

1 PNEUMATIC FILTERPRESS STATION LAB200-PFS

LAB200-PFS

GENERAL OVERVIEW

The station offered in this case is the "**LAB200-PFS.**"

The acronym PFS stands for "**Pneumatic Filterpress Station.**"

With this model customer can test every kind of sludge or liquid to filter, because the micro-filterpress is equipped with all the most important auxiliary and devices we can find in a complete industrial filterpress.

Unlike the more complete version "LAB200-CPFS", this version does not have the sludge tank, nor does it have the wash water tank, with associated hydraulic connections.



Image could be different from what is in technical description

This model of pilot unit has n°4 different versions:

LAB200-PFS / BASIC

LAB200-PFS / STD

LAB200-PFS / PLUS

LAB200-PFS / TOP

The differences in optional installed is highlighted in red and visible in attached P&I.

Depending on the version, the unit is provided with:

	BASIC	STD	PLUS	TOP
High pressure feeding pump up to 15 bar	✓	✓	✓	✓
Air generation system for cake blow / channel blow / core blow	✗	✓	✓	✓
High pressure squeezing system and membrane plates	✗	✗	✓	✓
Water pump for flushing and cake wash	✗	✗	✗	✓

Legend:

✓: feature installed

✗: feature not installed

TECHNICAL DESCRIPTION OF THE FETAURES INSTALLED

Filterpress Frame

BASIC	STD	PLUS	TOP
✓	✓	✓	✓

- ✓Fixed head completely made of AISI 304 stainless steel
- ✓Mobile head completely made of AISI 304 stainless steel
- ✓Cylinder head in painted carbon steel
- ✓Side beams made of AISI 304 stainless Steel
- ✓Frame resistant to a maximum pressure of 15 bar
- ✓Pressure gauge for measuring pressure on hydraulic power unit side
- ✓Hydraulic power unit with manual pump for hydraulic cylinder movement forward and backward
- ✓Hydraulic cylinder with painted carbon steel liner / Steel rod with high thickness Chrome coating

Set of standard filter plates as follows:

BASIC	STD	PLUS	TOP
✓	✓	✓	✓

- ✓N°1 movable head plate made of Polypropylene
- ✓N°1 fixed head plate in Polypropylene
- ✓Intermediate plates in Polypropylene depending on the configuration - see the chapter 2 "PLATES AND SPACER INCLUDED IN LAB200-PFS RECAP"

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Set of membrane filter plates as follows:

BASIC	STD	PLUS	TOP
✗	✗	✓	✓

✓ Membrane plates for membrane squeezing in Polypropylene - see the chapter 2 "PLATES AND SPACER INCLUDED IN LAB200-PFS RECAP"

Set of spacers as follows:

BASIC	STD	PLUS	TOP
✓	✓	✓	✓

✓ Spacers in AISI 304 stainless steel - see the chapter 2 "PLATES AND SPACER INCLUDED IN LAB200-PFS RECAP"

Valves, instrument and auxiliary:

BASIC	STD	PLUS	TOP
✓	✓	✓	✓

- ✓ Drip Tray in AISI 304 stainless steel
- ✓ Compensation bag in Inox AISI 304 for damping the overpressure resulting from the piston pump
- ✓ Sludge-side pressure gauge for filtration pressure reading
- ✓ AISI 316 stainless steel exclusion valves on each filtrate outlet
- ✓ Inlet slurry valve made of AISI 316 stainless steel
- ✓ AISI 316 stainless steel valve for depressurization of residual pressure

F&R Group:

BASIC	STD	PLUS	TOP
✗	✓	✓	✓

✓ Pneumatic F&R (filter and regulator) Group

Process Features N°1:

BASIC	STD	PLUS	TOP
✗	✓	✓	✓

- ✓ Core Blow and related low pressure air generation system
- ✓ Channel Blow Collector and related low pressure air generation system
- ✓ Cake Blow and Cake Wash Collector

Low pressure air generation system composed by:

- Low Pressure Air Tank
- Valves for air distribution

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Process Features N°2:

BASIC	STD	PLUS	TOP
✗	✗	✓	✓

✓ High Pressure generation system for Membrane squeezing system

High pressure air generation system composed by:

- High Pressure Air Tank
- Pressure Multiplier
- Pressure Gauge
- Safety Valve
- Valves for air distribution

Feeding pump:

