

Alderley



Shaping the future of produced water treatment solutions



Produced Water Treatment Solutions

Providing clear solutions with innovative design

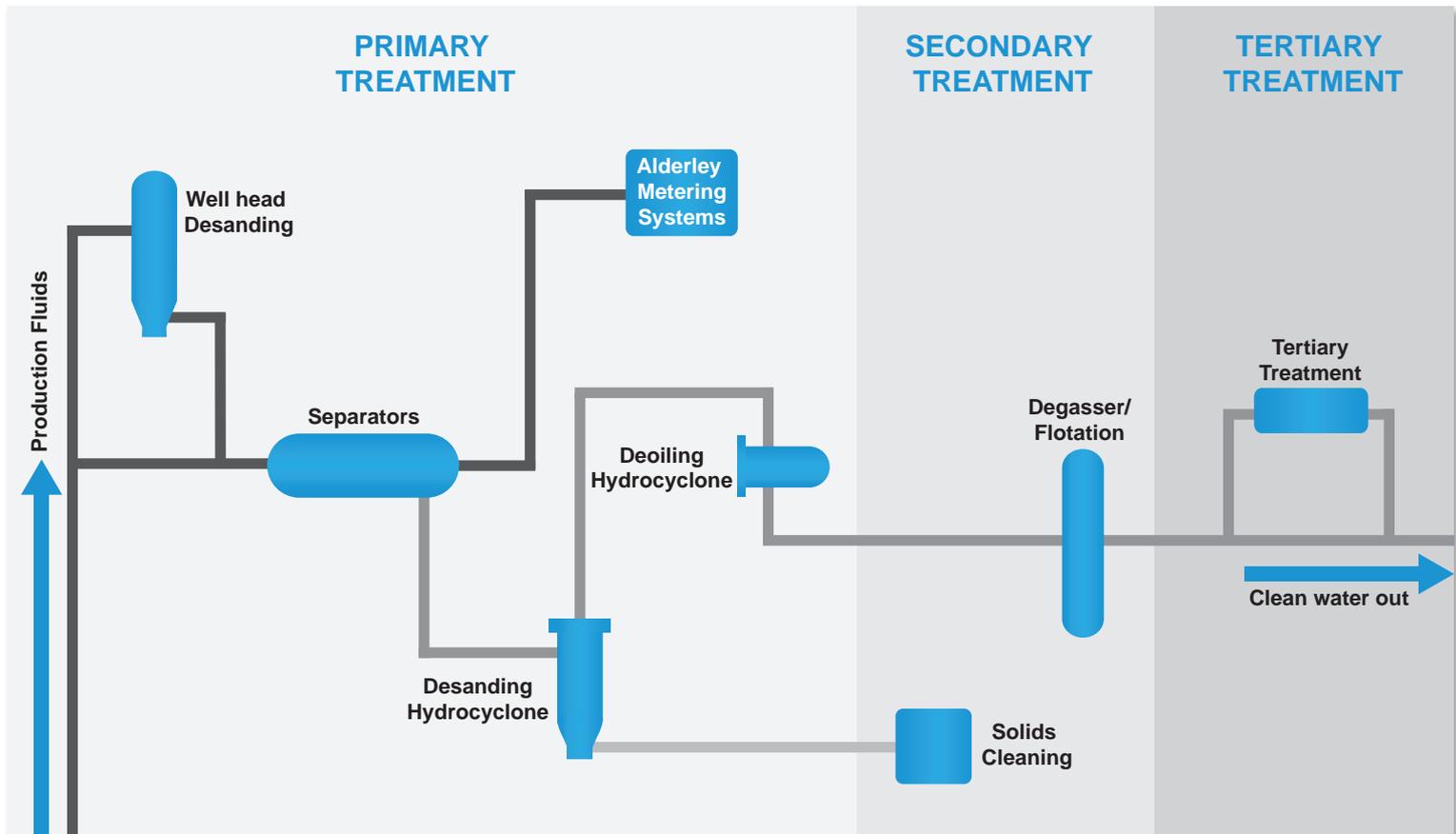
Produced Water Treatment Solutions

Solutions to meet the most stringent produced water requirements

However stringent your produced water treatment requirements, we can design and supply a system that meets your needs and surpasses environmental constraints, while maximising the income from the oil/gas field assets.

