GAS TECHNOLOGY PORTFOLIO

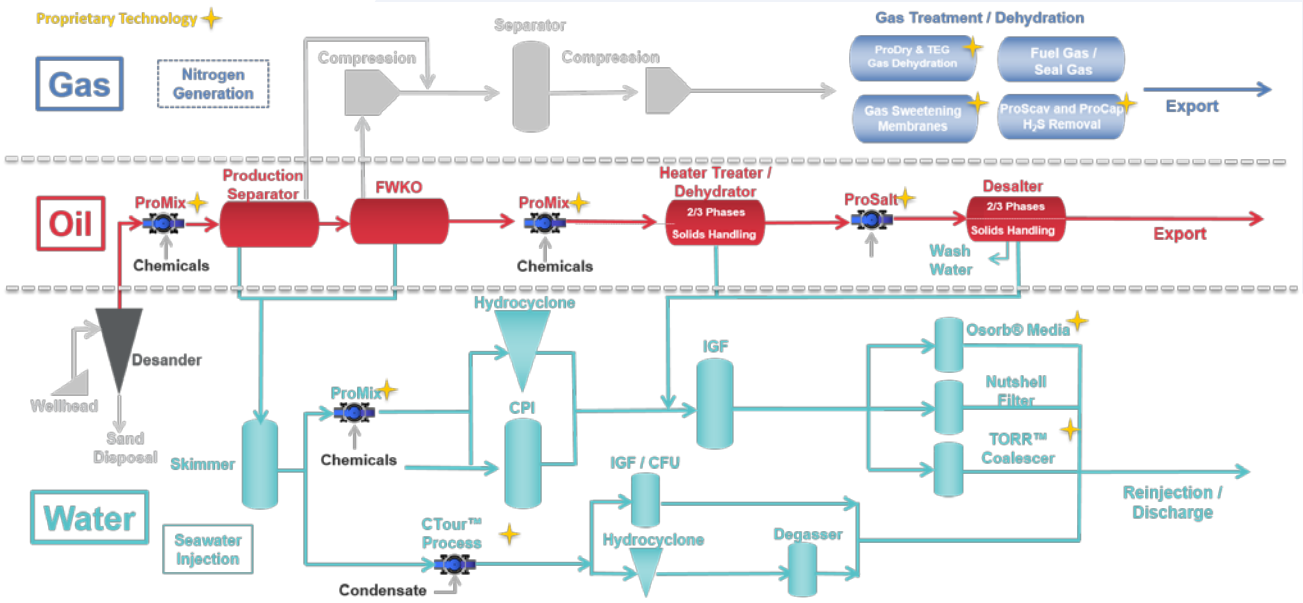
Global experience with over 100 gas projects delivered, coupled with innovative proprietary technologies for gas sweetening and dehydration.

Gas Membrane Package, TX, USA

ProSep

WHO WE ARE

Integrated process separation technology solutions provider for oil, gas and produced water streams to the global oil and gas industry



ProSep has a wide range of capabilities including crude dehydration and desalting, gas treatment and dehydration as well as a full lifecycle produced water treatment offering. ProSep Energy Services provides a diverse range of rental skids designed for the temporary treatment of a wide variety produced water streams.

ProSep is headquartered in Houston, TX, USA which is also the location of our state of the art laboratory and manufacturing/fabrication facility. ProSep has regional offices in Aberdeen, UK, Abu Dhabi, UAE and Kuala Lumpur, Malaysia.

WHY PROSEP

- Global presence with over 200 projects delivered worldwide. On average we have delivered a new project every 15 days since 2005.
- Well-documented global reputation, and track record for performance, value and safety.
- Flexible & dynamic team offering custom solutions to customers.
- Comprehensive solutions across oil, gas, and produced water streams.
- Innovative proprietary technologies proven to reduce OPEX & CAPEX.

WHAT WE DO

Our patented portfolio of onshore and offshore solutions for the treatment of oil, gas, and produced water offer innovative technologies packaged with global project management and execution expertise.

ProSep provides technologies & solutions for:

- PRIMARY SEPARATION
- CHEMICAL INJECTION
- THIRD PARTY MANUFACTURING
- RENTAL/LEASE OPTIONS
- GAS DEHYDRATION
- CO_2 SWEETENING
- H_2S SCAVENGING
- FUEL GAS CONDITIONING
- HCDP REDUCTION
- DEMULSIFIER OPTIMIZATION
- DECREASED WASH WATER CONSUMPTION
- DEHYDRATION & DESALTING
- CRUDE BLENDING
- PRODUCED WATER TREATMENT
- OIL IN WATER POLISHING
- OIL COALESCENCE
- SEAWATER TREATMENT

PROSCAV™

ProScav™ is a system for injecting, and mixing H_2S scavenger in the pipeline to remove moderate amount of H_2S from gas or liquids.


