

# KLEANSEP™ ultrafiltration system

## Degreasing Baths - Case study



### The KLEANSEP™ ultrafiltration system for degreasing baths

During degreasing treatments, the solution used in the bath, which is mainly made up of surfactants, becomes concentrated with oil and various constituents present on the surface of the metals, such as sulfur, zinc and phosphorus.

The result is a saturation of the bath causing a risk of oily residues on the surface of the metals. To counteract this, the oil concentration in the degreasing bath must be stabilized by crossflow ultrafiltration (UF). Example of application : automotive industry, precision mechanics, metal parts, surface treatment (galvanization, ...).

With the cross-flow UF system equipped with ceramic membranes, oil emulsion droplets (micelles) and all particles larger than 50 nm are stopped. The concentrate can be recovered as energy or other value-added molecules. The permeate, composed of water and surfactants, can be either:

- Recycled to produce a clean surfactant solution with a continuous system (CONTINUOUS RECYCLING MODE). The surfactants are reused in the degreasing bath. The composition of the solution is thus stabilized to maintain an optimal and constant degreasing performance,
- Or be sent to the wastewater treatment plant (TREATMENT MODE). After being collected in a buffer tank, the waste from the degreasing bath is treated directly at the source.

### ALSYS' reference with KLEANSEP™ systems for degreasing baths

| End user / product manufactured        | System size   | Flow rate | Start-up date |
|--|---------------|-----------|---------------|
| Automotive                             | 2 modules K19 | 1 m³/h    | 2020          |
| Mechanical / Luxury watchmaking        | 2 modules K19 | 1 m³/h    | 2016          |
| Mechanical / Luxury watchmaking        | 1 module K07  | 0,3 m³/h  | 2015          |
| Mechanical part / Electrical equipment | 1 module K07  | 0,3 m³/h  | 2010          |
| Mechanical part                        | 2 modules K07 | 0,7 m³/h  | 2009          |
| Automotive                             | 1 module K37  | 1 m³/h    | 2004          |
| Automotive                             | 2 modules K37 | 2 m³/h    | 2002          |
| Automotive                             | 2 modules K19 | 1 m³/h    | 2000          |
| Automotive                             | 4 modules K37 | 4 m³/h    | 1998          |
| Household appliances                   | 2 modules K19 | 1 m³/h    | 1995          |

- More than 80 systems commissioned worldwide (Germany, China, France, ...)
- ALSYS has ~ 40 years of experience in cross flow ultrafiltration of degreasing baths

### What makes KLEANSEP™ system unique ?

- Expertise of ALSYS teams for feasibility studies, pilot study, design, implementation, start-up, after-sales service and audit of the system in plants equipped with degreasing baths
- Surfactant and water savings: almost total recycling of surfactants (~ 95%)
- Treatment of the oily effluent: guarantee of a total separation of water and oil (permeate < 10 ppm)
- Concentration up to 50% of the oily emulsion before disposal
- Turnkey system, proven, easy to use, easy cleaning of membranes
- Consistent degreasing quality due to continuous removal of the oil emulsion
- Not dependent on oil concentration variations of the treated product
- Customized design of the system possible according to the constraints and needs of the customer (adjustment according to available space, adaptation to existing piping, integration of a Cleaning In Place...)

