

X-Cell – Electrolyser test cell

Overview & assembly manual

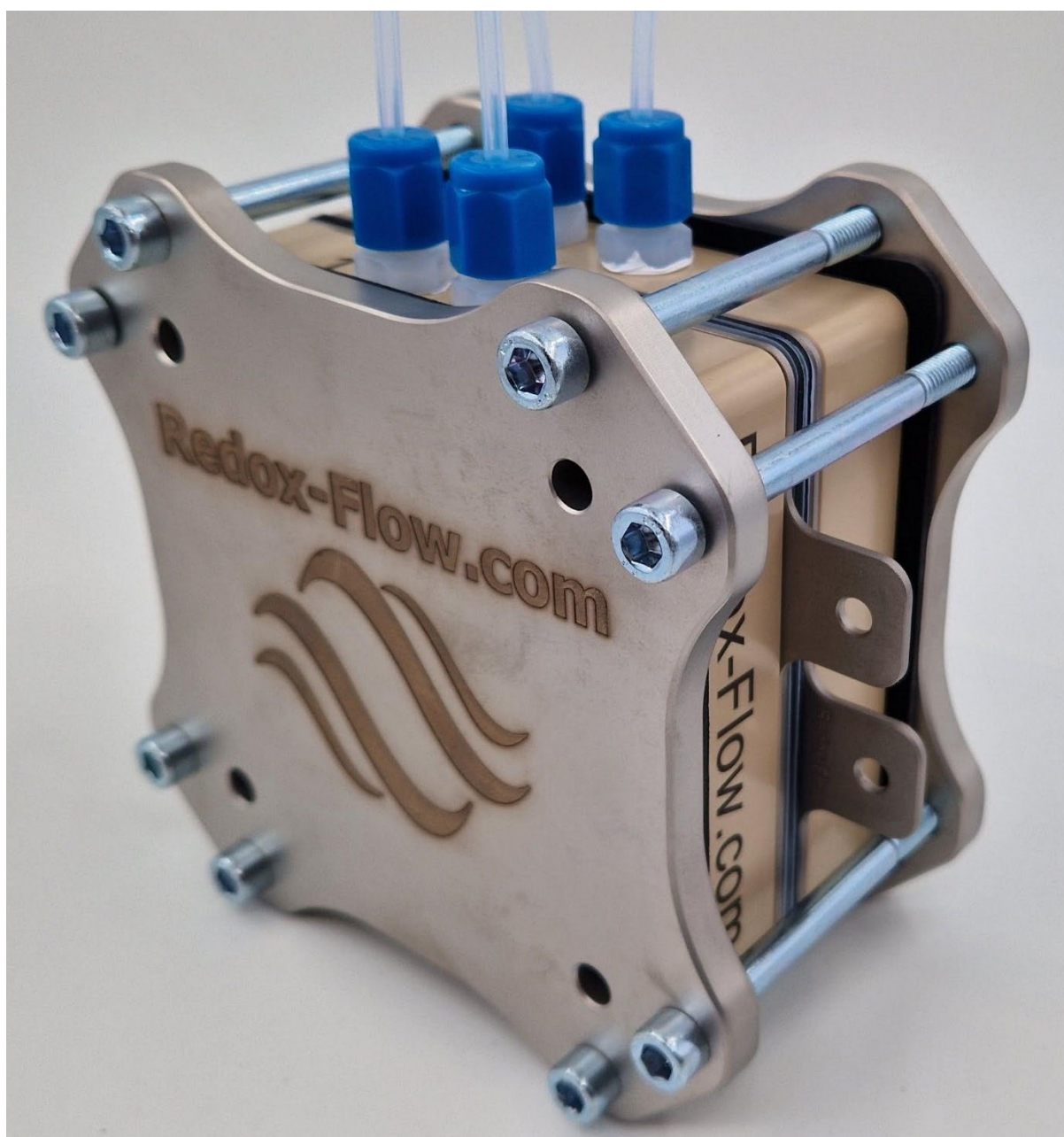


Notes

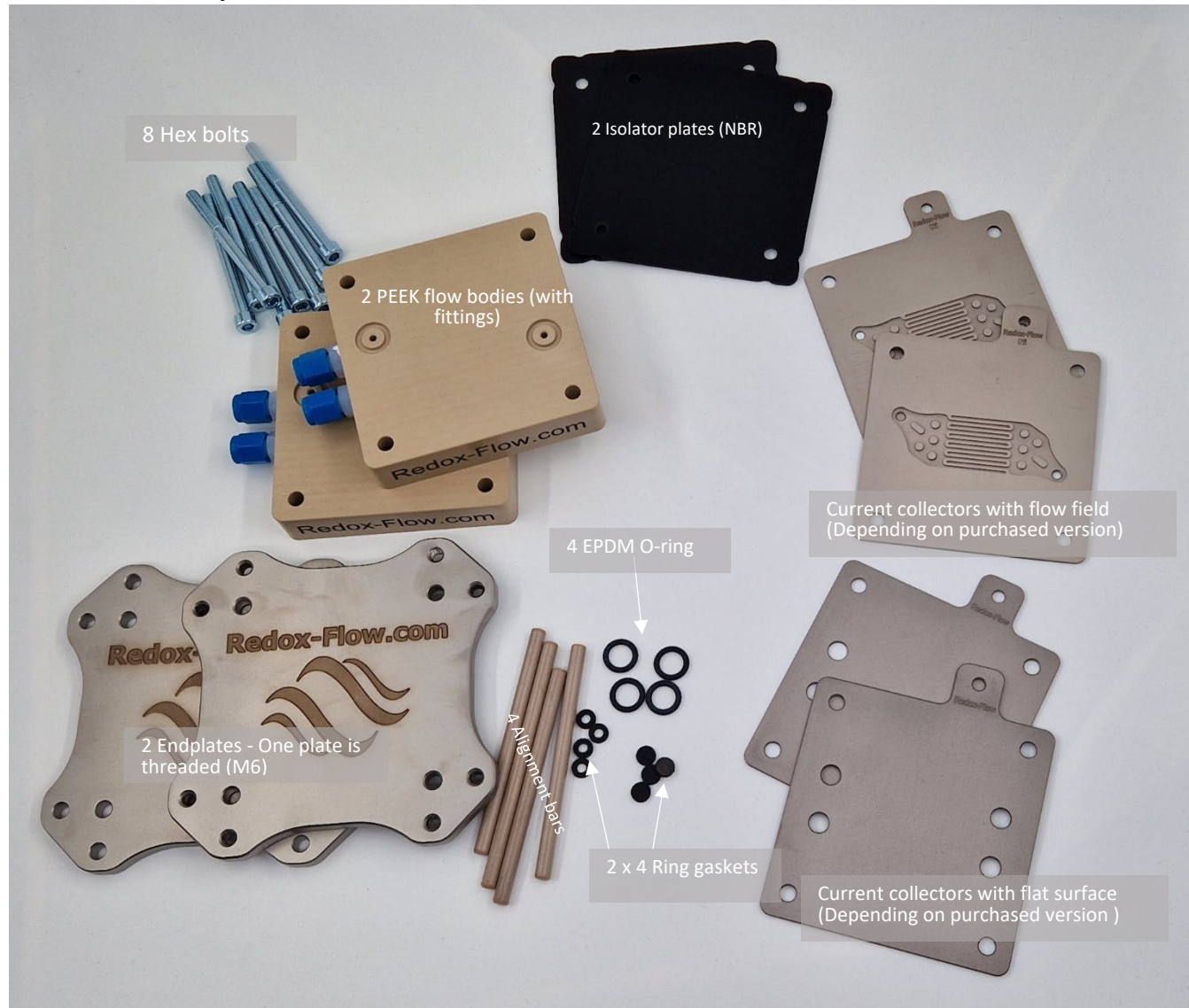
This electrolyser cell is intended for research purposes only and can be assembled in several ways.

There is no warranty on performance, corrosion, or lifetime on the items. It is purely for research purposes.

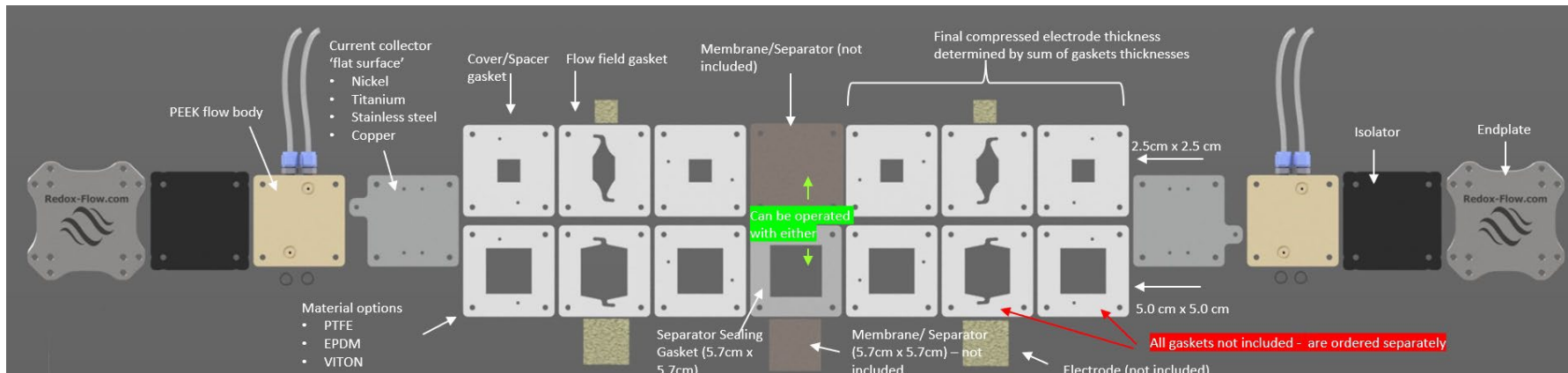
Version 3.1 – June 6, 2024



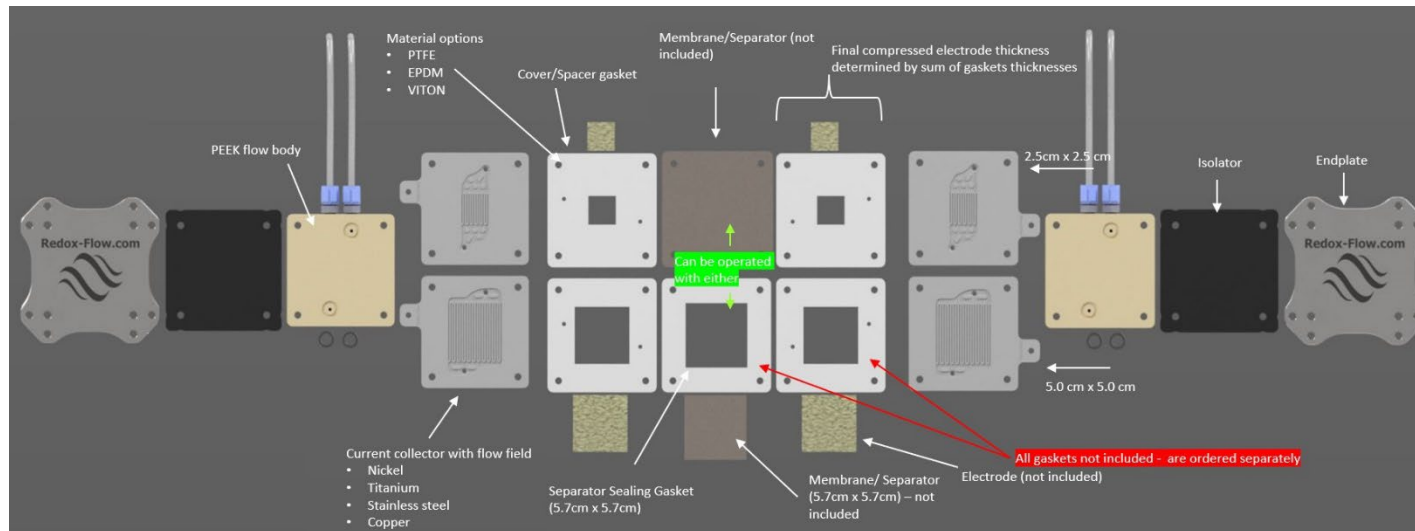
Overview of included components



Overview of variants



Overview of variants with **flat surface current collectors**. Assembly is from left to right – top shows 2.5cm x 2.5cm while bottom shows 5cm x 5cm assembly.

