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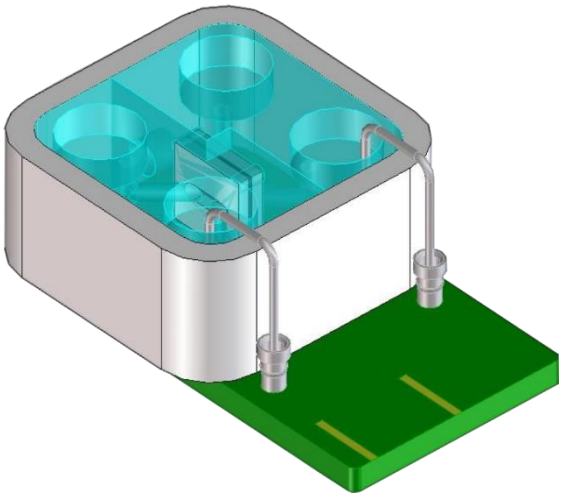
Nanopore Flow cell: assembly and cleaning procedure



This short user guide provides details on the individual components of the Nanopore Flow cell, its proper assembly and describes the cleaning procedure.

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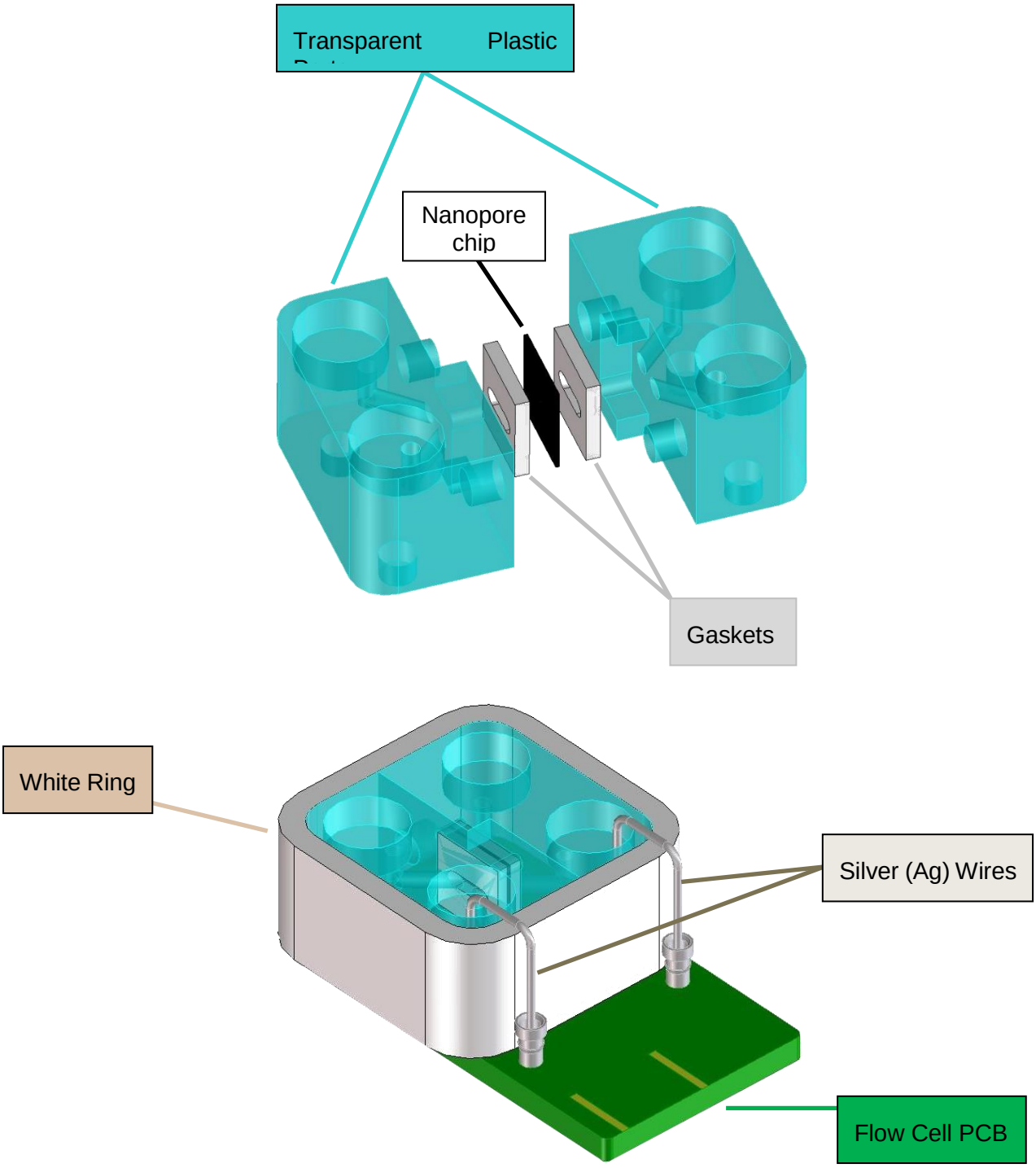
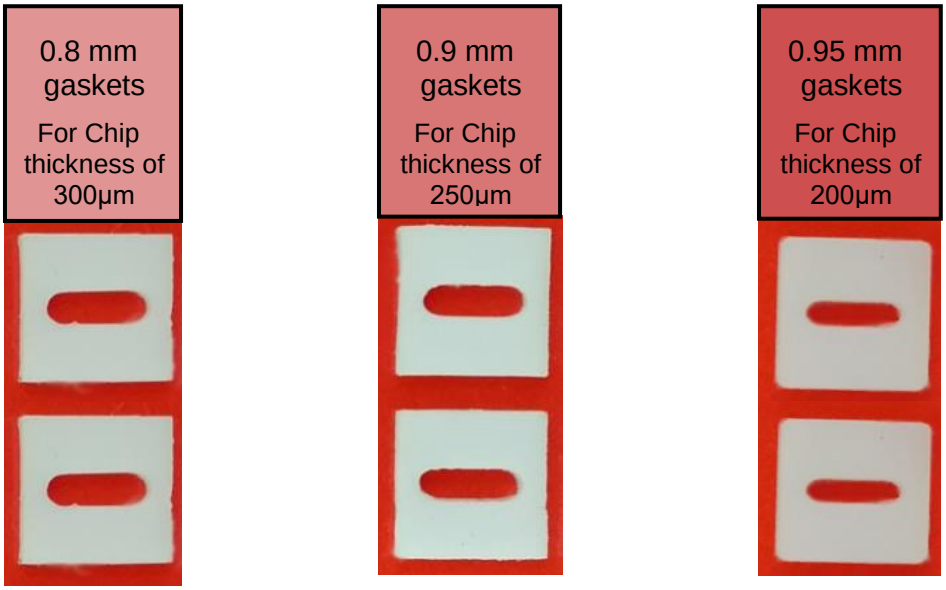
Pack List Items



