

Tailor-made services, for each stage of your project

Objectives of the project:

PROCESS Services

Development, fabrication and operation of an efficient membrane process (OPEX, CAPEX, Risks)

MATERIALS Services

Development and production of a membrane material (ceramic, polymeric)

Project stages:

1. Analysis of the separation problem and evaluation of membrane technologies

- Feasibility study
- Pilot testing and industrial trials
- Pilot system sale or rental

2. System engineering and membrane development

- Process design and engineering of the system (skid)
- Equipment development (module and seal)

- Development of ceramic and polymeric materials

3. System fabrication and membrane production

- Fabrication and assembly of the system

- Ceramic and polymeric membranes manufacturing

4. Operation of membrane filtration systems

- Commissioning and start-up technical assistance
- Audit, on-site technical assistance and staff training
- Upgrade of existing systems (revamping, optimization)

- Membrane replacement and after-sales services
- Analysis and autopsy of used membranes

Alslys, your experienced partner

- 400 membrane systems installed during more than 30 years, and in 20 countries, including the USA, France, Germany, Spain, China, Canada and Australia
- More than 100 different membrane products are offered, based on oxide materials (Kleansep™), silicon carbide (CeraMem®), or polymer (Plejade®)
- Annual membrane production capacity: > 100,000 m² (all materials combined)
- 2 test centers, equipped with 20 pilots. Design and project management offices located in the USA (Boston, MA), France (Ales), and Canada (Calgary)
- Technologies available for evaluation include: cross-flow or dead-end, ceramic materials based on oxide or silicon carbide, tubular or flat sheet, hollow fiber or spiral or polymeric tube, reverse osmosis, nanofiltration, ultrafiltration, microfiltration, pervaporation, gas separation, membrane contactor, combination of coagulation / adsorption (bentonite, powder activated carbon) / oxidation (chemical, ozone)
- A team of engineers and project technicians (process engineer, mechanical engineer, electrical / automatic engineer, industrial designer, chemical technician)
- 200 references of studies and industrial trials for projects valued from € 100,000 to € 20,000,000
- Dozens of after-sales service visits per year mainly in the USA, Canada, France, Italy, Switzerland, and Belgium
- Alslys companies typically perform 30 or more membrane autopsies per year

Contacts ☎:

Europe: +33 (0)4 66 85 95 36
 North America: +1 857 504 2250
 Asia: +86 (0)21 6350 3377



Analysis of the separation problem and evaluation of membrane technologies

PROCESS Services

Feasibility study



Alsys performs feasibility studies to:

- evaluate if a membrane separation process is applicable to your needs
- determine which type of membrane filtration technology is best suited for your needs

Objectives

- ✓ Separation, filtration, clarification, concentration, purification
- ✓ Characterization of the products to be separated (real product or simulating compound). Chemical and physical analysis
- ✓ Tests with laboratory or industrial size membranes
- ✓ Validation of membrane selectivity
- ✓ Comparison and selection of membrane and equipment
- ✓ Evaluation of permeate flow rate, impact of concentration factor
- ✓ Preliminary technical and economic evaluation of the proposed system
- ✓ Application development at laboratory scale (preliminary project studies)

Pilot testing and industrial trials



Alsys performs process pilots and industrial tests in order to:

- demonstrate the expected performances of the membrane process
- provide the technical (design,...) and economical (OPEX, CAPEX) data necessary for the system development and risk assessment

Objectives

- ✓ Validation of the filtration process and the results obtained during the feasibility tests
- ✓ Study the repeatability of the operating cycles (production, cleaning)
- ✓ Study of membrane ageing, evaluation of fouling, optimization of CIP (Cleaning In Place)
- ✓ Optimization of process parameters (velocity, pressure, cleaning frequency...)
- ✓ Development of industrial scale applications (basic and detailed preliminary project studies, FEED study...)

These studies and pilots can be carried out:

- From a few days to a few weeks
- At your site or at our sites in Salindres (France) or Boston (USA)

Our 2 test centers are equipped with:

- All qualified personnel
- The necessary equipment (20 different pilot systems, analysis tools, etc.)