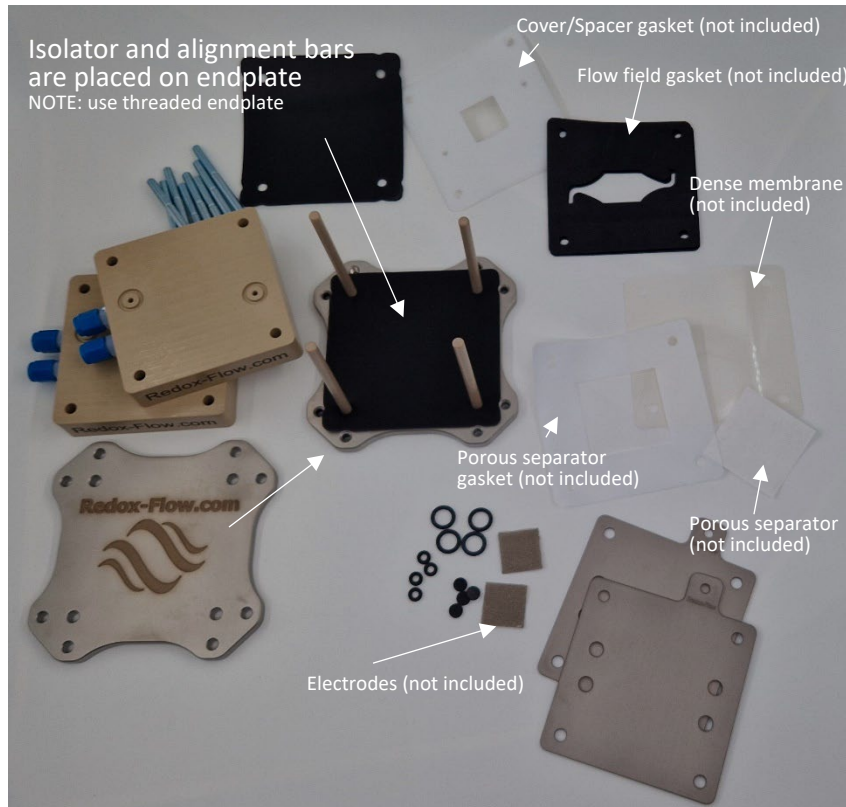


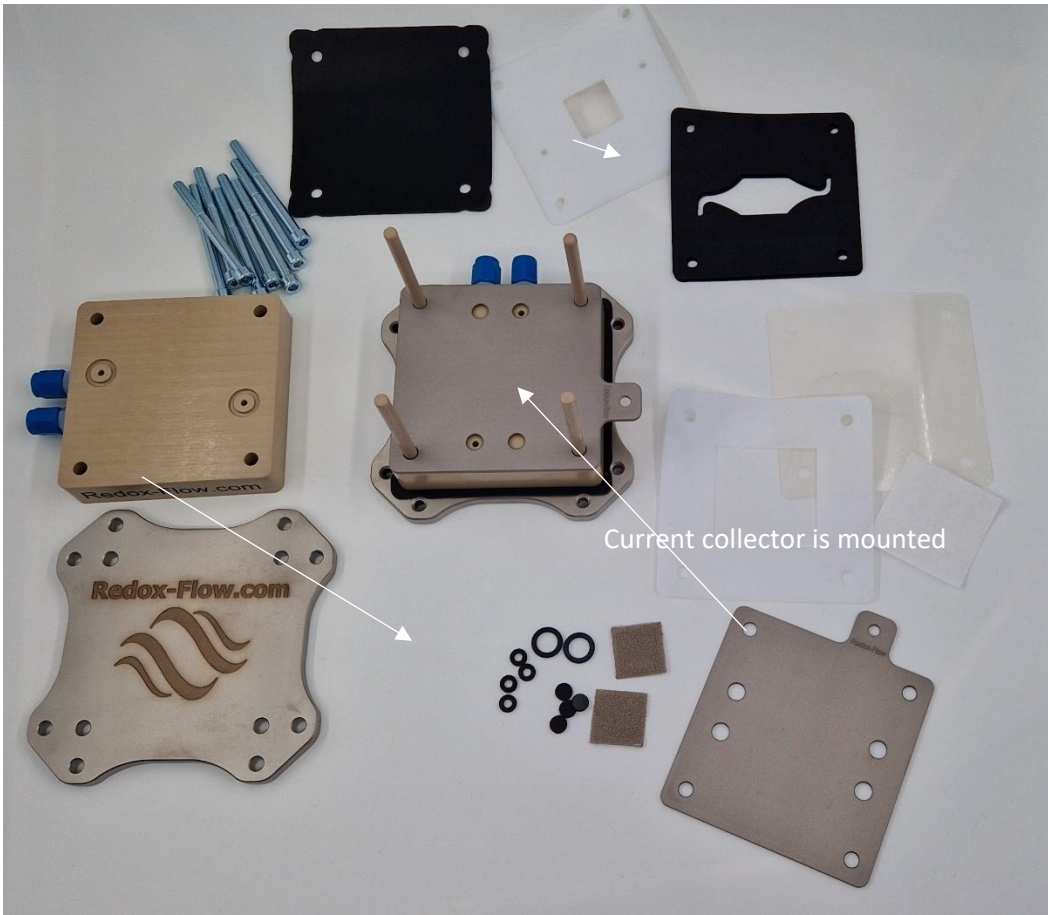
Overview of variants with **flow field current collectors**. Assembly is from left to right – top shows 2.5cm x 2.5cm while bottom shows 5cm x 5cm assembly.

Assembly with flat current collectors

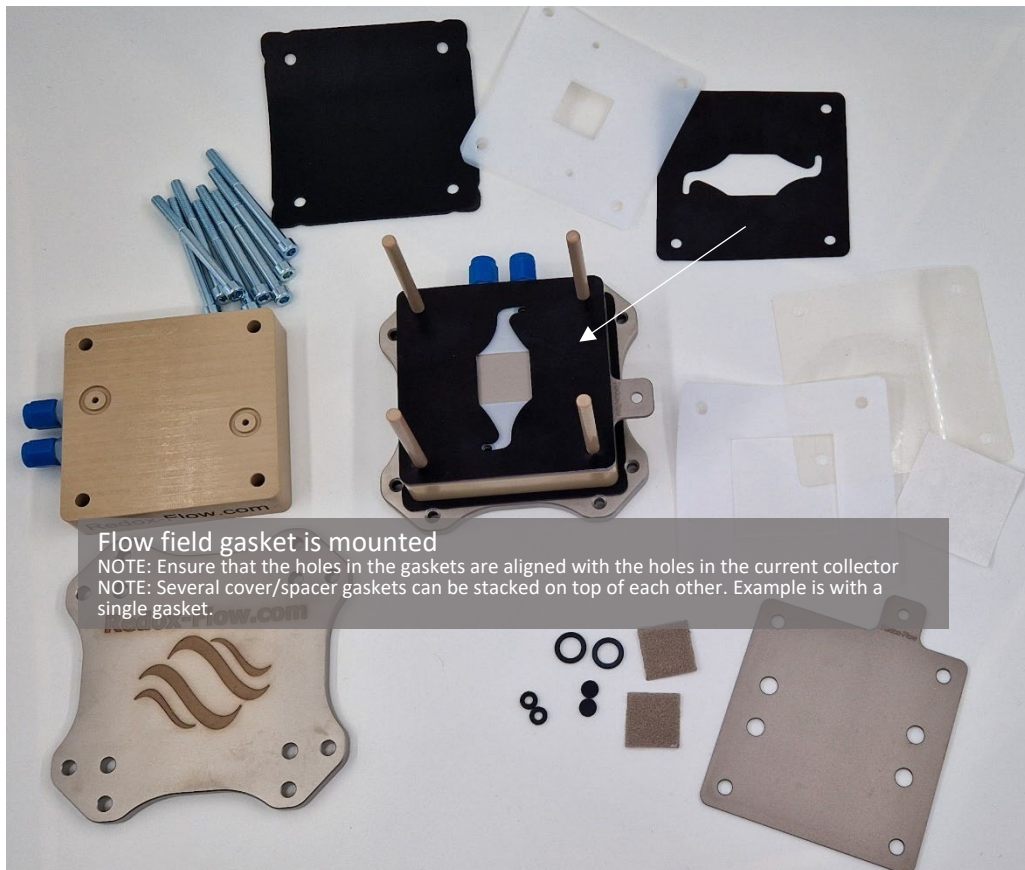
The following is an example on a 2.5cm x 2.5cm cell.

NOTE: The order of assembly does not strictly need to follow this assembly manual. Depending on use and experience it can be done in different order.





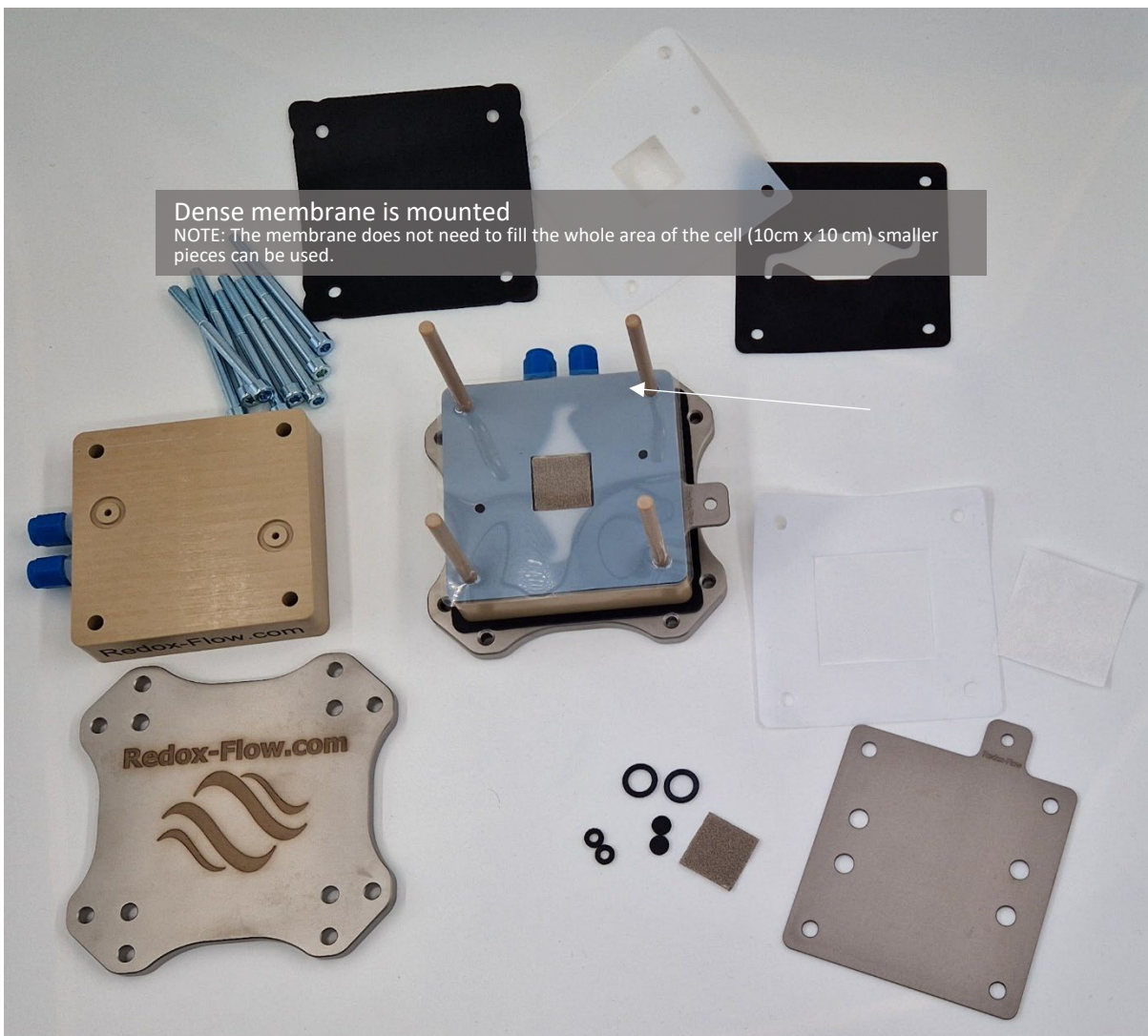
Ring gaskets are placed in holes in current collectors.
NOTE: Ring gaskets with holes are placed on top of the PEEK body with holes and vice versa for ring gaskets without holes
NOTE : Ring gaskets are included to minimize electrochemical side reactions on the current collector. The ring gaskets do not help sealing the cell and can be left out.