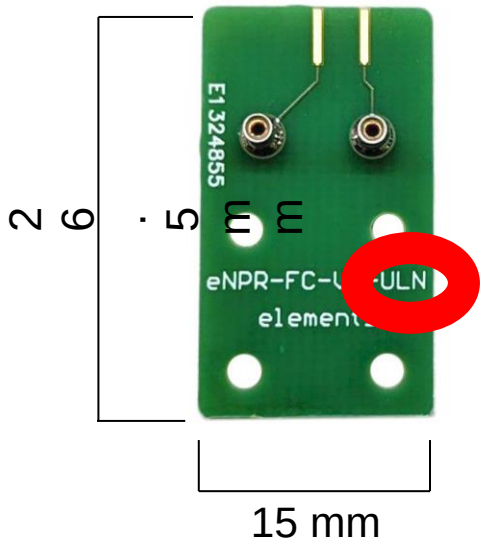
- Nanopore chips are available in different sizes with different thicknesses. This flow cell supports 5x5 mm and 200 µm thick nanopore chips.

- The thickness of the nanopore chips ranges usually from 200 to 500 micrometers. Three pairs of gaskets differing in their thickness are provided with the flow cell (0.8, 0.9 and 0.95 mm). Choose the gasket with the proper thickness (thicker chips need thinner gaskets) to fit nanopore chips of any thickness in this flow cell.



- This flow cell is available in three different materials: Standard PMMA, Delrin, Teflon and PC.

