

COURSE - DAY II

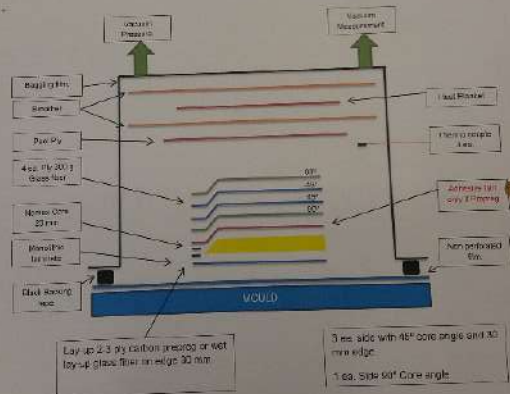
Resin/hardener Mix Ratio by Weight: 100/35

Calculation:

Total weight of Resin/hardener mixture (g) = Glass fabric (gram) * 1.2

Weight of resin needed = 100/155 * Glass fabric (gram) * 1.2

Weight of hardener needed = 35/155 * Glass fabric (gram) * 1.2



Workshop Task 2:

Composite sandwich panel fabrication:

Make a sandwich panel with Laminate from task 1, Nomex core and 4 ea. 300 g Glass fiber layers as per Drawing. (3 side with 30 mm Monolithic skin and 1 side with 90° sandwich structure).

Caution: USE SANDING KUD AND PROTECTIVE BREATHING MASK WHEN SANDING.

Caution: FOLLOW MSDS FOR CORRECTIVE PROTECTION (Hole protection, etc.).

Caution: OBSERVE AHEAD WORKING WHERE PROTECTION IS STORED.

- 1) Prepare the Monolithic laminate from task 1 and 1 ea. Nomex core to fabrication a sandwich panel, with 3 ea. side 45° and 1 ea. Side 90°.
- 2) Prepare 4 ea. Layers 300g Glass fiber (Wet layer), with resin mixture 1:1.2.
- 3) Prepare (PRO 6ETLAW 125/226 Resin, 180/35) mixture of Adhesive (66.5) and mix II together with Micro balloons to make the paste like as tooth paste.
 - a. Wet one side of the Monolithic laminate with one layer of the mixed resin above 1.5 mm thick layer.
 - b. Fasten the Nomex core to the wetted monolithic laminate.
 - c. Lay up the prepared 4 ea. 300 g glass fiber as per Drawing.
- 4) Use a mould plate covered with non-perforated film as a resin barrier.
 - a. Perform the bagging of the sandwich panel for curing process, together with a gauge plate (Optional) above the E-glass.
 - b. Install 3 ea. thermo couplers for the curing process.
- 5) Set the hot bonder for 8 hours/80°C curing process.

Workshop Task 2:

Composite sandwich panel fabrication

Make a sandwich panel with Laminate from task 1, Nomex core and 4 ea. 300 g Glass fiber layers as pr. Drawing. (3 side with 30 mm Monolithic structure and 1 side with 90° sandwich structure.

Caution: USE SANDING ROOM AND PROTECTIVE BREATHING MASK WHEN SANDING.

Caution: FOLLOW **MSDS** FOR CORRECTIVE PROTECTION. (Hand protection, ect.....)

Caution: OBSERVE BEFORE WORKING WHERE PROTECTION IS STORED.

1. Prepare the Monolithic laminate from task 1 and 1 ea. Nomex core to fabrication a sandwich panel, with 3 ea. side 45° and 1 ea. Side 90°.
2. Prepare 4 ea. Layers 300g Glass fiber (Wet layup), with resin mixture 1: 1.2
3. Prepare (PRO SET LAM 125/226 Resin, 100/35) mixture of Adhesive (60 G) and mix it together with Micro balloons to make the pasta tick as tooth pasta.
 - ☐ Wet one side of the Monolithic laminate with one layer of the mixed resin above 1, 5 mm thick layer.
 - ☐ Install the Nomex core to the weeded monolithic laminate.
 - ☐ Lay up the prepared 4 ea. 300 g glass fiber as pr. Drawing.
4. Use a mould plate covered with non-perforated film as a resin barrier.
 - ☐ Perform the bagging of the sandwich panel for curing process, together with a gouge plate (Optional) above the Breather.
 - ☐ Install 3 ea. thermo couplers for the curing process.
5. Set the hot bonder for 8 hours/80°C curing process.

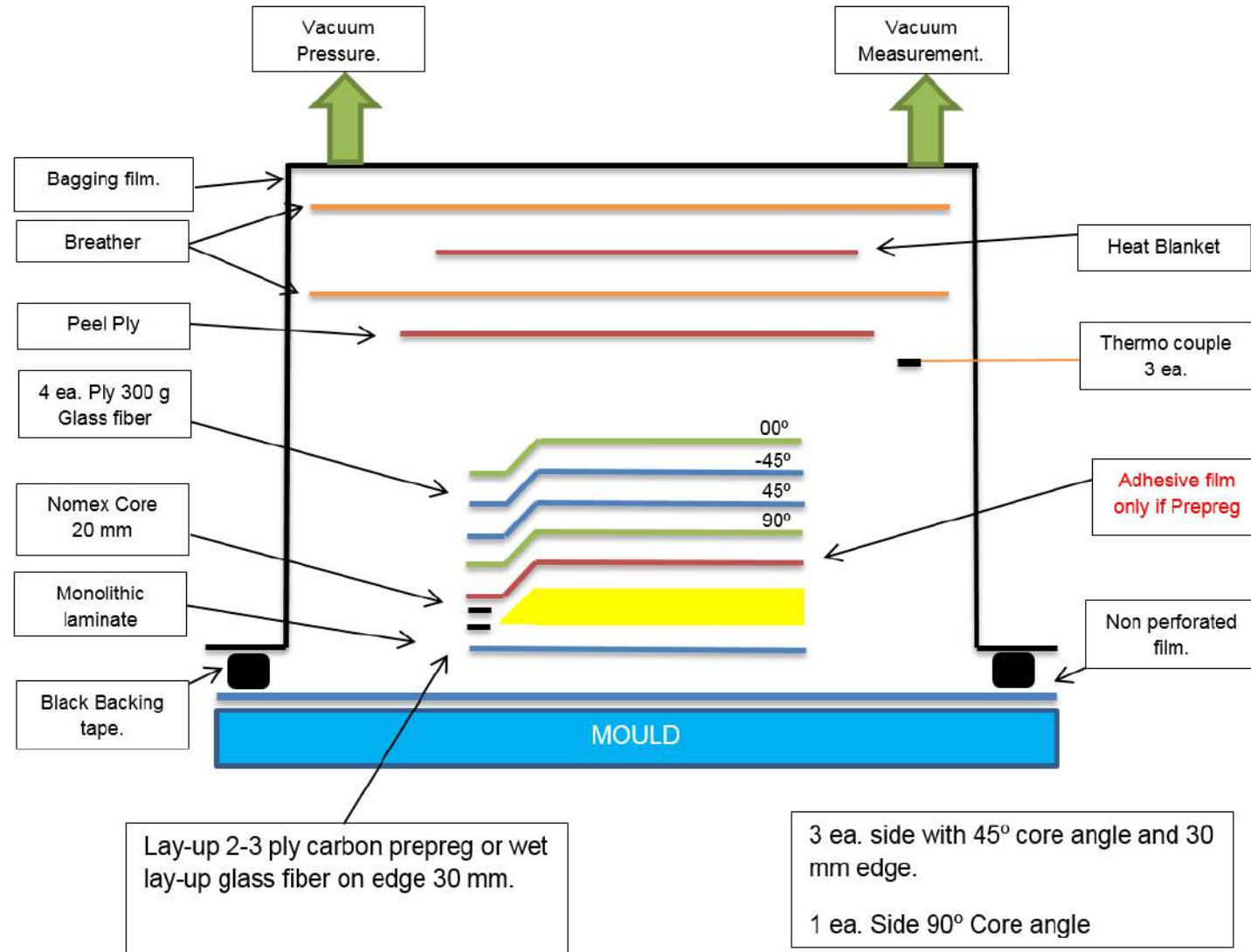
Resin/Harder Mix Ratio by Weight: 100/35

Calculation:

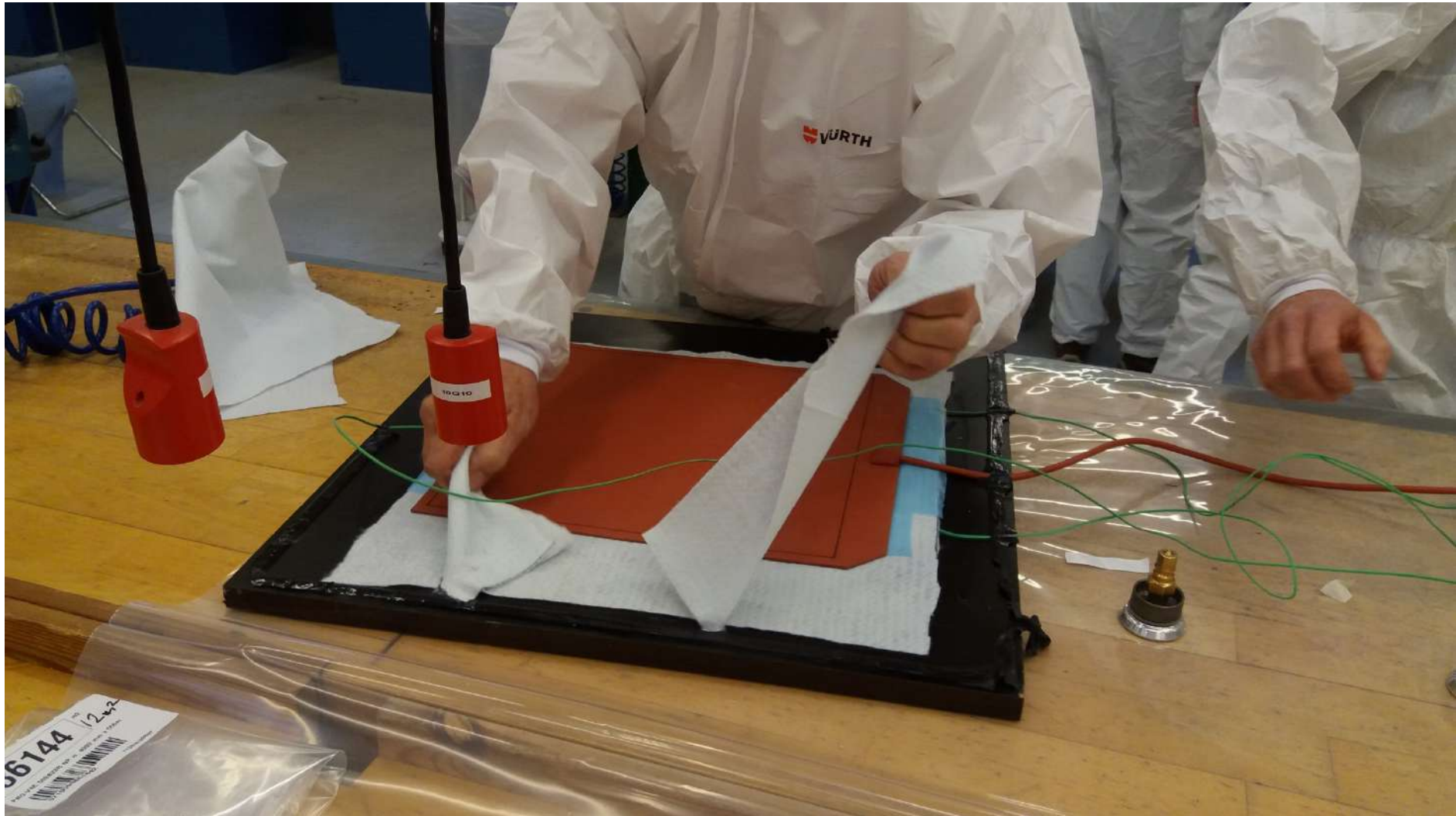
Total weight of Resin/hardener mixture is = Glass fabric gram * 1.2

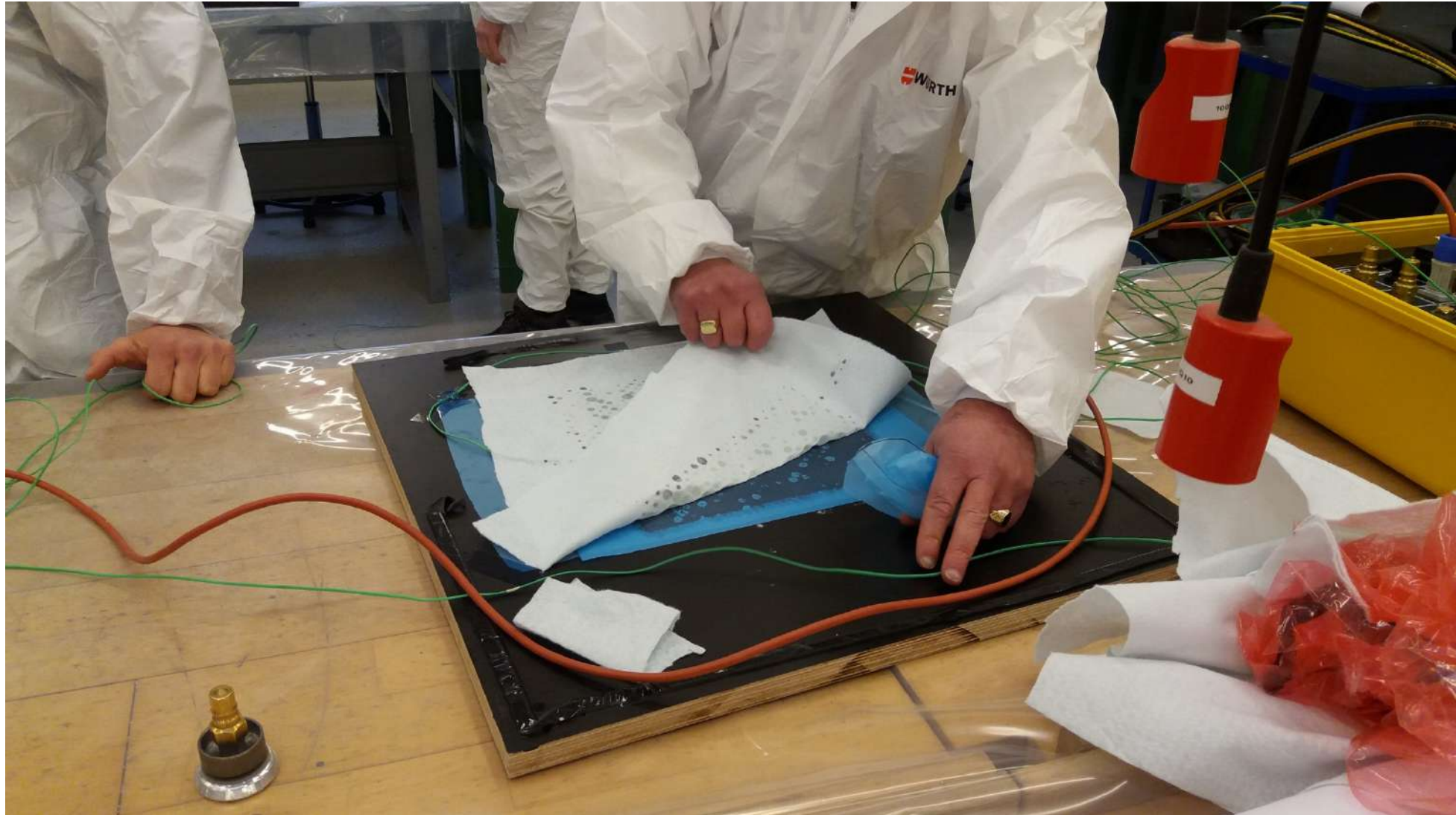
Weight of resin needed = $100/135 * \text{Glass fabric gram} * 1.2$

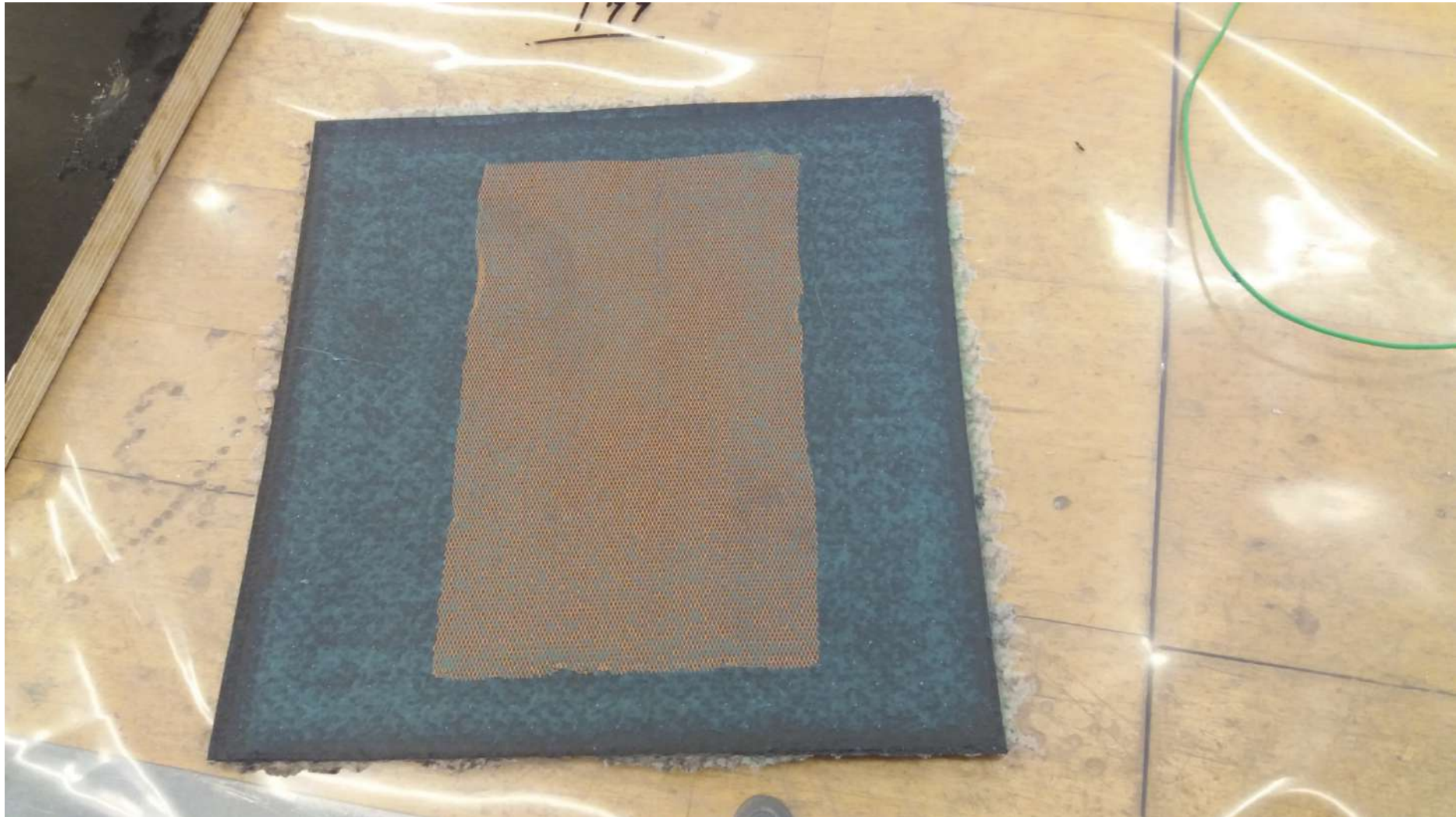
Weight of hardener needed = $35/135 * \text{Glass fabric gram} * 1.2$