The challenges of ever more stringent water discharge specification levels to meet the tighter re-injection requirements and lower environmental limits on discharge, can have a significant effect on the hydrocarbon process train; together with a detriment to the environment if it is discharged prior to suitable processing. No single piece of equipment can tackle the complex process of treating produced water to meet increasingly stringent regulations for discharge or re-use.

We are world experts at meeting even the most demanding of produced water treatment requirements



At Alderley, we have a long experience in the management and processing of produced water, together with handling some of the more difficult applications. We can offer you advice and guidance through a range of services and technologies to ensure you meet production and produced water treatment goals.

We provide the complete solution, from stand-alone or fully integrated, skid mounted produced water treatment systems covering Primary, Secondary and Tertiary Treatment processes.

Installation and delivery is implemented in-house, including all design, project management, engineering, procurement, construction, installation and commissioning.

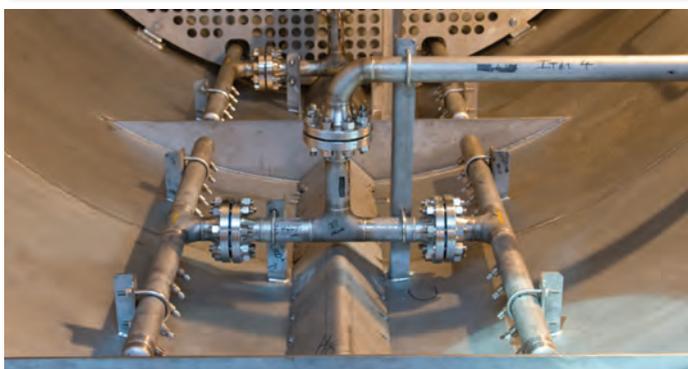
- Vast experience in offshore, onshore and FPSO applications
- Highly efficient and compact solutions
- Guaranteed to meet your compliance levels
- Full range of solutions covering all areas of the produced water treatment process
- Extensive knowledge and experience in standards and technologies

Providing clear solutions

Primary Treatment

The primary treatment of produced water in itself involves multiple technologies for both solids removal and oil/water separation, and can include one or more of the following unit processes:

- Upstream sand removal
- Separators/collection vessels
- Deoiling hydrocyclones
- Desanding hydrocyclones



Sand Cleaning

Alderley's sand cleaning packages remove surface oil by attrition, and dewater the fluid stream for either direct discharge into the environment, or into a solids bagging unit. Guaranteed levels of oil on solids and water concentration can thus be achieved.

Solids that have been separated by the desanding cyclone are normally accumulated in either an integral sand accumulator or Alderley's spherical accumulator for higher pressure systems.

Utilising the range of Solid/Liquid Liners (AP12 to AP80), Alderley's sand cleaning packages can process produced solids for either discharge to the environment or into a bagging skid.

Our integrated process ensures that while the footprint is minimised, time performance is maximised.

Ultimate Efficiency Desanding Hydrocyclones

Produced water desanding with exceptional performance

Alderley has been producing market leading desanding solutions over the last two decades. These solutions are working in some of the toughest production environments, satisfying our customers solids separation requirements.



Solid/Liquid Hydrocyclone Operation

A desanding hydrocyclone uses the rapid increase in rotational velocity to create centrifugal acceleration of the fluid. This forces the solids towards the outside of the hydrocyclone liner, before they are dropped into the vessel, where they are accumulated. Discharge of solids from the accumulator can be manual or automatic to suit your application needs.

Whether you are removing solids from production fluids to protect downstream equipment or treating produced water for discharge or re-injection, our desanding hydrocyclones use the latest technology to meet the most diverse of requirements. Throughput, pressure drop, reliability and the efficiency of solids removal are all important factors when specifying a hydrocyclone. Alderley's desanding hydrocyclone is designed to tolerate higher pressure drops and pass higher flow rates to bring highly efficient solids removal – all in the most compact of vessels.

