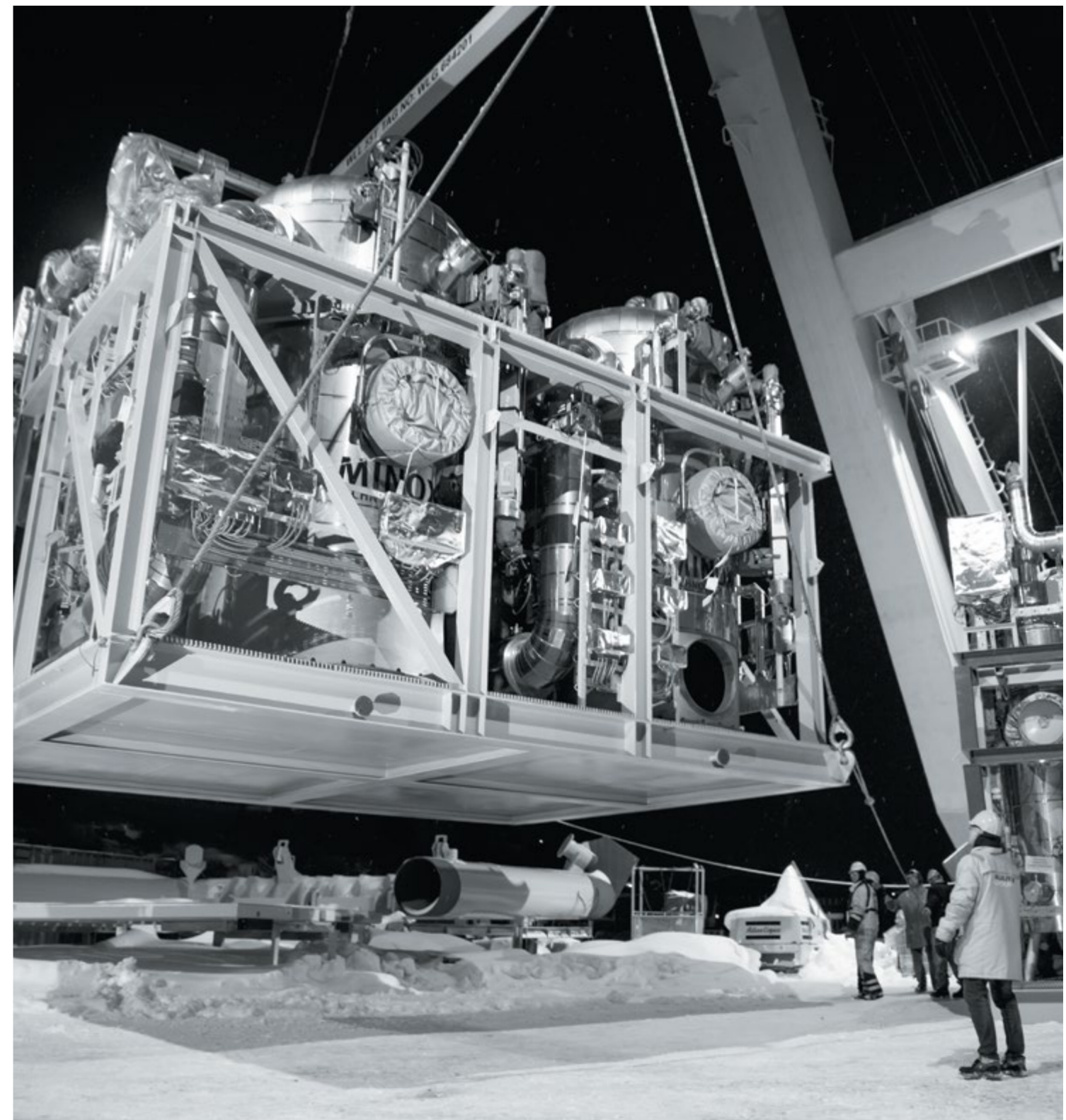


# LIGHT WEIGHT, COST EFFICIENT & CHEMICAL FREE DEOXYGENATION OF WATER

---



We develop Technology with the future in mind. Since 1991 we have supplied water deaeration technology to the global market, constantly improving our solutions based on operational experience. We are a company in steady growth, also expanding geographically. With office in Notodden Norway and agents in all major markets, we are increasing our staff to meet future demand for water injection as an improved oil recovery application.