BASIC	STD	PLUS	TOP
✓	✓	✓	✓

✓ Pneumatic piston pump:

- flow rate about 300 liters/h with automatic modulation
- wetted parts in S.S. Inox AISI 304
- Piston in in S.S. Inox AISI 304 with Chromium Coating
- Valve seat, Ball valve and Valve Body in S.S. Inox AISI 304

Water pump:

BASIC	STD	PLUS	TOP
✗	✗	✗	✓

✓ Pneumatic piston pump:

- flow rate about 300 liters/h with automatic modulation
- wetted parts in S.S. Inox AISI 304
- Piston in in S.S. Inox AISI 304 with Chromium Coating
- Valve seat, Ball valve and Valve Body in S.S. Inox AISI 304

Supporting frame:

BASIC	STD	PLUS	TOP
✓	✓	✓	✓

✓ Filter press, pump and tank support housing in painted carbon steel

✓ No. 4 total wheels (2 fixed and 2 steering)

✓ Filtration Cloths: NOT SUPPLIED (SUPPLIED AS OPTIONAL)

Written by: **Matteo Minghetti**

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2 PLATES AND SPACERS INCLUDED IN LAB200-PFS RECAP

PLATES TYPE:

Depending on the chosen version, LAB200-PFS is able to install filtering plates with recessed chambers or also mixed pack composed by recessed plate chambers and membrane squeezing plates.

Of course the use of plates with membrane squeezing requires the high pressure generation system to properly squeeze the natural rubber membranes of the membrane plates.

Because of this, the installation of a mixed plate pack (mixed plate pack means recessed plates and membrane plates together) is limited to the versions PLUS and TOP of the LAB200-PFS; because BASIC and STD do not install the high pressure generation system and because of this is not possible to use the membrane squeezing system.

PLATES MATERIALS:

As standard, all the plates (both membrane or recessed) installed in the LAB200-PFS series are made of PP (Polypropylene).

PP is the most common material used all over the world also in industrial filterpresses.

In some applications, due to the kind of fluid or slurry that must be filtered, or due to the T° of application, PP could be not be chemically compatible with the application.

For this reason, is also possible to install Stainless Steel AISI 304 or AISI 316 plates, with some limitations:

Limitation n°1:

Plates in AISI 304/316 have no chamber thickness (chamber thickness=0) and because of this is mandatory to use a spacer between two filtering plates to have a filtering volume

Limitation n°2:

Plates in AISI 304/316 cannot be supplied with membrane squeezing system

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EXAMPLE OF FILTERING VOLUMES AND FILTERING SURFACES WITH **POLYPROPYLENE PLATES**

These are the value of filtering volume and filtering areas of the plates and spacer available to install in LAB200 pilot filterpress unit