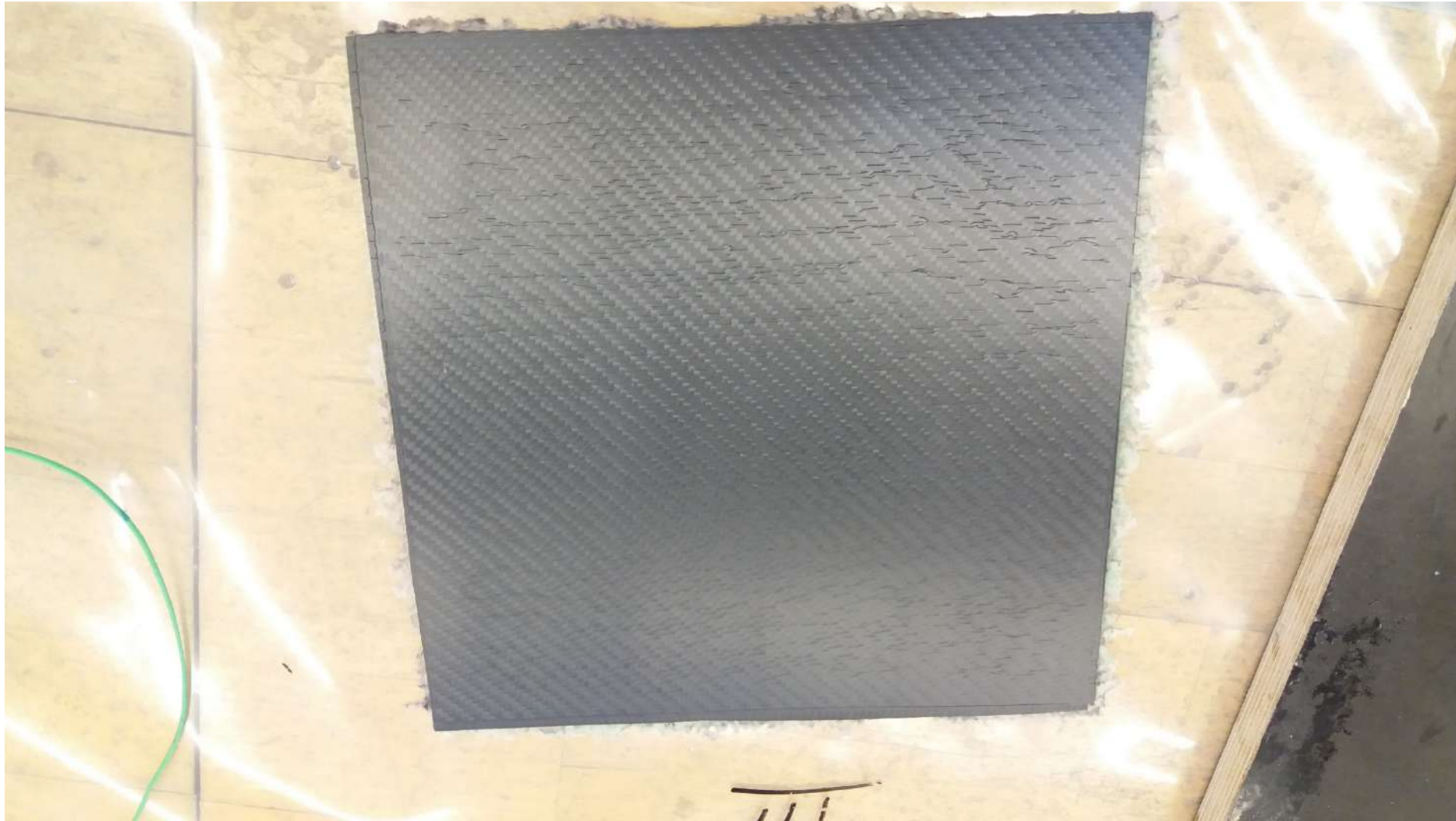














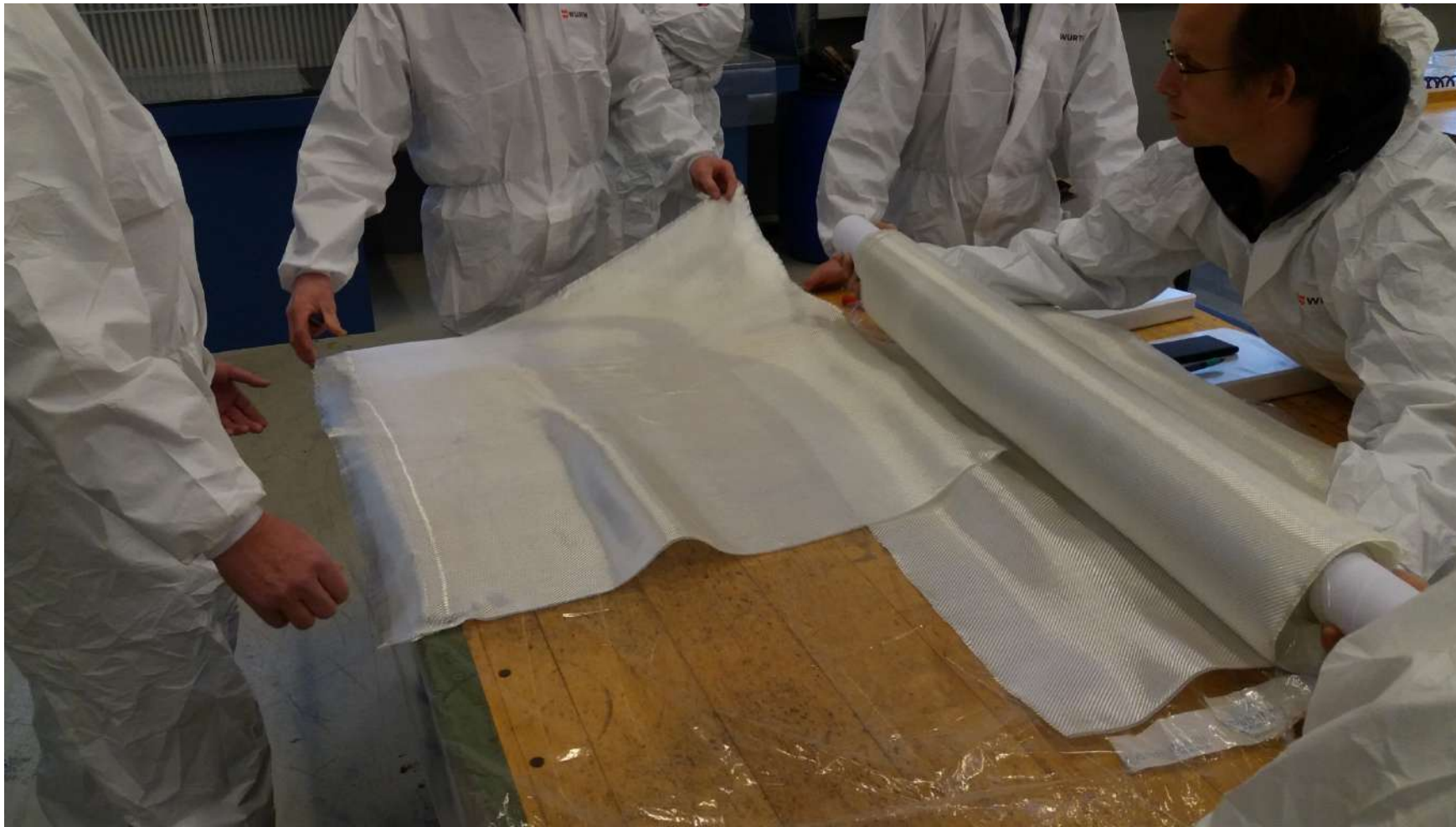




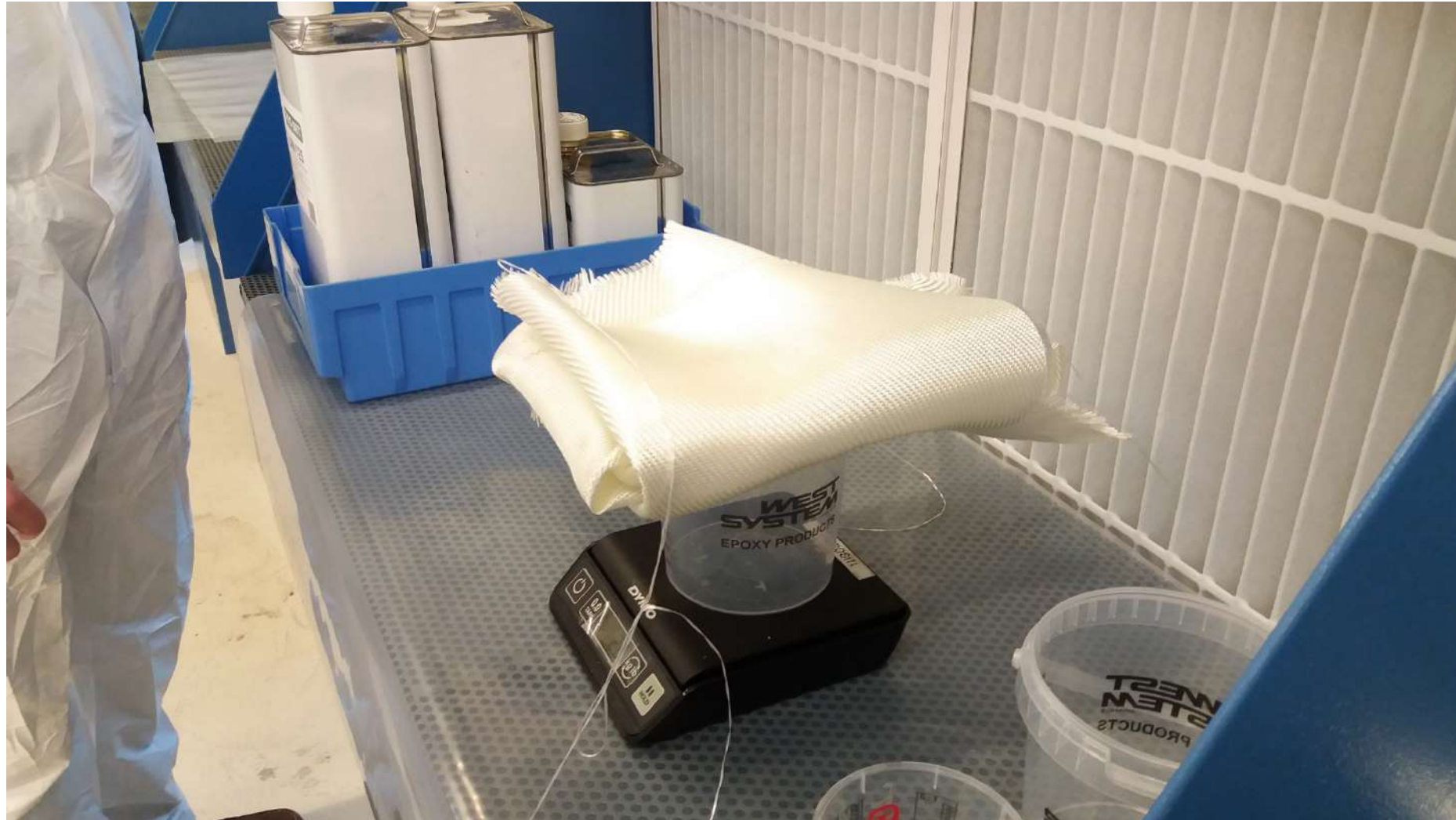




Prepare the material for lay-up by weighing the pre-determined quantity of dry fabric and the resin to be used.