We focus on continuously improving our technology as well as exploring other technological areas for further expansion. At the same time, the market demand for compact and cost-efficient solutions has brought us back to focus on the bare necessities of our application, and we now also offer standardized solutions in addition to our reputable tailor-made systems.

Bringing chemical free deaeration systems to the market, supplying green technology, is even stronger in our latest generation products. Our ongoing campaign "Reinforced Commitment" has proven valuable both for our clients and for us, and the focus on close dialogue and follow through will sustain. Our clients' opportunities and challenges are a constant inspiration for us to design and deliver successful solutions.

Please enjoy this brochure and the following key information about our products and organization.



## YOUR TRUSTED PARTNER IN WATER DEAERATION

---

Minox Technology is the leading provider of deoxygenation solutions bringing state of the art technology to the IOR water injection market worldwide. Although our activities are primarily targeted towards international oil companies, we also design and develop water treatment equipment for the on-shore and offshore processing industries.

The Minox systems are the most compact proven deoxygenation systems on the market with solutions that meet our clients' demands for low weight & space efficiency. While our customized systems are developed to meet client specific requirements, we also provide standardized, more cost-efficient solutions. With our field proven technology, innovative focus and sincere dedication towards our clients and projects, we aim to be your preferred water injection provider.



## MINOX DEOXYGENATION

---

The Minox Deoxygenation process is a gas stripping process where ultra-pure nitrogen gas is used to remove dissolved oxygen from water without the use of oxygen scavenging chemicals. The nitrogen gas is continuously circulated and regenerated in a closed loop. To remove the oxygen in the nitrogen gas, a catalytic reaction process is applied.

The Minox process can be designed to meet any practical demand for reduction of oxygen in water and is recognized by the industry as the most efficient way to deoxygenate water. The process operates on positive pressure (booster pumps can be eliminated), and the system requires a small footprint and height.

Depending on the type of contacting method applied between the nitrogen gas and the water, two different types of Minox Deoxygenation systems can be delivered, Minox®Compact, Minox®Tower and Minox® Membrane.



ALWAYS  
FOCUSING ON  
IMPROVING  
TECHNOLOGY



MINOX® COMPACT  
STANDARD VERSION



## THE MINOX PROCESS

---

- State of the art technology for IOR water injection
- No chemicals (oxygen scavenger) needed to meet required specifications
- Low weight
- Small footprint and height
- Flexible in design and capacity
- Operates on positive pressure
- Wide operational range
- Non-hazardous area application
- Field proven technology
- More than 20 years experience

