Subsurface Release™ Small-Bore Plug System

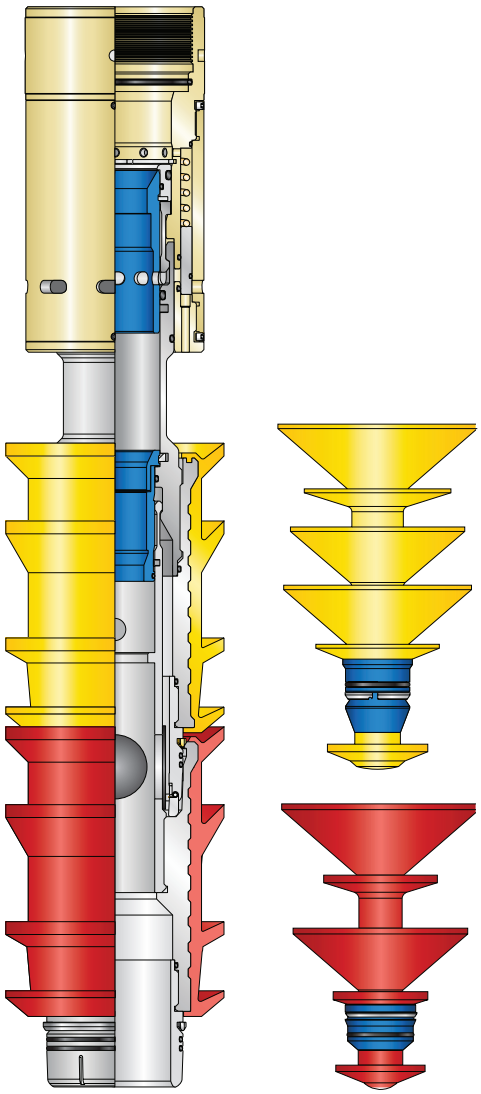
For Casing and Liner Sizes 7 in. to 7-5/8 in.

The Weatherford industry-standard Subsurface Release small-bore plug system is designed for use with 7-in. (177.8-mm) and 7 5/8-in. (193.7-mm) subsea casing hangers or hydraulic liner systems when the minimum drillstring drift is 2.17 in. (55.1 mm). The bore inside the plugs improves fluid-flow capacity and, when combined with Weatherford autofill float valves, reduces surge pressure on weak formations as the system is running in the hole. The patented, integral pressure-equalizer prevents pressure buildup above the plugs to prevent premature release.

The small-bore plug system is fully compatible with the Weatherford mechanical ball seat (MBS). When a setting ball lands in the seat, applied surface pressure facilitates setting the hydraulic hanger and shears the ball seat. The bottom dart is pumped from the surface in front of cement slurry and latches into the bottom plug, which releases. The bottom plug contains a rupture disk that enables circulation to be re-established after the wiper plug lands in the landing or float collar. The top dart is pumped behind the cement slurry and lands in the top plug. After the top plug is released, it wipes the casing before bumping on the top of the bottom plug, which provides a positive indication of cement displacement.

In the unlikely event that the top and bottom plugs leave simultaneously, the integral emergency bypass feature enables fluid to bypass the plug set and flow into the shoe track, which ensures continuation of cement displacement.

The subsurface release can be used with Weatherford autofill float equipment to dramatically reduce drillout and hole run-in time. The plugs are available in a latch-in, nonrotating profile or a Wiperlok® nonrotating profile that corresponds to the compatible WLCD landing collar or 402P/NP float collar. The plugs are primarily constructed from polyurethane and are available in either standard or combination fin designs.