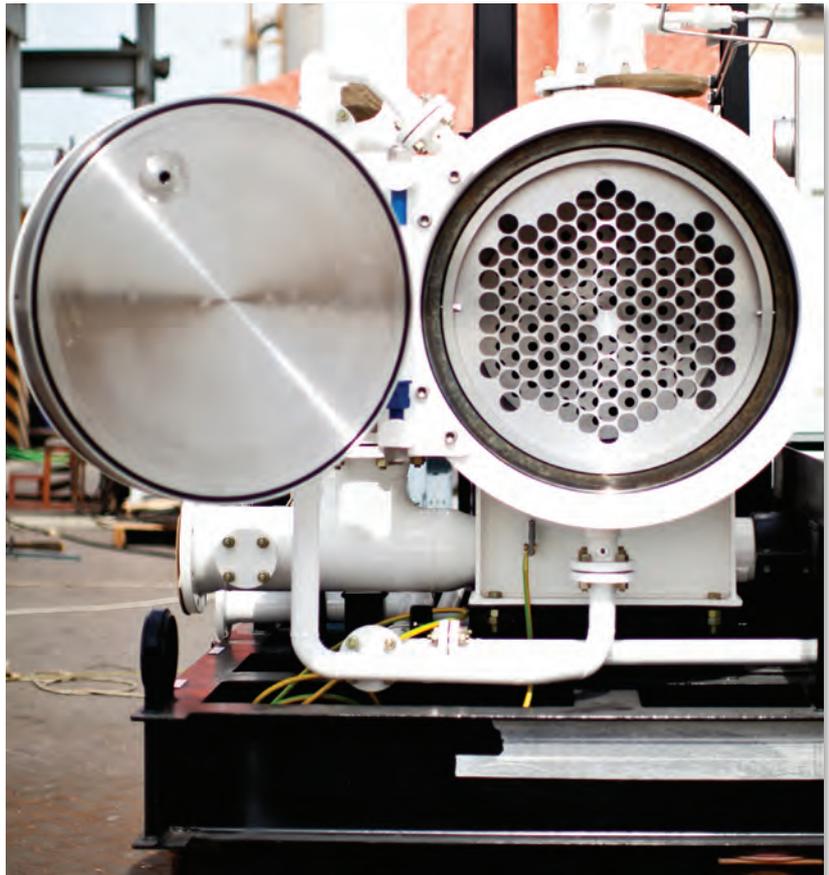
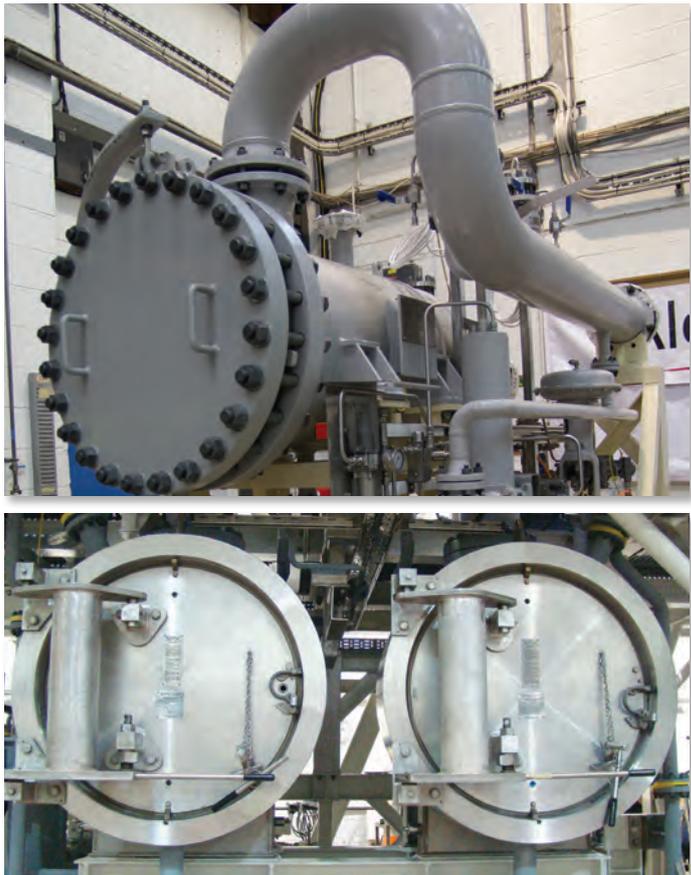
- High efficiency design
- High online turndown (>5:1)
- Compact vessel ideal for offshore applications
- High purity alumina ceramic and silicon carbide liners giving high erosion resistance
- Individually removable liners or cartridge design
- Continuous or batch sand removal
- Easy integration with solids clean-up and disposal systems
- Low maintenance