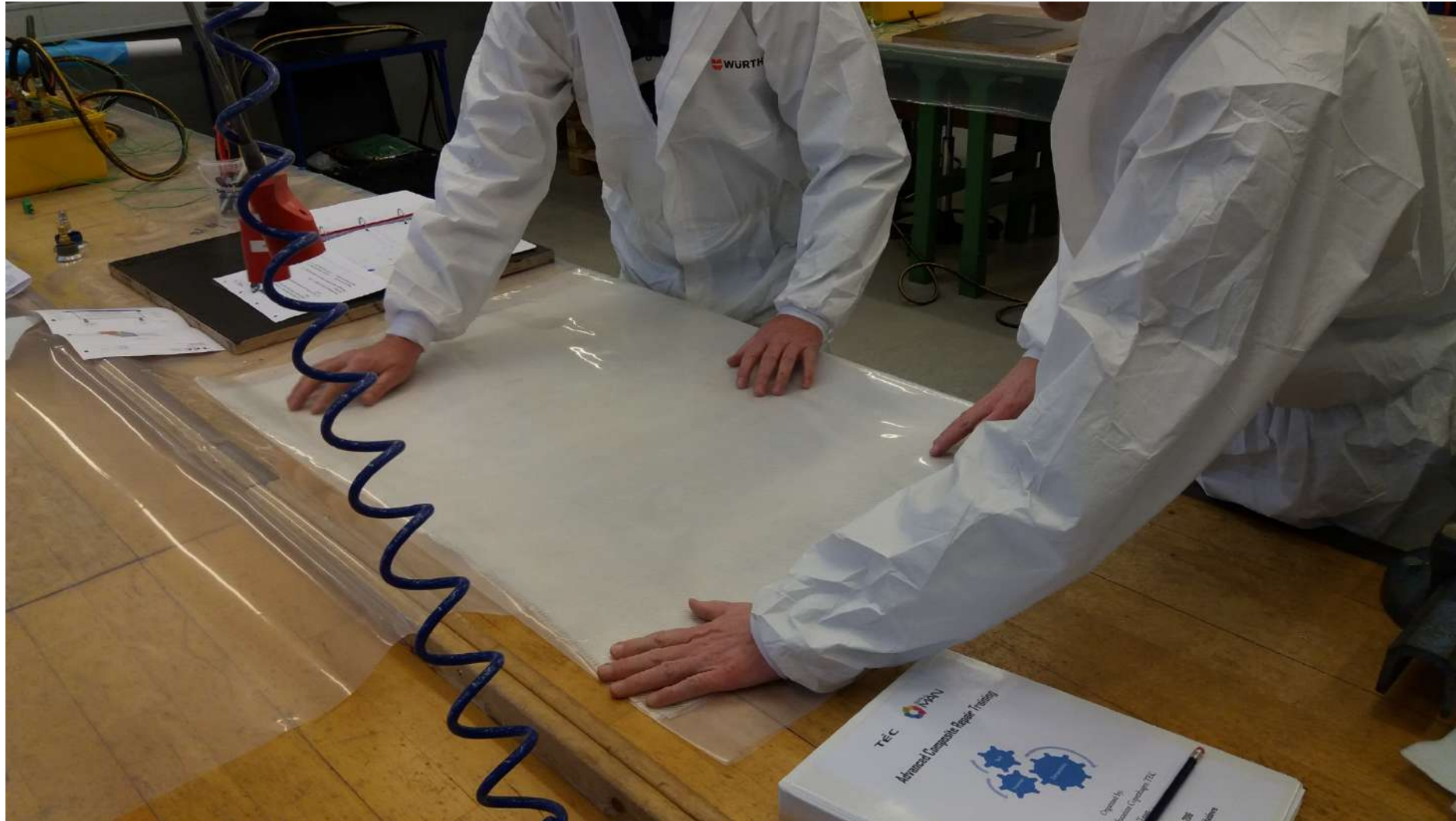




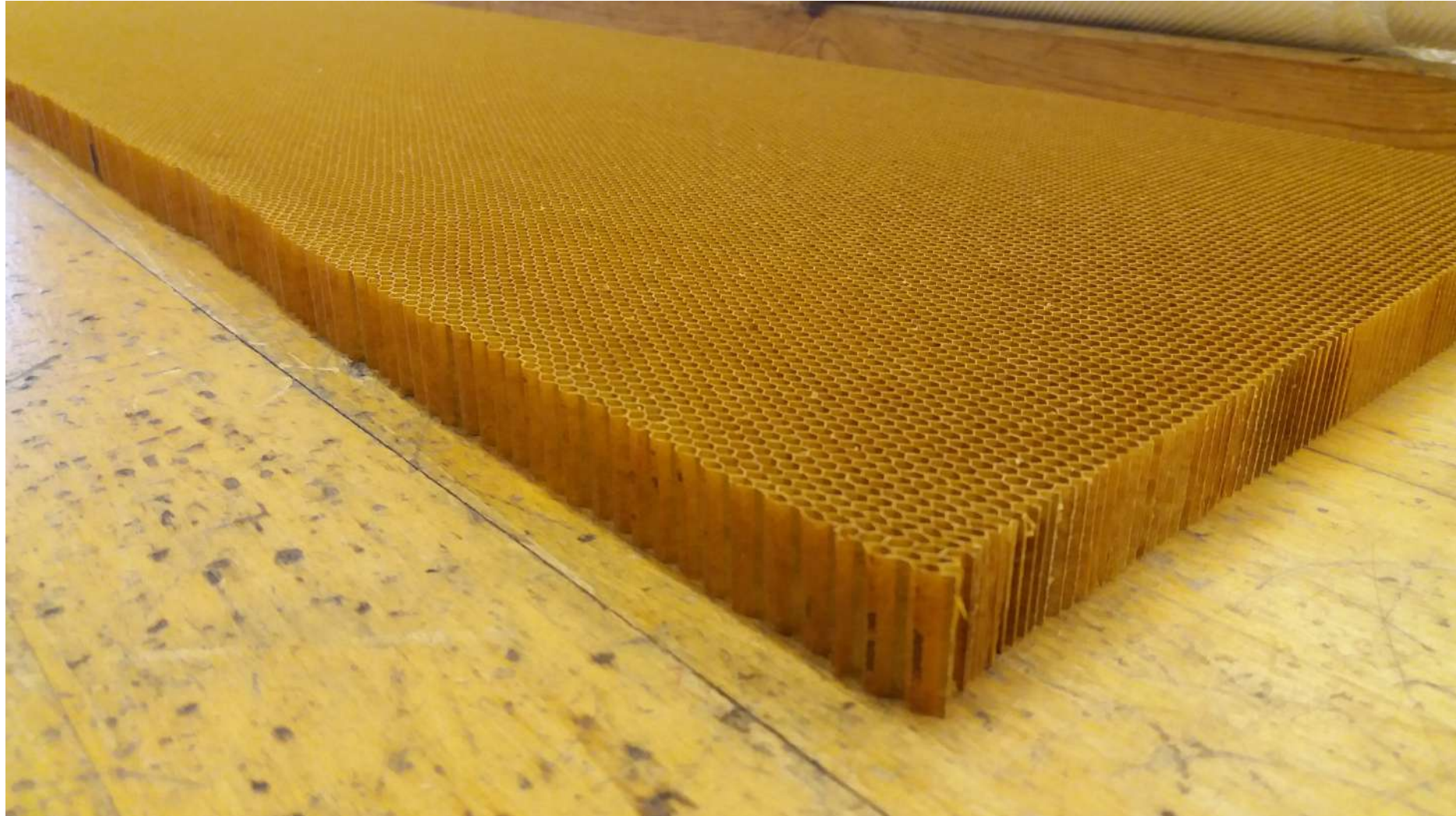








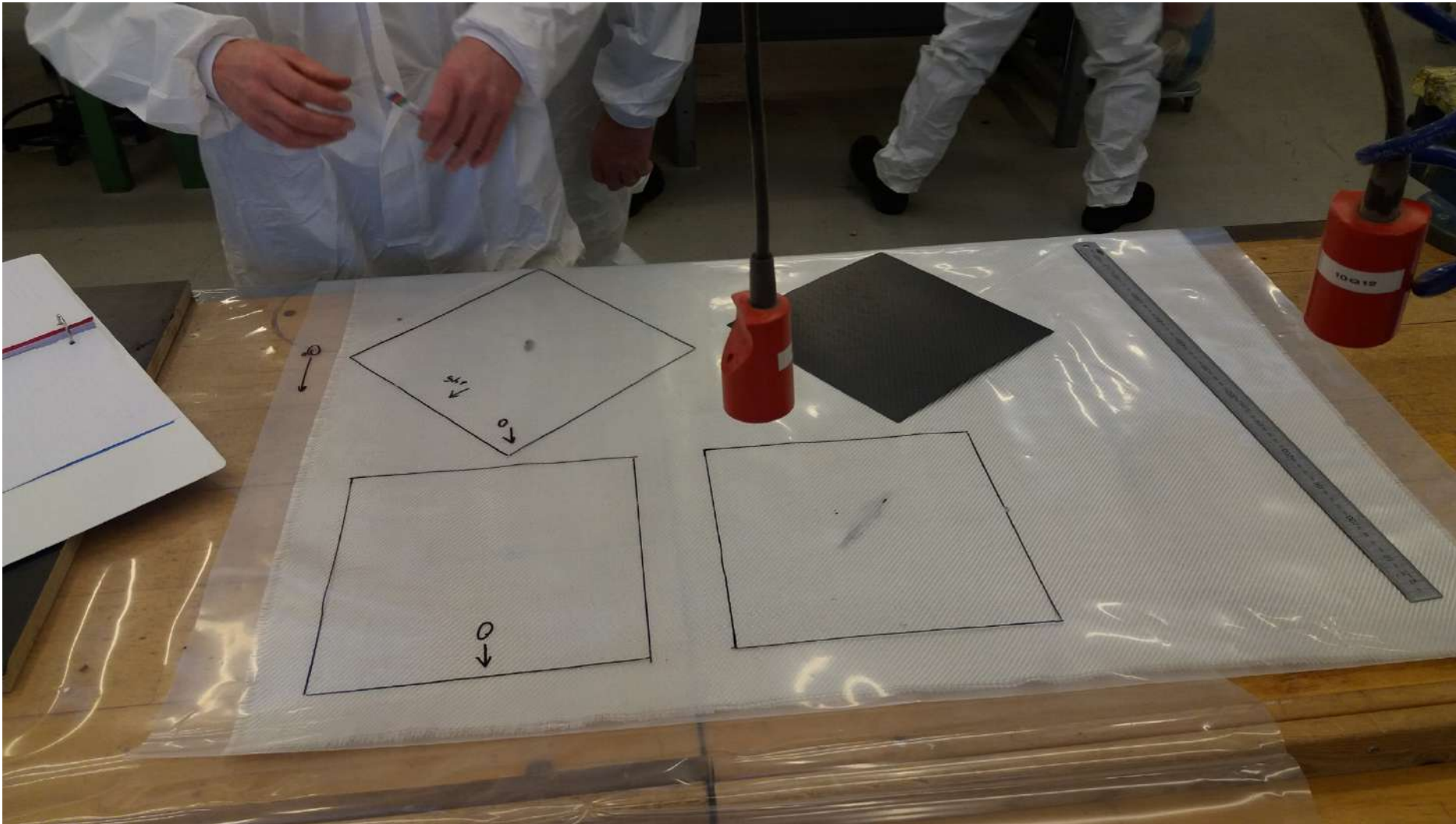


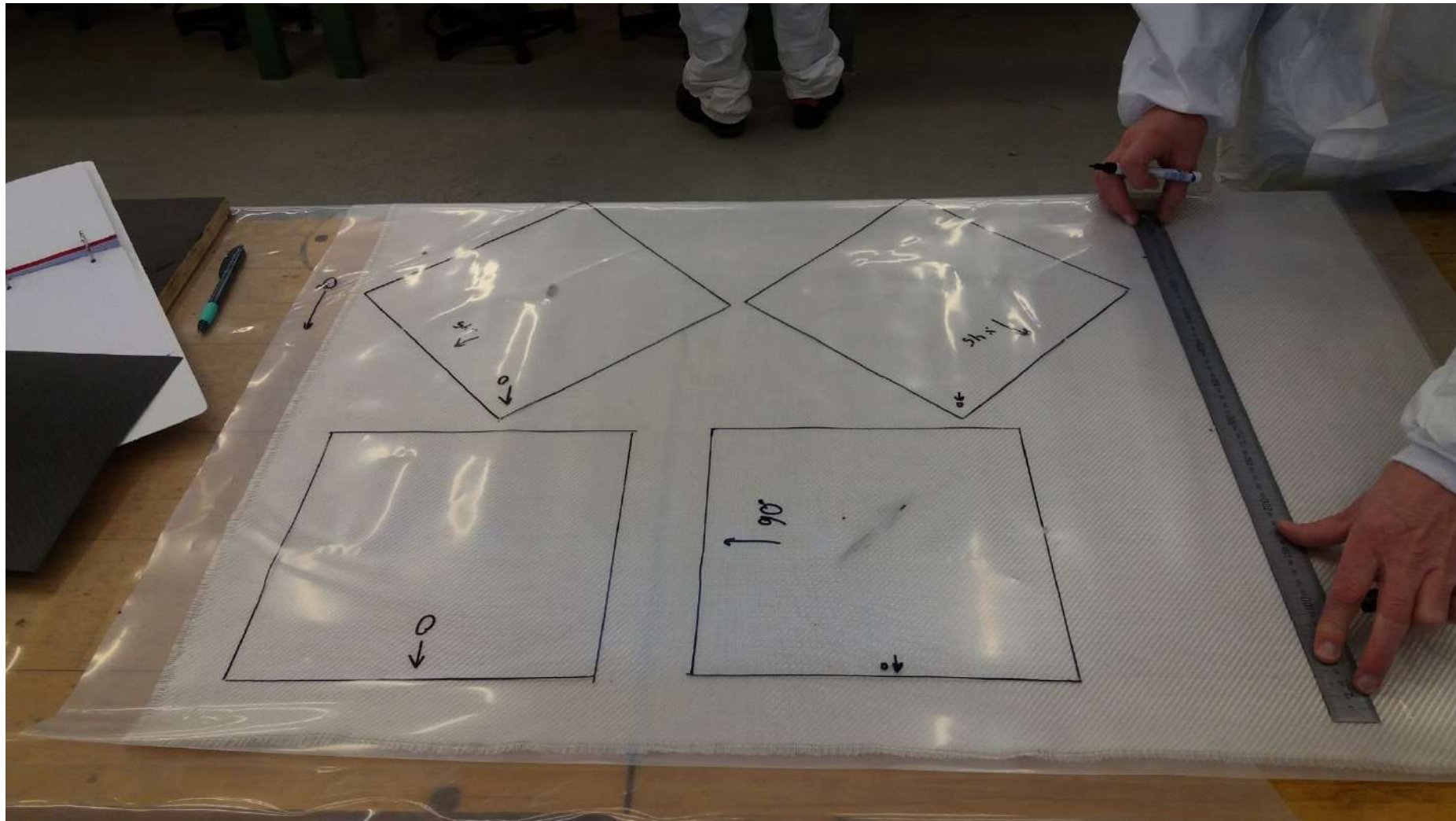




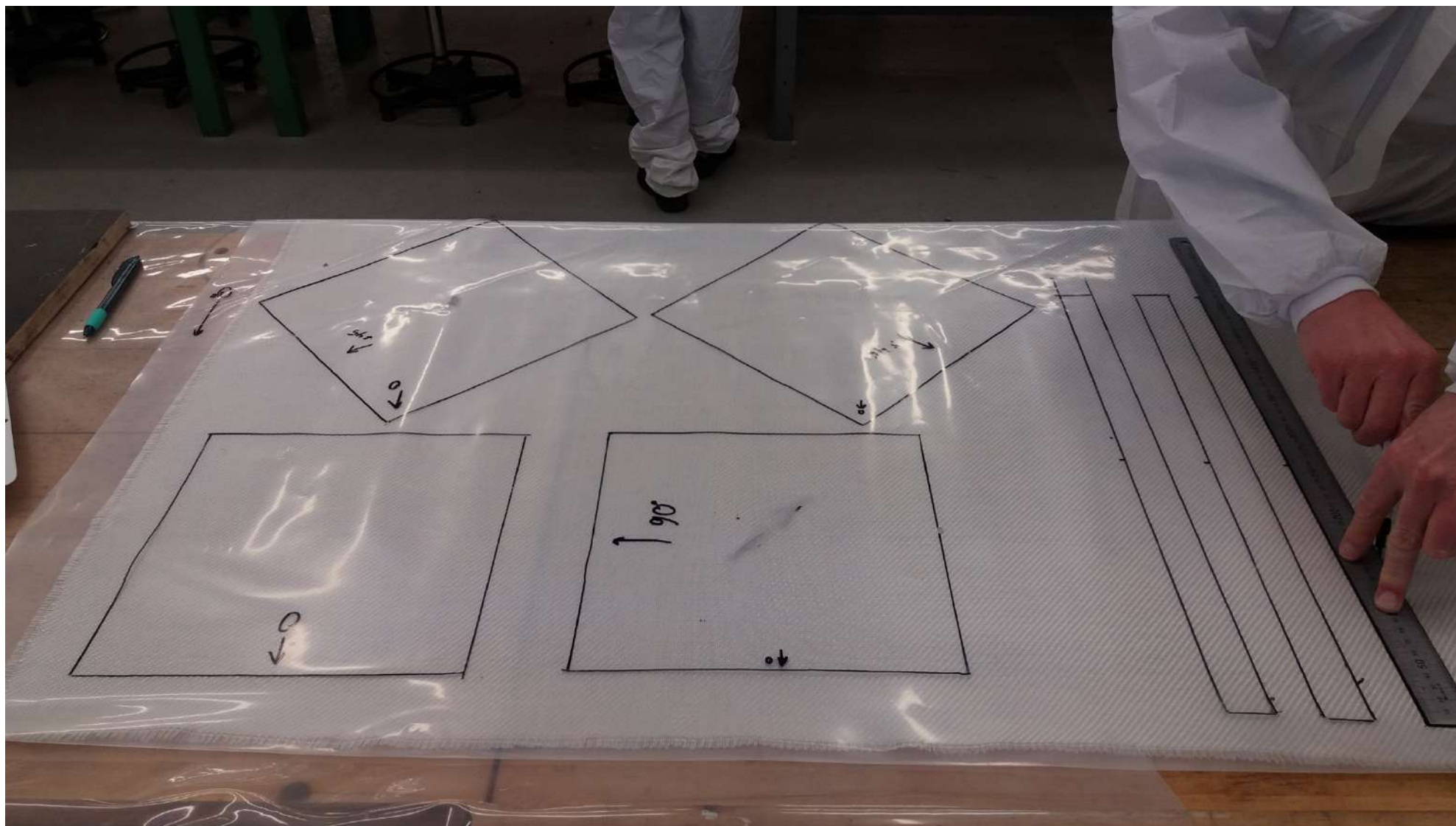


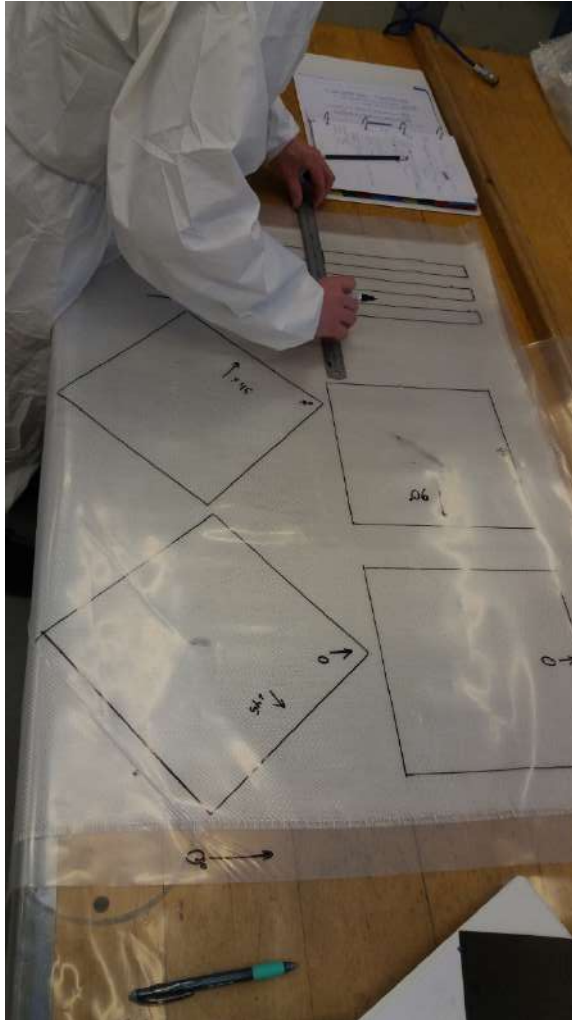
Place your dry glass fabric between two pieces of nylon bagging film. The top layer of bagging film will have your individual ply templates drawn on with a black fine point Sharpie pen. Each template will be placed and orientated to meet our ply-table orientation to meet our part's structural design.