Wide Variety of Membrane Technologies:

- Cross-flow or dead-end process operation
- Ceramic materials (based on oxide or silicon carbide) or polymeric
- Tubular, flat sheet, hollow fiber, or spiral
- Reverse osmosis, nanofiltration, ultrafiltration, microfiltration
- Pervaporation
- Gas separation
- Membrane contactor
- Combination of coagulation / adsorption (bentonite, powder activated carbon) / oxidation (chemical, ozone) and membranes

Contacts ☎:

Europe: +33 (0)4 66 85 95 36
North America: +1 857 504 2250
Asia: +86 (0)21 6350 3377

Analysis of the separation problem and evaluation of membrane technologies

PROCESS Services

MINIPILOT and POLYPILOT Pilot Test Systems

Alslys has developed a range of versatile filtration units (see data sheet) used to test ceramic or polymeric membranes:

- Portable crossflow filtration test system with Micro-Kleansep™ ceramic membranes (see data sheet).
- The MINIPILOT is designed to perform preliminary feasibility studies.
- The POLYPILOT 150 can be used for testing one module with one tubular multi-channel ceramic membrane, or one module with 2540 spiral wound membrane. This unit can be used to study the process parameters (flowrate, pressure drop, transmembrane pressure, tangential flow velocity, temperature, etc.) needed in order to design a full-scale system at optimum design conditions.
- The POLYPILOT 500 can be used for testing one module with three tubular multi-channel ceramic membranes, or two 4" spiral wound membranes. This unit can be used to acquire process design data, or used as a small production unit.



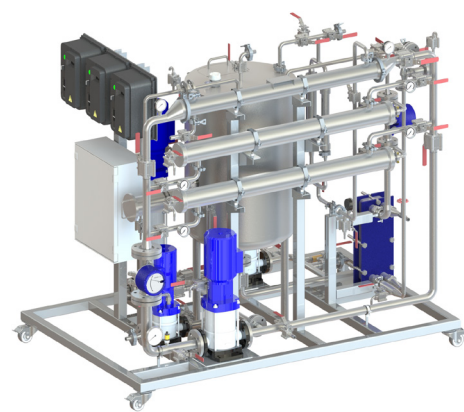
MINIPILOT

- Permeate flowrate 2 l/h max.*
- 5 l tank
- Tubular mono-channel ceramic MF, UF
- Flat-sheet polymeric MF, UF



POLYPILOT 150

- Permeate flowrate 150 l/h max.*
- 25 l tank
- Tubular multi-channel ceramic MF, UF, NF
- Spiral wound polymeric MF, UF, NF, RO



POLYPILOT 500

- Permeate flowrate 500 l/h max.*
- 200 l tank
- Tubular multi-channel ceramic MF, UF, NF
- Spiral wound polymeric MF, UF, NF, RO

(*) Depends on the type of filtered product and type of membrane. Permeate flux value: 250 LMH

Pilot rental



We rent a range of mobile pilots:

- Laboratory equipment
- Crossflow filtration test system portable
- Semi-industrial pilot with full-scale membranes
- Ceramic membrane pilot unit and polymeric membrane pilot

We can assist you in the implementation of the pilot on your site through training of your staff and technical assistance to start the tests.

Wide variety of pilots available for rental:

- Low pressure pilots: ultrafiltration, microfiltration, membrane contactors
- High pressure pilots: reverse osmosis, nanofiltration



Gas separation pilot

- Pervaporation pilot
- Gas separation pilot (not mobile)
- Pilot capacity: from 0,15 m² to 19 m² (membrane area)
- Micro-Kleansep™ portable filtration system (suitcase version)

Contacts ☎:

Europe: +33 (0)4 66 85 95 36
North America: +1 857 504 2250
Asia: +86 (0)21 6350 3377

Related product data sheets



ALSYS Group

ALSYS - EN0308 - MINIPILOT and POLYPILOT - Data Sheet

ALSYS - US0604 - MICRO-KLEANSEP SUITCASE UNIT - Data Sheet

Contacts

Europe: +33 (0)4 66 85 95 36
North America: +1 857 504 2250
Asia: +86 (0)21 6350 3377



 orelis@alsys-group.com
 www.alsys-group.com

ALSYS

Crossflow filtration pilot systems with ceramic and/or polymeric membranes

The MINIPILOT and the POLYPILOT are versatile crossflow filtration units used to test ceramic or polymeric membranes.