Providing clear solutions

Highest Performing Deoiling Hydrocyclones

Reduces oil-in-water levels to less than half that of some hydrocyclone designs

Since the late 1990's Alderley has produced in excess of 20,000 liners for deoiling packages, which have been supplied to more than 50 customers: helping to effectively support production and the successful management of oily water the world over.



Liquid/Liquid Hydrocyclone Theory

Produced water is channelled into the hydrocyclone head tangentially to the wall. The multiple tangential inlet design combined with a tapering internal geometry creates an accelerating vortex in the fluid as it flows through the liner. Because of the difference in density between the oil and water, the induced centrifugal force pushes the oil into a central core. Careful differential pressure control is used to remove the oily core in a countercurrent flow.

- Low investment and running costs
- Ideal for retrofitting/upgrading existing produced water treatment systems
- Compact and efficient
- High turndown
- High erosion resistance
- Low fouling

with innovative design

Secondary Treatment

Efficient complementary technologies to further reduce oil-in-water levels

At Alderley we have vast experience in complete produced water treatment solutions to meet even the most demanding requirements.

Secondary treatment conditions produced water and solids in preparation for discharge or further polishing. Hydrocyclones provide excellent removal of sand and free oils in water, but the latest stringent regulations often require complementary technologies to reduce the levels of oil and other contaminants further.

Alderley's flotation based technologies may be used at the primary stage of treatment, where low pressure drop combined with efficient oil removal is required.



Compact Flotation Units (CFU)

Alderley's CFU utilises our proprietary swirl device, resulting in a 'soft spin' cyclone.

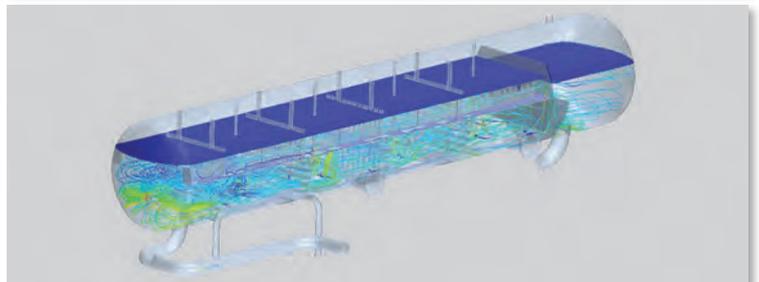
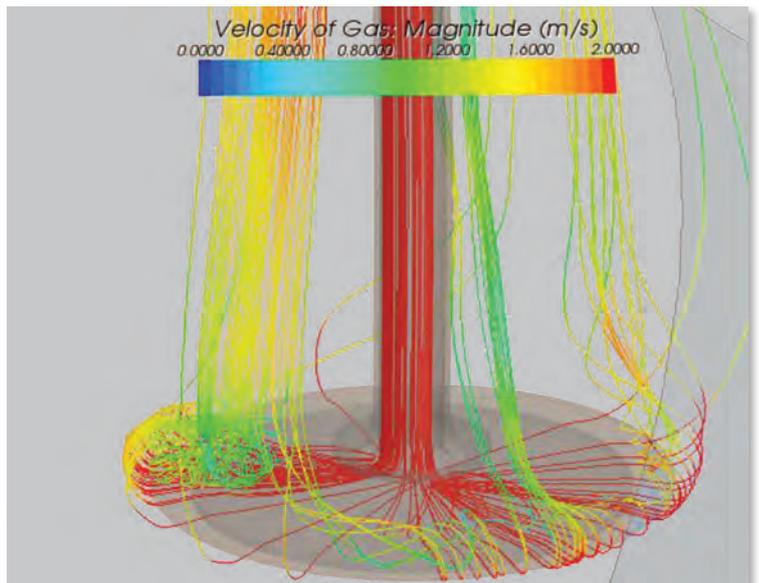
Our design has been optimised to maximise oil recovery while minimising the use of flotation gas. Using our multi-step pressure drop inlet we maximise the efficiency while reducing chemical usage.



