

GOWSP

Gas-Oil-water Separation Platform

GOWSP is an industrial-scale test platform including a 3" closed loop operated with real fluids, such as natural gas, crude oil and salt water. The platform is used for in-depth study of three-phase separation and incorporates specific tools for addressing complex technical challenges, such as subsea or EOR applications. It can also be used to calibrate multiphase equipment, such as monitors, flow meters and pumps. The loop is designed to cover a broad operating range of flow rates under controlled temperature and to reproduce numerous types of flows.

“The GOWSP platform is now considered by Total to be one of the key elements in our multiphase separation workflow to address challenging issues in complex environments. Use of the GOWSP platform improves our understanding of physico-chemical phenomena occurring during liquid/liquid and gas/liquid separation. We have successfully tested various crude oils and separators corresponding to different field application scenarios.”

Jean-Michel Munoz,
Total Multiphase Separation
Project Manager.



The GOWSP platform has been developed within the framework of a joint project with Total.

“The GOWSP platform was a key factor in the industrial-scale validation of our new technology. Tests have been successfully carried out, with efficient management and operation of the test loop.”

Stéphanie Abrand,
Saipem Multipipes Separator
Project Manager.

**GOWSP is available
on a contractual
basis or through
research partnerships**

IFP Energies nouvelles is a public-sector research, innovation and training center. Its mission is to develop efficient, economical, clean and sustainable technologies in the fields of energy, transport and the environment.

Technical Characteristics

Fluids

- Natural gas, nitrogen
- Crude oil, mineral oil, lubrication oil
- Salt water (35 g/l max)
- Viscosity: 40 cP nominal – 150 cP max
- Required oil volume: 6 m³ (40 bbl)

Operating conditions

- Pressure: from 18 bar up to 55 bar (from 260 up to 800 psi)
 - Temperature: controlled 80°C (180°F)
 - Flow rates:
 - Gas: 7.5-22 Am³/h (375-1,100 sdm³/h)
 - Oil: 0.4-15 m³/h (60-2,300 bbl/d)
 - Water: 0.4-15 m³/h (60-2,300 bbl/d)
 - Water cut: 0 to 100%
 - GVF: 23 to 98%
 - Pressure drop of tested device: 5 bar (72 psi) max
- Each flow line is controlled separately before mixing.

Piping

- Single phase line: 2"
- Multiphase horizontal lines: 3"
- Multiphase pipe length: 10 m (30 ft)
- Possible testing of vertical/horizontal equipment



Instrumentation

- On each single phase line:
 - Coriolis mass flow meter
 - Temperature
 - Pressure
- On oil lines:
 - On line viscometer
 - Gamma meter
 - GVF acoustic monitor
- On the reference separator:
 - Pressure
 - Temperature
 - Two interface profilers
- Samplings for physico-chemical analysis using a patented technology

References

Past references for multiphase equipment testing

- Multiphase flow meter (Schlumberger, Petroleum Software Limited – Geoservices)
- Multiphase booster (Total)
- Slug detector system (MetraVib)
- Multiphase turbine (DB Guinard Pumps)

GOwSP References

- 2006-2010 – Total – Liquid/liquid separation for subsea applications
- 2007 – Total – Pazflor – Gas/liquid separator
- 2008 – Total – Pazflor III – Gas/liquid separator
- 2009 – Total – Testing of a polymer for water/oil separation – EOR
- 2009 – Total – Pazflor III additional tests on a gas/liquid separator
- 2009 – Saudi Aramco/Total – Testing of a crude oil in emulsion
- 2010 – JIP BP/Saipem/Total – Testing of a multipipes separator
- 2010 – Total – Testing of a polymer for water/oil separation – EOR



Publications

Multiphase Loop Tests for Subsea Separation Unit Development

P. Pagnier, C. Noïk, P. Maurel (IFP Energies nouvelles)
A. Ricordeau, J.L. Volle (Total)
SPE-115963

Comprehensive Study on Gas/Crude Oil/Water Separation: Experimental and Numerical Analysis

C. Noïk, P. Pagnier, T. Palermo, J. Trapy, M. Ouriemi (IFP Energies nouvelles)
A. Ricordeau, B. Brocart, J.P. Lebrun (Total)
AIChE 2009 – Annual Meeting – November 12, 2009

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The information contained in this document is not contractual

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