RECESSED PLATE

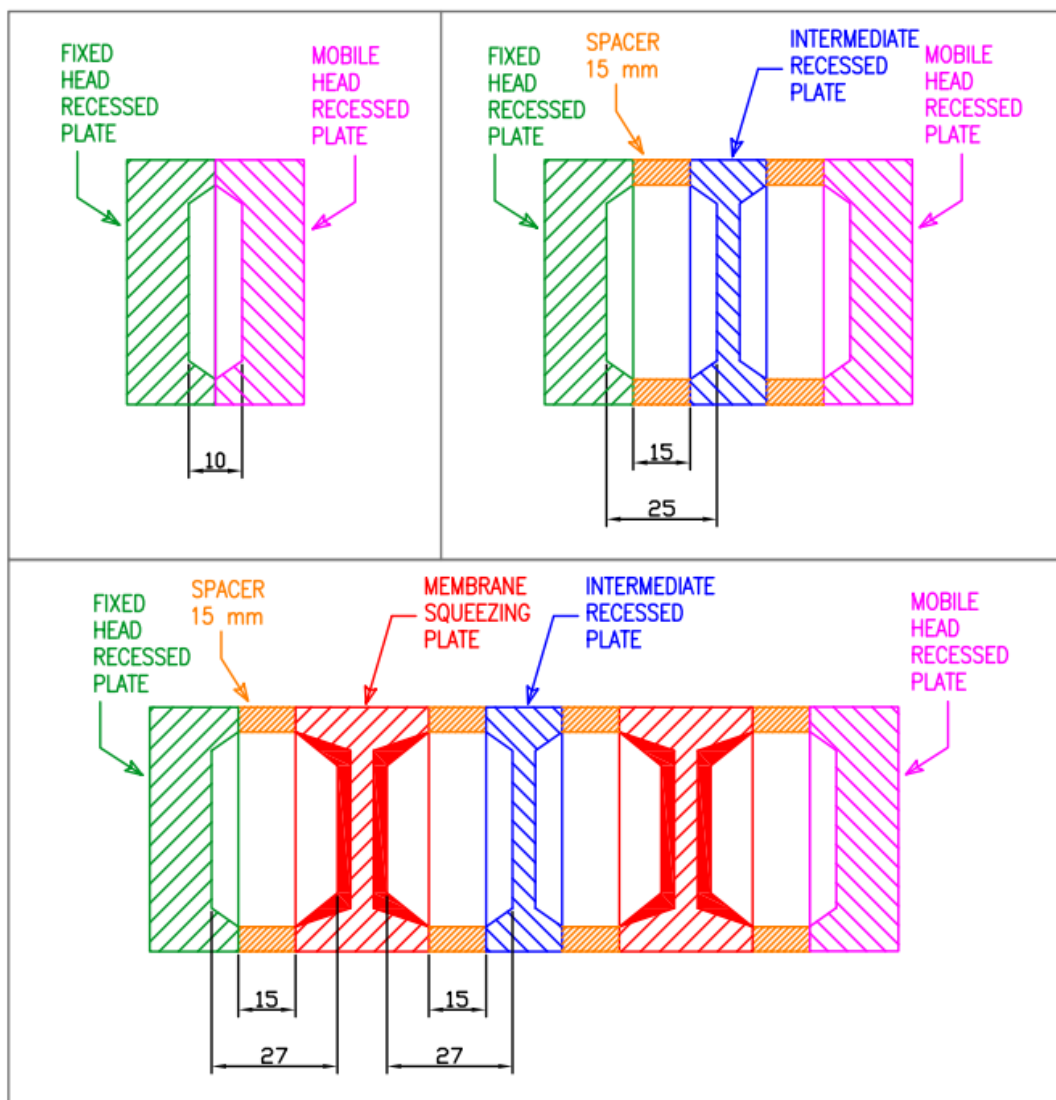
Standard Chamber Thickness: 10 mm
Standard Recessed Chamber Volume = 0.190 liters
Standard Filtration Area = 4.23 dm²

MEMBRANE PLATE

Standard Chamber Thickness: 14 mm (before squeezing)
Standard Recessed Chamber Volume = 0.413 liters
Standard Filtration Area = 4.23 dm²

SPACERS

Recessed Chamber Volume with +5 mm spacer = +0.116 liters
Recessed Chamber Volume with +10 mm spacer = +0.231 liters
Recessed Chamber Volume with +15 mm spacer = +0.347 liters



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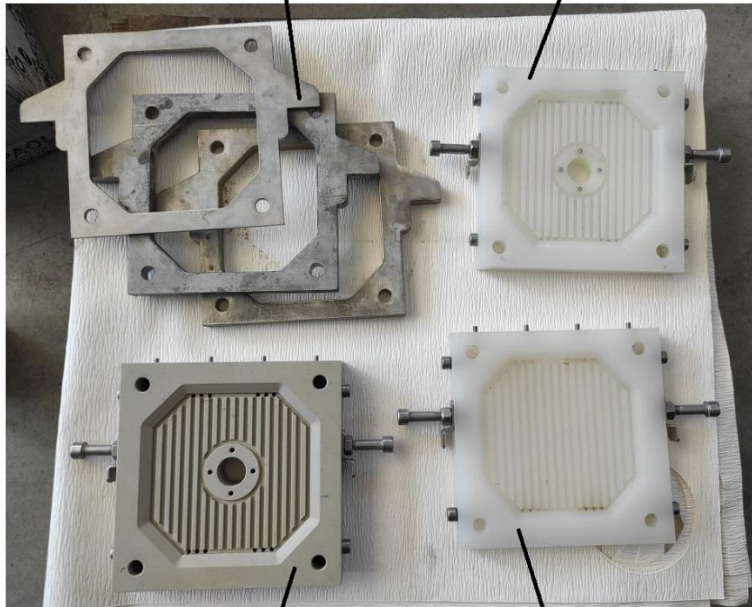
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N° 3 THICKNESS