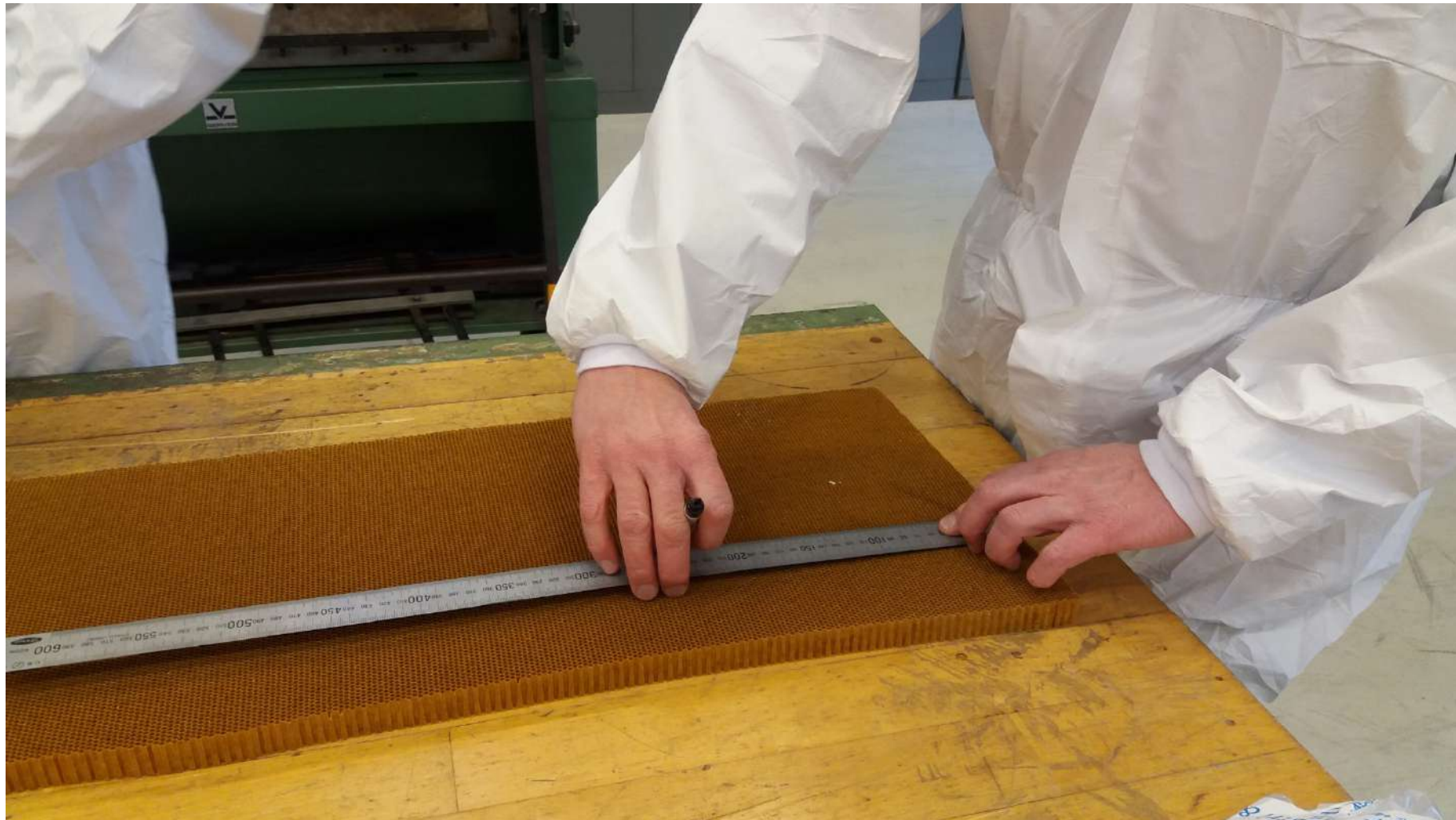


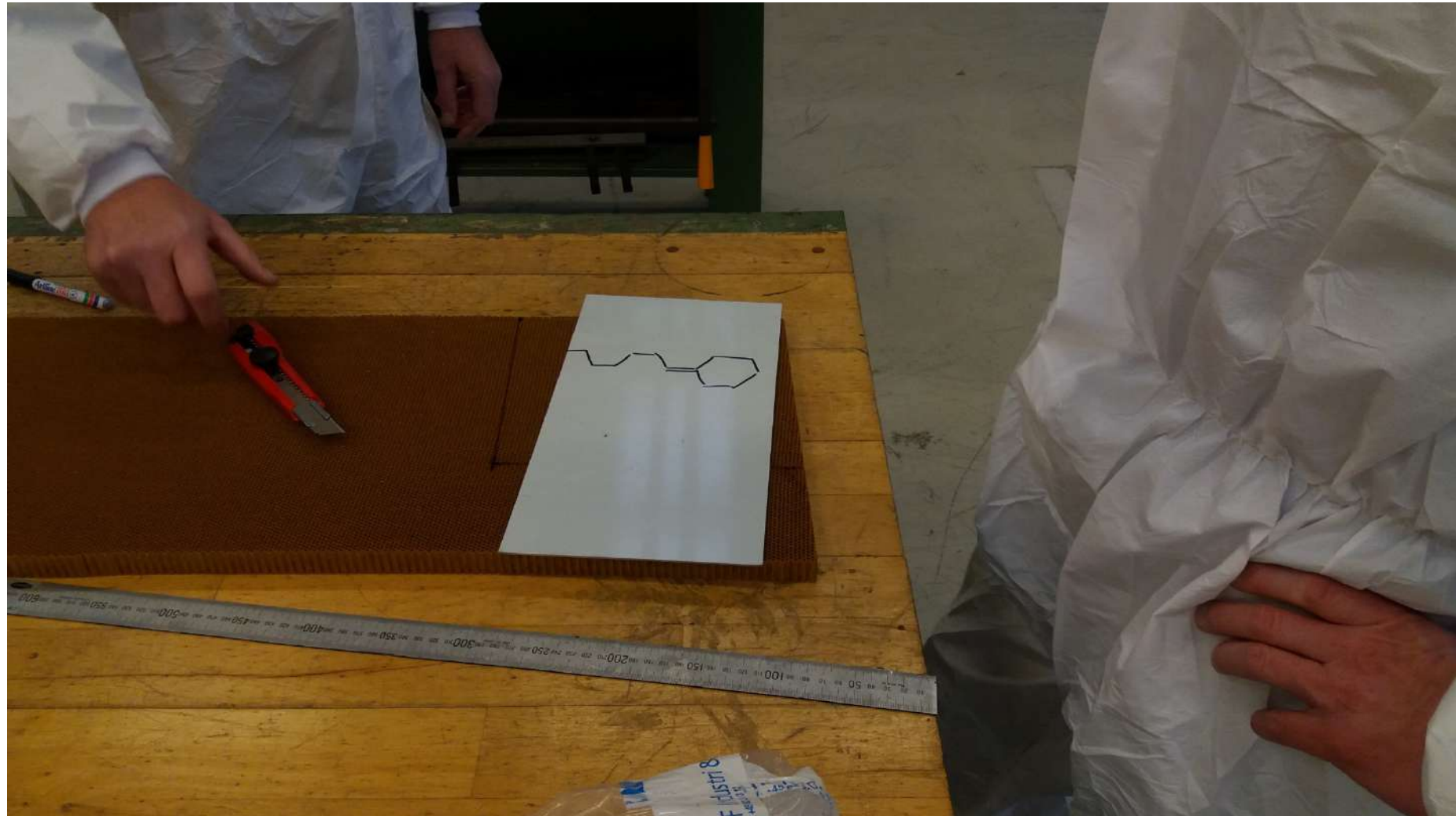