- The MINIPILOT is a laboratory equipment designed to perform preliminary feasibility studies.
- The POLYPILOT 150 can be used for testing one module with one tubular multi-channel ceramic membrane, or one module with 2,5" spiral wound membrane. This unit can be used to study the process parameters (flowrate, pressure drop, transmembrane pressure, tangential flow velocity, temperature, etc.) needed in order to design a full-scale system at optimum design conditions.
- The POLYPILOT 500 can be used for testing one module with three tubular multi-channel ceramic membranes, or two modules with 4" spiral wound membrane. This unit can be used to acquire process design data or used as a small production unit.

Wide range of process capacities

Laboratory pilot

Semi-industrial pilot with full-scale membranes



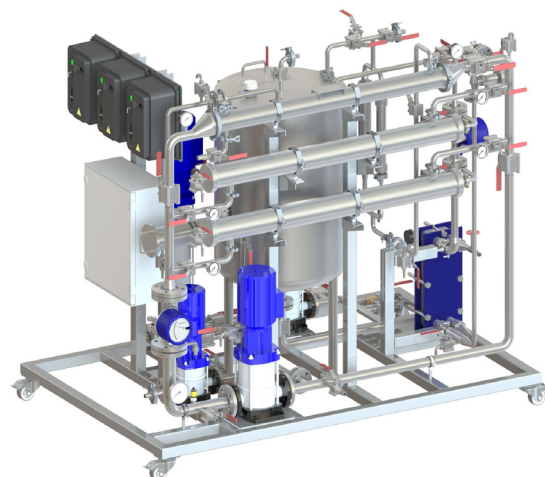
MINIPILOT

- Permeate flowrate 2 l/h max.*
- 5 l tank
- Tubular mono-channel ceramic MF, UF
- Flat-sheet polymeric MF, UF



POLYPILOT 150

- Permeate flowrate 150 l/h max.*
- 25 l tank
- Tubular multi-channel ceramic MF, UF, NF
- Spiral wound polymeric MF, UF, NF, RO



POLYPILOT 500

- Permeate flowrate 500 l/h max.*
- 200 l tank
- Tubular multi-channel ceramic MF, UF, NF
- Spiral wound polymeric MF, UF, NF, RO

(*) Depends on the type of filtered product and type of membrane. Permeate flux value: 250 LMH