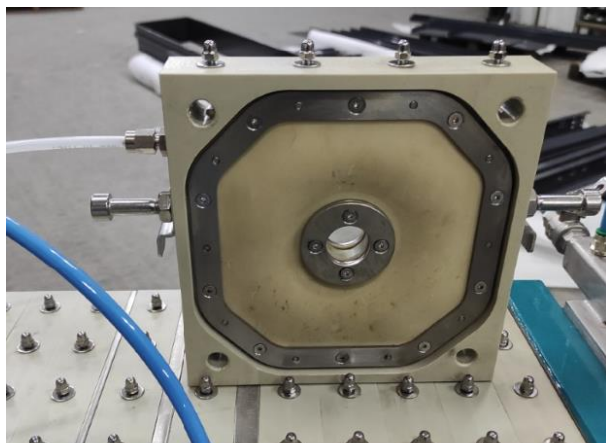
(+5, +10, +15mm)

**N°1 FIXED HEAD
RECESSED PLATE**



**N°1 INTERMEDIATE
RECESSED PLATE**

**N°1 MOBILE HEAD
RECESSED PLATE**



**MEMBRANE PLATE FOR
SQUEEZING OF THE CAKE**

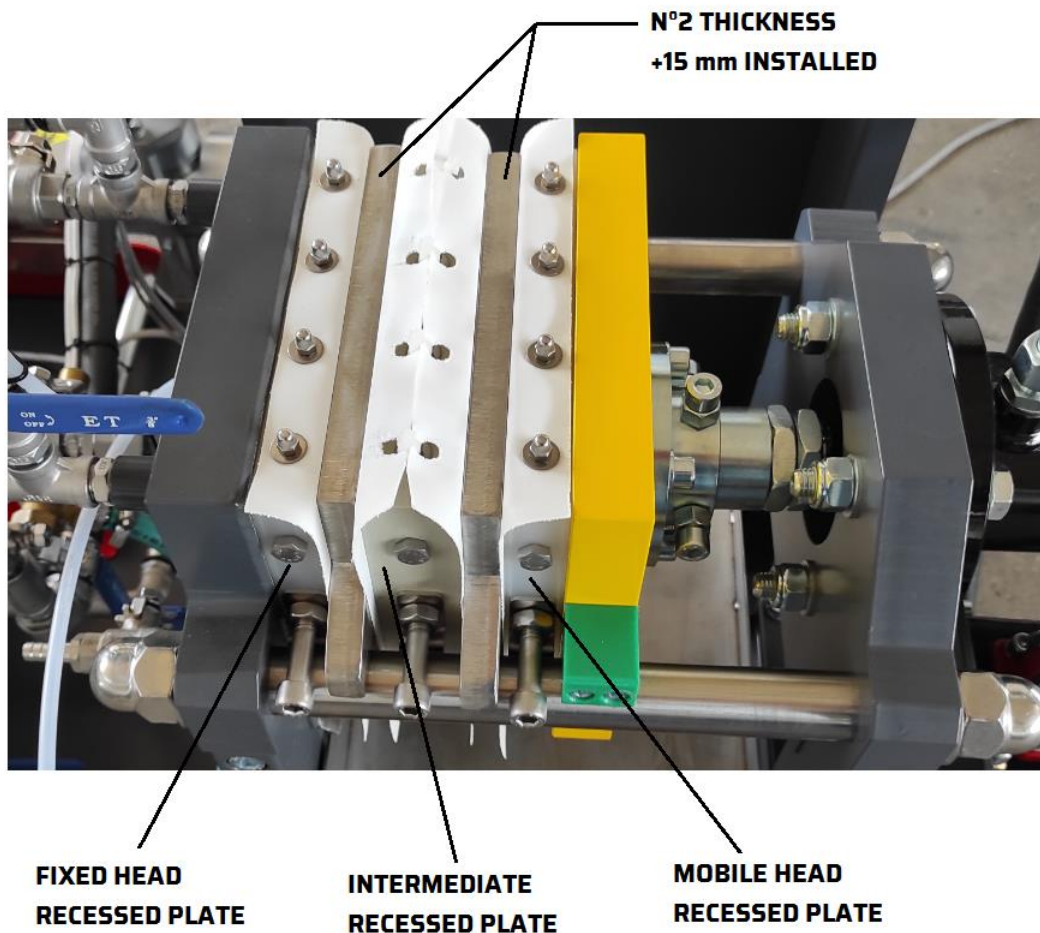
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Example of configuration with:

N°1 FIXED HEAD RECESSED CHAMBER

N°1 INTERMEDIATE RECESSED CHAMBER

N°1 MOBILE HEAD INTERMEDIATE CHAMBER

N°2 SPACERS (THICKNESS) + 15 mm

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FILTERING VOLUMES AND FILTERING SURFACES WITH STAINLESS STEEL

These are the value of filtering volume and filtering areas of the plates and spacer available to install in LAB200 pilot filterpress unit

PLATES

Standard Chamber Thickness: 0 mm

Standard Recessed Chamber Volume = 000 liters

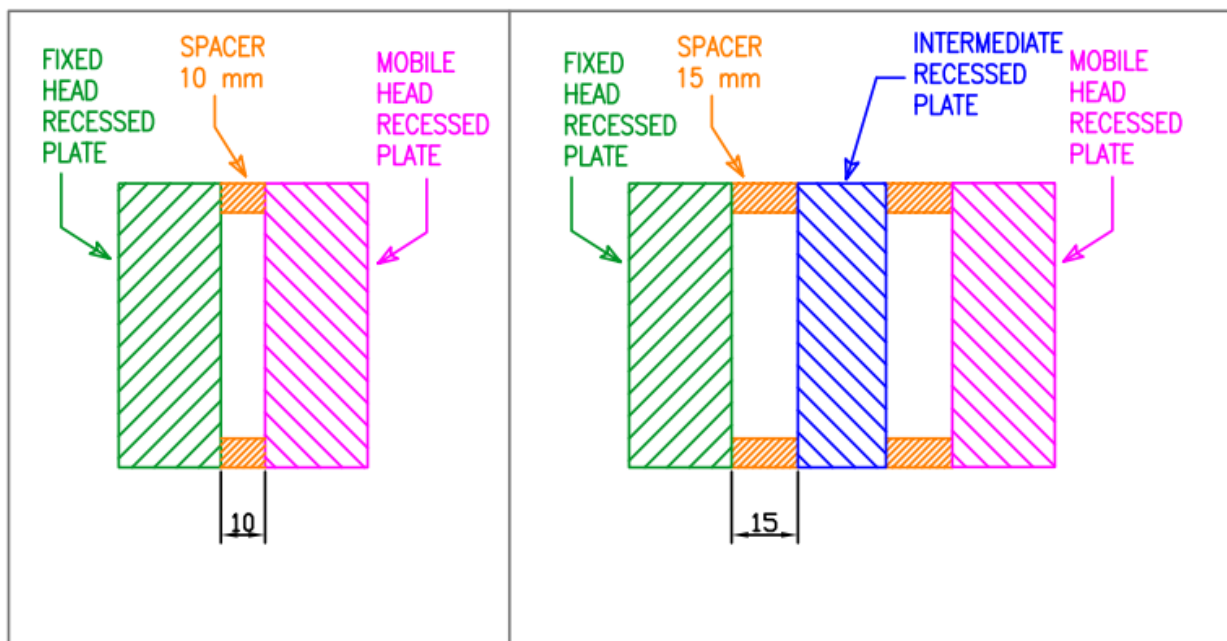
Standard Filtration Area = 4.23 dm²

SPACERS

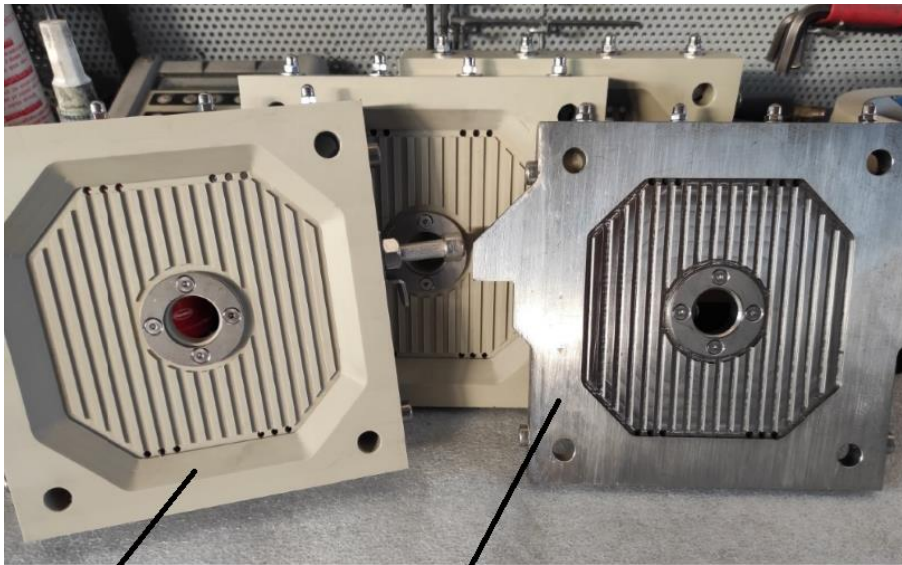
Recessed Chamber Volume with +5 mm spacer = +0.116 liters

