# Mechanical Ball Seat

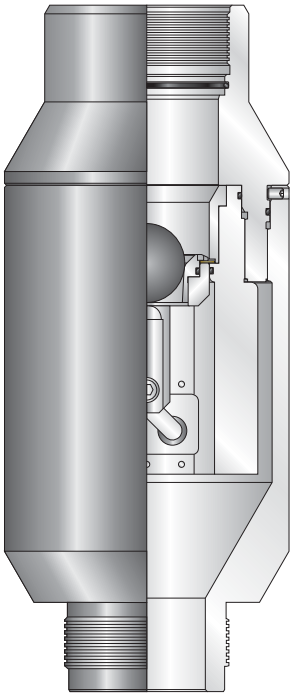
Weatherford's patented mechanical ball seat (MBS) is a device that temporarily plugs the running string to provide the pressure-tight chamber necessary to hydraulically activate the liner hanger or release the running tools. The temporary plug is created by dropping a setting ball that lands in a steel ball seat that is sheared out and retains the ball when the plug is no longer needed.

The MBS is located inside a sub in the running string, below the hanger and above the liner-wiper plug of the liner-hanger system. Before dropping the setting ball, the ball seat allows passage of a smaller trip ball to activate equipment below the liner hanger and running equipment, such as auto-fill float equipment, or a Defyer™ drill assembly. The primary setting ball is then used by the MBS to isolate pressure above the ball seat.

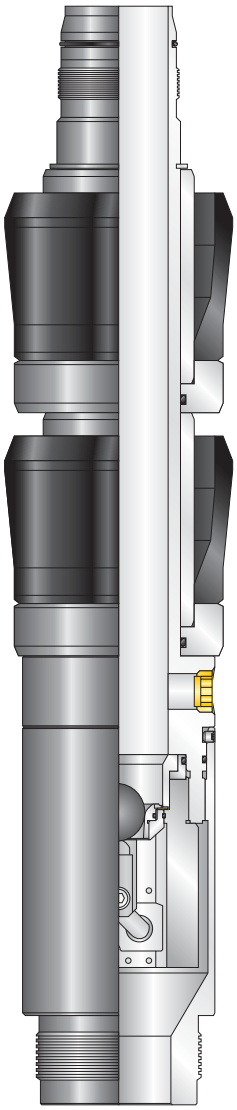
Upon completion of the hydraulic events, the ball seat shears with application of predetermined amounts of pressure and locks into the bypass position within the sub. With the ball seat in this location, pressure surge on the formation is eliminated or reduced when the ball seat shears. If cementing plugs are run, they are located just below the MBS and may sustain damage by the pressure surge. In this case, the energy-absorption tool (EAT) is placed between the plugs and the MBS to diffuse the pressure surge before it reaches the plugs, saving them from damage.

After the MBS is deactivated, the ball is trapped in the body, and the MBS is opened full-bore for passage of drillpipe darts. In the event the ball seat cannot shear, a backup rupture disk opens to establish circulation.

The MBS can operate in both horizontal and vertical wells and is recommended for pressure-sensitive formations and casing designs with close-tolerance annuli. The MBS is also valuable in drilldown applications where higher hydraulic setting pressures are required to prevent premature activation of hydraulic set tools by unexpected pressure spikes.



9 5/8-in. MBS makes up to existing conventional lower packoff



7-in. MBS with integrated lower packoff

## Applications

- Uncemented liners using hydraulically set liner hangers
- Liners for which high pressures are needed to activate hydraulic liner hangers and running tools
- Liners that require maximum drift for the running string

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## Features, Advantages and Benefits

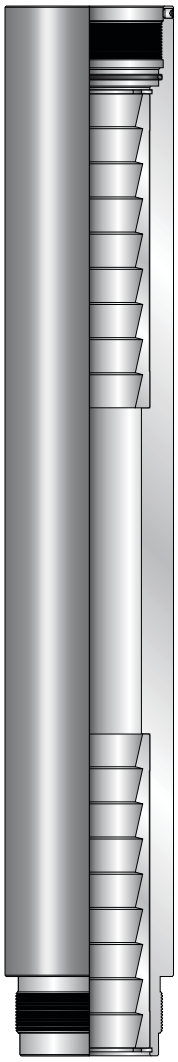
- Location of the MBS in the running tool mitigates surge pressure on the formation when the seat is sheared.
- The MBS reduces drillout time by eliminating the need to drill out a ball seat.
- The lower packoff provides a positive seal between the running-string OD and the liner ID to facilitate setting the hanger.
- The 7-in. version includes an integrated lower packoff whereas the 9 5/8-in. uses existing conventional lower packoff.
- Durable rubber swab cups are oil, gas and abrasion resistant and can withstand wear and tear under high pressures.
- Erosion-resistant steel construction enables high circulation rates and excellent sealing capabilities superior to those of ceramic ball seats. Tested accordingly to API RP 10F with 10 bpm (7-in. MBS) and 15 bpm (9 5/8-in. MBS) for 24 hours.
- The MBS is compatible with all Weatherford wiper plugs and darts for added operational flexibility.
- Multiple baffles in the EAT diffuse surge pressure when the ball seat shears, preventing high pressures from affecting the plugs below.

## Options

- Shear-ring-activated ball seats come in three different shear pressures that are color coded for easy identification: 2,500 psi (17.23 MPa) yellow; 3,000 psi (20.68 MPa) green; and 3,500 psi (24.13 MPa) red.
- Available in 7-in. and 9 5/8-in. sizes.

## Specifications

Contact an authorized Weatherford representative.



Energy Absorption Tool (EAT)