Services and Aftermarket

Process Systems Testing Services

We provide a unique, versatile once through testing service enabling you to develop, optimize and quantify produced water and separation technologies at field conditions.

The test facility at Flotta in the United Kingdom was opened in 1988 to support the development and testing of full scale offshore process equipment. Since opening, we have established a internationally recognized facility specializing in effluent treatment and water handling, with three-phase separation and electrostatics capabilities having been added in 2016.

Our facility is very unique, having the capabilities to operate on a continuous once through basis ensuring the feed conditions are constant and unaffected by recirculated test fluids. Our state-of-the-art facilities are combined with experienced process engineers and chemists on-site to evaluate the technology at every step in the process.

Technology Optimization

We provide highly adaptable processes that can be tailored to the requirements of each individual project and clients needs. We can vary all conditions throughout testing to ensure the technology is fully evaluated, even when the project changes during the test program.

Oilfield Chemistry Services

Our experienced chemists offer a range of oilfield chemistry services and consultancy. We cover a wide range of services from oil-in-water concentration to detailed Enhanced Oil Recovery (EOR) polymer analysis and can provide analysis to support pilot scale testing or conduct detailed laboratory scale studies.

Technology Validation

We provide a comprehensive resource for you to evaluate and validate a process technology. Our test facilities enable us to demonstrate the effectiveness of the equipment under controlled conditions. Confirmation of your investment decisions and the ability to assess technologies prior to purchase is extremely valuable. Our technology validation services provide an objective means for testing individual pieces of equipment and complete processes. Technology developers use our independent and confidential service for performance testing of products before introducing them to the market. Our test facilities have also been used for product certification and aiding market promotion via independent trials.

Benefits

The unique facility on Flotta provides a controllable test bed that simulates offshore fluids in an onshore safe environment and on a unique once basis.

- Actual or near field fluid conditions provide high confidence levels in technology testing.
- Safe, trouble free discharge of effluent from the testing, allowing once through flow, maintaining consistent feed operating parameters.
- Enhanced security of investment, with the opportunity to verify performance and operating envelopes before commitment to purchase.
- A cost effective way of gaining comparative data on available technologies prior to selection.
- On site heavy and medium crude oil ensures valid operating conditions and simplifies logistics and safety/environmental aspects.
- Confidentiality and security in results demanded by the Oil and Gas industry.
- Expertise of our team provides added value, a versatile service to clients requiring performance validation, product research or product development.
- Extensive support facilities including analytical laboratories and equipment, fabrication workshop and mechanical handling, providing a comprehensive resource.
- Combined resources that enables us to offer a truly holistic solution.

Specifications

Our central indoor test hall of 640 m^2 with additional outdoor test area, offices and laboratories offers the following capabilities:

- Seawater to 20,000 BWPD as either raw seawater, filtered to specification, and/or deaerated on a continuous throughput basis.
- Oily water simulation to 10,000 BWPD
- Freshwater to 5,000 BWPD
- Bulk oil to 4,000 BOPD
- Once through or closed loop processing
- Numerous thermal fluid heater systems up to 90°C
- Remote operation and control automation
- Pressure, flow and temperature control and monitoring
- Controllable solids mixing vessels and injection packages
- Controllable oil and chemical dosing packages
- Controllable oil droplet size, including sub 4 µm at over 2000mg/l oil concentration
- Polymer and alkali surfactant polymer mixing vessels and injection packages
- Inert gas (nitrogen) and compressed air supplies
- Electrical power in single and three phase
- Disposal of used liquids and chemicals
- Outdoor test and bunded storage area.
- On-site fabrication, workshops and stores, with 5m high access
- On-site laboratory and office support of over 450 m^2