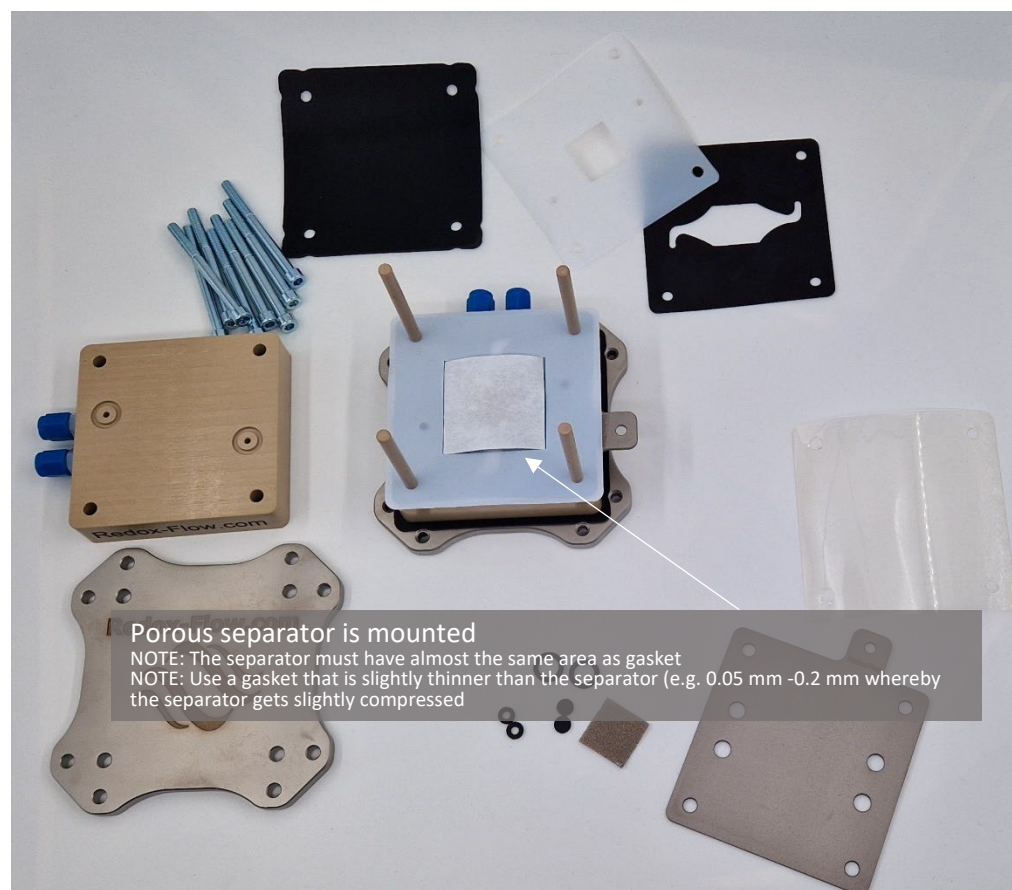
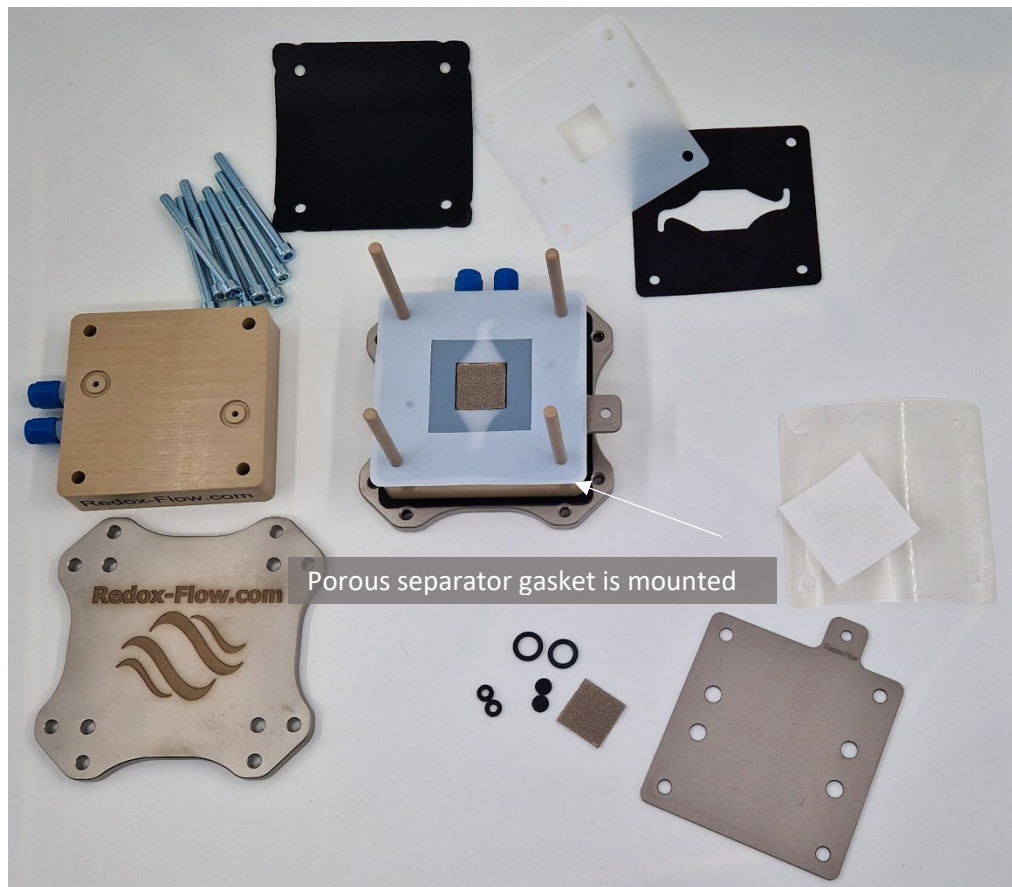
IMPORTANT – In the following two different ways of assembling the cell is shown.

- A. For dense separators/membranes.**
- B. For porous separators (e.g. Zirfon) - to prevent leaking through the side of the separator.**

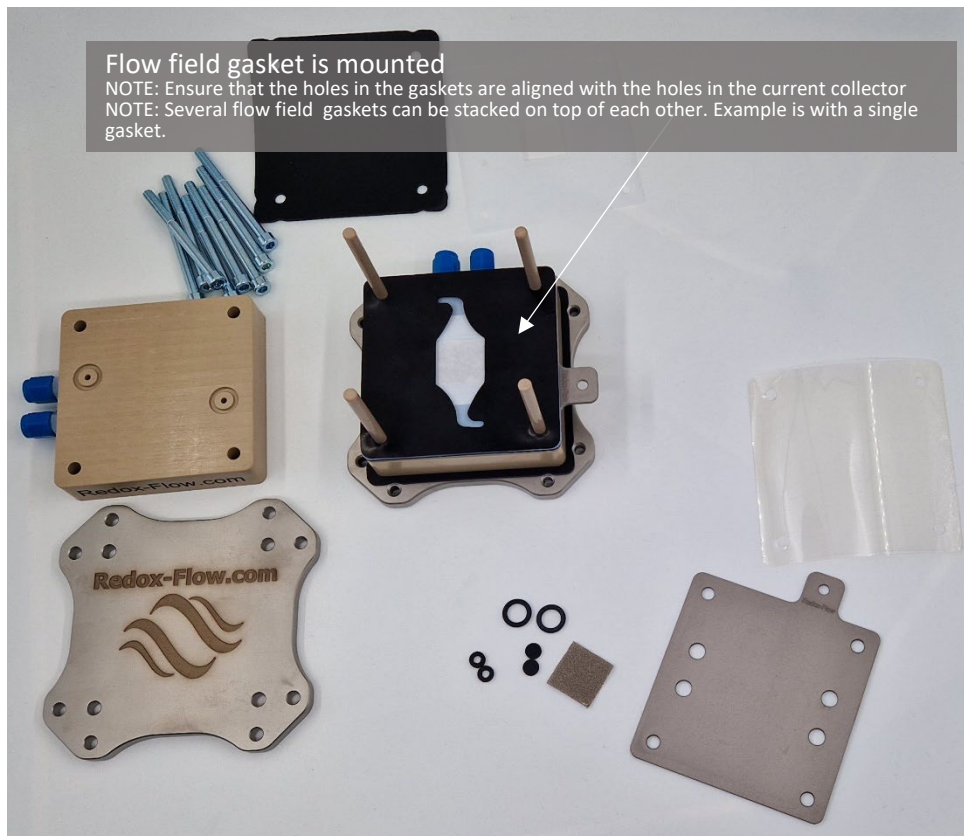
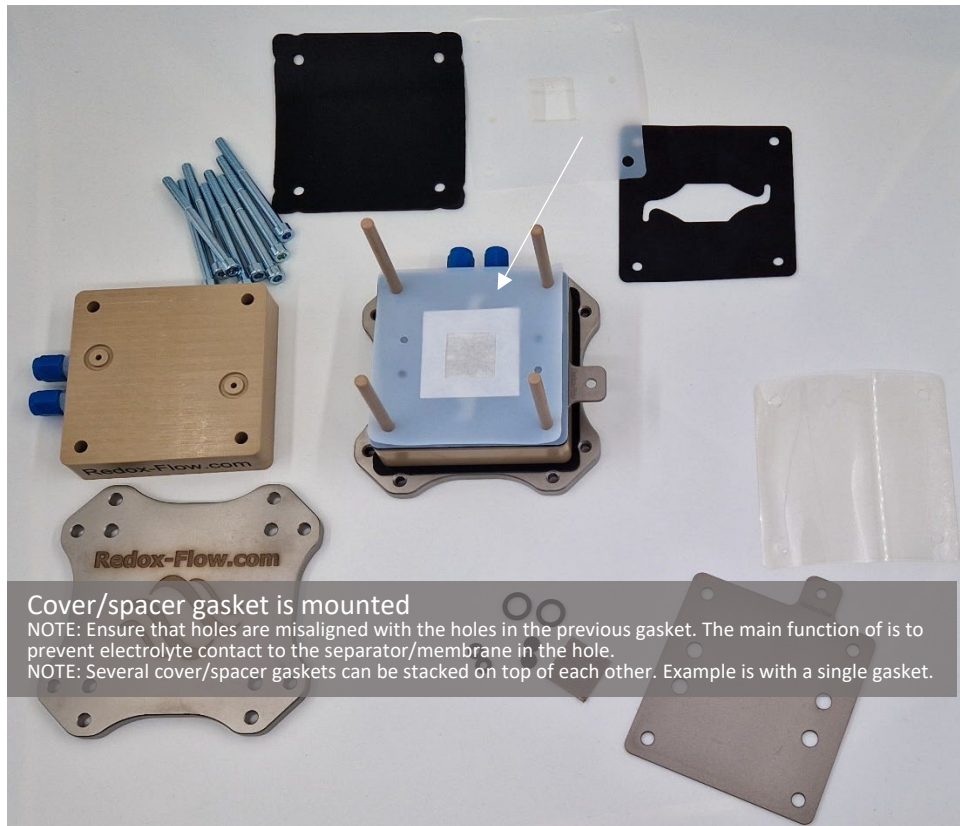
Assembly A - For dense separators/membranes