- The flow cell's PCB is available with two types of noise configuration: low noise (LN) and ultra low noise (ULN). With the LN configuration the maximum applicable voltage is ± 2000 mV. The ULN configuration allows the RMS noise to be reduced by ~30% but limits the applied voltage to ± 700 mV. The UltraLowNoise PCB is labeled as ULN to be distinguished from the LN one. If the label disappears, the two PCBs can be distinguished by the distance of the gold pads electrodes as shown in the figure below. **Important Note:** The EDR3 software must be set according to the selected PCB by clicking on the dedicated button as described in the dedicated "how-to" guide.



UltraLowNoise PCB

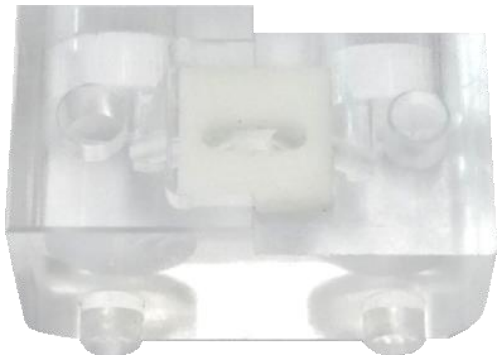
LowNoise PCB

Flow cell assembly & cleaning procedure

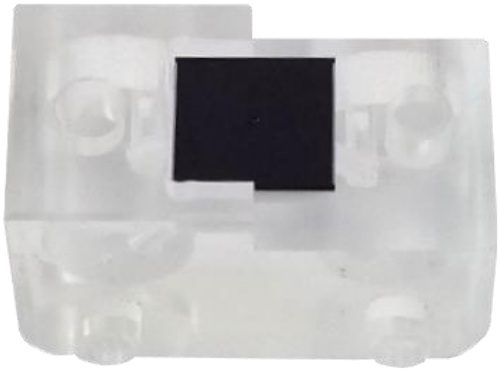
Before assembling the flow cell, check that every part is in good condition. In particular, check for the presence of deep scratches or crevices at the area in contact with the gaskets that may prevent the proper sealing.

1. Choose one of the transparent plastic parts and place it on a flat surface as shown below

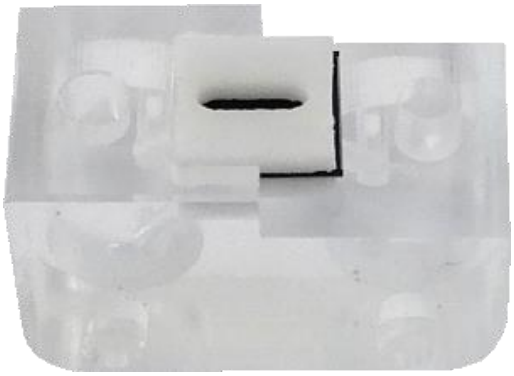
2. After selecting the appropriate gasket (according to the thickness of your nanopore chip), clean the gaskets with Isopropanol or Ethanol, then wash them with deionized water and dry them. Now place one of them on the plastic piece as shown.



3. Wash the nanopore chip in the same way as you washed the gaskets. Afterwards, place the chip on top of the gasket as shown below (the black square represents the chip)



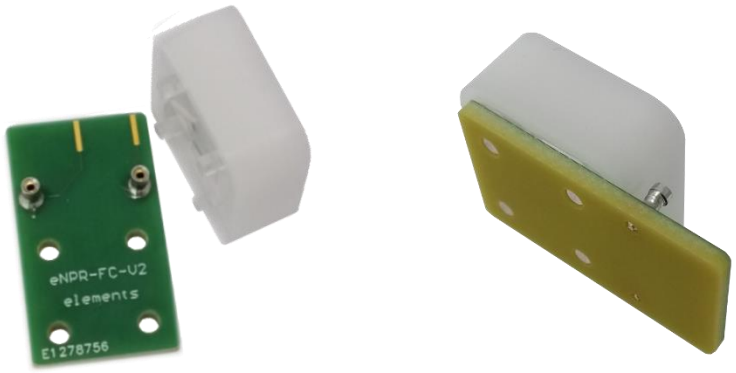
4. Next, place the second gasket on top of the nanopore chip.