Recessed Chamber Volume with +10 mm spacer = +0.231 liters

Recessed Chamber Volume with +15 mm spacer = +0.347 liters



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**PLATES IN
 POLYPROPYLENE:
 CHAMBER=10mm
 VOLUME=0.190 liters**

**PLATES IN
 STAINLESS STEEL
 CHAMBER=0mm
 VOLUME=0.000 liters**



**FIXED HEAD
 PLATE IN SS** **THICKNESS
 +25mm INSTALLED** **INTERMEDIATE
 PLATE IN SS** **MOBILE HEAD
 PLATE IN SS**

Example of configuration with:
 N°1 FIXED HEAD RECESSED CHAMBER
 N°1 INTERMEDIATE RECESSED CHAMBER
 N°4 MOBILE HEAD INTERMEDIATE CHAMBER
 N°5 SPACERS (THICKNESS) + 25 mm

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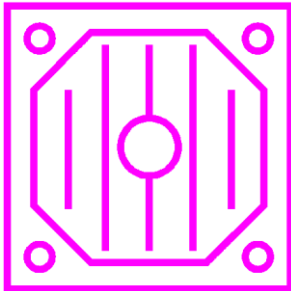
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RECAP - RECESSED PLATES:

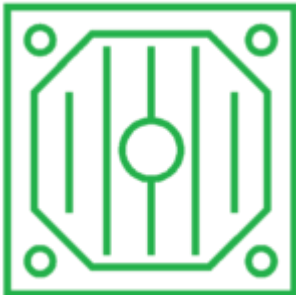
BASIC	STD	PLUS	TOP
✓	✓	✓	✓



MOBILE HEAD RECESSED PLATE

Material: Polypropylene
Standard chamber thickness: 10 mm

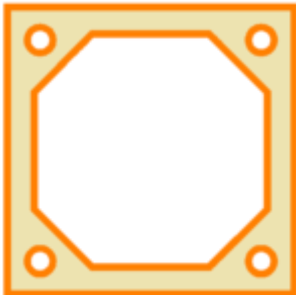
Material: STAINLESS STEEL
Standard chamber thickness: 0 mm



FIXED HEAD RECESSED PLATE

Material: Polypropylene
Standard chamber thickness: 10 mm

Material: STAINLESS STEEL
Standard chamber thickness: 0 mm



SPACERS

Material: AISI 304 (standard) / AISI 316 (on request)
Thicknesses available: 5mm / 10mm / 15mm / 25 mm



INTERMEDIATE RECESSED PLATE

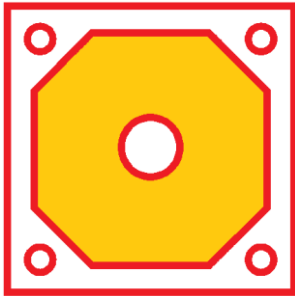
Material: Polypropylene
Standard chamber thickness: 10 mm

