ADS
Diverter System™
Deep well programs on the Arabian peninsula present unique challenges during the initial phase of drilling operations. Shallow gas pockets may be encountered that require managed well bore control that is not currently available on existing land rigs. Utilizing feedback from the Saudi Arabian Oil Company (Saudi Aramco), Dril-Quip, Inc. has developed the Arabian Diverter System (ADS) to address these challenges.

The ADS (patent pending) is a portable diverter installed on the conductor and establishes a pressure-tight seal to enable controlled diversion of any gas pockets that might be encountered. This diverter system integrates three elements – the diverter housing, packing elements and an overshot spool-type connector – into a unitized protection device. The ADS incorporates safe, reliable field-proven technology and performance features into a 500-psi-rated working pressure design.

Elastomer packers in the diverter close and seal around pipe suspended through the rig’s rotary table, isolating the rig floor from fluids and gases flowing from the well bore. Large outlets located below the packers control and divert the flow to a designated area.

Hydraulic controls for the diverter system are incorporated into the rig’s BOP control system. Valves with hydraulic actuators are mounted on each of the diverter outlet lines to control the movement of fluids and gases through the system.

The handling and test tools provided facilitate testing, operation and maintenance of the system.

FEATURES

- Large-bore diverter accommodates 36” drift
- A range of split insert packers provides well bore protection during both drilling and casing operations
- Split packer design also facilitates running selected packer elements through a 37-1/2” rotary table
- Split insert packer design simplifies installation via weight-set, lock-ring style auto-locking components; no hydraulics required
- Overshot radial bolt connector features quick, easy make-up using standard impact wrenches
- Overshot connector packer seal is hydraulically energized for reliable control of the well bore fluids
- Engineered, designed and operated in accordance with applicable API industry standards
- Adaptable to most land drilling rigs
- Complete ADS diverter and valve system available from single source (Dril-Quip)
Scope of Supply

- 10" Split Packer
- 18" Split Packer
- 27-1/2" Split Insert Packer
- 32-1/2" Solid Insert Packer
- Diverter Housing
- Retrieving Rod Assembly
- Handling Tool
- 10" Release Ring
- 18" Release Ring
- 27-1/2" Release Ring
- Tool Joint Pin
- Diverter Test Tool

Diverter system valves not shown in illustration.
**Main Packer**
The Main Packer is housed in the main body of the diverter, and consists of a tubular elastomer seal with metal rings molded on each end. The one-piece packer is retained in the main body of the diverter by the packer lockdown, retaining and load ring. The Main Packer functions the insert packers when the diverter is closed. Hydraulic pressure deflects the packer toward the bore, which in turn deflects each of the insert packers installed. The Main Packer is only removed during maintenance operations.

**Solid Packers and Split Insert Packers**
The Solid and Split Insert Packers land in the main body of the diverter and are designed to close and seal around various pipe sizes. The packers consist of a tubular elastomer seal with metal rings molded on each end. The Split Insert Packers are split in half so that they can be installed or retrieved while pipe is suspended through the rotary table. A spring-loaded lockdown ring is bolted to the top of the packer and retains it in the previously installed larger packer. Tapped holes in the top of the lockdown ring permit the swivel insert retrieving rods to release the lockdown ring and recover the packer assembly when necessary. Each Split Insert Packer has two alignment slots located at the top of the packer to orient the packer assembly such that the split between the two halves is offset 90° from the split between the two halves of the previous size. All packers are rated to 500 psi.

**10" Split Insert Packer**
The 10" Split Insert Packer incorporates J-slots on the ID to interface with the Packer Handling Tool. The packer is operated with 925 psi and has a minimum closing diameter of 4-1/2".

**18" Split Insert Packer**
The 18" Split Insert Packer lands in the 27-1/2" Solid Packer and is normally run with the 10" Split Insert Packer. The packer is operated with 850 psi and has a minimum closing diameter of 9-5/8".

**27-1/2" Split Packer**
The 27-1/2" Split Insert Packer lands in the main body of the diverter. It is operated with 750 psi and has a minimum closing diameter of 26".

**32-1/2" Solid Insert Packer**
The 32-1/2" Solid Insert Packer lands in the main body of the diverter housing. It is operated with 750 psi and has a minimum closing diameter of 28".
Easy, simple Diverter Housing installation
The integral Overshot Packer is an adapter spool that stabs over and provides a molded elastomer seal around the field-cut 36” conductor casing. A field-welded ring on the conductor OD provides a shoulder for the overshot spool radial bolt-type connector to contain any end-load forces in the event of a shallow gas encounter.

Test the Overshot and Diverter Packers
The integral Overshot Packer and Split Insert Packers are tested with the Packer Handling and Diverter Test Tool.

Step 1
- Install conductor casing
- Weld ring on upper section of casing
- Install ADS Diverter System
- Make up Radial Bolt Overshot Connector
- Energize Overshot Packer element

Step 2
- Test system components with Packer Handling and Test Tool
- Retrieve Test Tool
Reliable managed bore protection during drilling operations
The Split Insert Packers can be installed assembled together with the Packer Handling Tool or individually with the Running and Retrieving Rod Assembly. Hydraulic pressure applied to the Main Packer element functions the Insert Packers closed as required during drilling operations.

Reliable managed annulus during casing installation
The Split Insert Packers are retrieved and the 32-1/2” Solid Packer is installed to provide protection during surface casing installation.

Step 3
- Run drill bit
- Reinstall Packer assembly
- Drill out for surface casing
- Retrieve bit and bottom hole assembly

Step 4
- Run surface casing and cement
- Nipple down ADS Diverter System
- Nipple up BOP stack