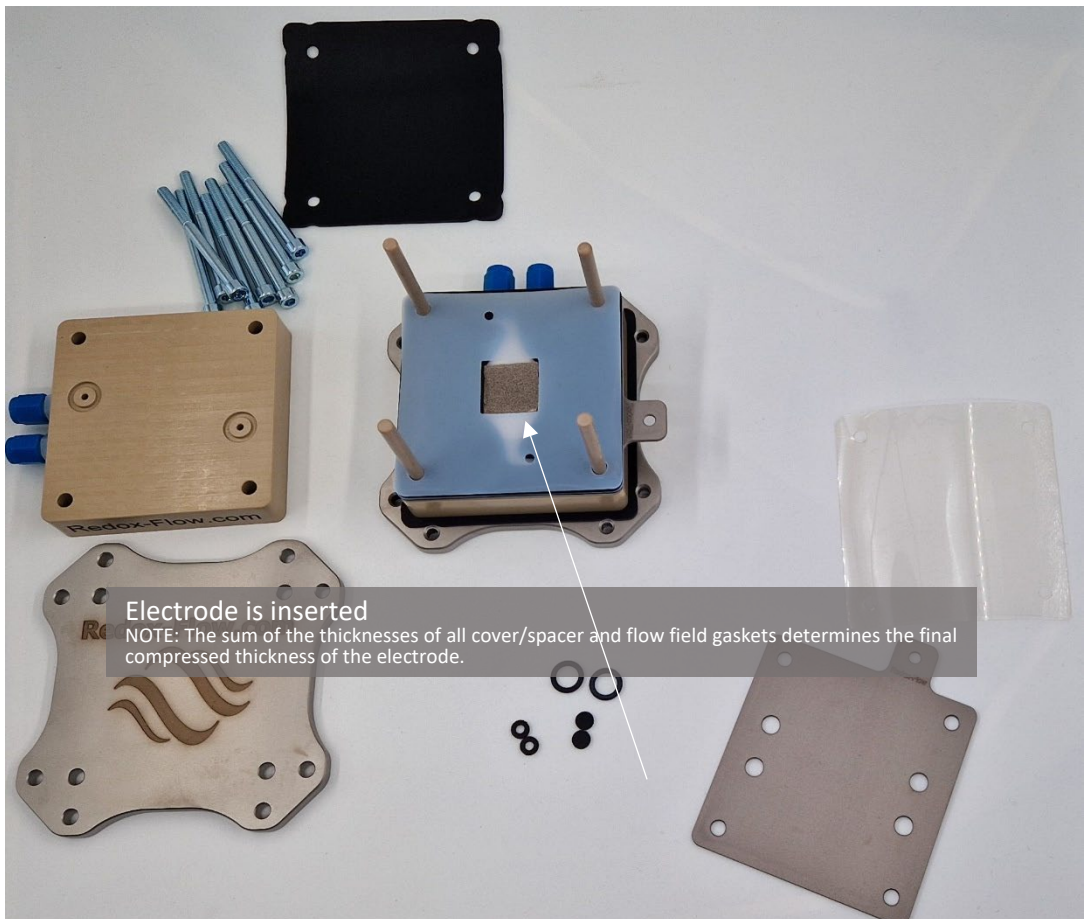
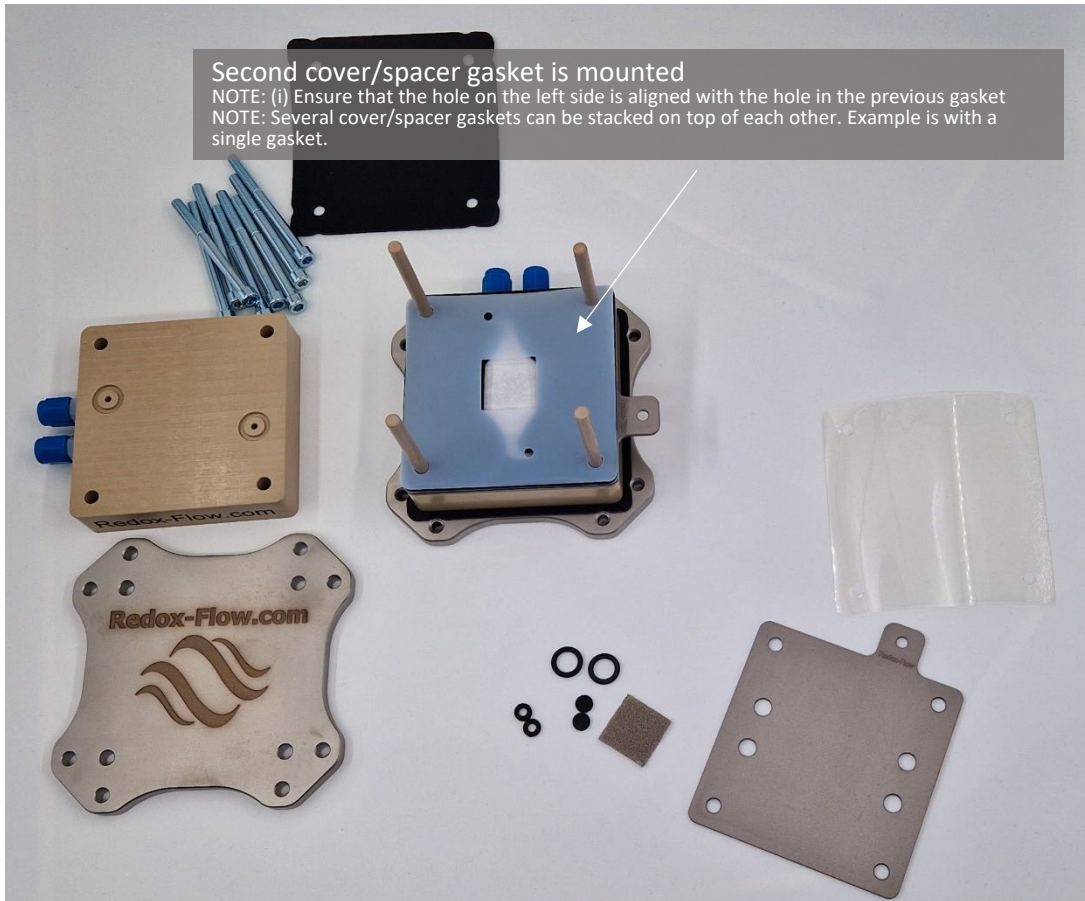


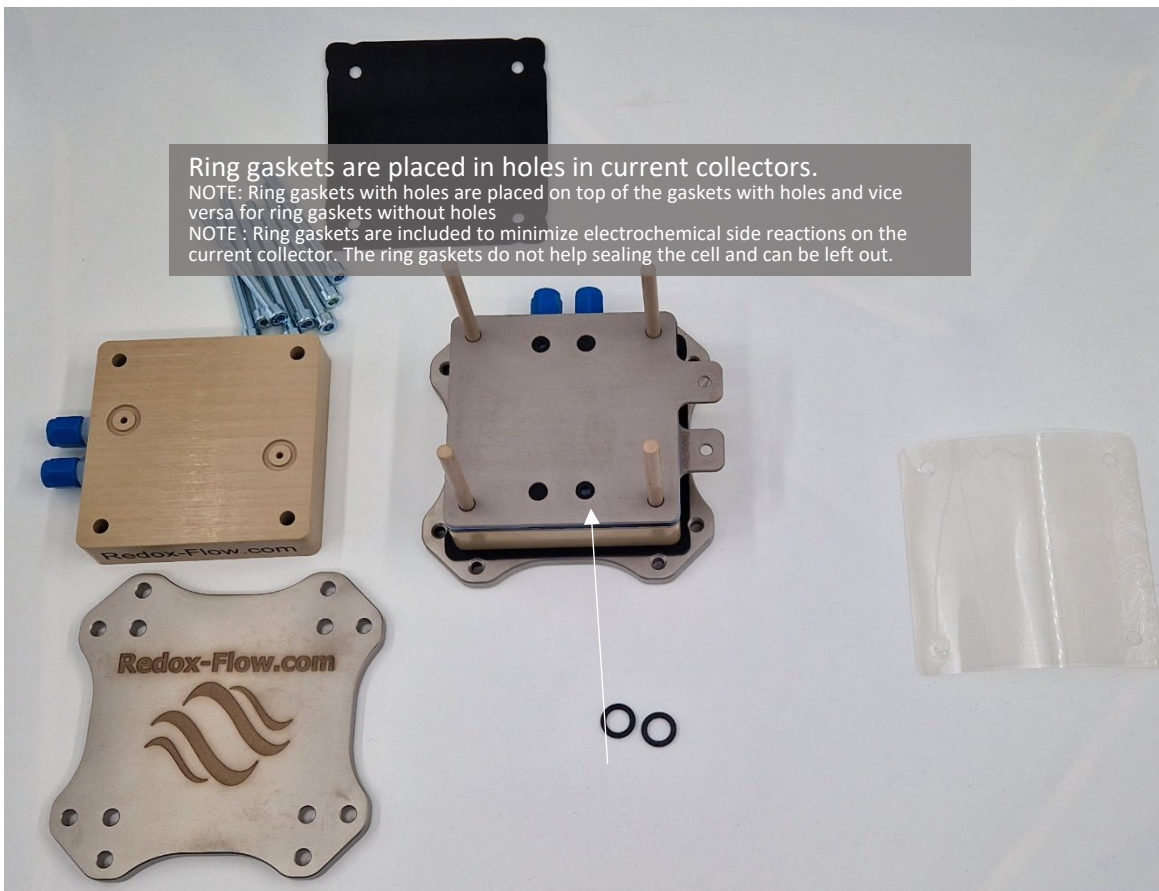
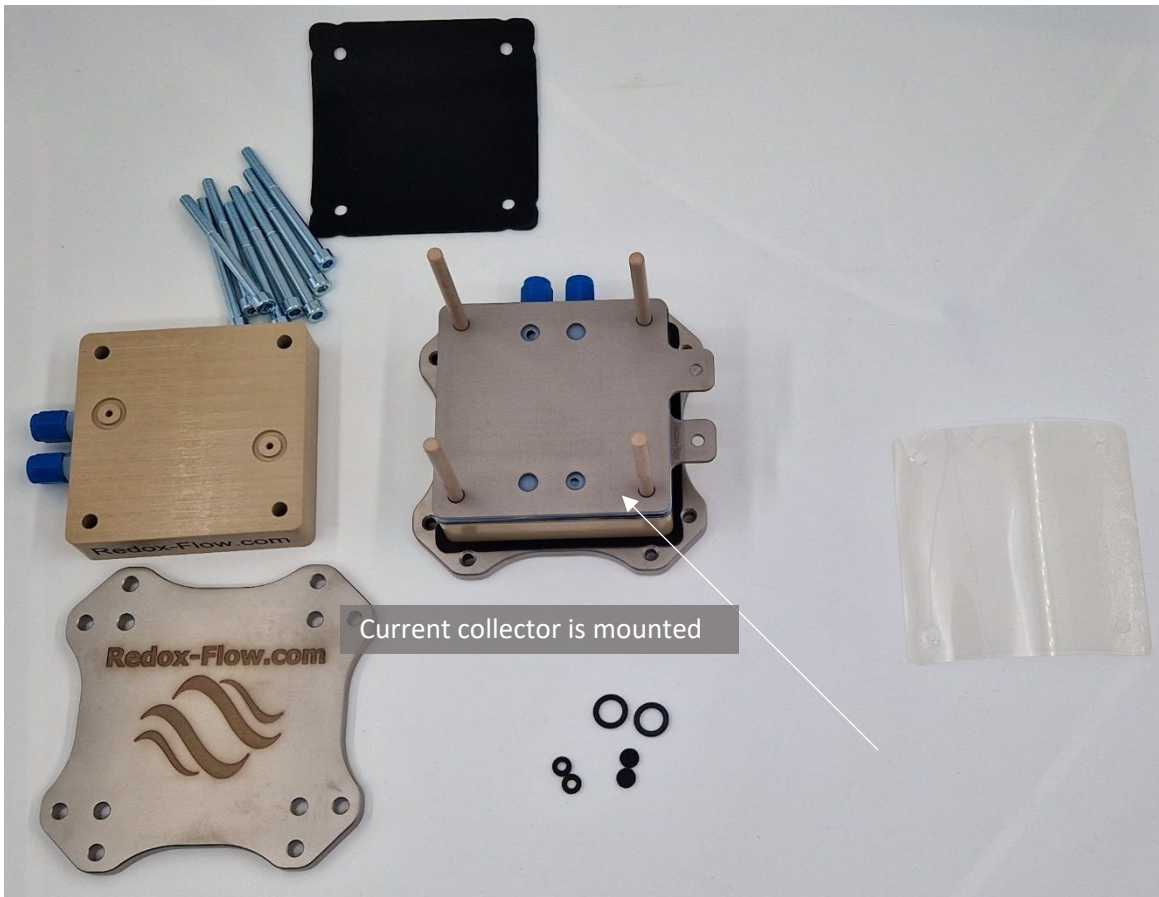
Assembly B - For porous separators

