

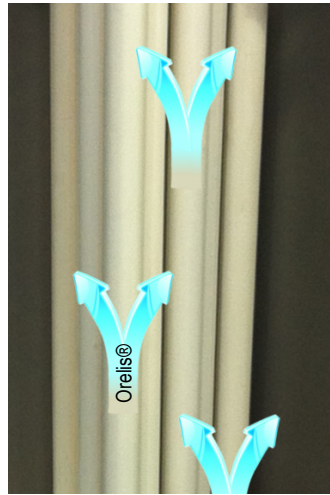
Product sheet: KLEANSEP™ MODULE

Ceramic modules Kleansep™ for cross-flow filtration

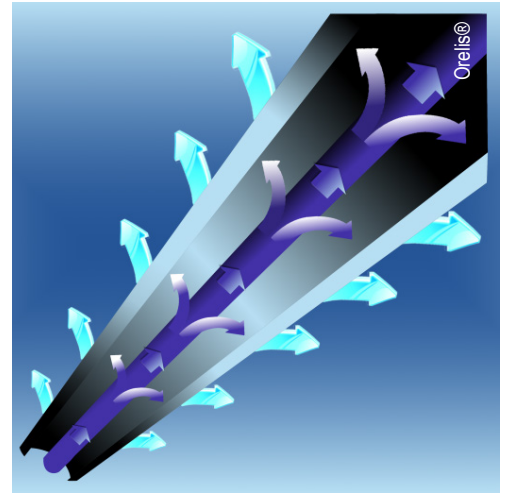
Operating a filtration module



Module in place of the installation



Flow through the channels of ceramic membranes



Cross flow filtration in a channel of a ceramic membrane

4 big stages for assembling of a ultra or micro filtration module, in our workshop



Membranes assembling



Implementation of the gasket



Installation and screwing of the tightening plate



Bubble test: sealing test integrity of housing, membranes and gaskets

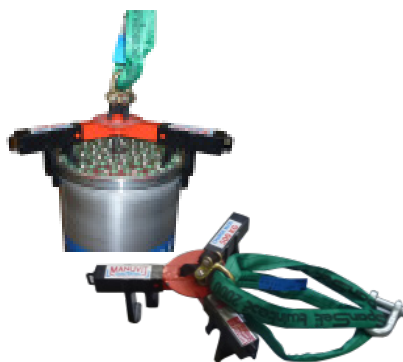
Tools

Orelis Environnement sells tools for handling modules in optimal safety conditions. The first tool is a machine with wheels that keep the module in its slip jaws. Then allowing the lift and take it securely to the installation. The tool-carriage also allows the reversal of the module during operations bubble test (this test is done on both sides).



Module keeps by jaws

The second tool is a gripper which is marketed to allow the lifting of all models of modules, whether to clamp or flange, safely. Wearing safety boots is recommended throughout of handling modules.



Gripper

This is another tool tightening plate extractor. It allows to easily remove the tightening plate slot to perform the maintenance of filtration modules.



Implementation of the extractor



Extraction of the plate

Product sheet: KLEANSEP™ MODULE

Ceramic modules Kleansep™ for cross-flow filtration

Designing a Kleansep™ Module

A filtration module Kleansep™ is the assembly of a tubular stainless steel (or housing), and ceramic membranes and elastomeric gaskets. This assembly can be carried out in our workshop or on your site by our technical team.