Degassers

Alderley can design and supply a degasser to fit your process requirements and needs. Produced water degassers are typically operated at close to atmospheric pressure, as the produced water enters the 'degasser' the dissolved gas is liberated, resulting in millions of tiny gas bubbles that adhere to residual oil requirements and ensures maximum hydrocarbon recovery.

Alderley can provide a range of secondary separation processes along with project management and customer support to deliver a fully integrated package on time and on budget.



Induced Gas Flotation (IGF)

Alderley provide two and four cell IGF systems to meet the performance requirements of your application. The IGF works by recycling gas bubbles into the produced water. These bubbles adhere to solids and oil within the produced water and cause them to float to the top of the vessel where they are skimmed off.

The IGF vessels operate a controlled residence time system for each cell to maximise the efficiency of the system.

Chemicals may also be added to the system to improve the adherence of particles and break down emulsions. We will advise on the necessity for the use of chemicals during our detailed design service to you.

Computational Fluid Dynamics (CFD)

Alderley can undertake CFD studies. The objective is to optimise the effectiveness of separation technologies with respect to oil removal from produced water.

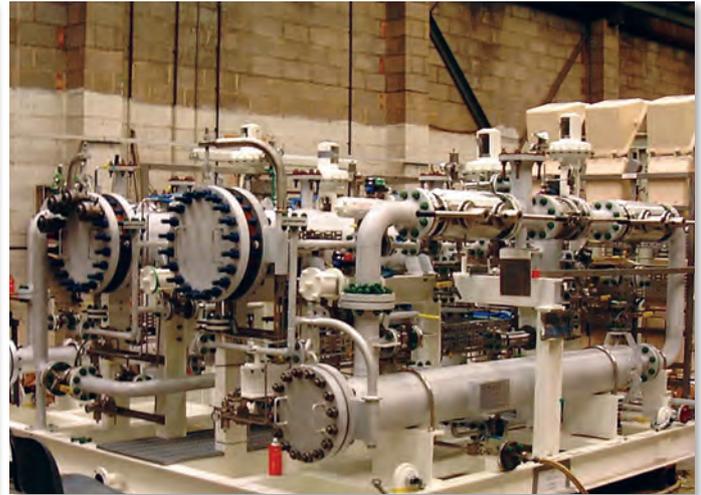
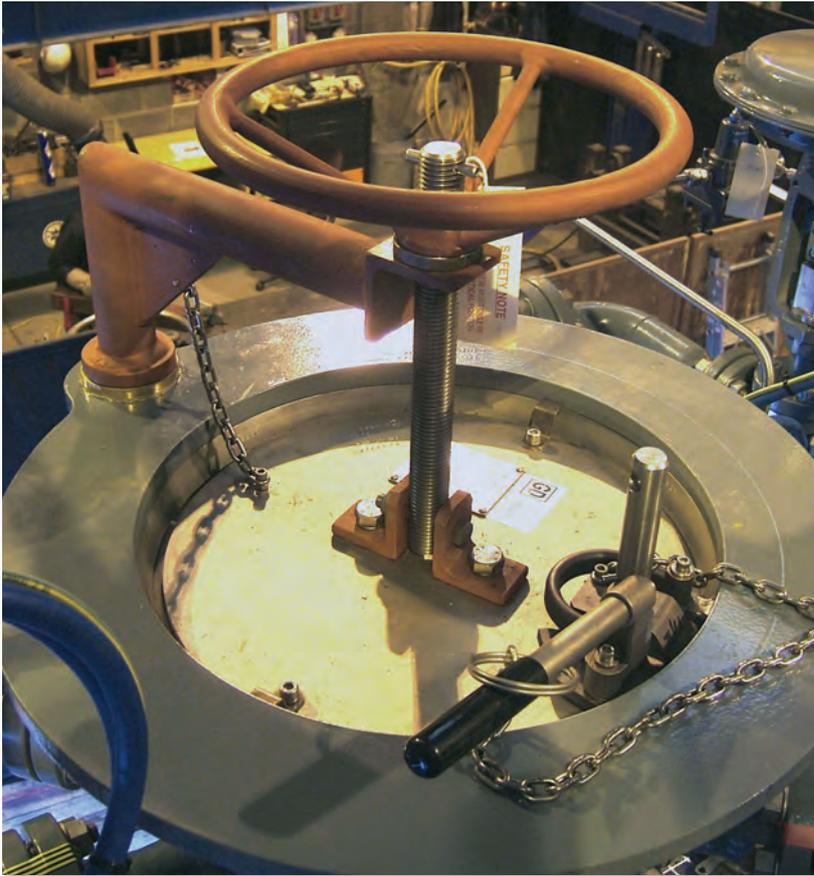
These services are utilised for both minimising equipment footprint while maximising efficiency, together with assessing existing process performance and providing brownfield upgrades.