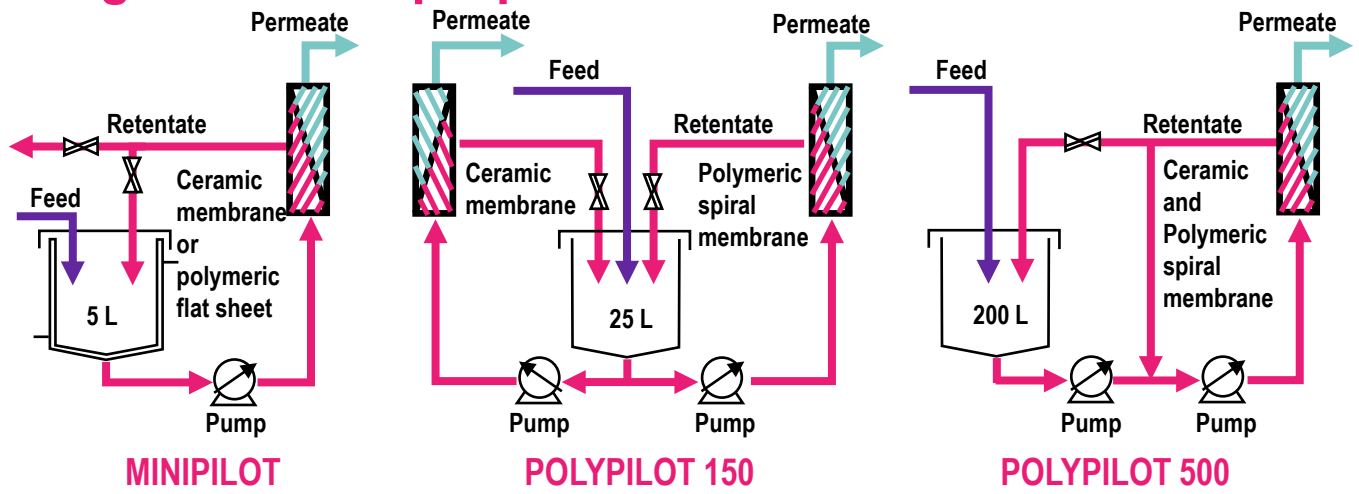
MINIPILOT features

- Quick results
- Ceramic and polymeric laboratory membrane
- Low working volume
- Easy set up and operation

POLYPILOT features

- Process results are directly scalable to a full-scale system
- Enables parametric study of the key process parameters, (including flowrate, pressure drop, concentration factor, cleanability, transmembrane pressure, and temperature)
- A pilot with closed loop
- A small batch production unit with low power consumption
- Operation with either ceramic or polymeric full-scale membranes

Operating mode and properties



Length x Width x Height	950 x 600 x 1000 mm		1100 x 950 x 1765 mm		1990 x 1290 x 1760 mm	
Wetted surfaces	316L stainless steel and EPDM or FPM or NBR gaskets (seals)					
Empty weight	70 kg		290 kg		600 kg	
Circulation flowrate	0 to 500 l/h		0 to 4000 l/h		0 to 13000 l/h	
Pressure range	0 to 4 bar		0 to 40 bar (60 bar optional)		0 to 40 bar	
Electric power supply	220 V		2 x power plugs 380 V 3-phase		1 x power plugs 380 V 3-phase	
Circulation pump motor	0,4 kW		3 kW		6 kW	
Mini and maxi working volume	1 - 5 l		8 - 25 l		20 - 200 l	
Membrane type	MF / UF		MF / UF / NF / RO		MF / UF / NF / RO	
Instruments	Indicators (local display)					
Tank	5 l		25 l		200 l	
Options	Thermoregulator group		Digital sensor, Electrical heater, Backpulse / Backwash			
	MicroKleansep™	Rayflow®	Kleansep™	Persep™	Kleansep™	Persep™
Membrane area	80 cm ²	2 x 125 cm ²	from 0,15 to 0,5 m ²	2,5 m ²	from 0,45 to 1,5 m ²	4 m ² - 14 m ²
Membrane geometry	Tubular mono-channel 400 mm long	Flat-sheet	Tubular multi-channel 1178 mm long	Spiral wound 2,5"	Tubular multi-channel 1178 mm long	Spiral wound 4"
	Ø ext. 10 mm	75 x 160 mm	Ø ext. 25 mm	2540	Ø ext. 25 mm	3838-3840-4040
Membrane type	Ceramic	Polymer	Ceramic	Polymer	Ceramic	Polymer
# of membranes / module	1	1	1	1	3	1
Maximum transmembrane pressure	4 bar	4 bar	10 bar	64 bar	10 bar	40 bar
Maximum temperature	80°C	50°C	100°C	45°C	100°C	45°C
Module material	316L stainless steel	PMMA	316L stainless steel			
Membrane material	Oxide-based ceramic	PAN or PVDF or PES	Oxide-based ceramic	Depending on membrane	Oxide-based ceramic	Depending on membrane
Hydraulic diameter/ Liquid path thickness	6 mm	0,5 and 1,5 mm	6 - 5 - 4,5 - 3,5 - 2,8 - 2,2 - 2 mm		6 - 5 - 4,5 - 3,5 - 2,8 - 2,2 - 2 mm	
pH	0-14	3-10	0-14		0-14	
Cut-off	Microfiltration 0,45 µm, 0,2 µm, 0,1 µm HR	Ultrafiltration from 30 nm (~150 kD) to 200 nm	Microfiltration 1,0 µm, 0,8 µm, 0,45 µm, 0,2 µm, 0,1 µm HR	Microfiltration 0,1 µm	Microfiltration 1,0 µm, 0,8 µm, 0,45 µm, 0,2 µm, 0,1 µm HR	Microfiltration 0,1 µm
	Ultrafiltration 300 kD HF, 150 kD, 50 kD, 15 kD		Ultrafiltration : 300 kD HF, 150 kD, 50 kD, 15 kD	Ultrafiltration 300 kD, 150 kD, 50 kD, 15 kD	Ultrafiltration 300 kD, 150 kD, 50 kD, 15 kD	Ultrafiltration 300 kD HF, 150 kD, 50 kD, 15 kD
			Nanofiltration 150 D and 300 D	Nanofiltration 150 D and 300 D	Nanofiltration 150 D and 300 D	Nanofiltration 150 D and 300 D
			Reverse osmosis	Reverse osmosis	Reverse osmosis	Reverse osmosis

