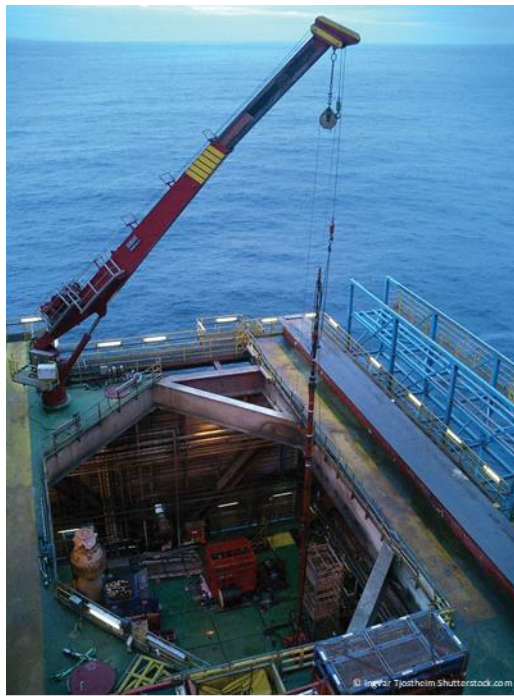




Slim Pump Safety Valve (SPSV)

A compact, pressure-actuated, downhole safety valve
for cable-deployed ESPs.

EuALF2021 - European Artificial Lift Forum, 10th February 2021.

Mark Wiltosz, Global Business Development Manager.

Mwiltosz@pragma-well.com

SP Series - Enabling Retrofit Artificial Lift

Keeping artificially lifted oil wells producing cost-efficiently is becoming more challenging, however:

- Slim-line electric submersible pumps (ESP) are offering the industry better value.
- Cable deployment of ESPs allows a more flexible operational solution compared to conventional ESP's.
- Permanent magnet motor technology increases the life & efficiency of the ESP technology by up to 30%.

Therefore Pragma have developed a slim pump product series for retrofit artificial lift applications, based around a novel safety valve design, actuated by pressure differentials rather than requiring control lines.

SP Safety Valve (SPSV) - Benefits

In conjunction with a cable deployed ESP the SPSV:

- Enables continued production in failed conventional ESP wells.
- Enables increased recovery in highly depleted wells by enabling cable deployed systems to be run
- Extends life of field without a full workover.
- Acts as a Fluid Loss Valve (FLV) protecting the reservoir.
- Improves the safety of the latest ESP designs by preventing backspin of Permanent Magnetic Motors (PMM).

SPSV Operational Overview

- The SPSV is designed to open only when the ESP is powered on then shut as soon as the ESP is no longer powered.
- Fail-safe position is closed on loss of power to ESP, stopping production.
- Completely mechanical design requiring no electrical power, electronics, batteries, atmospheric chambers or hydraulic control lines.
- Run together with the ESP or packer BHA.
- Compact design to minimise rig up height required (SV approx. 1.25M).
- API 14A certified July 2020.



SPSV API 14A Certification

- Southwest Research Institute (SwRI, San Antonio, Texas) have performed Annex C and then Annex B V3 testing in accordance with API 14A.
- Annex D temperature tested at 120 and 150 deg. C.



SPSV Specifications

Specifications:			
Tool working pressure rating	5000 psi / 345 bar		
Make up length	3ft / 1m	47" / 1.2m	54" / 1.4m
Outside diameter	2.17" 55.1mm	SP263 2.625" 66.7mm	SP319 3.19" 81.9mm
Weight	19lbs 9kg	40lbs 18kg	75lbs 34kg
Design setting depth	Limited only by ESP design depth		
Design temperature rating	Standard: 150°C / 302°F High Temp: 170°C / 338°F		
Flow area	0.33 in ²	0.78 in ²	1.59 in ²
Design flow rates	TBC	<2000 bbl/day	<5,000 bbl/day
Connections	Customer specified		
Available Metallurgies	Customer specified – 4140, 13Cr, Inconel 625 etc		

Two size variants currently available:

- **3.5" production tubing**
 - 2.625" OD SPSV
- **4.5" production tubing**
 - 3.19" OD SPSPV

2.17" SPSV specification as per client requirements



SPSV Deployment Options

- The Pragma SPSV can be deployed via multiple options:
 1. As part of the ESP assembly and latched into a pre-set packer.
 2. Run separately into the packer after it has been set, but before the ESP BHA has been run.
 3. Run below the packer (Packer Feedthrough required).

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Questions?

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Mark Wiltosz, Global Business Development Manager.
Mwiltosz@pragma-well.com Tel: +44 1224 937630