Tertiary Treatment

Where stringent standards are required for re-injection or environmental discharge

Alderley can provide a wide range of tertiary or polishing technologies, including adsorption, coalescing, solids filtration and nutshell filters. Each of these technologies would be chosen and combined, if appropriate, to deliver the best performance to meet the clients' discharge specification.

These tertiary technologies would typically reduce free and dissolved hydrocarbons to less than 5 mg/l and solids to 2 μm . Additional technologies can be added as required to further reduce the BOD, COD, Mercury and other constituent components to deliver a completed produced water treatment solution.



Adsorption Filters

Our advanced adsorption technology can reduce free hydrocarbons and dissolved hydrocarbons to 2 mg/l.

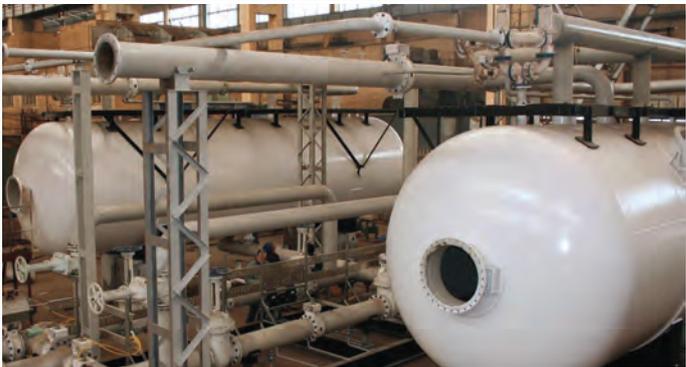
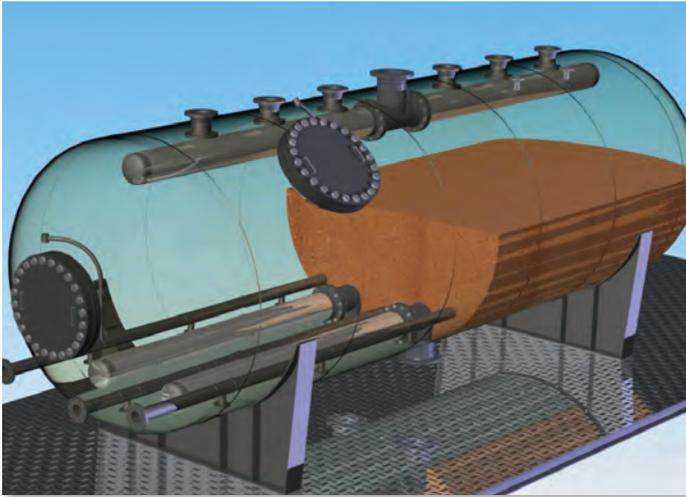
Hydrocarbons such as BTEX (Benzene, Toluene, Ethyl Benzene and Xylene) can be effectively removed to meet the latest "Risk Based Approach" recommendation to operators by OPSAR to further reduce emissions that pose a risk to the environment.

