

SAFETY

You should always plan your work before starting and go through all the safety issues involved. A risk analysis may be required, consult your supervisor or technical staff. Read through the material safety datasheets (MSDS) and use appropriate safety equipment and procedures.

Read carefully through the instructions. If something is left unclear, always ask for further instructions. You are responsible for the safety of yourself, the equipment, and others in the vicinity.

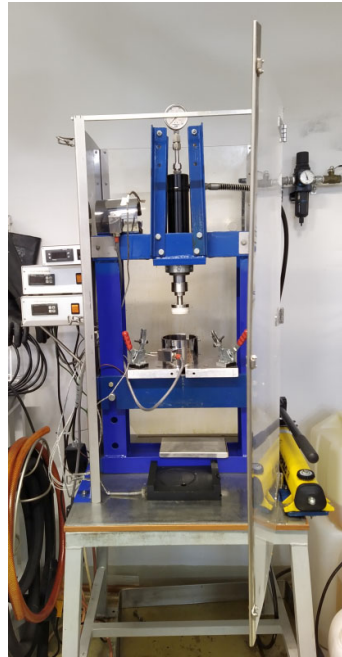
Be careful of chemical residues before and after the process. Clean and dry the parts thoroughly after your work!

Label clearly and store your samples appropriately. Minimum information for labels is full name, contact information, date, and chemical contents.

Use thermal protective gloves when appropriate. The equipment involves pressurized equipment – use the safety door when operating the pump. When operating the heating units, make sure the feedback loop between the heating jackets and temperature sensors is realized!

Small filtration unit

Image 1 – Small filtration unit



The unit is equipped with heating for the cylinder and platform. Two different size cylinders and pistons can be used to accommodate different volumes and pressure requirements.

Filtration Unit Parts

There are two different filtration cylinders and matching pistons for the filtration unit. They differ in volume and in the pressure attainable (piston area) using the filtration unit.

Preparations

Before assembling the unit, you will need to cut the actual filter for it.

Often the cutting waste from the larger filtration unit can be used for the smaller unit. Store in / check cabinet J3, especially for the smaller cylinder. **Do not** store unusable leftovers in the cabinet.

Filter media rolls are stored in ABio-hall (Room 259) shelf, next to the stairs up to the balcony (technical staff, Room 351). The shelf and rolls are labelled. It is a good practice to at least draw the outlines on the whole width of the roll, minimizing the waste.

Use the dedicated shears (one pair at the shelves, another in the cabinet J3) to cut the material. Cutting the material will produce small metal debris, that can penetrate skin. Make sure you clean adequately.

Image 2 - Cutting template for filter (Small cylinder)



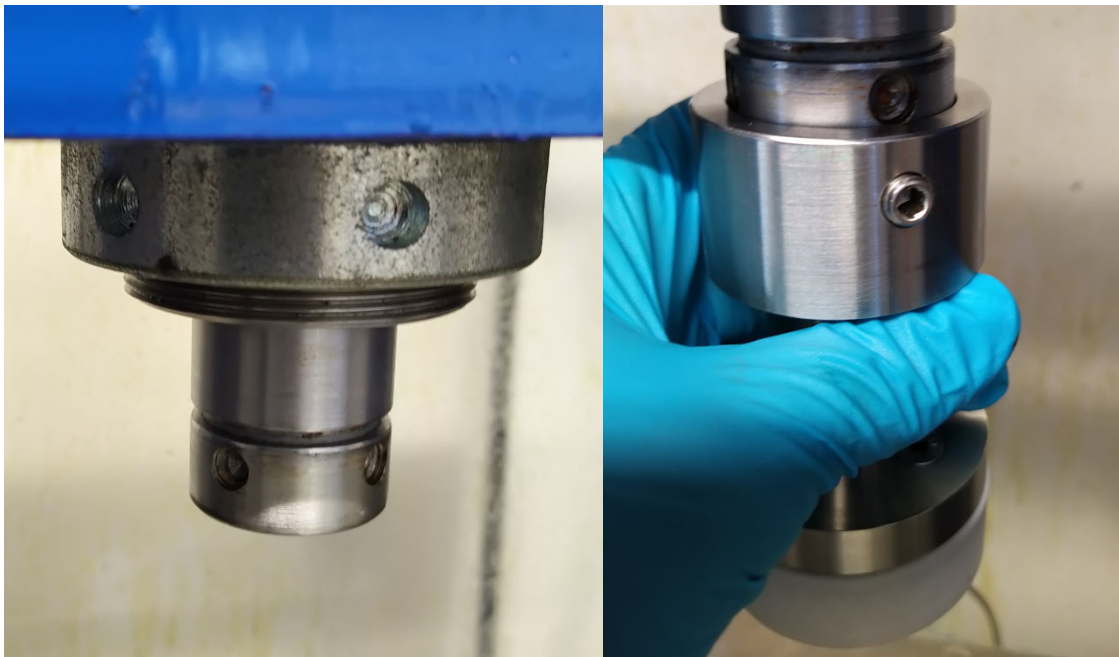
There is a white, plastic cap that can be used as a template for cutting the filter for the small cylinder (See Image 2). Use the support plate (See Image 5) as a template for the large cylinder.

