Zenith™ ESP Bypass Completion Systems
Access to perforations and logging operations below the ESP without workover
In a cost-conscious industry, gaining access below the electrical submersible pump (ESP) without the expense of workover and associated downtime is crucial; production logging, memory gauge deployment or other wireline and coiled tubing operations essential for effective reservoir management cannot be achieved with the pump blocking access below.

The Zenith ESP bypass system's Y-Tool technology offsets the pump in the wellbore and provides a parallel, unobstructed straight-line conduit for well intervention below the ESP with wireline or coiled tubing, or for the deployment of dual ESP completion systems.

In addition, unique features in the re-engineered Zenith system enable simpler, safer installation, adding significant rig time and cost savings over traditional ESP bypass installations — even before any operating gains are achieved from increased uptime with the ESP bypass system in place.

Easy access below ESP
The Zenith ESP bypass system offers a well-proven means of achieving access below the ESP without the need for workover. Wireline and coiled tubing operations can be carried out without pulling the ESP — cost of downtime is avoided.

Operators are able to carry out logging, perforation, well treatment and stimulation operations with the artificial lift system in place, effectively managing production operations and reservoir performance without pulling the ESP.

Access to perforations below the ESP
- Add perforations.
- Formation treatments: solvents, scale inhibitor.
- Logging with coil tubing or wireline
- Memory gauge deployment.
- Sample collection.
- Identify water and oil zones.

Operator savings

<table>
<thead>
<tr>
<th>Operator</th>
<th>Regular Install</th>
<th>Zenith Install</th>
<th>Time Saved</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12hrs</td>
<td>5hrs</td>
<td>7hrs / 58%</td>
<td>58%</td>
</tr>
<tr>
<td>B</td>
<td>8hrs</td>
<td>3.5hrs</td>
<td>4.5hrs / 56%</td>
<td>56%</td>
</tr>
<tr>
<td>C</td>
<td>17hrs</td>
<td>9.5hrs</td>
<td>7.5hrs / 44%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Simpler, safer system installation
The re-engineered, new-technology design of the Zenith ESP bypass system with patented Saddle Assembly™ has revolutionised the way ESP bypass systems are installed; halving regular bypass installation times and significantly reducing rig costs and time-to-production delays.

Risk of dropped bypass tubing and danger of slippage are also eliminated. Zenith completions' unique system design also allows for thermal expansion of the ESP assembly, preventing subsequent damage which may be detrimental to the continued operation of the ESP, maximising pump protection.

Zenith completions from GE combine industry experience with cutting-edge technology to deliver innovative systems that overcome well constraints and enhance oil recovery.

Designed in response to industry demand for high-quality, time-saving, reliable oilfield equipment, the user-friendly Zenith ESP bypass (y-tool) system has been selected by many operators worldwide, delivering sizable reductions in installation time and related costs while enabling simplified reservoir access and minimised downtime in over 2,000 electric submersible pump wells.

“The new-technology design of the Zenith™ ESP bypass system from GE Oil & Gas has simplified and revolutionised the way ESP bypass systems are installed.”

William Beveridge, Electro-Mechanical Sustaining Manager
Zenith™ ESP Bypass (Y-Tool) system profile

System options

9-5/8” Bypass system*
3 1/2” threads on the Y-Tool’s upper and two lower connections.

7” Bypass system*
2 3/8” threads on the Y-Tool’s connections allow for application in slimline casing.

*Other system sizes available on request.

Auto Y-Tool system
Replace the standard Y-Tool with Auto Y-Tool alternative for interventionless operation; removing the requirement to set and pull plugs to switch between production and intervention operations.

2,000 Bypass systems installed globally

Zenith™ ESP Bypass (Y-Tool) system profile

System benefits

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Solution</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature changes result in expansion leading to damaged motor and clamps. Reduced run life.</td>
<td>Bypass Saddle allows for different expansion rates by allowing the bypass tubing to move unrestricted.</td>
<td>Prevents damage to the ESP equipment.</td>
</tr>
<tr>
<td>Traditional systems need to be exactly spaced out to allow components to fit together.</td>
<td>Zenith Bypass Saddle allows for 8ft of tubing movement.</td>
<td>Eliminates complicated space out.</td>
</tr>
<tr>
<td>Difficulty handling tensile or compression forces due to tailpipe or completion equipment below pump.</td>
<td>The Zenith Bypass Saddle passes all compression forces onto the Y-block.</td>
<td>No load on the ESP.</td>
</tr>
<tr>
<td>Different sizes of clamps required for different ESP, cable or casing size. Difficult to change ESP or cable.</td>
<td>Unique design allows clamps to fit multiple equipment sizes.</td>
<td>Minimised inventory and flexibility.</td>
</tr>
</tbody>
</table>

Logging experience

PERFORATING
STIMULATION/ACIDISING
NITROGEN INJECTION
EXTENDED TAIL PIPE
NATURAL FLOW
RUNNING LOB
PLT LOGGING

Zenith Auto Y-Tool operation

Fig 1. Pump switched on: Auto Y-Tool isolates bypass leg, opening flow path above ESP leg, allowing production to surface while preventing recirculation.

Fig 2. Pump stopped: Auto Y-Tool allows passage of intervention tools and fluids past the Y-tool and through bypass tubing.

Fig 3. When installed in a dual ESP completion, production from lower ESP can be produced via the bypass tubing.

Cable Support Clamp & Clips
Hold the bypass tubing in line with the ESP and secure cables and lines

Bypass Tubing
Conduit for bypassing the ESP with logging tools and slickline operations

Coupling
Connection to operator tubing

Crossover
For ease of handling of the bypass during assembly on the rig floor

Top Nipple
Enables setting of standing valves or isolation sleeve

Y-Block
Offsets ESP in the wellbore to allow access below through bypass tubing

Swivel Nipple
For setting of plugs

Crossover
Connects Y-block to the pump discharge head

Bypass plugs

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Zenith™ Bypass Tubing Matrix

<table>
<thead>
<tr>
<th>Casing</th>
<th>Max diameter of ESP assembly (in)</th>
<th>Available space in casing drift for bypass tubing (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.750</td>
<td>4.000</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>23</td>
<td>6.241</td>
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<td>7</td>
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<td>6.059</td>
</tr>
<tr>
<td>7</td>
<td>32</td>
<td>5.969</td>
</tr>
<tr>
<td>7</td>
<td>35</td>
<td>5.879</td>
</tr>
<tr>
<td>7-5/8</td>
<td>26.4</td>
<td>6.844</td>
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<td>7-5/8</td>
<td>29.7</td>
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</tr>
<tr>
<td>7-5/8</td>
<td>33.7</td>
<td>6.640</td>
</tr>
<tr>
<td>8-5/8</td>
<td>32</td>
<td>7.796</td>
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<tr>
<td>8-5/8</td>
<td>36</td>
<td>7.700</td>
</tr>
<tr>
<td>9-5/8</td>
<td>43.5</td>
<td>8.599</td>
</tr>
<tr>
<td>9-5/8</td>
<td>53.5</td>
<td>8.379</td>
</tr>
</tbody>
</table>

For system sizes not listed above, please contact your local GE Oil & Gas representative.

Imagination at work

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