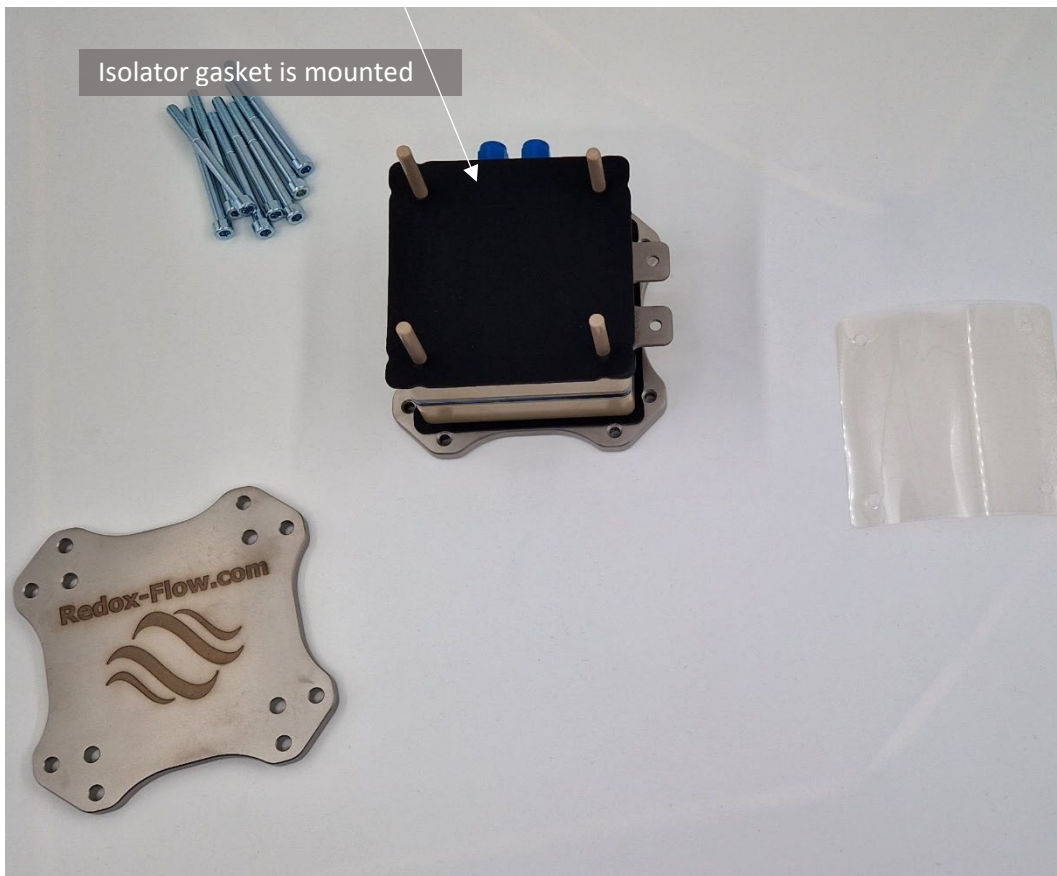
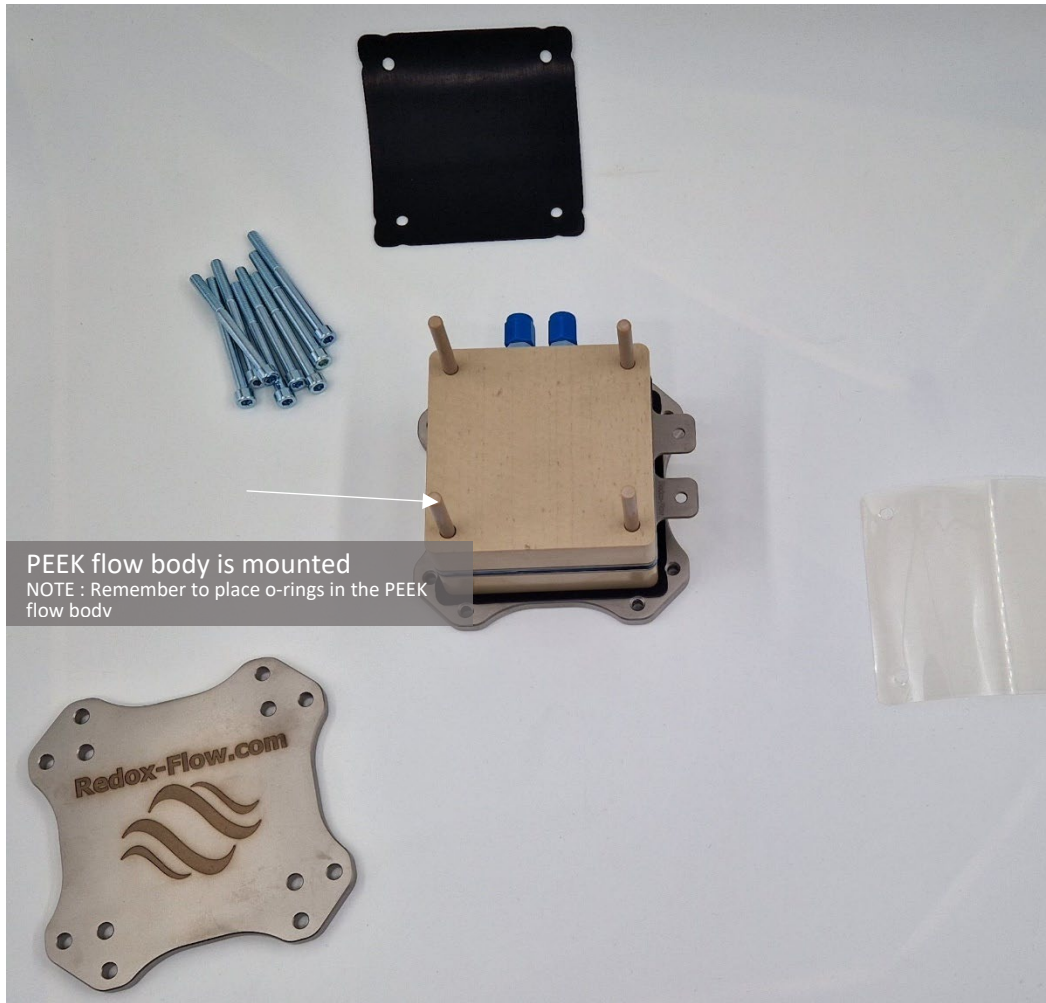


From here both assembly A and B follows the same procedure

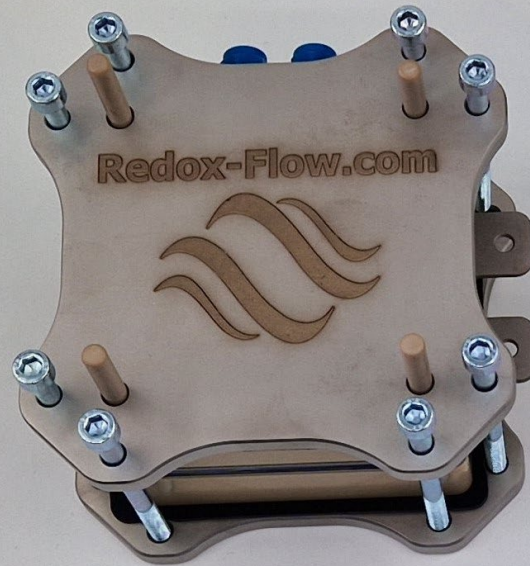




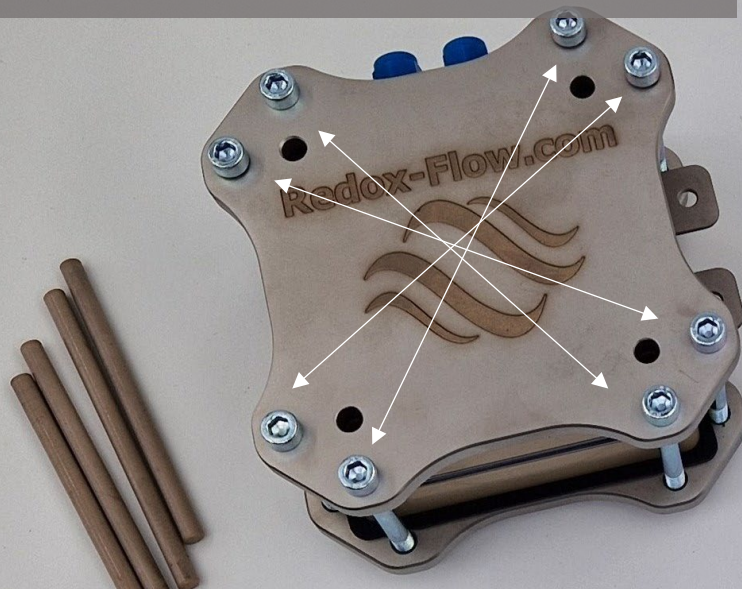




Endplate and hex bolts
are mounted

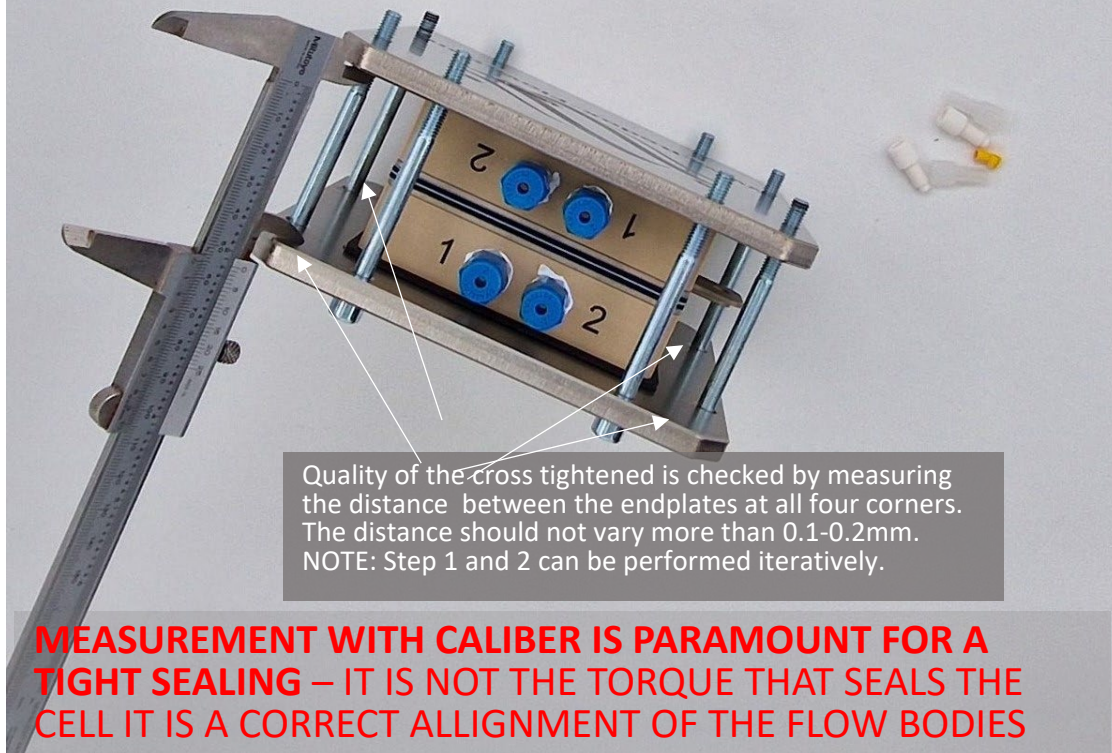


STEP 1 - IS VERY IMPORTANT FOR A
TIGHT SEALING FOR THE CELL



Hex bolts are cross tightened up to 6 Nm
NOTE: Remember to pull out alignment bars before the cell
is too tight