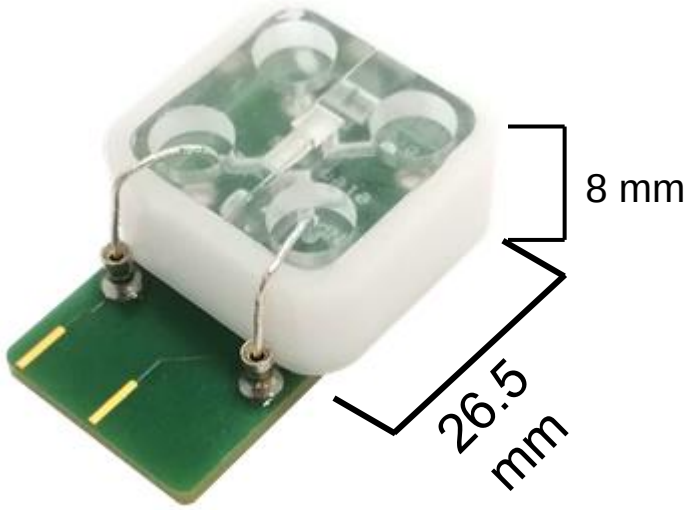
5. By inserting the second transparent plastic piece, you can feel the Compression of the gasket. You will have the same shape as a sandwich.

6. Fit the sandwich into the white ring

7. It is time to mount the sandwich surrounded by the white ring on the PCB. Be careful of the four clear plastic pins and the four holes on the PCB. You should place the prepared set on the PCB as shown in this figure, so that four cylindrical pins fit inside the PCB holes.



8. Insert now the silver wires into the PCB sockets as shown, so that the other side of the silver wires enters into the flow cell holes. Before fitting the silver wires into the PCB sockets, they must be chlorinated. The easiest way to chlorinate the silver electrodes is to dip the wires into a sodium hypochlorite solution for 10-15 minutes (the commercial bleach is fine for this purpose). Before installing the wires in the flow cell rinse them with abundant distilled water. Please make sure not to immerse in the bleach the portion of the wires which will fit into the PCB sockets.



9. Your flow cell is now ready, you have two chambers on the left and right, each containing a minimum of 10 and a maximum of 60 microliters. Using a 10-100µL pipette, inject your electrolyte solutions through the holes pointed by the blue arrows in the figure below.

10. Insert the flow cell into the eNPR reader.

11. At the end of each experimental session, clean the flow cell as described below. Note: the use of any solvents other than those listed above is not recommended. Before using a solvent, check its compatibility with the flow cell material (PMMA, Delrin, Teflon, PC). The cleaning procedure refers to the plastic parts of the flow cell. The gaskets can be cleaned simply by rinsing with distilled water. Do not use solvents such as alcohols acids or bases to clean the gaskets.

PMMA Flow cell cleaning:

Carefully separate the components, rinse the flow cell with DD water. Spray rubbing alcohol (Isopropyl Alcohol) and gently clean the components using a soft bristled toothbrush. You can use compressed air to remove rubbing alcohol (Isopropyl Alcohol) and water until the chip is dry. Once all the components are clean and dry, store them in the dry airtight container.

To remove oligonucleotides such as DNA aptamers that are weakly bound to the flow cell surface, you can use a 0.1 M buffer containing KH_2PO_4, KCl and NaCl salts, pH of 7.4.

If you have used biological substances, you can use 10% bleach solution for 10 minutes and then 70% Isopropyl Alcohol) for 10 minutes.

At the end of any treatment, wash with DD water and let the flow cell dry.

Do not use Ethanol, Acetone or pure bleach to clean the PMMA flow cell. If dishwashing liquid is used, the flow cell hydrophobicity changes.

Delrin® Flow cell cleaning:

The Delrin-made flow cell can be cleaned by following the above described procedure. If needed, Delrin material can tolerate the use of Ethanol 70% and Acetone. After the treatment, wash with abundant DD water. DO NOT use bleach (even if diluted). Exposure to strong acids or bases outside the Ph range of 4 - 9 is not tolerated.

PC Flow Cell cleaning

The PC-made flow cell can be cleaned by following the above described procedure. PC tolerates acetic acid (20%) and sodium hydroxide (20%) solutions. Do not use pure bleach (use 10% diluted bleach, if needed), Acetone and abs Ethanol (use 20% diluted Ethanol, if needed).

Teflon™ Flow Cell cleaning

Teflon is the most versatile plastic in terms of chemical compatibility. It is highly resistant to most acids, alcohol, detergent and solvents. In any case, we recommend not to expose the flow cell to solvents for a long period of time. After some minutes, wash with DD water and dry.