Depending on the process requirements, our adsorption technology can be delivered in bulk or as a cartridge-based system.

Coalescing

Based around a range of both cartridge and inline proprietary designs, our coalescing technologies are used to maximise and enhance the performance of traditional separation equipment, or the sand polishing stage or simply as a guard filter to protect downstream equipment.

Alderley can provide a range of tertiary separation processes along with project management and customer support to deliver a fully-integrated package on time and on budget.



Solids Filtration

Either as a pre-treatment to our coalescing technologies or as a stand alone process, Alderley can deliver very efficient solids filtration to less than 2 μm absolute, in backwashable cartridge format, and down to 10 μm using a self cleaning format.

Nutshell Filters

Alderley's range of polishing filters using nutshell media are typically used onshore to remove the final free oil and suspended solids entrained in the produced water.

Our superior design of media management minimises backwash duration while stimulating media attrition typically caused by other mechanical machinery.

Nutshell filters have the capability to deliver oil and solids reduction to less than 2-5 mg/l and 90% solids removal to 2 μm .

Extensive, global reference lists are available covering all technologies and applications to demonstrate our capability and delivery. Please see below for examples of just a few of the projects we have delivered.

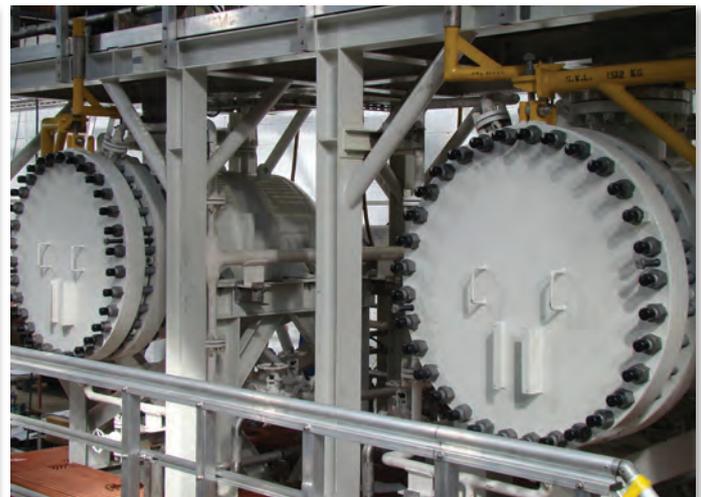


	Customer/ Contractor	Project	Description
4	Oman Oil Company Exploration & Production LLC	Abu Tubul Block 60 - GPP Project, Oman	The scope of supply consists of a Degasser Vessel; 2 x 100% Progressive cavity pumps; Solids filters; Coalescing filters and a Compact Flotation Unit: all of which are skid mounted and suitable for working in the harsh desert environment. The package reduced the oil-in-water content of the incoming fluid from 2000 ppm to less than 30 ppm. The project was engineered from our head office in Wickwar, UK and manufactured and assembled by our project execution team based in Dubai, UAE.
5	AOIC (operated by BP Exploration) Halliburton International Inc	Azeri, Chirag, Deepwater Gunashli (ACG) Phase 3 - DUQ platform, Azerbaijan	Produced water treatment module comprising 5 x AP20 Deoiling Hydrocyclone Vessels, 3 x AP50 Desanding Hydrocyclone Vessels and 1 x Degasser Vessel. The package outlet specification is 29 mg/l oil-in-water and 98% removal of sand particles above 50 µm. The hydrocyclones were manufactured from duplex stainless steel and the degasser from carbon steel with glass flake lining.

Alderley



A total focus on the needs of the oil and gas industry



Contact us to see how we can help with your produced water treatment needs

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