MINOX® COMPACT  
TAILOR-MADE VERSION



MINOX® TOWER



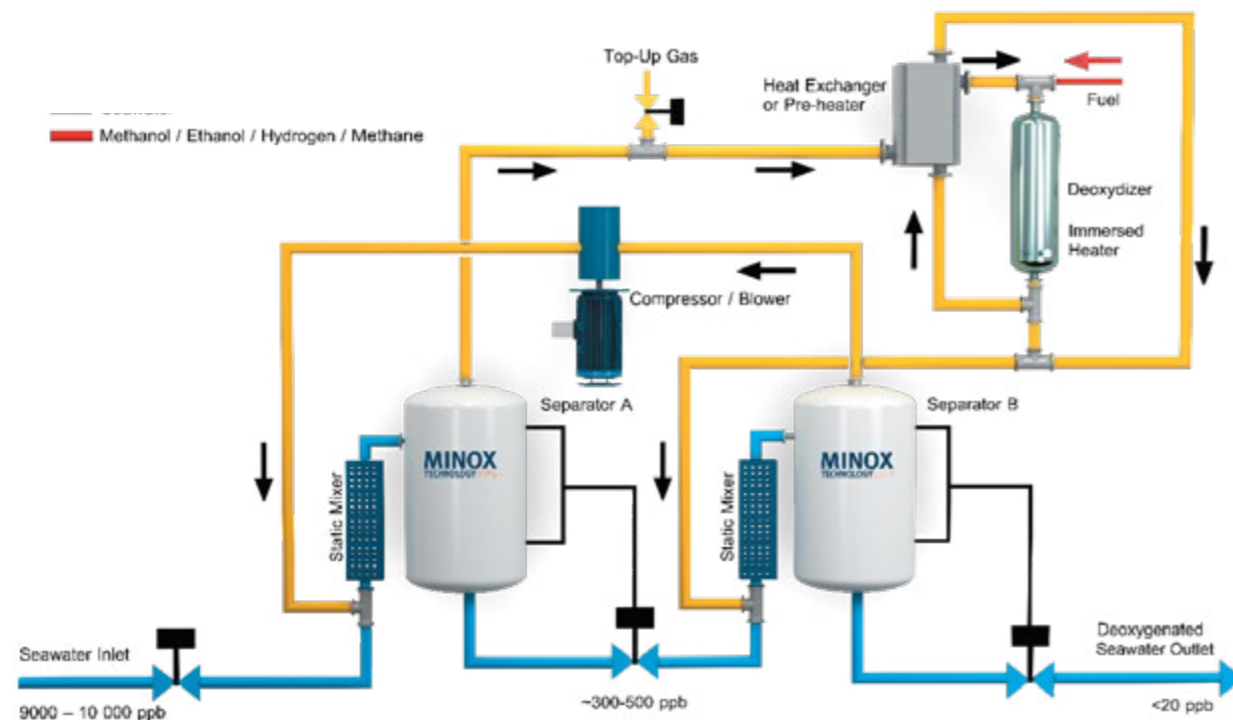
## MINOX<sup>®</sup> COMPACT

A key process feature of this Minox deoxygenation system is the method of contacting the nitrogen stream with the water. This is done in static mixers where co-current turbulent flow is achieved, producing highly efficient mixing of water and gas, simultaneously stripping the dissolved oxygen from the water to very low concentrations.

The Minox<sup>®</sup> Compact edition doesn't require any scavenger chemicals.

The low weight combined with flexible and skid mounted design allows for efficient tailoring in accordance to the customers' specifications.

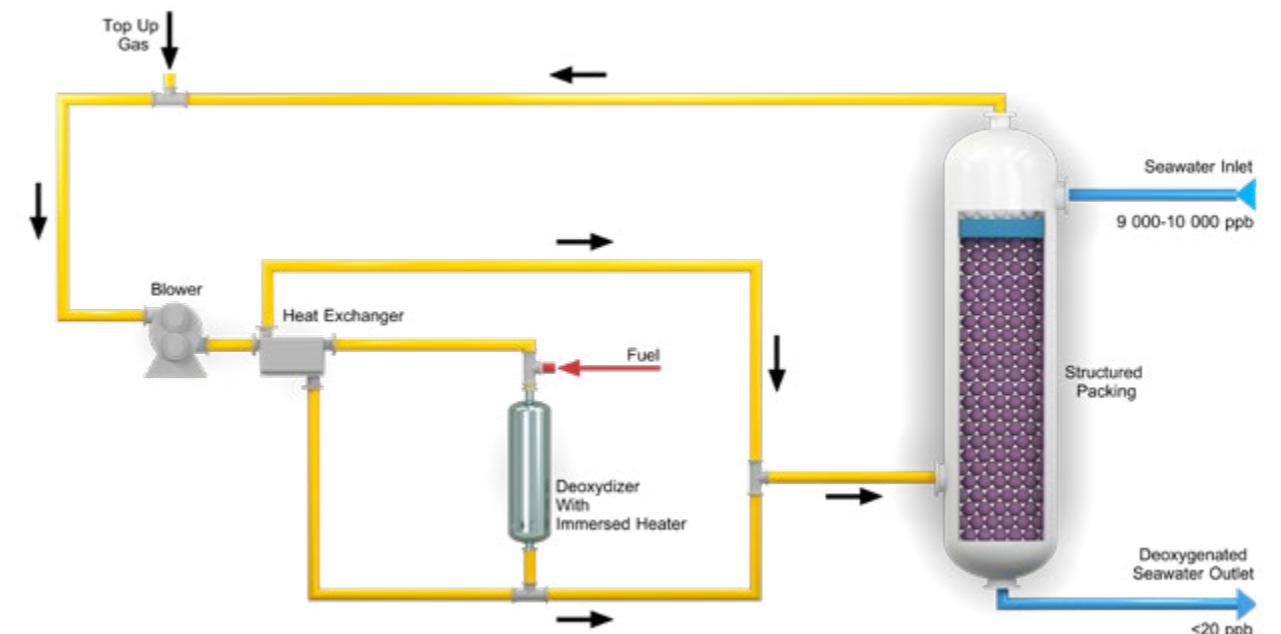
Each unit can be tailor made to fit into a given space which makes it possible to install on existing platforms, or when conventional deaeration systems are being upgraded. In such cases, the process will not only enable injection water volumes to be increased with a reduced oxygen content, but the need for scavenger chemicals is eliminated or greatly



