviated wells.

Applications

- Useful in any circumstance where a section of a hole requires abandoning and plugging of cement and high-pressure squeeze-cementing operations
- Applicable in wells requiring proper placement of an *ACP* to shut off water, oil, or gas

Features, Advantages and Benefits

- The plug-and-abandon retainer kit significantly reduces rig time when cement is being squeezed in high-angle or horizontal openhole sections for abandonment.
- The kit is compatible with all standard *ACP* assemblies with seal elements 10 ft (3 m) and longer, maximizing operational efficiency with minimized equipment inventory.
- The standard kit includes all required equipment and does not require any special *ACP* inventory, contributing further to cost savings.
- Hydraulic-disconnect shear screws are field accessible, simplifying overall job setup.
- The kit can be easily assembled at any operating district, enabling the kit to be shipped separately from the *ACP* tool, saving rig time.

Specifications

Packer Size (in./*mm*)	Top Connection Box (in.)	Overall Length			Minimum ID (in./*mm*)	Maximum OD Disconnect (in./*mm*)	Maximum Pull (lb/*kg*)	Pressure Required to Disconnect (psi/*MPa*)
		Kit Only (ft/*m*)	Complete Assembly (ft/*m*)					
			10-ft (3-*m*)	20-ft (6-*m*)				
2-3/8 *60.3*	2-3/8 (EUE)	4.00 *1.2*	21.30 *6.5*	31.90 *9.7*	1.00 *25.4*	3.38 *85.9*	104,340 *47,328*	500 or 1,000 *3.4 or 6.9*
2-7/8 *73.0*					2.88 *73.2*	4.00 *101.6*		
3-1/2 *88.9*	2-7/8 (EUE)	19.90 *6.1*	23.50 *7.2*	33.80 *10.3*	2.88 *73.2*	4.63 *117.6*	144,960 *65,753*	500 or 1,000 *3.4 or 6.9*
4-1/2 *114.3*								
5-1/2 *139.7*			23.80 *7.3*					
7 *177.8*								
9-5/8 *244.5*								

Contact product line management for availability.

To discover all of the advantages of Weatherford's complete inflatable packer offering, contact a Weatherford representative, visit **weatherford.com**, or email **inflatablepackers@weatherford.com**

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