Assembling the filtration unit

Detachable parts and tools for the small filtration unit are stored in two baskets in Cabinet J3 - each cylinder sets in their own. **Return the parts and baskets to the cabinet after every use - dry and cleaned.**

Changing the piston

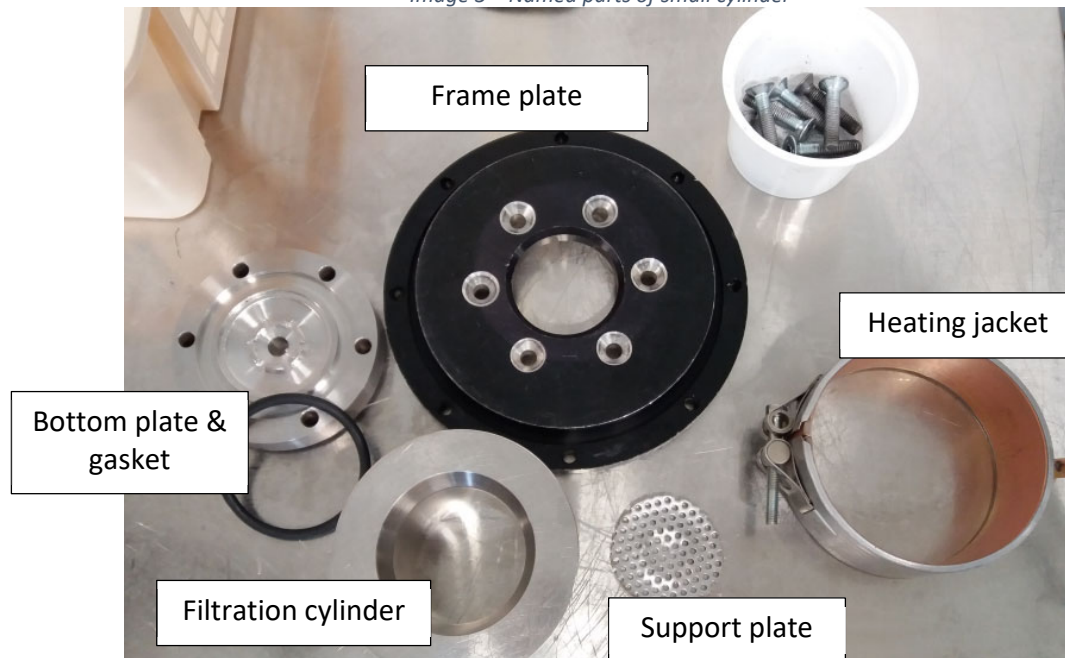
The piston shaft has two shallow holes for attaching the pistons. Larger piston has two hex-screws, the smaller piston only one. Open the screws before changing the piston. Align the holes with the screws before attaching the piston and tightening them.



Small cylinder

Parts of the small cylinder are shown in Image 3.

Image 3 – Named parts of small cylinder



Insert the gasket and the support plate on the cylinder bottom plate (See Image 4). Place the pre-cut filter on top of the support plate. Make sure the filter does not overlap the gasket! Trim if need be.

Place the actual cylinder on top of the bottom plate, aligning the bolt holes with each other. Flip the setup over. Realign the bolt holes if need be. Put the frame plate on top, aligning again the bolt holes. (See Image 4)