## MINOX<sup>®</sup> TOWER

Based upon the same basic principle of cycling and purifying nitrogen gas, the Minox<sup>®</sup> Tower system offers a competitive alternative to vacuum and fuel gas deaerators, yielding a very low residual O<sub>2</sub> content. In this system the contacting between the nitrogen stream and the water is done through counter-current flow over a packed bed of structured packing. The system can operate under atmospheric, or a few bar pressure. The danger related to using natural gas as stripping gas is removed. Reduced weight and lower operational expenditures are among the other product advantages.

It is even possible to convert existing vacuum or fuel gas towers into Minox<sup>®</sup> Tower. Vacuum tower conversion into a Minox<sup>®</sup> Tower makes it possible to increase water flow through the tower. The system allows for a residual O<sub>2</sub> content down to 20 ppb or less, without applying scavenger chemicals. Next to that lower operational expenditures and increased discharge pressure are additional advantages. By converting a fuel gas tower into Minox the danger related to fuel gas as stripping gas can be removed, additionally unnecessary waste of fuel gas can be avoided.





## R&D ACTIVITIES

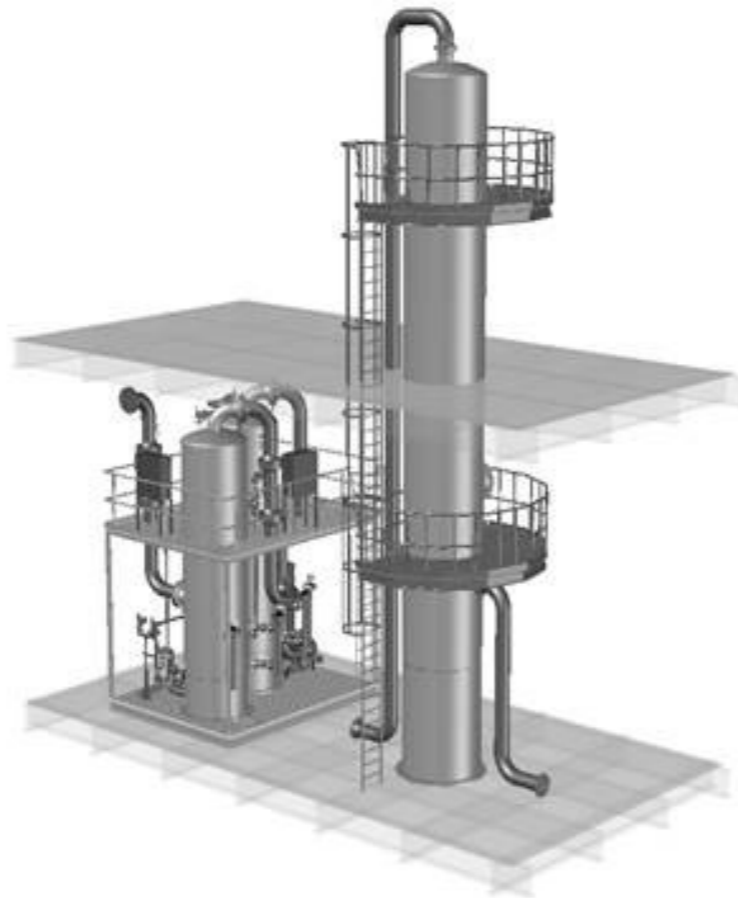
---

Minox Technology shall be the preferred water injection provider for operators worldwide by focusing on state of the art deaeration technology. We have over the past decades successfully developed The Minox Compact Deoxygenation System from 1st to 5th generation through competent people and excellent tools and techniques. All of which is built on the solid base of valuable experiences made from the already performing Minox systems.

