

SAPEX OIL TOOLS LTD.



SAPEX / WOT

INFLATABLE PRODUCTS DIVISION

PRODUCTS, APPLICATIONS & SPECIFICATIONS

TOMORROW'S TECHNOLOGY FOR TODAY'S ENERGY

SAPEX / WOT EXTERNAL CASING PACKERS

CONTINUOUS MANDREL ECP

Continuous Mandrel ECP

Continuous Mandrel ECP assemblies are designed with packer elements in a 4 foot length (1.22 m.), 10 foot (3.05 m.), or 20 foot (6.10 m.) length. Packer elements on these tools conform well to irregular or washed out hole diameters. Steel reinforcement slats used in the elements help to center these tools in vertical, deviated, or horizontal wellbores.

Tools are available in a standard clearance model where higher differential pressures may be encountered across the packer element. Special clearance tools are also available for applications where restricted hole diameters may occur.

Continuous Mandrel ECP assemblies are typically inflated with cement displacement fluid. An integral screen prevents coarse particles from entering the valve system. Valves are designed with high quality materials which do not erode when abrasive materials are pumped through the system.

The valve system provides positive closing after the element is fully inflated to a preset pressure. A mechanical locking device prevents any further movement after the shear valve has shifted to the final closed position.

For inflatable elements, advanced elastomer compounds are available for high temperature applications to 350° F (180° C). Standard elastomer compounds may be used for temperatures up to 240° F (115° C).

Features & Benefits

- Continuous one piece Mandrel which eliminates the need for internal threaded connections. Mandrel specifications are identical to the casing used in the well.
- Valve system is located above the packer element. Valve operation is not affected by unpredictable pressure changes below the element.
- Superior anchoring system prevents element rotation and prevents lower packer shoe travel while tools are run into the well.
- The tool is manufactured with high strength steel materials suitable for H₂S and CO₂ environments.
- Shear pins in the valves may be easily replaced in the field, allowing the operator greater flexibility when well conditions change.



SAPEX / WOT EXTERNAL CASING PACKERS

APPLICATIONS FOR EXTERNAL CASING PACKERS

a) To Prevent Loss Of Cement

External Casing Packers may be positioned in the casing string directly above a lost circulation zone. The packer effectively prevents the loss of high-density cement slurries into the lost circulation zone. For these applications, a second stage cementing operation is normally performed above the ECP, after setting the packer.

b) To Prevent Gas Migration Through Cement Columns

In many wells, gas migration through a cement slurry can be prevented by setting an External Casing Packer directly above a high pressure gas zone. Improved cement integrity will be achieved.

c) To Prevent Unwanted Water Production

An External Casing Packer may be positioned slightly above an oil-water or a gas-water contact, in order to minimize water production from those zones.

d) To Minimize Damage To Sensitive Formations and Barefoot Completions

In the past, barefoot completions were used to minimize formation damage to production zones. However, today's technology, using under balanced drilling methods, allows drilling of the well to the required total depth, and to set External Casing Packers directly above sensitive formations.

e) For Centering Casing In Horizontal Wells

Several External Casing Packers may be used on horizontal casing strings in order to centralize casing and to ensure even distribution of cement around the casing.

f) Slotted Liners

External Casing Packers may be positioned at one or more points on slotted liners. These packers may then be set at a later date, using cup-type tools.

SAPEX / WOT EXTERNAL CASING PACKERS
 SIZES (AVAILABLE WITH 4 FOOT, 10 FOOT or 20 FOOT PACKER ELEMENT)

<i>Casing Size</i>		Standard Size ECP (Maximum O.D.)		Special Clearance ECP (Maximum O.D.)	
<i>Inches</i>	<i>mm.</i>	<i>Inches</i>	<i>mm.</i>	<i>Inches</i>	<i>mm</i>
2 3/8	60	3.62	92	3.39	86
2 7/8	73	4.25	108	3.65	92
3 1/2	89	4.75	121	4.30	109
4	102	5.18	132	4.77	121
4 1/2	114	5.75	146	5.50	140
5	127	6.25	165	5.95	151
5 1/2	140	7.00	178	6.50	165
6 5/8	168	7.93	202	7.63	194
7	178	8.25	210	8.00	203
7 5/8	194	9.00	229	8.75	222
8 5/8	219	10.25	260	10.00	254
9 5/8	244	11.25	286	11.00	279
10 3/4	273	12.75	324	12.38	314
11 3/4	298	13.75	349	13.38	340
13 3/8	340	15.75	440	15.25	387
16	406	18.25	464	17.88	454
18 5/8	473	22.00	559	21.50	546
20	508	23.00	584	22.50	571