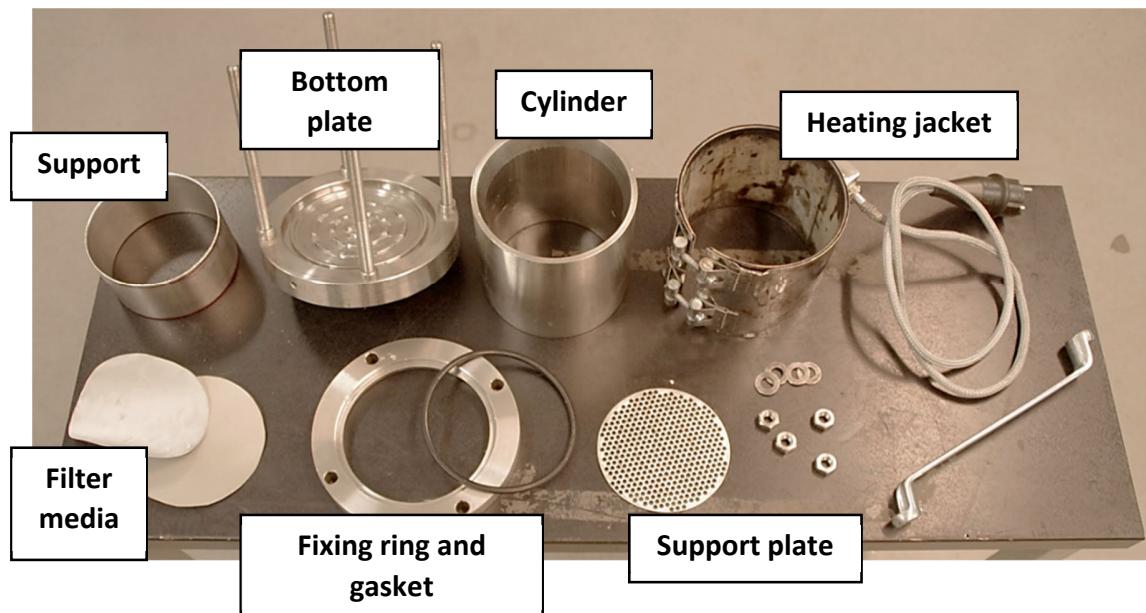
Apply heat grease (Cabinet G2) on the bolt tips (1 cm), if need be. Insert and tighten (10 Nm torque). Check the filter is aligned and in position.

Move the assembled cylinder to the filtration unit. Slide matching heating jacket over the cylinder. Slide temperature sensor between the heating jacket and the cylinder. Tighten the jacket bolts for a snug fit for a more efficient heating.

Large cylinder

Parts of the large cylinder are shown in Image 5.

Image 5 – Large cylinder parts



Assemble the filtration cylinder at the filtration unit, on top of the black plastic platform, as the heating jacket cord is fixed.

Insert the gasket and the support plate on the cylinder bottom plate. Place the pre-cut filter on top of the support plate finer side facing up. (See Image 6) Make sure the filter does not overlap the gasket! Trim if need be.

Place the actual cylinder on top of the bottom plate, checking the filter media is well aligned. Slide the heating jacket over the cylinder. Slide temperature sensor between the heating jacket and the cylinder. Tighten the jacket for a snug fit for a more efficient heating.

Insert the fixing ring on top. Place the washers and nuts on the threaded rods and tighten using a ring spanner.

Image 6 – Assembly of large cylinder



Preparing for the filtration

Make sure there is enough oil in the manual pressure pump. Lack of oil will influence the pressure attainable with the pump.

Place the assembled cylinder on the heated metal platform. Align the extrusion hole of the bottom plate with the notch in the metal platform. While the latches are open, lowering the piston down inside the cylinder will help align the unit.

Adjust the swivelling latches holding the cylinder in place by adjusting the threaded bolts if need be. The latches should “click” into closed position when the height is correctly adjusted. Failing to adjust them properly might lead to the cylinder being freed when the piston pressure is released.

Check the used heating jacket is connected to the appropriate heating unit. Check the heating platform sensor and heating element are attached.

The temperature of the heated platform and heating jackets is controlled with PID controllers. Turn only the controllers to be used ON. Setpoint for the temperature can be changed by briefly pressing *P*, then using arrow buttons to change the value. The topmost unit is the controller for the platform heating. (See Image 7)

Image 7 - Temperature controllers



The temperature sensors are crucial for the PID temperature controllers to measure the temperature of the used heating elements. Without the feedback, they will heat uncontrollably at maximum temperature. This may damage the equipment and even lead to a fire.

Filtration

Make sure the cylinder, piston, and material to be filtered have reached appropriate temperature and that there is a plastic film or other receiver for the filtered dope. Check the latches holding the cylinder in place are closed and close the safety door. Close the piston driving pump pressure release valve by rotating clockwise.

Start operating the pump handle, checking the pressure gauge at the same time. Keep the pressure steady but low (<50 bar) and wait for the material to push through the filter. High pressure will more probably damage the equipment than make it filter quicker.

Cleaning up and finishing

After filtration is finished, turn off the heating controller units. Release the piston driving pressure by rotating the pressure release valve counter-clockwise. Wait for the piston to ascend – the vacuum inside the cylinder will try to hold the cylinder in place.

Collect the filtered material and store accordingly.

Release the latches holding the cylinder in place. Disassemble the cylinder by following the assembly steps in reverse order.

Remove residuals with moistened paper towels or rinse under running water if applicable. **Dry and store equipment in their own baskets and return to cabinet.**