Material: STAINLESS STEEL
Standard chamber thickness: 0 mm

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PLATES AND SPACER INCLUDED IN LAB200-PFS RECAP

BASIC	STD	PLUS	TOP
✗	✗	✓	✓



MEMBRANE SQUEEZING PLATE

Material of plate: Polypropylene

Material of Membrane: Natural Rubber

Chamber thickness before squeezing: 14 mm

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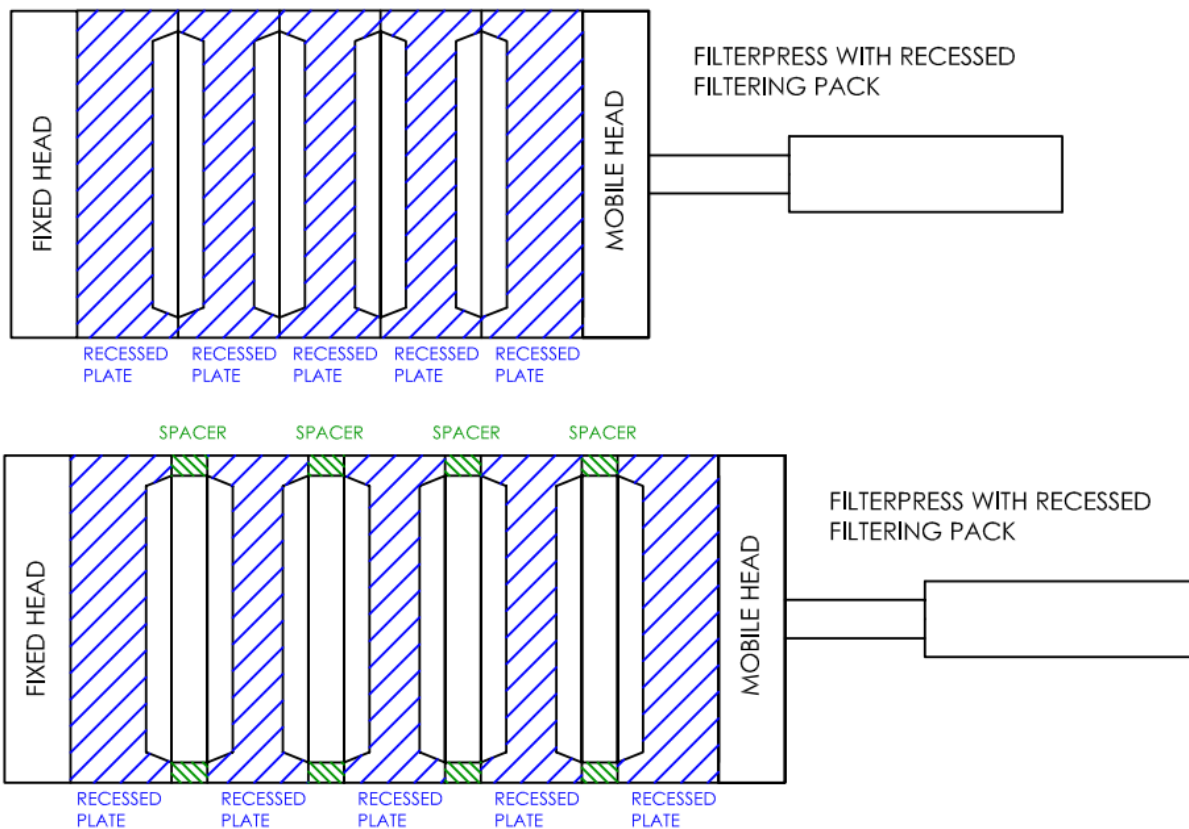
FILTERING PLATES INSTALLATION & USE

The pilot filterpress here shown, allow customer to use different plates & spacers configurations. In the **LAB200-PFS / PLUS** and **LAB200-PFS / TOP** versions, both recessed and membrane plates are provided, in order to allow client to use the most flexible and versatile laboratory filterpress in the market. Instead, in the **LAB200-PFS / BASIC** and **LAB200-PFS / STD** version, only recessed plates (with spacers) can be installed.

In the same **LAB200-PFS / PLUS** and **LAB200-PFS / TOP** version is possible to install:

- ✓ A maximum of N°15 recessed plates (with or without spacers) - STANDARD FILTRATION or
- ✓ A maximum of N° 8 recessed plates and N°7 membrane plates (with or without spacers) - MEMBRANE FILTRATION WITH MIXED PACK (is called mixed pack because the membrane is between a recessed plate and the other one).

N.B.: to use filtration with membrane, the **number of recessed plates used must be n°1 more than the number of membrane plates**. Spacers are used only to increase filtering volume of the filtration chamber.