ProScav mixing technology

FEATURES

+ Easy to install compact inline system
+ Option for simultaneous flow metering & mixing
+ Robust design for low maintenance

BENEFITS

+ Exceptionally efficient mixing with low pressure drop (0.03 to 0.3 bar)
+ 30 – 40% reduction in scavenger consumption
+ High turndown ratio in scavenger injection rate
+ Low to zero maintenance if the required 50 micron filter is equipped in the scavenger injection line

ProScav™ utilizes the scavenger chemical more efficiently than conventional injection systems such as atomizing nozzles, quills, and static mixers due to it's mixer component's efficient mass transfer capabilities.

It's internal geometry provides extremely efficient mixing with a low pressure drop, typically below 0.3 bar. Scavenger consumption is reduced by 30 – 40% due to improved utility, and mass transfer. Other typical OPEX expenditure is also reduced, such as transportation, storage, handling, and disposal.

The award winning ProScav system's compact size, low-maintenance, and tolerance to flow variations make it ideal on offshore installations, where the spent scavenger can be discharged to sea or disposal wells.

Compared to other offshore gas sweetening methods for H_2S-polishing, ProScav is extremely cost-efficient, particularly compared to solid scavengers.

30 - 40% REDUCTION IN SCAVENGER CONSUMPTION

LOWER YOUR OPEX COSTS

EXCEPTIONAL MIXING EFFICIENCY WITH LOW PRESSURE DROP

HIGH TURN DOWN RATIO

NATURAL GAS MEMBRANES

ProSep's membrane technology and packaging capabilities provide customers with cost effective CO_2 removal/separation, H_2S removal, N_2 removal, dehydration, and hydrocarbon dew point control solutions.

EOR CO2 Membranes, West Texas, USA

BENEFITS

+ Wide range of feed gas pressure, compositions and flow rate (high turndown)
+ Low weight & space requirements
+ Flexible to fit special footprint configurations particularly important for offshore applications
+ Reduced environmental impact
+ Can interchange with conventional membrane elements

EXPERIENCE

ProSep has designed, engineered, fabricated, installed, and commissioned over 200 membrane separation skids for natural gas applications in 15 countries worldwide.

We have extensive experience with gas separation membrane performance characterization and the potential contamination effects that may occur.
ProSep can provide turnkey solutions from project design through fabrication, commissioning & start-up to post-installation service, including parts replacement.

CO_2 SEPARATION

Historically, CO_2 removal in natural gas streams has been conducted using amine systems. However, over the past thirty years membrane systems have gained notable traction in this market segment with ProSep leading in innovation and system design.

Ease of operation, flexibility, and lower capital requirements routinely make membranes the system of choice for CO_2 removal from natural gas streams. ProSep's membrane systems successfully treat feed gas at a wide range (between 3% - 88%) of inlet pressures and feed gas concentrations.

LONGER LIFE THAN CELLULOSE ACETATE MEMBRANES

INCREASE HYDROCARBON RECOVERY BY 10%

RESISTANCE TO LIQUID HYDROCARBON & WATER EXPOSURE

60% HIGHER SELECTIVITY THAN CONVENTIONAL ELEMENTS


CO2 Membranes, West Texas, USA

The same CO_2 membrane systems used to sweeten our customers' natural gas sales line can also be used to concentrate CO_2 for injection for EOR applications. With our partners at FujiFilm, ProSep now offers an enhanced line of CO_2 membranes for separation and removal called the Apura. They utilize a new, innovative polymer and thin film coating technology to provide new levels of performance with excellent resistance to contaminants.

ProSep and our partner FujiFilm membrane modules provide extended life expectancy over traditional cellulose acetate (CA) modules which are typically replaced at a rate of 20% per year - equivalent to complete replacement of modules every five years. The ProSep elements' extended life expectancy is based on field performance but will depend on proper pretreatment and operation for which the modules have been designed to operate.

PROSEP'S MEMBRANE SKID

ProSep's membrane skids are modular in design and construction lending themselves to easy scalability as production volumes and concentrations change. ProSep membrane skids are designed to allow seamless addition or removal of membrane elements to compensate for process changes.

Our 56,000 sq.ft. purpose built fabrication facility has the capabilities to undertake the manufacture of large structural fabrications, vessels and piping spools, as well as being able to fully manufacture packaged membrane equipment.

Depending on the design operating conditions, ProSep membrane systems are provided in one or two-stage designs.

+ One stage configuration

+ Two-stage configuration

In some instances a two-stage system may be required to achieve maximum undesirable component content in the permeate stream and maximum hydrocarbon recovery to the sales pipeline. Performance of two-stage systems can achieve up to 99% hydrocarbon recovery in the sales gas stream.

WHY PROSEP?

+ Recognized as a global leader in the CO_2 membrane market as well as process application, and optimization

+ Experience with new, robust, top of the line FujiFilm Apura membranes as well as other sweetening membranes including flat sheet and hollow fiber designs

+ Global presence with over 200 membrane skids installed

+ Well-documented global reputation and track record for performance, value and safety

+ Offer design, fabrication, commissioning, maintenance, and lease options for membrane skids

+ Provide timely response to fulfill our customer needs globally

LOW CAPITAL INVESTMENT FOR MEMBRANE SYSTEM

EASY START UP AND SHUTDOWN

MINIMAL UTILITIES REQUIRED

LOW MAINTENANCE AND OPEX

PRODRY™ & TEG

ProDry™ is primarily used in the glycol dehydration process for the removal of water from gas flows as a smaller alternative for conventional contact towers. ProSep also designs and fabricates gas dehydration systems triethylene glycol (TEG).