We have an agile organization and management culture, which enable us to move quickly and adapt swiftly to new situations, and we are constantly looking for ways to assess and improve our products, as well as finding new solutions.

One of our current new developments is Minox®DryGas, an innovative, compact and lightweight system for dehydration of natural gas.

The new technology, based on static mixers and high tech separation, will replace the existing, old technology based on high and heavy contactor towers.



WE SHALL BE  
THE PREFERRED  
WATER INJECTION  
PROVIDER



## SERVICE & OPERATION

---

We make it our business to be proactive on our clients' behalf and follow up throughout the entire lifecycle of the plant with a global presence. From the specifications are defined and the designs fabricated, to implementation, commissioning and full operation. Training programs for plant supervision, combined with our custom-made service & maintenance program, ensure high operational quality over time, and further increase the durability of the plant.

The Minox Service Team works in close dialog with our clients to plan and execute the necessary tasks in order to reach the intended results in the most cost-efficient manners. The art of giving the right response at the right time is a ever present focus for our people.

Our goal is to offer our clients the best practices in the industry throughout the entire lifecycle of the plant. Excellent after sales & service business is an important part of this commitment. We provide and deliver:

- Ugrades
- Plant Follow Through
- Spare Parts
- Plant Condition Monitoring
- Training
- Inspections & Maintenance

24 hours response time guarantee on weekdays: [service@minox.no](mailto:service@minox.no)