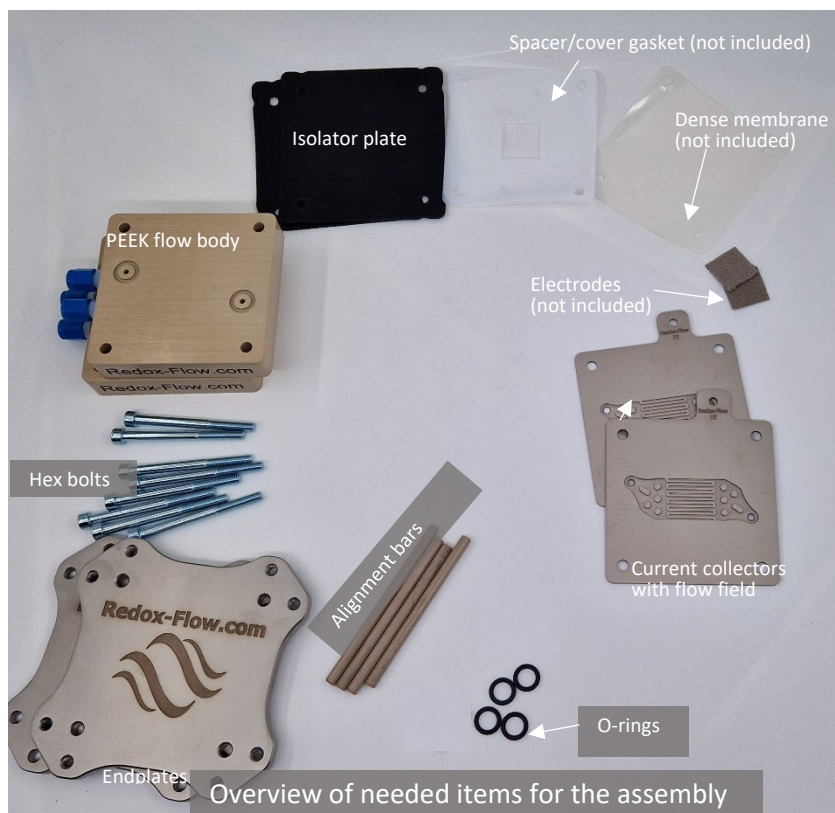
STEP 2 - IS VERY IMPORTANT FOR A
TIGHT SEALING FOR THE CELL

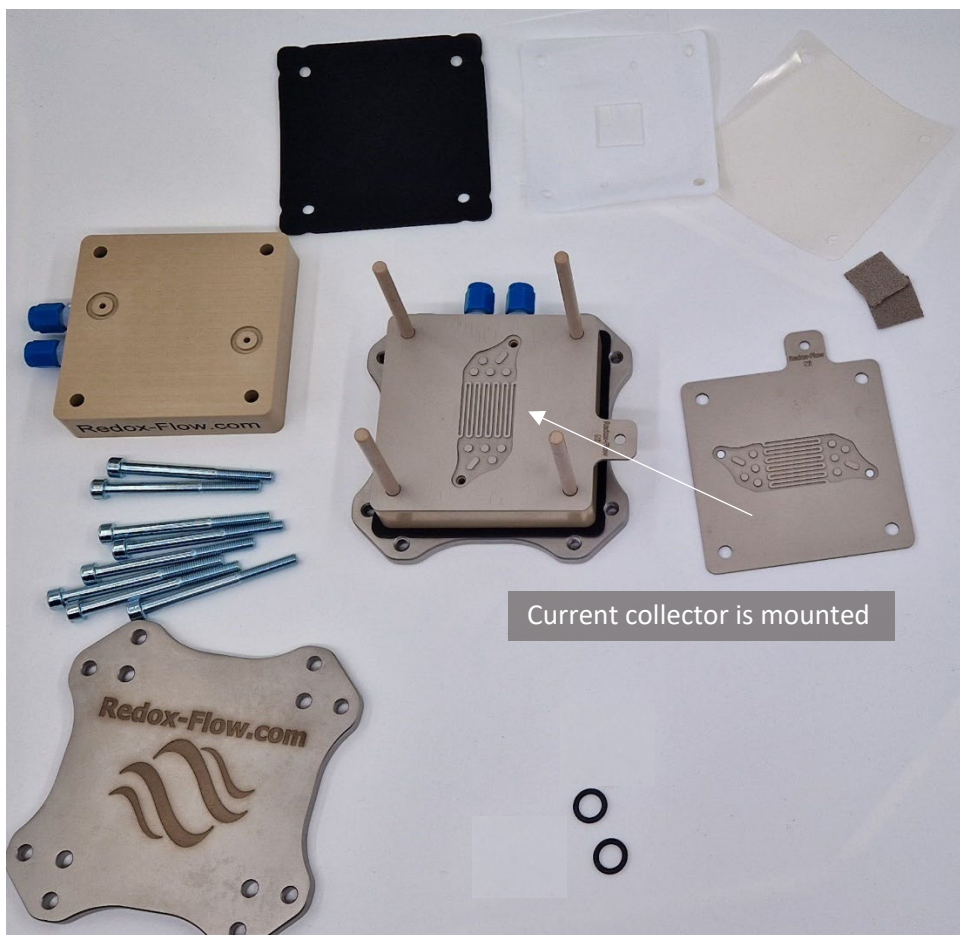
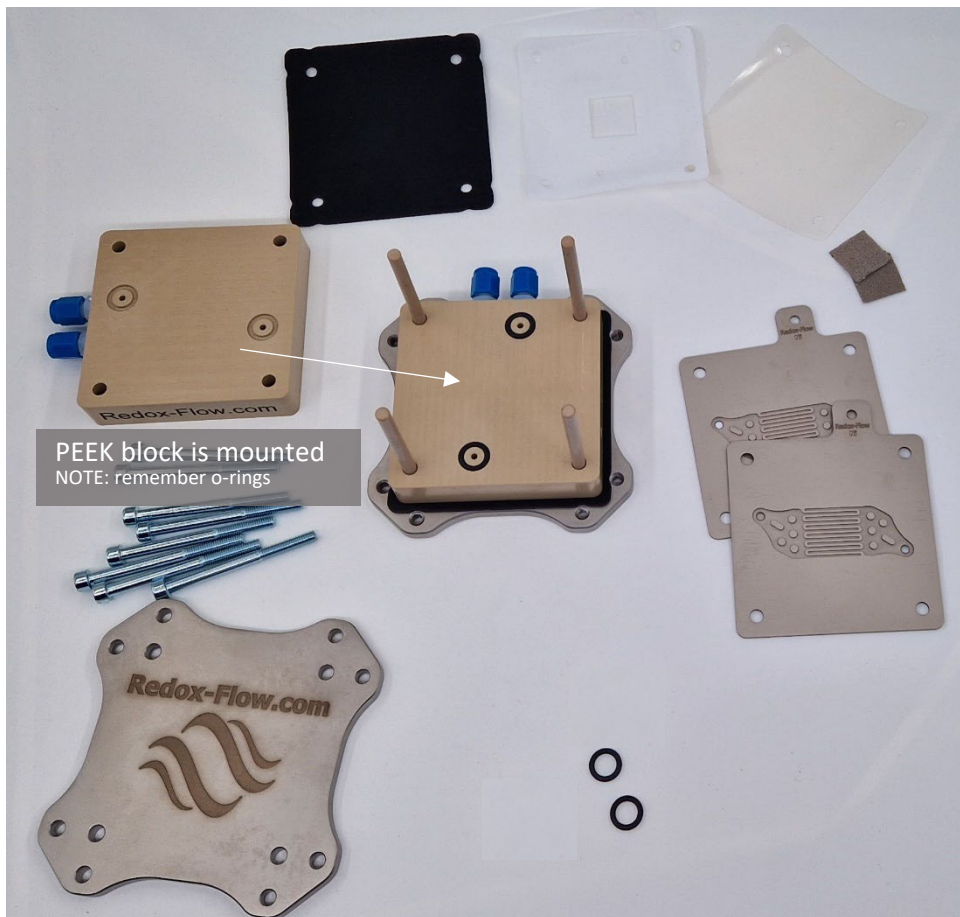


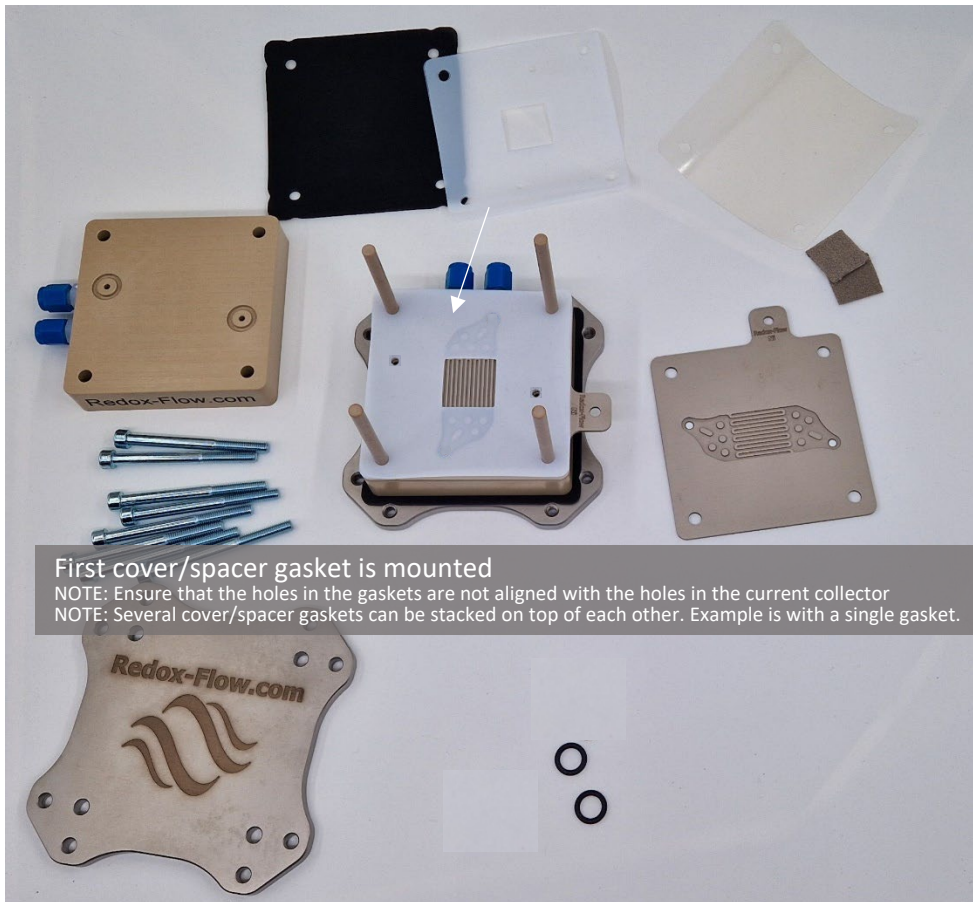
Assembly with flow field current collectors

The following is an example on a 2.5cm x 2.5cm cell.

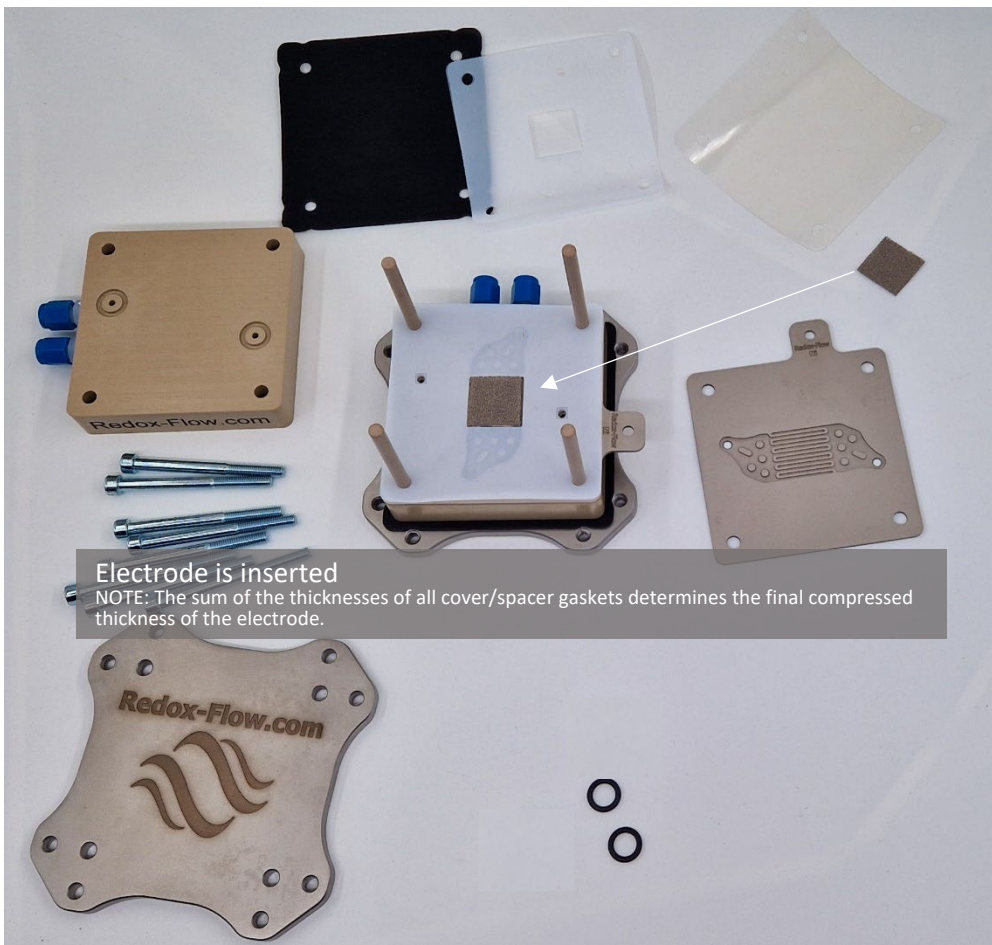
NOTE: The order of assembly does not strictly need to follow this assembly manual. Depending on use and experience it can be done in a different order.