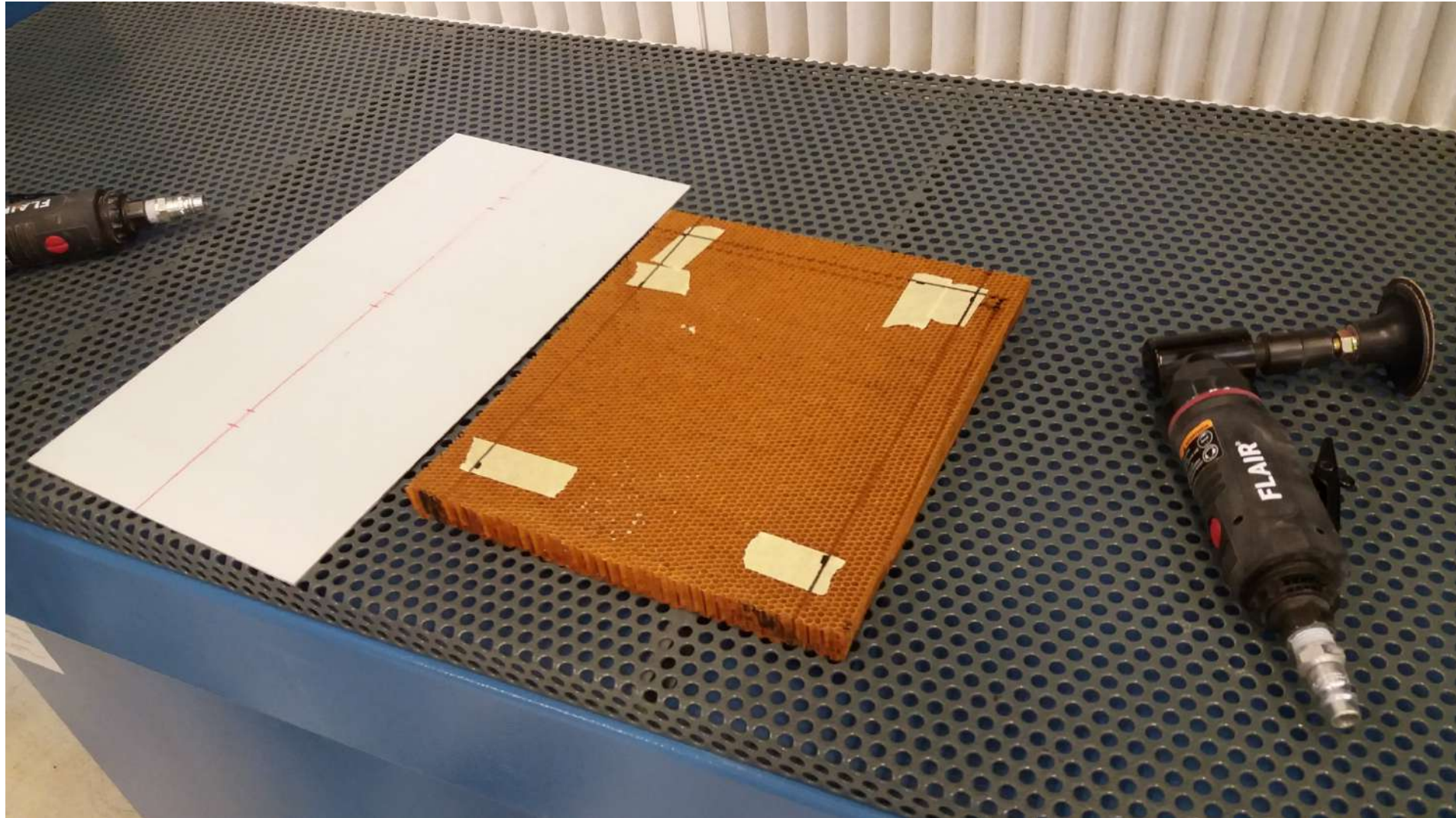


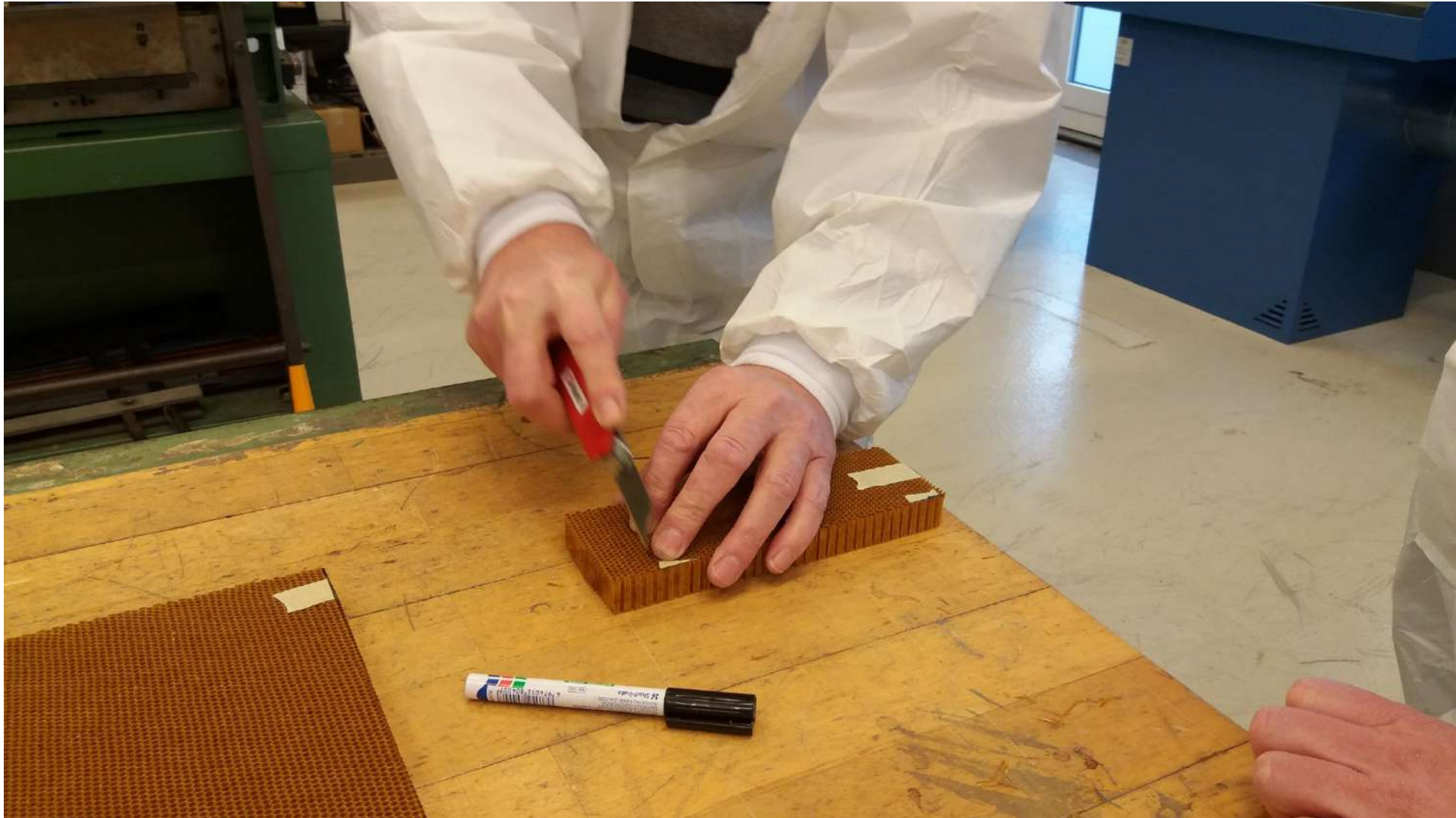