STANDARD FILTRATION // WITH OR WITHOUT USE OF SPACERS

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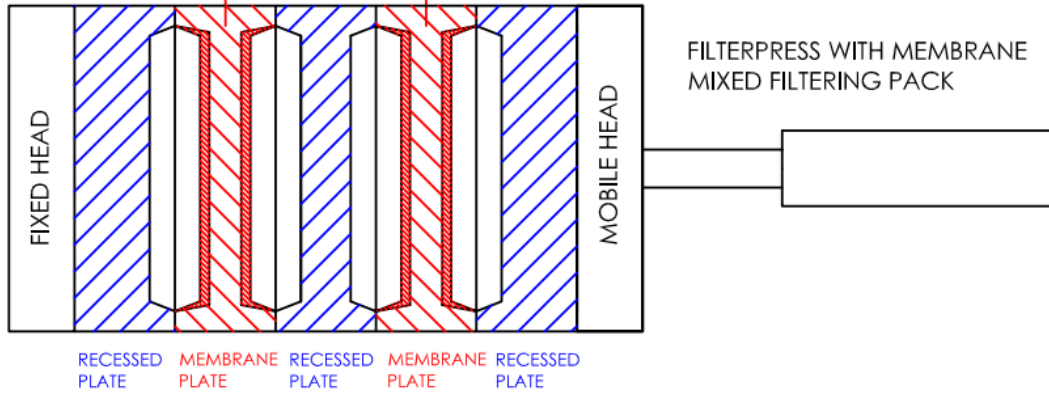
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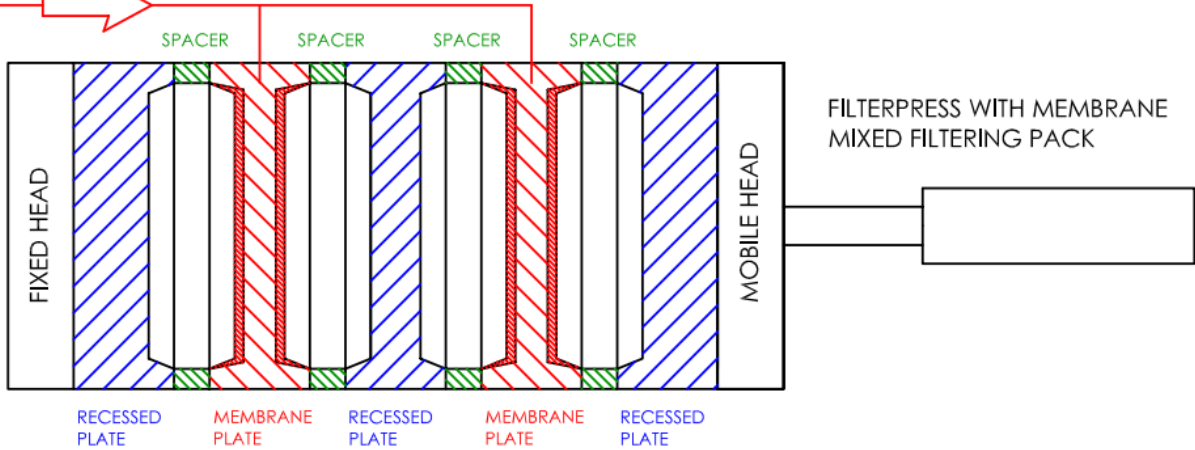
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COMPRESSED
AIR



COMPRESSED
AIR



MEMBRANE FILTRATION WITH MIXED PACK // WITH OR WITHOUT USE OF SPACERS

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ABOUT MEMBRANE SQUEEZING PLATES

Membrane squeezing filtrations, allow to obtain some benefits and it is used in this cases:

- The dewatered slurry has characteristics that make pressure filtration through a pump only possible up to 6-7 bar. Beyond this limit, the pump is not able to increase the pressure. Therefore, if you want to obtain a cake with a high percentage of dry solids even with these slurry, it is necessary to use squeezing system.
- The noble part of the filtration process is the filtrate and it is necessary to recover as much as possible. For example, this is the case with the filtration of slurry from the processing of sugar beet or sugar cane. In this case, squeezing is combined with washing the cake in such a way as to recover as much sugar as possible.
- The slurry in question is thixotropic and, beyond a certain limit, it is no longer possible to filter it with simple pump pressure, but a mechanical squeezing action is needed to dewater the slurry to the maximum.
- It is desired to dewater the residual cake as much as possible in a shorter cycle time, as the squeezing action is usually much faster than a normal filtration cycle.

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