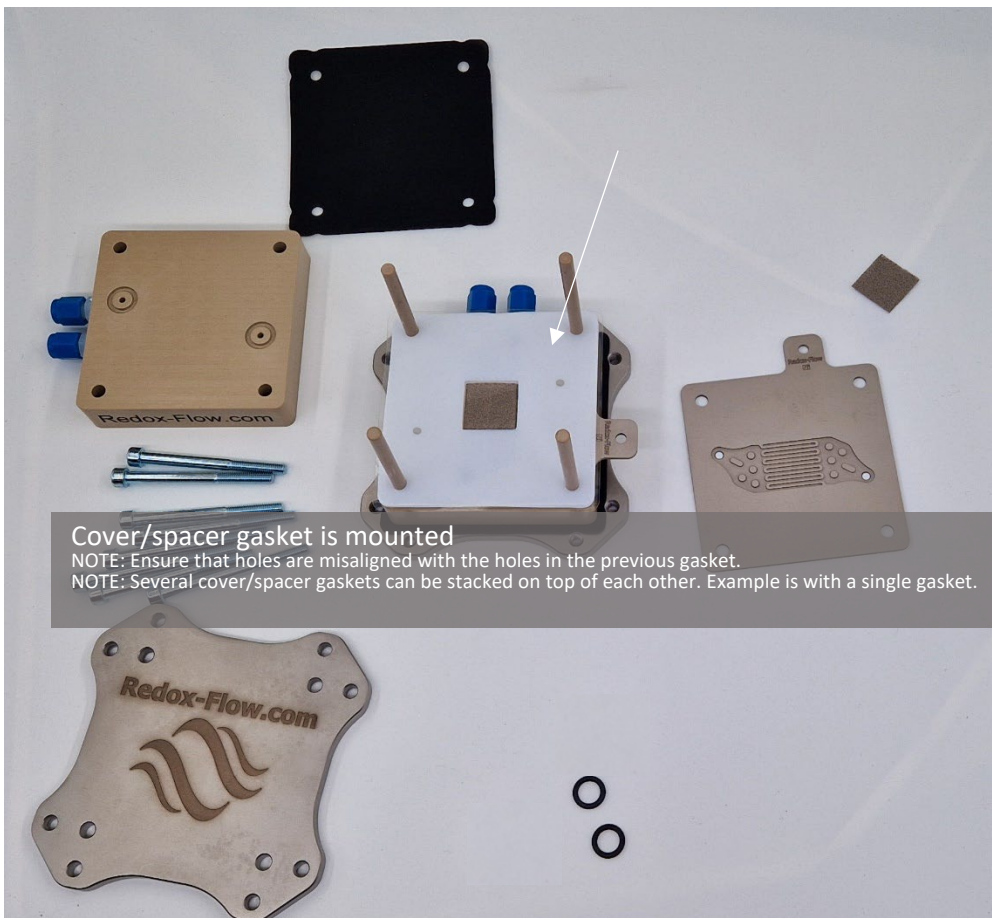
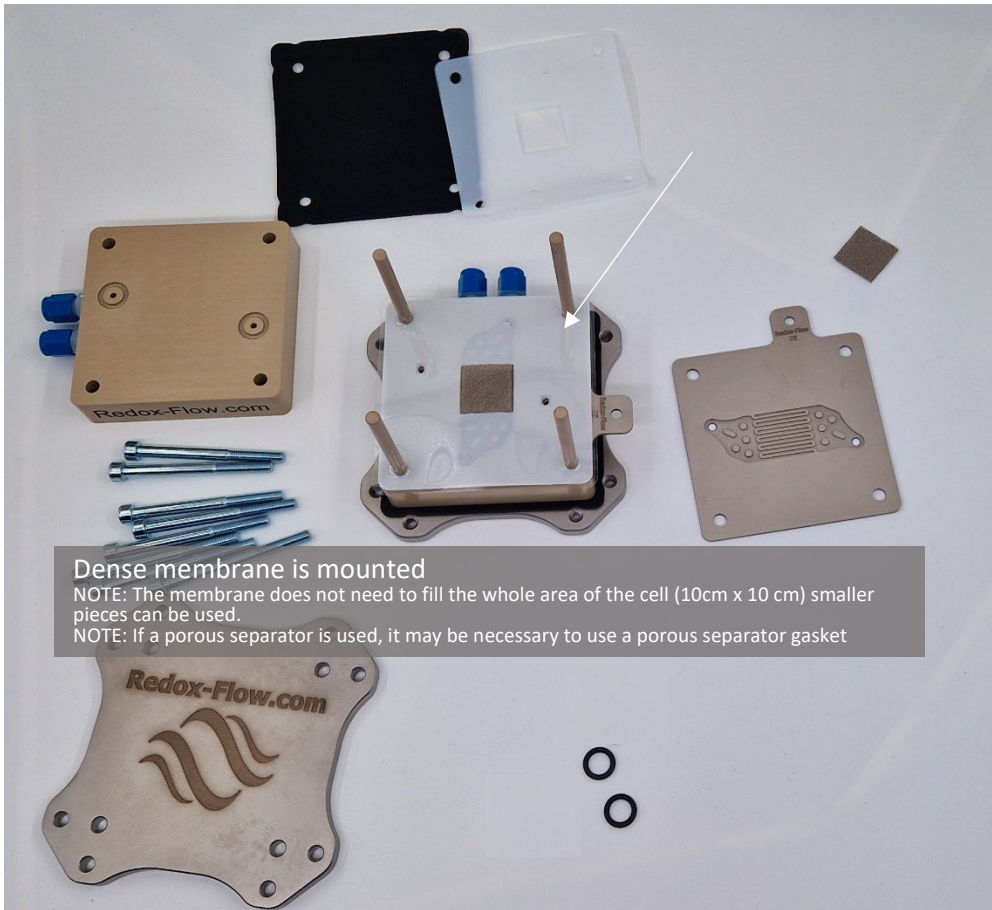


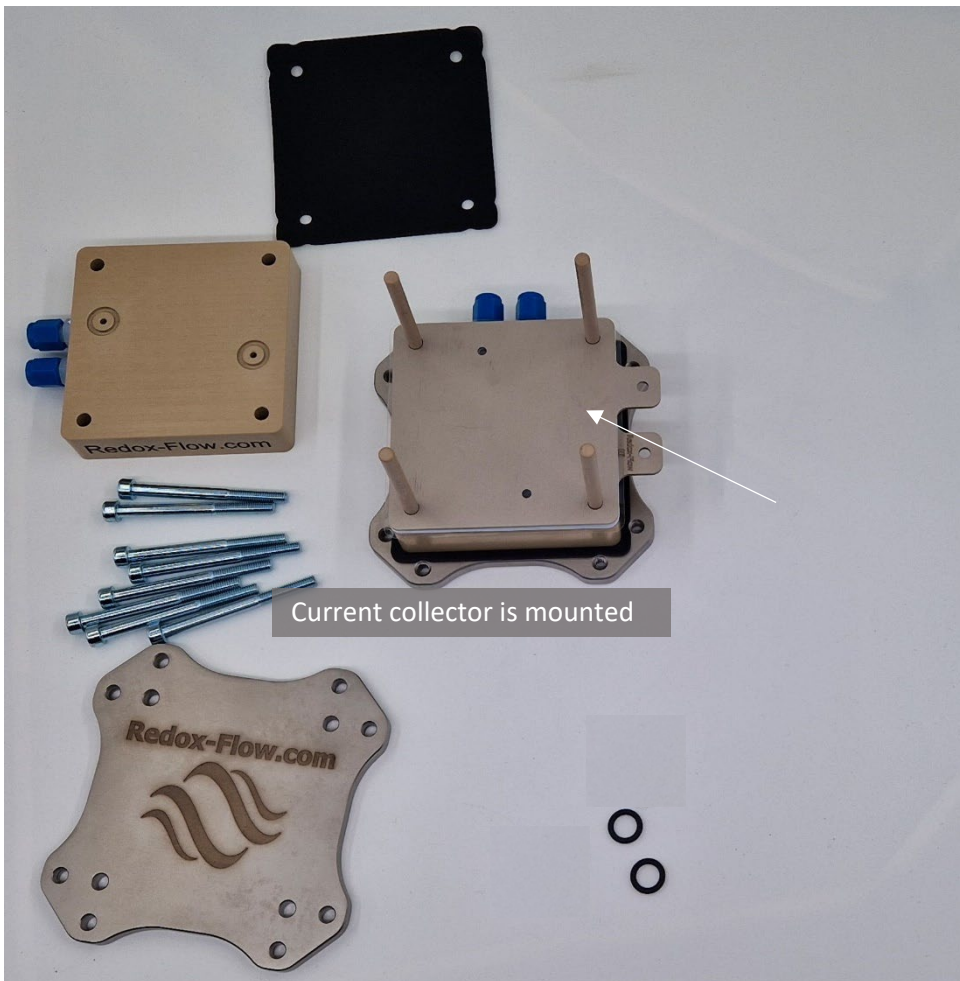
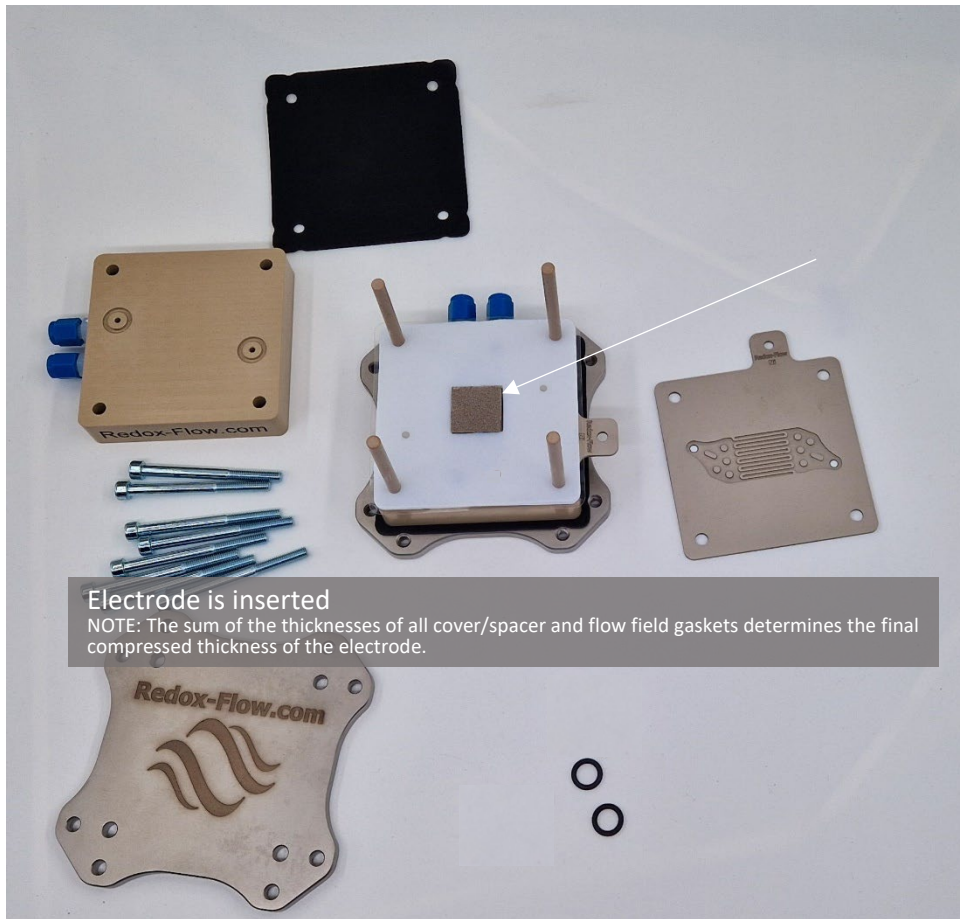