Applications

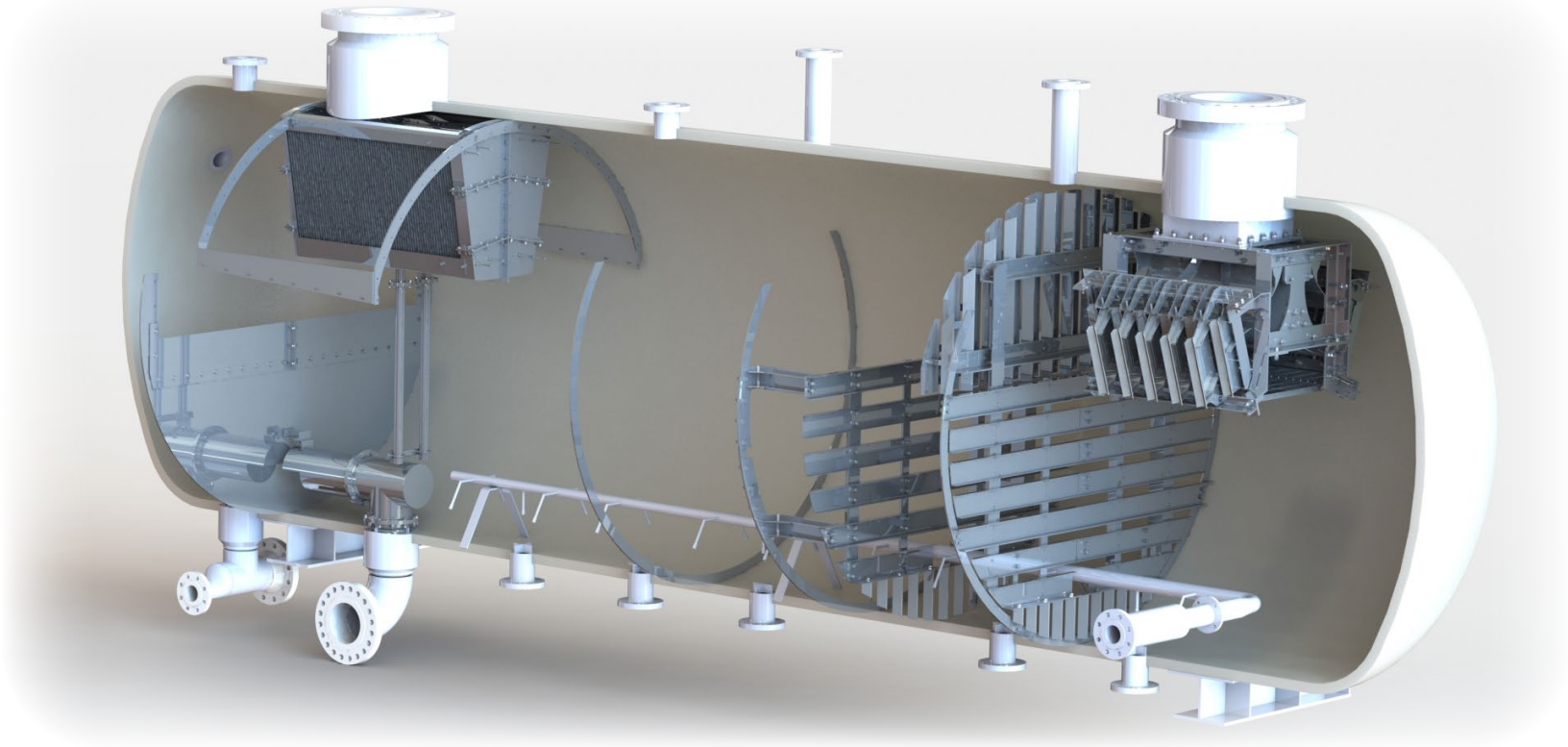
Some of the technologies we have tested at our facility in Flotta include:

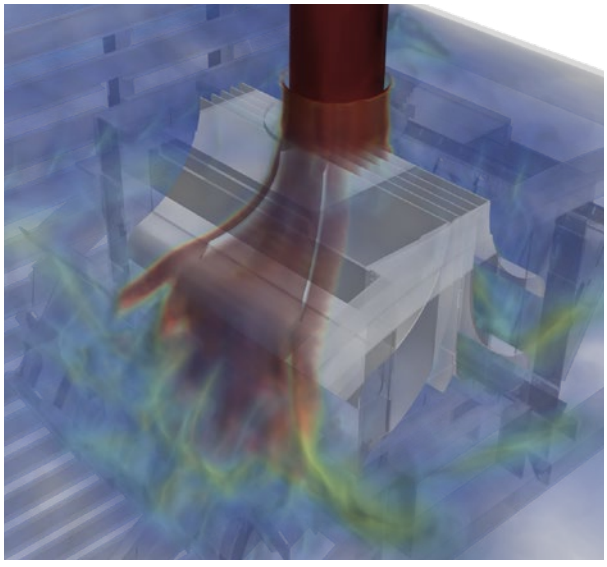
- De-oiling and pre-separation hydrocyclones
- Membrane, media and self cleaning filters systems
- Horizontal and vertical IGF technologies
- Compact separation vessels
- Online and offline oil in water monitoring technologies
- Laboratory oil in water analysers
- Oil droplet size measuring technologies
- Coalescing technologies
- Separator internals, including numerous inlet devices, baffling, plate packs etc.
- Motion vessel internals
- Slug catchers
- De-aerators
- Solids cyclones
- Other sand removal systems, both internal to vessels and external
- Back-produced EOR and ASP fluid handling technologies
- Reduced shear / coalescing valves
- Electrostatic coalescing technologies
- Various polishing stage technologies
- Subsea separation vessels
- Numerous novel technologies that have never progressed into the market

Physical Modeling

In addition to the digital environment of Computational Fluids Dynamics (CFD), our flow loops enable physical modeling of a wide range of process challenges under various fluid conditions allowing determination of the best process solutions. One area that we are commonly asked to investigated is in the performance of separator vessels.

