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.
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)

<table>
<thead>
<tr>
<th>Casing Size</th>
<th>Standard Size ECP (Maximum O.D.)</th>
<th>Special Clearance ECP (Maximum O.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td>mm.</td>
<td>Inches</td>
</tr>
<tr>
<td>2 3/8</td>
<td>60</td>
<td>3.62</td>
</tr>
<tr>
<td>2 7/8</td>
<td>73</td>
<td>4.25</td>
</tr>
<tr>
<td>3 ½</td>
<td>89</td>
<td>4.75</td>
</tr>
<tr>
<td>4</td>
<td>102</td>
<td>5.18</td>
</tr>
<tr>
<td>4 ½</td>
<td>114</td>
<td>5.75</td>
</tr>
<tr>
<td>5</td>
<td>127</td>
<td>6.25</td>
</tr>
<tr>
<td>5 ½</td>
<td>140</td>
<td>7.00</td>
</tr>
<tr>
<td>6 5/8</td>
<td>168</td>
<td>7.93</td>
</tr>
<tr>
<td>7</td>
<td>178</td>
<td>8.25</td>
</tr>
<tr>
<td>7 5/8</td>
<td>194</td>
<td>9.00</td>
</tr>
<tr>
<td>8 5/8</td>
<td>219</td>
<td>10.25</td>
</tr>
<tr>
<td>9 5/8</td>
<td>244</td>
<td>11.25</td>
</tr>
<tr>
<td>10 ¾</td>
<td>273</td>
<td>12.75</td>
</tr>
<tr>
<td>11 ¾</td>
<td>298</td>
<td>13.75</td>
</tr>
<tr>
<td>13 3/8</td>
<td>340</td>
<td>15.75</td>
</tr>
<tr>
<td>16</td>
<td>406</td>
<td>18.25</td>
</tr>
<tr>
<td>18 5/8</td>
<td>473</td>
<td>22.00</td>
</tr>
<tr>
<td>20</td>
<td>508</td>
<td>23.00</td>
</tr>
</tbody>
</table>

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
Single Set, Pull Release Inflatable Production-Injection Packer

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.

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.

INFLATABLE PRODUCTS DIVISION
EXTERNAL CASING PACKERS
INFLATABLE PRODUCTS

SAPEX / WOT INFLATABLE PACKERS
SINGLE SET, PULL RELEASE INFLATABLE PRODUCTION-INJECTION PACKER
**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 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.

*Tomorrow’s Technology for Today’s Energy...*
SAPEX Products and Services are readily available worldwide. Please contact your nearest SAPEX REPRESENTATIVE at any time.

HEAD OFFICE

CANADA
10 View Drive
Box 141C RR8
Edmonton, Alberta T5L 4H8
Canada
Tel/Fax: +1-780-973-3528
Email: sapex@lycos.com

OPERATING LOCATIONS

INDONESIA
ADMINISTRATIVE
Duta Mas Fatmawati Blok B1 # 16
Jln. R.S. Fatmawati #39
Jakarta 12150
Indonesia
Tel: +62-21-727-98129
Fax: +62-21-727-98128
Email: mka-jakarta@indo.net.id
Email: KL.sapexindo@telkom.net

OPERATING
DURI BASE
Jl. Jend. Sudirman # 63
Duri, Riau 28884
Indonesia
Tel: +62-765-598-006
Fax: +62-765-598-005
Email: sapexindo@telkom.net

PRABUMULIH BASE
Jl. Pertwi Nangka # 098
Prabumulih, SumSel
Indonesia
Tel/Fax: +62-713-320329

BRUNEI
TechTrack Supplies & Services Company
Lot 4920 Simpang 145, Jalan Sungai Pandan 4
Kuala Belait, Negara Brunei Darussalam
Mailing Address : P.O. Box 343
Kuala Belait KA1131
Negara Brunei Darussalam
Tel (673 3) 336409
Fax (673 3) 335722

IRAN
Tehran Afra Co Ltd
4 Eshraghi Street
North Kargar Ave.
Tehran 14118
Iran
Tel (98 21) 69 44 396/7
Fax (98 21) 69 44 398

JAPAN
Avery-Laurence (Japan) Ltd
6-28-401 Akasaka 9-chome
Minatoku, Tokyo 107-0052
Japan
Tel (81 3) 3405 5055
Fax (81 3) 3423 1579

MALAYSIA
Oilvest Engineering (M) Sdn Bhd
29A Jalan Wickham
Off Jalan Ampang Hilir
55000 Kuala Lumpur
Malaysia
Tel (603) 4256 7009
Fax (603) 4256 2519

PHILLIPINES
Welkin Oilfield & Industrial Supplies Corporation
236 Valero Plaza, 124 Valero Street
Salcedo Village 1227, Makati City
Metro Manila
Philippines
Tel (632) 816 1718/812 6197
Fax (632) 817 3412

SINGAPORE
LOAD CELL SERVICES LTD.
66 Toh Tuck Road # 04-09
Singapore 596730
Tel: +65-6462-1338
Fax: +65-6463-1662
Email: ianlim@loadcellservices.com
Email: ian calim@singnet.com.sg

VIETNAM
Loadcell Services Pte Ltd
143 Binh Gia
Vung Tau
Vietnam
Tel (84) 64 582373
Fax (84) 64 581254