### BENEFITS of KLEANSEP™ ceramic membranes

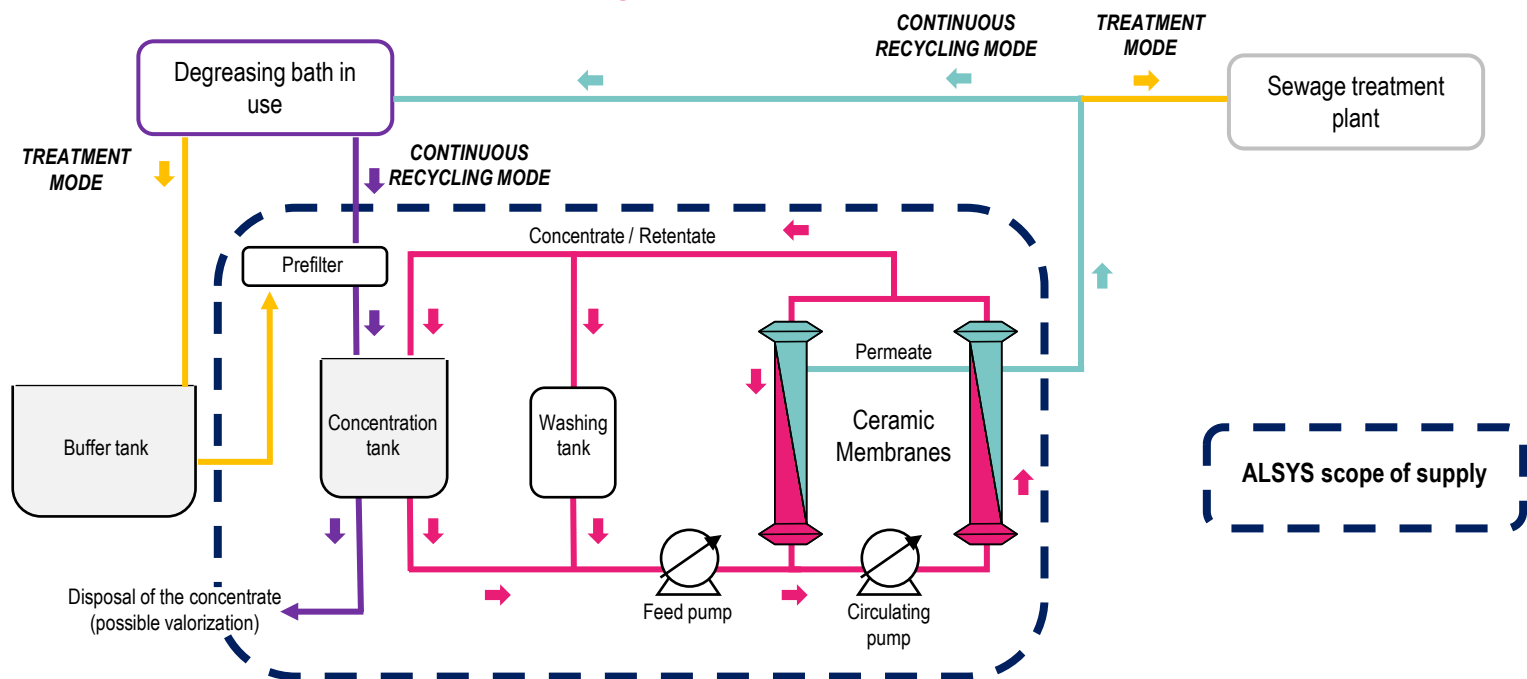
- Long lifetime (~ 5 years)
- Accurate selectivity: residual oil content < 10 ppm
- The 300 kD HF (High Flux) membrane has been specially developed for use in CONTINUOUS RECYCLING MODE to achieve excellent permeability and high abrasion resistance. Average flow rate of 100 LMH (l/m²/h)
- In TREATMENT MODE, the 15 kD membrane allows an optimized selectivity

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# How the KLEANSEP™ system works ?



## KLEANSEP™ systems, modules and membranes for degreasing baths

### KLEANSEP™ systems range characteristics

| Main characteristics                          | KLEANSEP™ System<br>1 K07 | KLEANSEP™ System<br>2 K19 | KLEANSEP™ System<br>2 K37 |
|---|---------------------------|---------------------------|---------------------------|
| Dimensions Length x Width x Height:           | 1150 x 930 x 2200 mm      | 2200 x 1800 x 2200 mm     | 2200 x 2000 x 2200 mm     |
| Weight:                                       | 380 kg                    | 500 kg                    | 620 kg                    |
| Frame materials:                              | Stainless steel           | Stainless steel           | Stainless steel           |
| Piping materials:                             | Stainless steel / PVC     | Stainless steel / PVC     | Stainless steel / PVC     |
| Membrane area according to membrane geometry: |                           |                           |                           |
| 7 channels :                                  | 1,12 m <sup>2</sup>       | 3,04 m <sup>2</sup>       | 5,92 m <sup>2</sup>       |
| 19 channels :                                 | 1,75 m <sup>2</sup>       | 9,5 m <sup>2</sup>        | 18,5 m <sup>2</sup>       |
| 31 channels :                                 | 2,38 m <sup>2</sup>       | 12,92 m <sup>2</sup>      | 25,16 m <sup>2</sup>      |
| Circulating flow rate:                        | 0,3 m <sup>3</sup> /h     | 1 m <sup>3</sup> /h       | 2 m <sup>3</sup> /h       |
| Valves:                                       | Manual                    | Manual                    | Manual                    |

### Characteristics of KLEANSEP™ UF 300 kD HF and 15 kD membranes and modules

| KLEANSEP™ Ceramic Membranes          |                           |
|--------------------------------------|---------------------------|
| Geometry:                            | Multichannel tubular      |
| Number of channels:                  | 7      19      31         |
| Channel hydraulic diameter:          | 6 mm    3,5 mm    2,8 mm  |
| Membranes pore size and cut-off:     | <b>300 kD HF or 15 kD</b> |
| pH range:                            | From 0 to 14              |
| Maximum operating pressure:          | 10 bar                    |
| Ceramic support material:            | Oxide-based ceramic       |
| Membrane material:                   | Oxide-based ceramic       |
| End sealing:                         | 1 mm or 16 mm             |
| Unaffected by solvents and radiation |                           |

| KLEANSEP™ Modules            |   |
|------------------------------|---|
| Modules geometry:            | K07, K19, K37   |
| Housing type:                | Tubular   |
| Steel type:                  | SS 316L ; SS 316Ti ; Titanium ; Uranus B6 (904L) ; Hastelloy C22 ; Hastelloy C276 |
| Connection type:             | Clamps ; Flange (ISO, ANSI or DIN)  |
| Gaskets elastomer materials: | NBR ; EPDM ; FPM ; SILICONE   |
| Working temperature:         | > 100°C   |

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