The theoretical design for a separator vessel does not in itself produce an optimum separator performance due to the potential for non-ideal flow patterns and dynamic behavior within the separator. Therefore, to develop a suitable overall separator design the techniques of physical modeling, often combined with CFD, are utilized to convert a theoretical design into one which has a hydraulic efficiency as close to the ideal as possible.

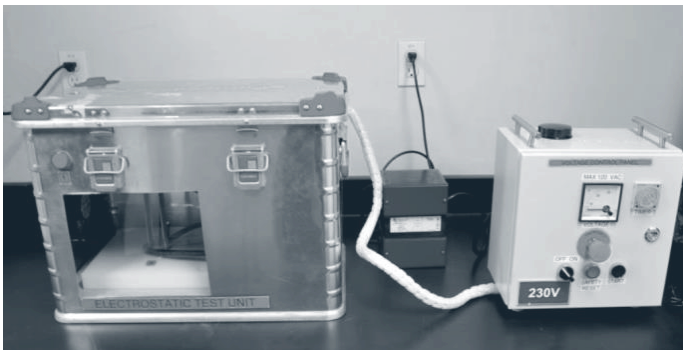




From bench scale to a 50,000 BPD full sized system, our test facility and laboratories have the ability to test electrostatic technologies at three different scales. The third unit is a small pilot scale 350 BPD development unit.

Electrostatic Laboratory Testing

Our inventory includes three bench scale mobile electrostatic test units. These units allow our chemists and engineers to take the technology to your facility and analyze the impact of Electrostatic Coalescence on live fluids, thus eradicating any potential degradation of samples during transit. These units can apply up to 10,000 volts to the sample, over a predetermined time frame. The technology, combined with experienced operators conducting separation profiling of the fluids allows a full understanding of the electrostatic impact.



Pilot Scale 350 BPD

Our small pilot scale unit allows for testing of electrostatics in a multitude of configurations. Not only can we investigate vertical and horizontal orientations and flow at a wide range of Flux rates, but we can also demonstrate the effect of applying different voltage types (AC vs DC) This skid also features an upstream inline Compact Electrostatic Coalescer (CEC™).

The package has been designed to maintain the critical dimensions, while also minimizing the oil volumes required to operate.

Large Scale Electrostatic Test Loop

Our large scale electrostatic flow loop features a full scale separator, fully controllable fluids conditions with multiple electrostatic technologies.

Key Features

- Separator size - 2.3m ID x 5m T/T
- Oil Flow – up to 250 m^3/hr
- Water flow – up to 75 m^3/hr
- Temperature – ambient up to 40° C
- Nitrogen purge
- On-site sampling and analysis capabilities
- Multiple safety circuits and systems in place

Oilfield Chemistry Services

Our experienced chemists offer a range of oilfield chemistry services and consultancy support, both offshore and in our own laboratories.

Emulsion Studies

- Fluids Separability
- Influence of Temperature
- Effect of Chemicals
- Water-in-Oil (WIO) Content
- Water-in-Oil (WIO) Droplet Size
- Density and Viscosity
- Bulk Fluids Solids Content
- Wax Appearance Temperature (WAT)
- Pour Point
- Saturates, Aromatics, Resins and Asphaltenes (SARA)

Polymer and Alkali Surfactant Polymer (ASP) Testing

- Interfacial Tension
- Surfactant Partitioning
- Polymer Solution Rheology
- Molecular Weight Determination
- Polymer Concentration Analysis
- Effect of MEG on Oil-Water Separation
- Purpose Built Test Column
- Multiple Sample Points to assess Oil/ Water Quality

Oil-In-Water (OIW) Analysis

- IR and UV fluorescence spectroscopy

Water Chemistry Analysis, e.g.,

- Alkalinity
- Total and Dissolved Iron
- Dissolved Oxygen

Ion Analysis

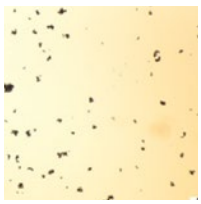
- Anions and cations

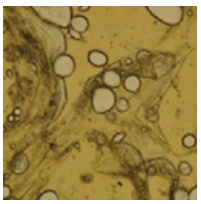
Dissolved Hydrocarbon Analysis

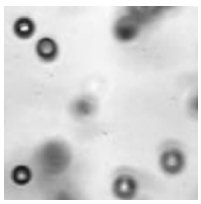
- BTEX
- Polyaromatic hydrocarbons (PAH)
- Organic (fatty) acids