- 1) Above tools may be supplied with Premium Thread and/or Premium Casing
- 2) When Ordering, please specify:
 - a) Casing Size
 - b) Casing Grade
 - c) Casing Weight
 - d) Casing Thread

SAPEX / WOT INFLATABLE PACKERS

SINGLE SET, PULL RELEASE INFLATABLE PRODUCTION-INJECTION PACKER

Single Set, Pull Release Inflatable Production-Injection Packer

Single Set Inflatable Production-Injection Packers are used for isolating zones in open hole or in casing. These tools are retrievable and may be used for testing, treating, production or injection. These tools may also be used as retrievable bridge plugs. For horizontal wells, two tools may be spaced with blank casing to provide a scab liner system. Production may then take place from above and/or below the scab liner system.

Single Set Inflatable Production-Injection Packers may be used in vertical, deviated, or horizontal wells. No rotation is required to operate Single Set, Pull Release Packers. These tools are ideal for coiled tubing operations.

Inflatable packer elements for this tool are 66 inches (1.67 m) in length. High strength cable reinforcement is used to provide excellent expansion characteristics in washed out or irregular well bores, as well to provide high differential pressure capabilities. Cable reinforcement allows these elements to return very close to the original run-in diameter. In addition, elements are less likely to lose rubber down hole because superior bonding occurs between rubber and cable.

Running Procedures

To set the packer, pressure is applied to the tubing. No rotation or tubing manipulation is required. A valve assembly locks pressure in the packer element once tubing pressure is released.

To unset the packer, an upward pull is applied to the tool. Pulling force required to unset the packer is determined by the number of shear screws installed prior to run-in. This force can range from 5,000 to 30,000 pounds.

Features & Benefits

- Inflatable packer elements provide greater clearance through restrictions in a well.
- Tool requires no rotation for setting or releasing the packer.
- System does not depend on a poppet valve to maintain pressure in the packer element. A shear sleeve is mechanically locked to maintain inflation pressure in the packer.
- A cable-reinforced packer element provides superior bonding of rubber to cable, and therefore less rubber is likely to be lost down hole.
- System allows pressure to be fully equalized across the packer element, when unsetting the packer. This minimizes packer element damage.



SAPEX / WOT INFLATABLE PACKERS THRU-TUBING RETRIEVABLE PACKER

Thru-Tubing Retrievable Packer

The Thru-Tubing Retrievable Packer is used for testing, treating, production or injection. The tool may also be used as a retrievable bridge plug. A high expansion packer element allows the tool to be run through tubing and set in larger casing or open hole below the tubing string. High-strength stainless steel strips are used in thru-tubing packer elements to allow expansion up to three times the original run-in diameter and still provide good differential pressure capabilities.

The Thru-Tubing Retrievable Packer is typically run into the well using coiled tubing. The tool is designed so fluid is allowed to enter the tubing string while running in, and yet no balls or darts are pumped from surface in order to operate the packer. An opening valve in the tool prevents fluid from entering the packer element until the tool is positioned at the correct setting depth. When pressure is applied in the tubing, this valve shears to allow the packer to set. As pressure increases in the packer element, a closing valve shears to lock inflation fluid in the packer. The valve cannot be re-opened when squeeze pressure is applied in the tubing.

A velocity valve is used in conjunction with the retrievable packer to allow circulation of fluids to the tool, after the packer has been set. An expendable ball-and-seat assembly allows fluid to be pumped through the packer.

Running Procedures

To set the packer, apply pressure to the tubing. After the packer is set, increase tubing pressure to open circulating ports on the velocity valve. Circulate fluid to the packer. Increase tubing pressure to close the circulating ports. Squeeze fluid through the packer.

To unset the packer, an upward pull is applied to the tool. Pulling force required to unset the packer is determined by the number of shear screws installed prior to run-in.

Features & Benefits

- High-expansion packer element allows running through tubing and setting in larger casing or open-hole below tubing.
- No balls or darts are pumped from surface to operate tool.
- System uses a shear sleeve to mechanically lock inflation fluid in the packer element. The valve cannot be re-opened when squeeze pressure is applied.
- System allows tubing to fill as the tool is run into the well.
- System allows packer to be set and checked before treating fluid is pumped down hole.



SAPEX Products and Services are readily available worldwide.
Please contact your nearest SAPEX REPRESENTATIVE at any time.

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