The small-bore plug system with latch-in, nonrotating profile

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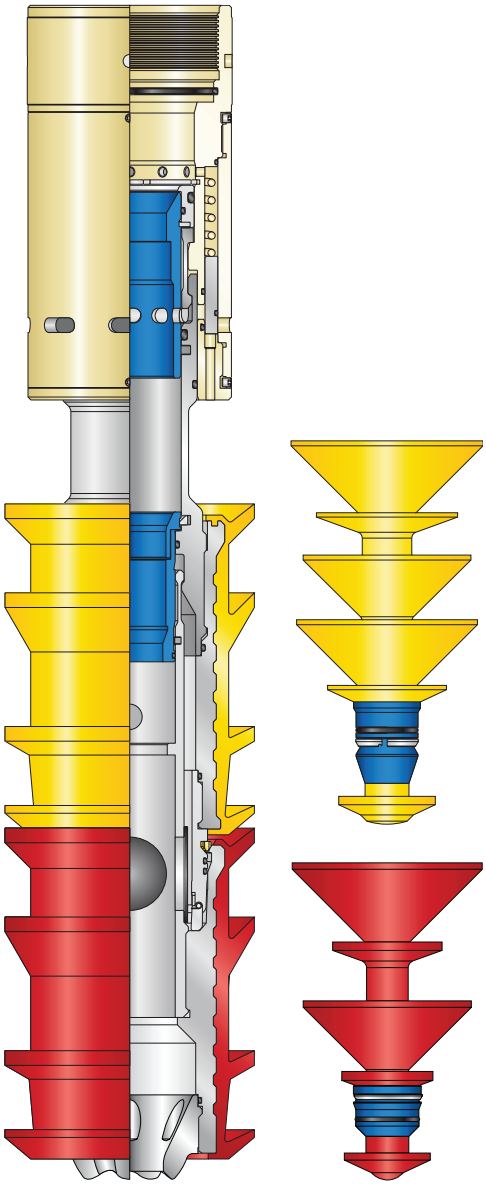
Applications

- Liners for which a dual wiper-plug system is required to provide separation of fluids during the cementing operations
- Liners run with close-tolerance annuli
- Liners run in pressure-sensitive formations
- Latch-in configuration is compatible and recommended for use with Weatherford WLCD landing collar and autofill float equipment.
- Wiperlok® configuration is compatible and recommended for use with Weatherford 402P/NP float collars and autofill float equipment.

Features, Advantages, and Benefits

- The dual plugs are released by darts that maintain fluid separation through the drill pipe and cement contamination.
- The patented, integrated pressure-equalizer prevents pressure buildup above the plugs to prevent premature release and enables rotation of the running string without rotating the plugs in the casing, thereby preventing damage to the plug fins.
- Polyurethane plug fins offer superior abrasion resistance and excellent wiping action, which results in a clean-casing ID after passage.
- The system is polycrystalline-diamond-composite (PDC) drillable with a latch-in, nonrotating profile or Wiperlok nonrotating profile to prevent rotation of the plugs during drillout of the landing or float collar.
- Two large rupture disks in the bottom plug minimize risk of plugging with solids or debris, which ensures system reliability.



Suburface Release Small-Bore Plug System with *Wiperlok* nonrotating profile

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Features, Advantages, and Benefits (continued)

- Fully compatible with Weatherford MBS to eliminate the need for a ball seat within the plugs and unnecessary equipment below the landing or float collar, improving operational efficiency and reducing cost.
- The 1.78-in. (45.21-mm) bore enables 1.750-in. (44.45-mm) trip balls to pass through to activate float equipment below the plug.
- In the event the dual plugs are released simultaneously by the bottom dart, the integral emergency bypass feature enables fluid to bypass the plug set and flow into the shoe track, which ensures continued cement displacement.

Specifications

Plug Sizes (in., *mm*)	7 *177.8*	7 × 7-5/8 *177.8 × 193.7*	7 × 8-5/8 *177.8 × 219.1*	7 × 9-5/8 *177.8 × 244.5*	7-5/8 *193.7*	7-5/8 × 8-5/8 *193.7 × 219.7*	7-5/8 × 9-5/8 *177.8 × 244.5*
Maximum plug-bump pressure (psi, *MPa*)	8,000 *55.16*						
Maximum plugback pressure (psi, *MPa*)	3,000 *20.68*						
Top plug-launch pressure (psi, *MPa*)	2,000 to 2,500 *13.79 to 17.24*						
Bottom plug-launch pressure (psi, *MPa*)	800 to 1,200 *5.52 to 8.27*						
Minimum plug ID (in., *mm*)	1.78 *45.21*						
Minimum flow area (in., *mm*)	2.49 *63.25*						
Maximum rigid-dart diameter (in., *mm*)	2.13 *54*						
Minimum pump-through drift diameter (in., *mm*)	2.17 *55*						
Flow endurance (bbl/min)	10 for 24 hr 14 for 4 hr						
Maximum circulating temperature rating (°F, °*C*)	257 *125*						
Maximum temperature rating for bump pressure rating (°F, °*C*)	350 *177*						
Equalizer actuation pressure (psi/*MPa*)	50 to 100 *0.34 to 0.69*						