Oil Droplet Size and Solids Particle Size Analysis

- ViPA (online)
- Malvern insitec particle sizer (online)
- Malvern mstersizer 3000E (offline)







Total Suspended Solids Content (TTS)

- Online and batch solids sampling

Solids Characterization

- SEM/EDS
- XRD
- FTIR

Microbiological Analysis (e.g., sulphate reducing bacteria)

Whole Effluent Assessment/Toxicity Analysis

Our Chemistry Services have an international reach and employ the latest analytical instrumentation and methods, so that you get the most accurate and reliable results. Our expert staff are trained to the highest standards and have an in-depth knowledge of their fields, including practical experience in offshore environments to both international and local regulations and standards.

We offer a wide range of services that can be tailored to meet your particular requirements, from a comprehensive laboratory study to a one-of test, either at our facility or yours worldwide.

Our quality management system is ISO 9001/2015 certified.

Enhanced Oil Recovery Study

Our services team recently undertook a Joint Industry Project with BP, Shell, Statoil, Total, Wintershall, Conoco Phillips and Enquest to look at the effects of back produced polymer on bulk separation and then produced water (PW) technologies. An upfront detailed lab study ensured that the forthcoming bulk and PW technology trials were conducted at representative conditions to that found in the field.

Since starting in the EOR field in 2010, our knowledge and understanding of the polymers and the effects on oil and water have grown exponentially.

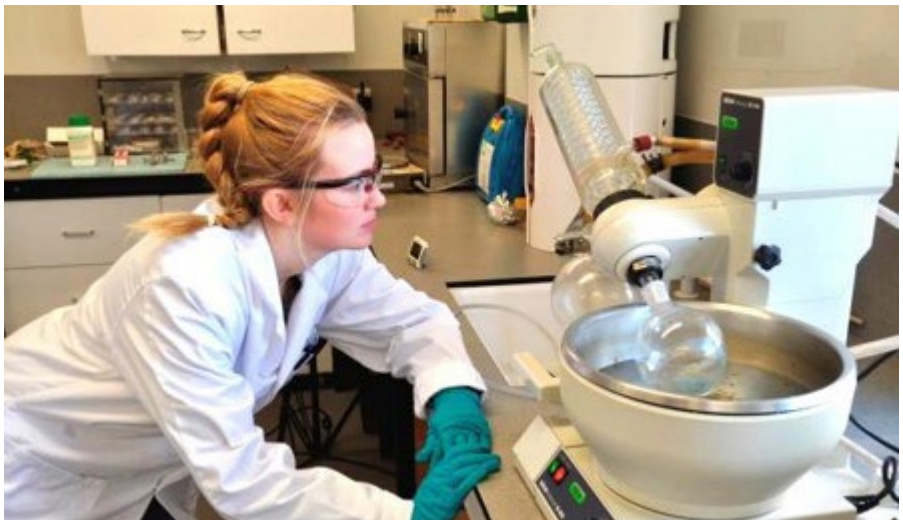
Our vast experience with technologies and processes that cover almost all process areas in the Oil and Gas industry make us ideally placed to pass on this knowledge in a format that best suits your needs. Our worldwide training programs ensure that your operations meet the highest performance and safety standards.

Our most reputed training courses include:

- Hydrate Inhibition Technology (HIT™)/MEG unit
- Triethylene Glycol Regenerative Gas Dehydration Systems (TEG)
- Sulphate removal and seawater treatment
- Gravity separation with options of internals design, fabrication and hands-on installation
- Electrostatic coalescing and Desalter
- Fired Heaters
- Produced water and sand and solid treatment

Our customized training programs include:

- Real field data analyses and optimization of equipment delivered by Wellstream Processing or others
- Conceptual design workshops tailored to a particular green or brownfield application
- Case study with full visualization utilizing live laboratory and CFD simulations
- Programs to incorporate key equipment suppliers or specialist guest speakers
- Collaboration with universities and technology centers to expand and enhance our offerings



All our programs include a balanced presentation of all technologies available, including the latest developments and trends in the market. Environmental regulations and safety hazards are also addressed.

Locations

Our Process and Flow Technologies Business Unit manufactures top-quality equipment for the oil and gas industry and across various industrial markets.

Service expertise drives predictable uptime that is critical to your operation. Our deep knowledge of your processes ensures you have the latest technology for your application to get the job done right, with trusted products you can depend on – first time, on time, every time.


Oslo, NOR
Korea, SKR
Shanghai, CN
Dubai, UAE
Saudi Arabia, UAE
Kuala Lumpur, MSIA
Batam, IDN
Singapore, SGPR
Perth, AUS
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