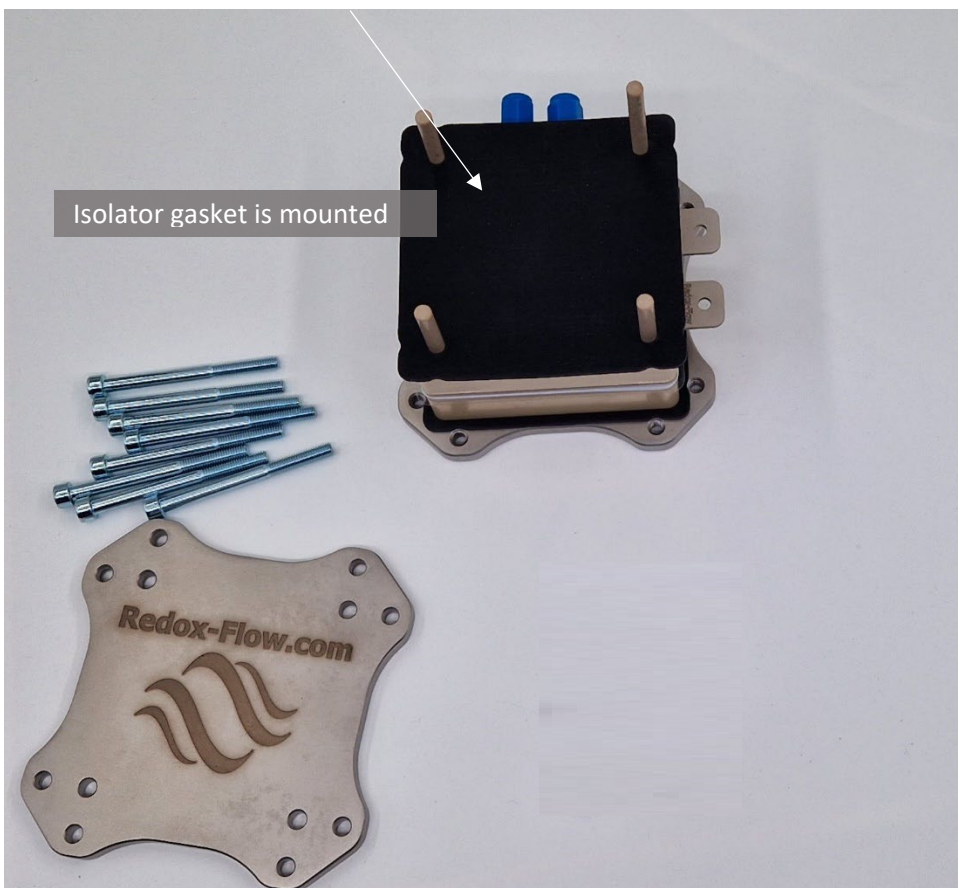
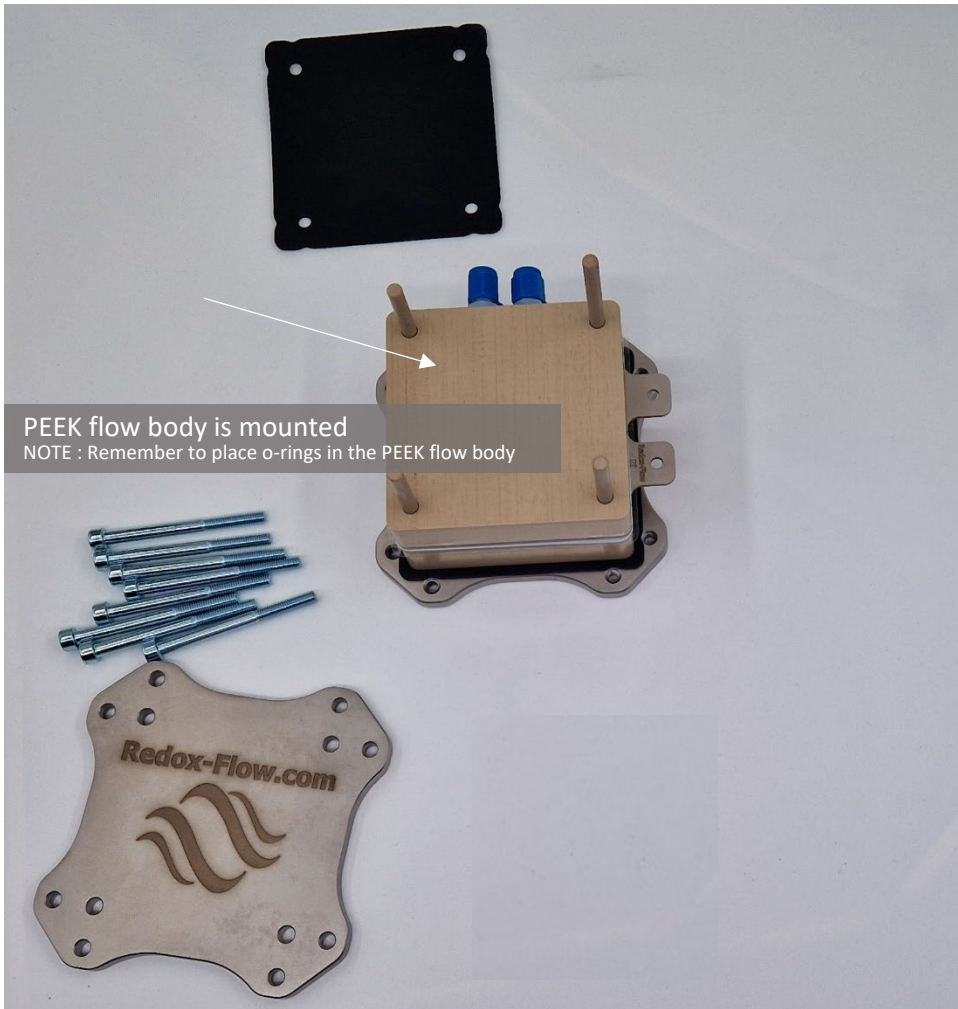
First cover/spacer gasket is mounted
 NOTE: Ensure that the holes in the gaskets are not aligned with the holes in the current collector
 NOTE: Several cover/spacer gaskets can be stacked on top of each other. Example is with a single gasket.



Electrode is inserted
 NOTE: The sum of the thicknesses of all cover/spacer gaskets determines the final compressed thickness of the electrode.



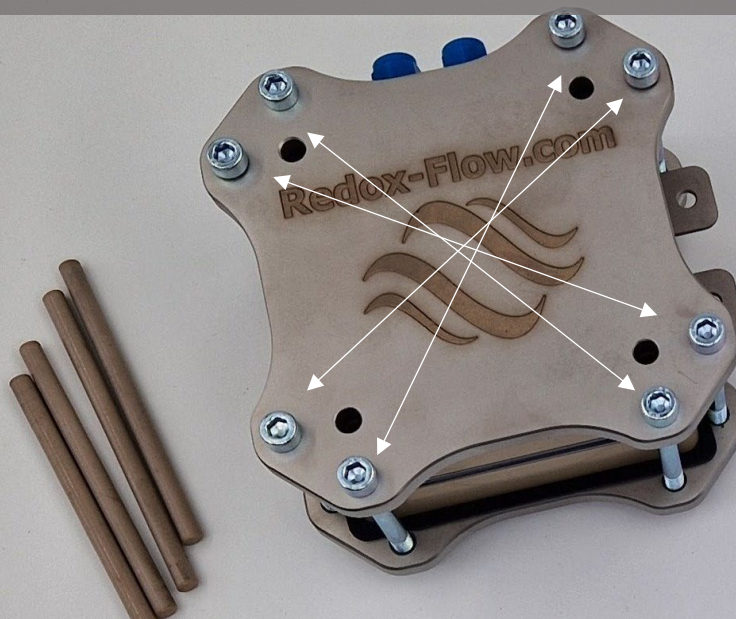




Endplate and hex bolts
are mounted

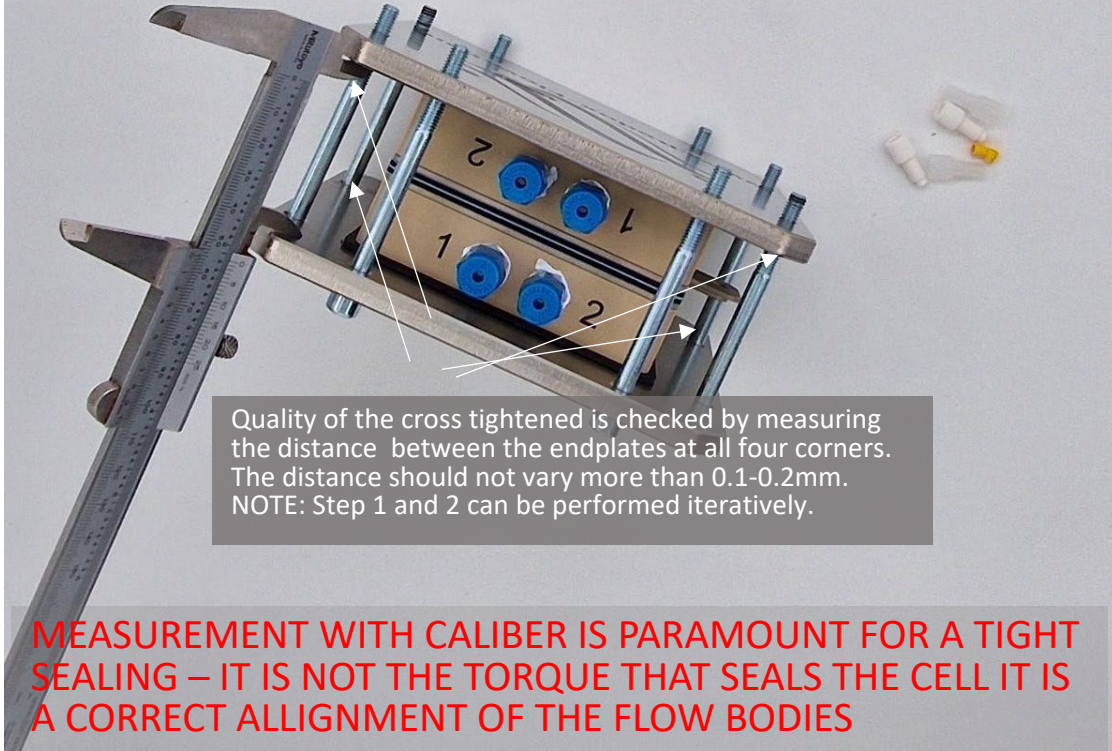


STEP 1 - IS VERY IMPORTANT FOR A
TIGHT SEALING FOR THE CELL



Hex bolts are cross tightened up to 6 Nm
NOTE: Remember to pull out alignment bars before the cell
is too tight

STEP 2 - IS VERY IMPORTANT FOR A TIGHT SEALING FOR THE CELL



Quality of the cross tightened is checked by measuring the distance between the endplates at all four corners. The distance should not vary more than 0.1-0.2mm. NOTE: Step 1 and 2 can be performed iteratively.

MEASUREMENT WITH CALIBER IS PARAMOUNT FOR A TIGHT SEALING – IT IS NOT THE TORQUE THAT SEALS THE CELL IT IS A CORRECT ALIGNMENT OF THE FLOW BODIES

Application notes – Temperature sensors

- Items shown in the following may not be included with the cell and needs separate ordering



On each of the PEEK flow bodies there are $\varnothing 4$ mm holes for inserting temperature sensors for an accurate determination of the operating temperature.



Application notes – Electrical connections