---

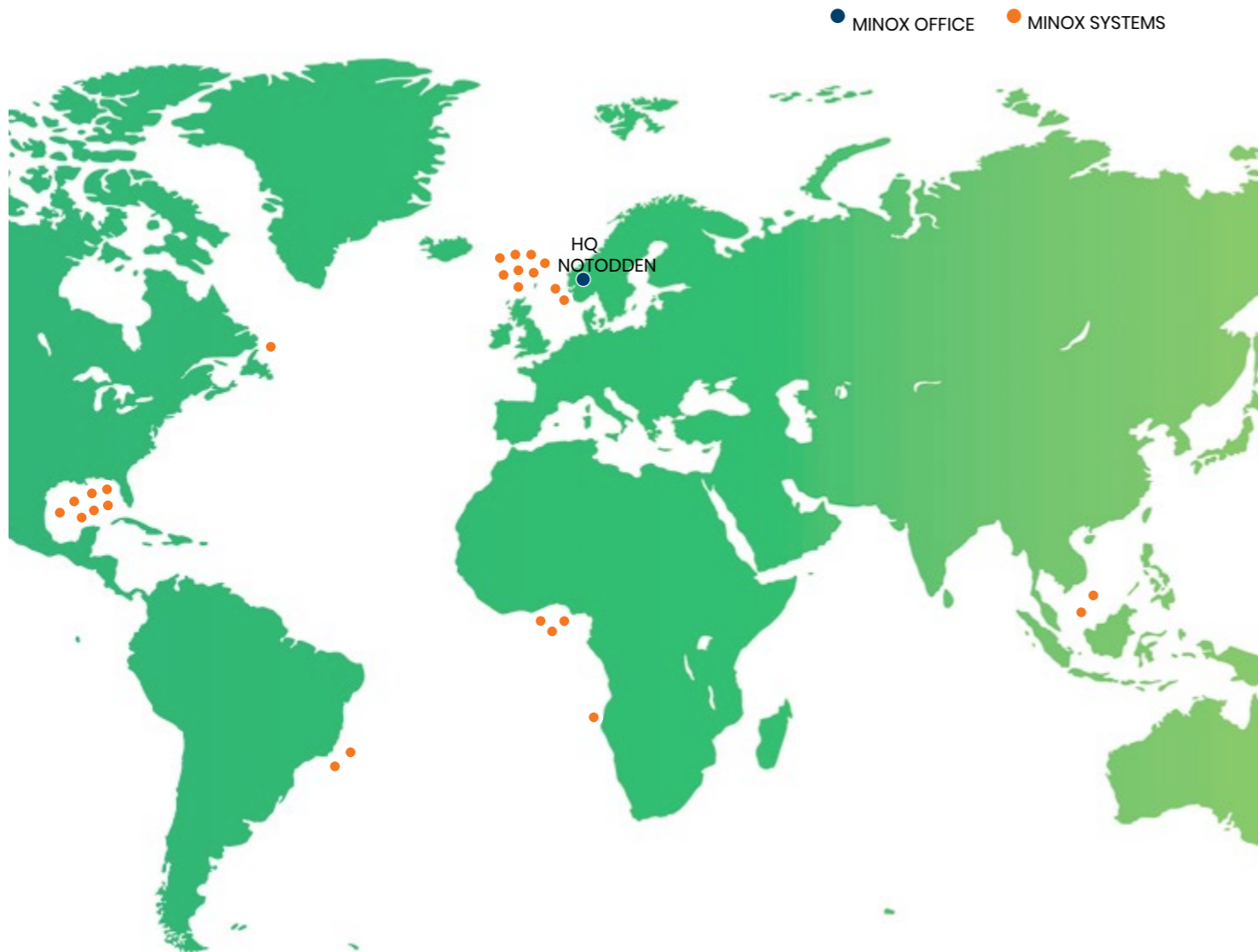




## OFFICES & REFERENCE PROJECTS

Minox Technology AS is based at Notodden in Norway. Our agents are found in all major markets.

At Notodden a core team of dedicated and experienced professionals take responsibility for design & engineering, fabrication, sales & marketing and after sales & services. On the following page you will find a selection Minox systems delivered since 1991, listed with key data.



PROJECT & LOCATION	END CLIENT/ OPERATOR	CAPACITY BHPD	PERFORMANCE PPB	DELIVERED YEAR	MINOX GENERATION
Jack and St Malo	Chevron	70 000	10	2021	4th
Egina Nigeria	Total	2 x 251 000	20	2016	4th
Hebron Newfoundland	ExxonMobil	2 x 189 000	10	2014	4th
Clov Angola	Total	280 000	30	2013	4th
Tahiti Gulf of Mexico	Chevron	100 000	20	2010	4th
Sture Onshore Nor-	Statoil	3 000	20	2009	4th
Sumandak II Malaysia	Petronas	55 000	20	2007	Tower
Ursa Gulf of Mexico	Shell	240 000	20	2007	4th
Agbami Nigeria	Chevron	2 x 225 000	10	2005	4th
Balam Gulf of Mexico	Pemex	36 000	20	2005	4th
P – 18 Brazil	Petrobas	126 000	20	2005	Fuel gas conversion
Mars Gulf of Mexico	Shell	94 000	20	2003	3rd
Heidrun North Sea	Statoil	200 000	20	2002	3rd
Bonga Nigeria	Shell	2 x 200 000	10	2002	3rd
Fluminense Brasil	Shell/Modec	100 000	20	2002	3rd
Dan North Sea	Maersk	225 000	20	2001	2nd
Glitne North Sea	Statoil/Teekay	65 000	20	2000	2nd
Valhall North Sea	BP	220 000	20	2000	2nd Upgraded
Statfjord C North Sea	Statoil	790 000	20	1998	Fuel gas conversion
Perintis Malaysia	Petronas	25 000	20	1998	Tower
Tinfos Onshore Nor-	Eramet	1500	10	1998	1st
Schiehallion North Sea	BP/Teekay	280 000	20	1996	Tower
Vigdis North Sea	Statoil	136 000	20	1996	Tower
Foinhaven North Sea	BP/Teekay	165 000	20	1995	Tower
Snorre A North Sea	Statoil	377 000	10	1991	1st