Contacts ☎:

Europe: +33 (0)4 66 85 95 36
Americas: +1 857 504 2250
Asia: +86 (0)21 6350 3377

MICRO-KLEANSEP™ SUITCASE UNIT

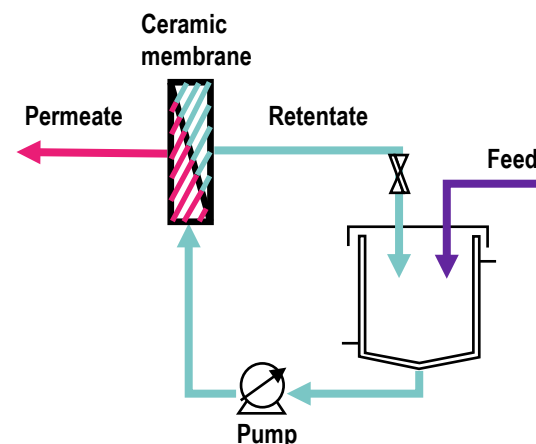
Crossflow filtration test system with MICRO-Kleansep™ membranes

- Test mono-channel ceramic membranes for preliminary feasibility
- Portable and compact, for small process fluid volumes

Capabilities:

- Permeate flowrate: 0.5 gal/hr or 2 l/h, maximum*
- Low viscosity, water based fluids, only
- MF, UF, NF applications

(* Based on 150 gfd (250 l/mh). Actual result depend on the process fluid composition and viscosity



Benefits

- Quick results to determine separation characteristics
- Low volumes of process fluid can be used
- Easy to use, little assembly required
- Compact
- Portable
- Available for purchase or rent



SYSTEM SPECIFICATIONS	
Dimensions:	18" L x 24" W x 12"H (46 cm x 61 cm x 30 cm)
Wetted surfaces:	Stainless steel 316L, FFKM, PVC
Empty weight:	65 lbs (29 kgs)
Circulation flowrate:	0 to 2.2 gpm (0 to 0.5 m ³ /hr)
Maximum pressure:	60 psig (4.1 bar)
Maximum temperature:	122°F (50°C)
Operating volume:	1.3 to 2.6 gal (1 to 10 l)
Filtration type:	MF or UF or NF
Instrumentation:	Analog pressure gauge, only
Electric power:	120 V, 60 Hz

MEMBRANE SPECIFICATIONS	
Active area:	12.4 in ² (80 cm ²)
Membrane geometry:	Monochannel 0.4 in OD x 15.7 in long (10 mm OD x 400 mm long)
Maximum transmembrane pressure:	3 to 6 bar (depending on MWCO and pump)
Membrane maximum temperature (thermal resistance):	302°F (150°C)
Housing material:	Stainless steel 316L
Membrane material:	Oxide-based ceramic
Feed channel diameter:	0.23 in (6 mm)
pH:	0-14
Available pore size or MWCO:	0.45 µm, 0.2 µm, 0.1 µm HR, 300 kD HF, 150 kD, 50 kD, 15 kD, 5 kD, 1 kD

Contacts ☎:

Europe: +33 (0)4 66 85 95 36
Americas: +1 857 504 2250
Asia: +86 (0)21 6350 3377

