

DRILL STEM TESTING

ETS design Drill Stem Test (DST) jobs to achieve your test objectives economically. Whether your goal is to determine reservoir pressure, permeability, skin, or productivity, our down hole technology delivers the right answers.

Accurate down hole pressure measurements, even under very hostile conditions, increase your confidence in reservoir characterization.

Flexibility in the DST string design gives you reservoir information from multiple zones on the same test, saving rig time and allowing you to update your reservoir model sooner.

Full Bore Test Packers

The Full-Bore Test Packer (FBTP) is specially designed for Full Bore Drill Stem Testing (DST) and Tubing Conveyed Perforating (TCP) operations.

During TCP operations where the detonation of the TCP charges can cause rapid pressure surges, the hydraulic hold downs react to prevent packer movement.

The full opening design allows unrestricted fluid flow and tool movement through the tubing bore. A pressure balanced bypass valve which is held open when running and retrieving, prevents swabbing effect. The valve also allows debris to be washed from the top of the packer when releasing. The bypass valve is held closed by pressure from below and in turn helps prevent upward movement of tubing.

Available in sizes

for use in casing sizes from 4" up to 13-3/8" and several models from low pressure sweet service to high pressure high temperature hostile environment H₂S and CO₂ Service Packers.

Full Bore Tension Safety Joint

The Full-Bore Tension Safety Joint (TJ-1001) is a two stage disconnect tool which is run above the packer that allows the tubing to be disconnected from the tool string below it should the need arise. The TJ first requires a predetermined tensile load to be applied from surface in order to sever the shear ring assembly which initiates the disconnection. The tensile load required to shear is dependent of specific requirements and ranges from 4,000 to 66,000 pounds (this figure includes the weight of the test string below the TJ). The second stage of disconnection requires right hand torque to be applied to the tubing while simultaneously stroking it vertically approximately nine inches. Disconnection requires two strokes per revolution and approximately six revolutions are required. The inner mandrel of the tool is indexed to both the splined housing and the release nut. In rotating the tubing to the right, the mandrel indexes the release nut which has a left-hand thread, unscrewing it from the body and separating the tool. In the unlikely event that the shear pin assembly is severed unintentionally during operations the tool will not separate unless right-hand torque and vertical stroking are applied.

Available in two sizes

STJ-1001 3.125"OD x 1.125"ID
TJ-1001 5.000" OD x 2.250"ID

Full Bore Hydraulic Jar

Full Bore Hydraulic Jar (FBHJ) is a straight-pull operated jar with a closed hydraulic system and a unique balance piston used to equalize oil pressure with tubing pressure. The FBHJ is also able to transmit torque to the right at any position along full stroke.

The FBHJ is designed for easy control of the jarring action by the operator. The time delay impact control is allowed for by use of Flow

Restrictors between the upper and lower oil chambers. Fluid flow is restricted only in the upward pull direction so the jar is easily reset for subsequent jars.

Due to the balance piston, the hydraulic section is sealed to well bore fluids however is balanced to tubing pressure. This helps reduce tool wear and the potential of seal failure.

Available in two sizes

#SHJ-1001 3.125"ODx1.125"ID
NHJ-1001 5.000" ODx2.250"ID

Full Bore Gauge Carriers

The Full-Bore Gauge Carrier (FBGC) has been designed as a single body type carrier capable of housing up to four QUARTZ DIGITAL or Piezo- Resistive Electronic Memory Pressure / Temperature Gauges. The gauges are attached to the housing with metal seal connectors and are retained below the O.D. of the carrier to protect the gauges from damage while running the string. The carrier can be configured to provide outside and inside position electronic recorders. The gauge carrier can be custom designed to client's requirements.