## FIELD PROVEN TECHNOLOGY

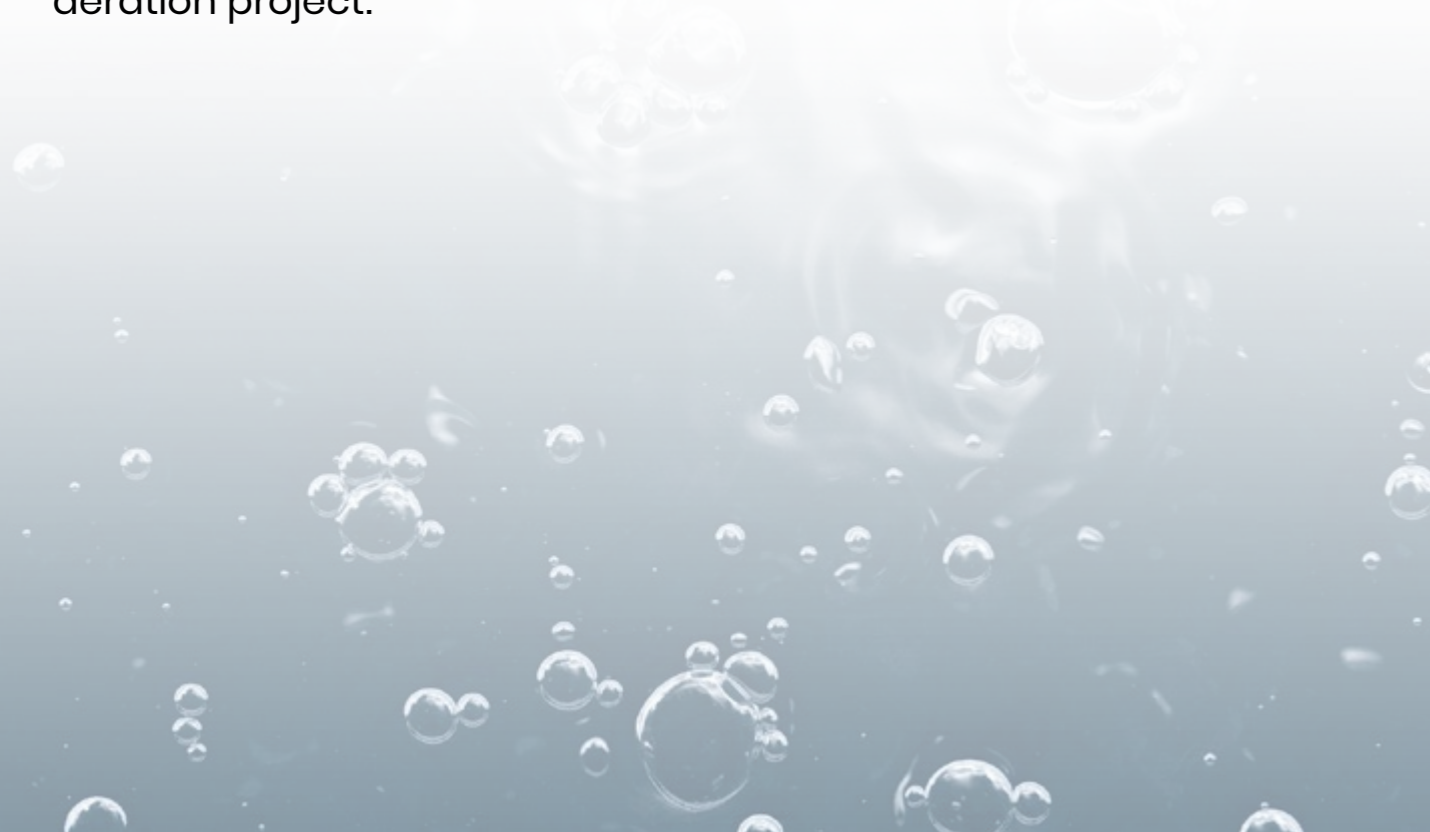
---

Minox and Norsk Hydro's Research center initially developed the technology during 1985-90. Over the years more than 30 Minox systems have been delivered to the international oil industry. To a large extent, the systems are physical gas stripping systems with no need for chemical scavengers to achieve oxygen removal according to specification.

Experience and expertise combined with our field proven technology ensures reliable and efficient deaeration systems and services.

On behalf of several clients, we are currently engaged in upgrading some of our early generation systems to meet today's requirements for production capacities and green technology.

Please contact us for further information about Minox Technology and the possibilities we can create for your water deaeration project.



# YOUR TRUSTED PARTNER IN WATER DEAERATION

---

Photos: www.dalewalter.no & Shutterstock

Minox Technology AS

Sauheradveien 93  
NO-3683 Notodden

Phone: +47 35 11 57 00  
E-mail: [minox@minox.no](mailto:minox@minox.no)  
[www.minox.no](http://www.minox.no)

**MINOX**  
TECHNOLOGY 