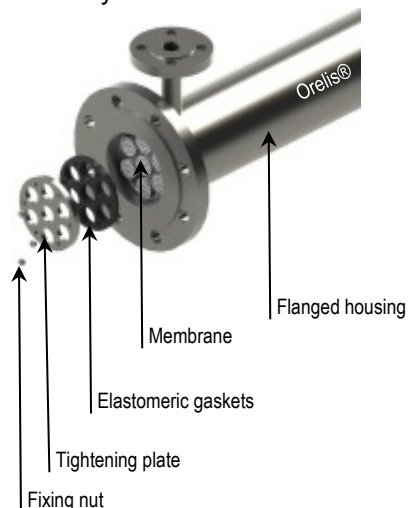


Diagram of a Kleansep™ flanged module K07

Its advantages

The Kleansep™ filtration module is modular! The housing can be supplied in various types of steel, stainless steel 316L or 316Ti ... to filter all types of liquids, or almost. We propose in several models, that is to say it can develop from 0.16 to 62 sqm membrane area (depending on the quantity of membranes and membrane channel number). So it feels completely flow filter to reduce energy costs. The membranes are also very strong, they are resistant to chemical and thermal solicitations. The connection modules are available in different versions, to clamp SMS, flanged ISO or ANSI / ASME to meet existing standards and integrate more easily on an installation regardless of the country of use. And finally the seal is made by a single gasket, only two gaskets are required in a Kleansep™ module. They are very easy to set up and replace. They are available in various elastomers: NBR or EPDM or FPM or SILICONE to fulfill the constraints on their use. The elastomer was chosen for its ability to regain its original shape after cessation of stress.

Presentation of the different type of module

| Modules geometries | Membrane area in sqm | | Clamp connection | | | Flanged connection | | |
|--------------------|----------------------|------|------------------|-------------------|--|--------------------|-----------|---|
| | From | To | Retentate | Permeate | Picture | Retentate | Permeate | Picture |
| Module K01 | 0,16 | 0,5 | SMS DN25 | Micro-clamp 10/12 |  | NA | NA | na |
| Module K03 | 0,48 | 1,5 | SMS DN104 | SMS DN25 |  | ISO DN80 | ISO DN20 |  |
| Module K07 | 1,08 | 3,5 | SMS DN104 | SMS DN25 |  | ISO DN100 | ISO DN20 |  |
| Module K19 | 2,95 | 9,5 | ISO DN150 | SMS DN25 |  | ISO DN150 | ISO DN20 |  |
| Module K37 | 5,7 | 18,5 | ISO DN200 | SMS DN38 |  | ISO DN200 | ISO DN32 |  |
| Module K72 | 11,52 | 36 | NA | NA | NA | ISO DN300 | ISO DN50 |  |
| Module K99 | 15,3 | 49,5 | hook Ø 354 mm | SMS fitting DN51 |  | ASME DN350 | ASME DN65 |  |
| Module K138 | 22,08 | 69 | Ø 441 mm | SMS DN76 |  | ASME DN400 | ASME DN65 |  |

Different type of steel Stainless steel 316L or 316Ti or Titane or Uranus B6 or Hastelloy C22 or C276

The filter modules are equipped with ceramic membranes

| GEOMETRY OF MODULES | | Number of channels - Membrane area in sqm | | | | | | |
|---------------------|-----------------------|---|------|------|-------|-------|------|-------|
| Modules | Quantity of membranes | 7 | 8 | 12 | 19 | 31 | 52 | 61 |
| Module K01 | 1 membrane | 0,16 | 0,2 | 0,2 | 0,25 | 0,33 | 0,5 | 0,45 |
| Module K03 | 3 membranes | 0,48 | 0,6 | 0,6 | 0,75 | 0,99 | 1,5 | 1,35 |
| Module K07 | 7 membranes | 1,12 | 1,4 | 1,4 | 1,75 | 2,31 | 3,5 | 3,15 |
| Module K19 | 19 membranes | 3,04 | 3,8 | 3,8 | 4,75 | 6,27 | 9,5 | 8,55 |
| Module K37 | 37 membranes | 5,92 | 7,4 | 7,4 | 9,25 | 12,21 | 18,5 | 16,65 |
| Module K72 | 72 membranes | 11,52 | 14,4 | 14,4 | 18 | 24,48 | 36 | 32,4 |
| Module K99 | 99 membranes | 15,84 | 19,8 | 19,8 | 24,75 | 32,67 | 49,5 | 44,55 |
| Module K138 | 138 membranes | 22,08 | 27,6 | 27,6 | 34,5 | 45,54 | 69 | 62,1 |

Our technical team is available to perform the maintenance in situ or in our workshop. Tel +33 (0)4 66 85 95 36 - contact@orelis.com