Available in two sizes

3.125"OD x 1.125"ID
5.000"OD x 2.250"ID

Full Bore Tester Valves

The Full-Bore Tester Valve is an annulus pressure-controlled ball valve and is designed to allow multiple cycles during cased hole testing and perforating operations. It is fully balanced to annulus pressure and will remain in the closed position while tripping in hole. Operation of the FBTV insensitive to tubing pressure changes. The FBTV is a spring loaded normally closed ball valve. Spring force holds the valve in the

closed position. It is opened and maintained open by applying additional pressure to the annulus. When applied annulus pressure is released, the ball valve will close. Fluid at hydrostatic pressure is trapped behind the nitrogen chamber acting against a piston, compressing the nitrogen to hydrostatic pressure. The nitrogen then acts against the lower piston, the same hydrostatic pressure that is acting against the lower piston is also passing through pressure ports, located in the upper outer housing acting against the upper piston. Both the upper and lower piston have the same cross-sectional area, thus keeping the ball valve balanced. Therefore, the only load holding the ball valve closed is the compression spring. One of two different unique ratchet sleeves are available. Depending on which ratchet is used, the ball valve will open with applied annulus pressure and will close or lock open once pressure is released. The FBTV has a splined lower end and will allow torque to be applied through the tool.

Available in two sizes

444665 3.125"OD x 1.125"ID
444867 5.000" OD x 2.250"ID

Full Bore Circulating Valves

The Full Bore Circulating Valve (FBCV) is opened and closed by increasing and bleeding off tubing pressure. This allows the FBCV to be used in both open hole and cased-hole testing and is completely independent of tools actuated by differential pressure. The FBCV Indexing Mandrel shifts up when internal tubing pressure is increased to hydrostatic pressure plus 500 psi. Once tubing pressure is released annulus pressure will force the indexing mandrel back to its original position. A guide sleeve will restrict movement of the indexing mandrel forcing the valve to stay closed.

At a predetermined number of these up/down cycles, the guide sleeve will allow the indexing mandrel to shift all the way down exposing

ports for reverse circulation. The next increase in tubing pressure will shift the indexing mandrel all the way up exposing ports for tubing to annulus circulation. Once the increased tubing pressure is released, the indexing mandrel will shift back down to its original closed position. The FBEV is again ready to repeat its cycling sequence.

Available in two sizes

421303 3.125"OD x 1.125"ID
459214 5.000" OD x 2.250"ID

Full Bore Exit Valves

The EXIT Valve is an annulus pressure controlled single function Sleeve Valve. The tool is to be used during simple cased hole testing and perforating operations at the end of the program when circulation from the tubing to the annulus is necessary. The is fully balanced to tubing pressure and will remain in position until cycled. Once the EXIT Valve is opened the EXIT Valve cannot be reclosed. The EXIT Valve sleeve valve is operated by a differential piston and controlled by annulus pressure. Annulus hydrostatic pressure is calculated at packer depth prior to the EXIT Valve being run downhole, to ensure the correct selection of rupture disc. The EXIT Valve is run in the hole in the closed position. When the tool is required to be opened, pressure is applied to the annulus. The Rupture Disc breaks, allowing the Differential Piston to move, shearing the Shear Pins in the Shear Sleeve and allowing circulation between the tubing and the annulus. As the Sleeve moves further, a ratchet lock ring engages, preventing the Sleeve from moving.

EXIT Valve

Available in two sizes

NSKV1000 3.125"OD x 1.125"ID
463252 5.000" OD x 2.250"ID

Full Bore Expansion Joints

The Full-Bore Expansion Joint (FBEJ) compensates for expansion and contraction of the test string during testing operations. The test string is fixed at two points, the Hanger or the Slick Joint in the BOP Stack and at the Packer.

Utilizing annular and tubing piston areas the Expansion Joint is both pressure and volume balanced. This eliminates any axial loading on the tool due to internal or external pressure and prevents a change in the volume or pressure of the annulus or tubing as the tool reciprocates. During the test, the test string will be subject to varying temperatures and pressure effects which will cause changes in the test string length. The Expansion Joints must be used to compensate otherwise string buckling, fracture or packer displacement could occur. The number of Expansion Joints required in a test string depends on the test program and well conditions.

Available in two sizes

NEJ-3501 3.125"OD x 1.125"ID
NEJ-1001 5.000" OD x 2.250"ID