ProDry, Norway

TEG Package, Malaysia

PRODRY™ FEATURES:

+ Compact inline system; easy to install at any pipe angle
+ Small footprint and low installation weight
+ Feasible for high pressure applications (<100 barg)
+ Debottlenecking of existing gas dehydration systems
+ Not sensitive to platform (wave or ship) motion

PRODRY™

The key component of the ProDry™ system is it's injection mixer which achieves efficient mass transfer between glycol and gas containing H_2O.

The systems internal geometry provides extremely efficient mixing with a low pressure drop, typically below 0.3 bar. Optimal at high pressure and flow rate conditions, ProDry can reduce footprint, weight and operating expenditures.

This compact technology is ideal to improve capacity of existing systems or as a new stand-alone system when moderate dew point reductions are required.

TEG - GAS DEHYDRATION

We design and build to site-specific requirements by engineering every gas dehydration system with the latest process simulation software. The detailed design of the equipment considers performance, operability, reliability and safety. Tailored system employs automatic control coupled with monitoring technologies local or integrated in the centralized control system of the plant.

Proprietary solutions for further increasing the efficiency/debottlenecking of existing units, by combining a co-current ProDry mixer in series with a conventional counter-current contactor.

HIGH EFFICIENCY MIXING WITH LOW PRESSURE DROP

INCREASED DEW POINT REDUCTION FOR EXISTING SYSTEMS

HIGH GAS FLOW RATE IN CO-CURRENT CONTACTOR

NO RISK FOR FLOODING OR FOAMING IN THE PRODRY™ CONTACTOR UNIT

GAS REFERENCES

ProSep has delivered over 100 gas projects since 2005 working with 55 different operators and service companies across 25 countries.

CO_2 MEMBRANES

EOR CO_2 FIELD EXPANSION

LOCATION: West Texas, USA
EQUIPMENT: 8 x 36 tube membrane skid packages
APPLICATION: EOR CO_2 recovery
MEMBRANE TYPE: Spiral bound

FEED FLOW: 220 MMSCFD
CO_2: 88.17%
RESIDUE CO_2: 10%

CO_2 MEMBRANES

NATURAL GAS SWEETENING

LOCATION: California, USA
EQUIPMENT:
2 X Forced air draft coolers
2 X Pretreatment skids
2 X 42 tube membrane skids

MEMBRANE TYPE: Spiral bound
APPLICATION: CO_2 sweetening

FEED FLOW: 150 MMSCFD
CO_2: 3.0 %
RESIDUE CO_2: <1.5%

FUEL GAS CONDITIONING

FIELD COMPRESSION

LOCATION: Malaysia
EQUIPMENT: Fuel gas and seal gas package

FUEL GAS FLOW RATE : 17MMSCFD
OUTLET GAS SUPERHEAT: 400C differential temperature above the dew point at all operating pressure level.
SEAL GAS AT A FLOW RATE: 0.8MMSCFD
OUTLET GAS SUPERHEAT: 400°C
PERFORMANCE: Dry fuel gas at superheat 280°C above its Hydrocarbon Dew point in all operating cases.

TEG GAS DEHYDRATION

FPU SEMI SUB

LOCATION: Malaysia
EQUIPMENT: TEG regeneration package
EQUIPMENT SIZE (LXWXH): 12M X 5.5M X 14M
PERFORMANCE: Lean TEG flowrate = 7.0 m3/hr

NITROGEN GENERATION

TGT FPSO FIELD DEVELOPMENT

LOCATION: Offshore Vietnam
EQUIPMENT: Nitrogen generator package
EQUIPMENT SIZE (LXWXH): 5.3m x 3.2m x 5.9m

PERFORMANCE: Nitrogen Gas - higher purity ≥ 97% volume at 220 Sm3/hr

H_2S SCAVENGING

H_2S SCAVENGING PROJECT

LOCATION: Norwegian sea
EQUIPMENT: One 8" ProScav™ scavenger injection mixer. Length: 1250 mm

FLOW RATE (KG/H): 0.25 – 2 (MIN-MAX)
INLET PRESSURE (P) (BAR): 38
OPERATING TEMPERATURE (T) (°C): 60

prosep.com

ProSep

info@prosep.com

AMERICAS - HQ

6509 W. Little York Rd.
Houston, TX, 77040
USA
+1 (281) 504-2040

EUROPE

Buchan House
Quarry Road
Aberdeen, AB16 5UU
UK
+44 (0)1224 690226

ASIA PACIFIC

Suite 8.1, Level 8
Menara Tokio Marine Life
No 189 Jalan Tun Razak,
50400 Kuala Lumpur, Malaysia
+ 603 27 15 66 80

MIDDLE EAST

Mohammed Salem Ahmed Harbi
Al Ameri Building
Mezzanine Floor
PO Box 3949, Abu Dhabi UAE
+ 971 (0) 2 449 6801