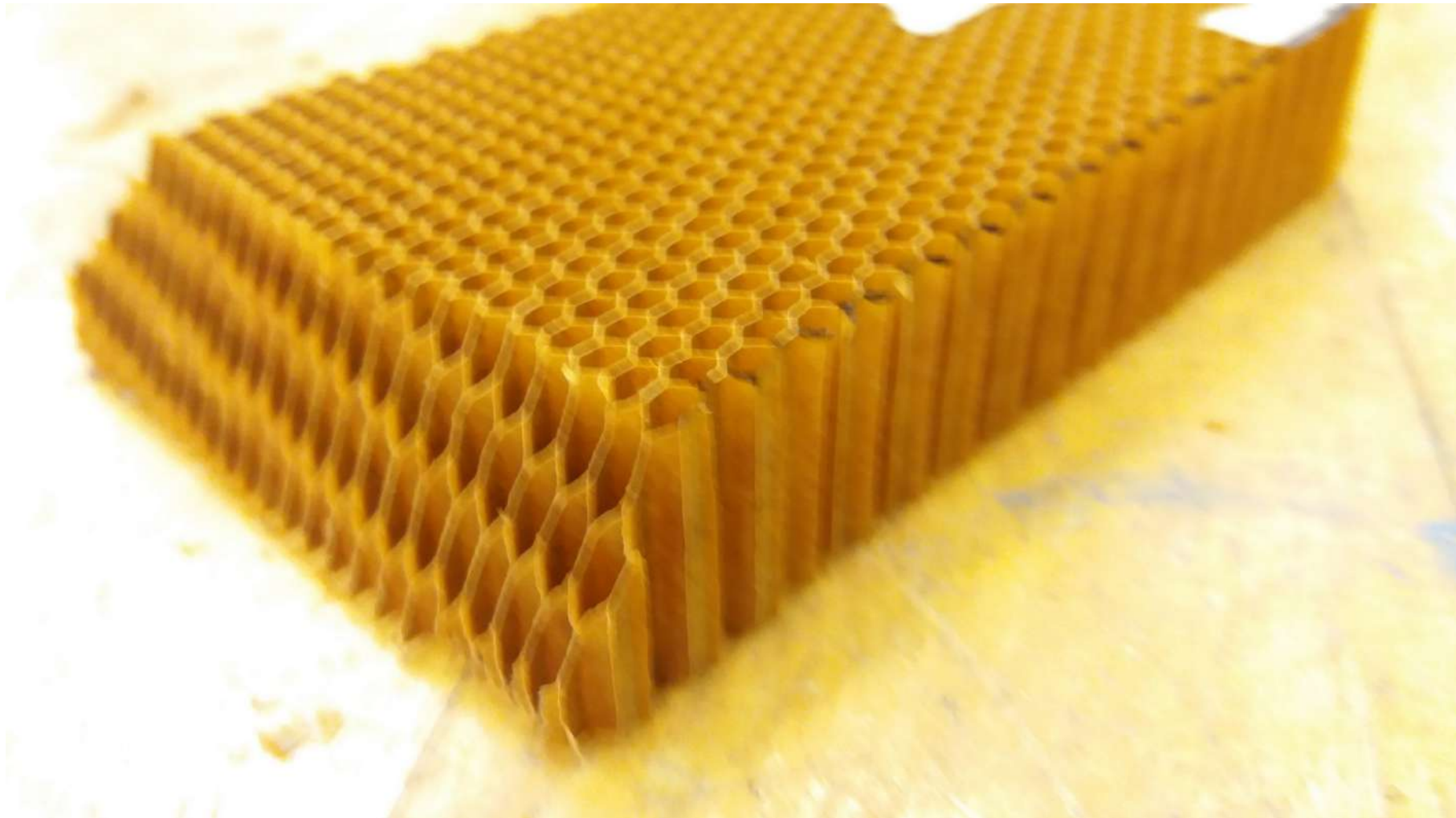






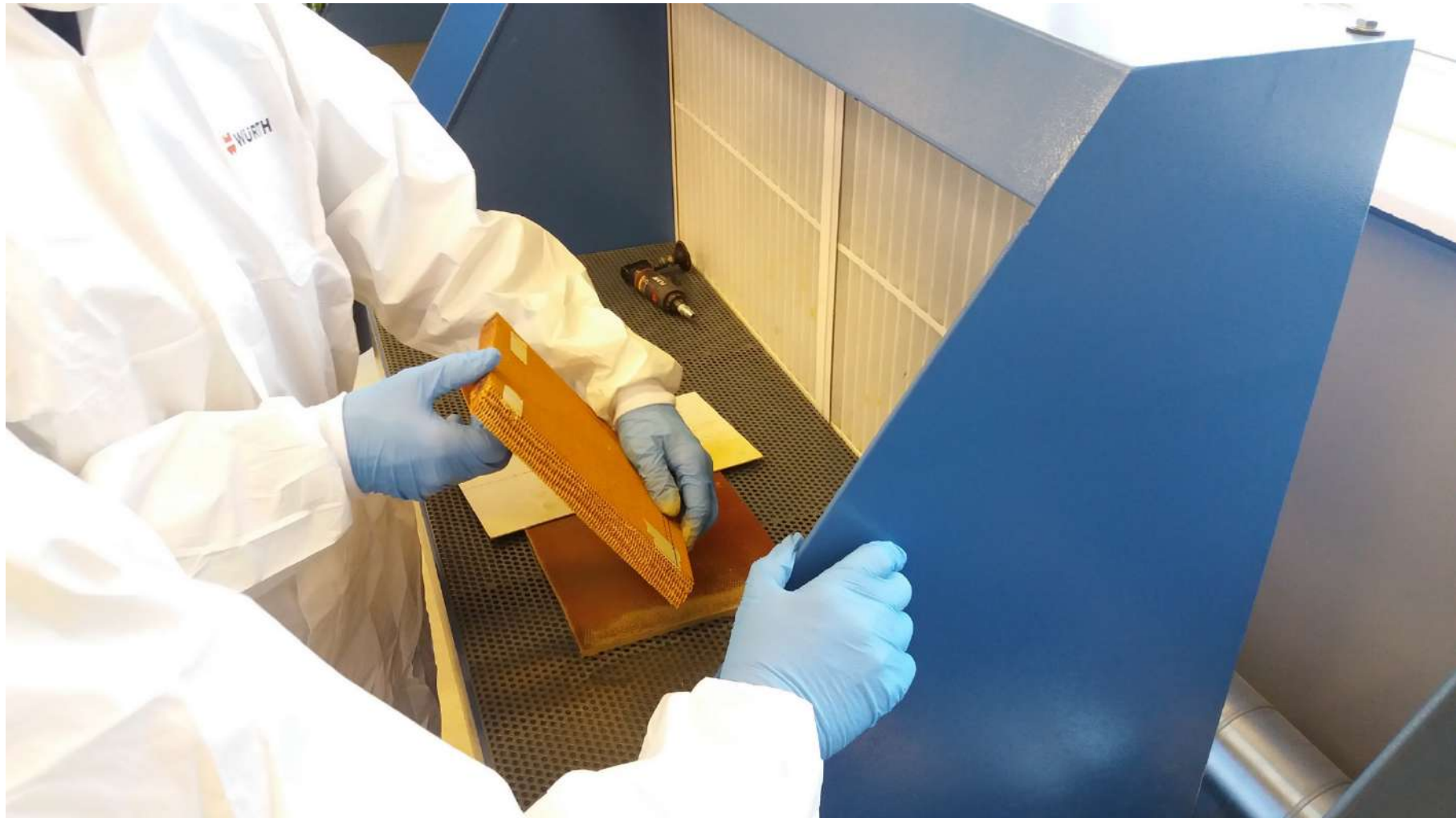


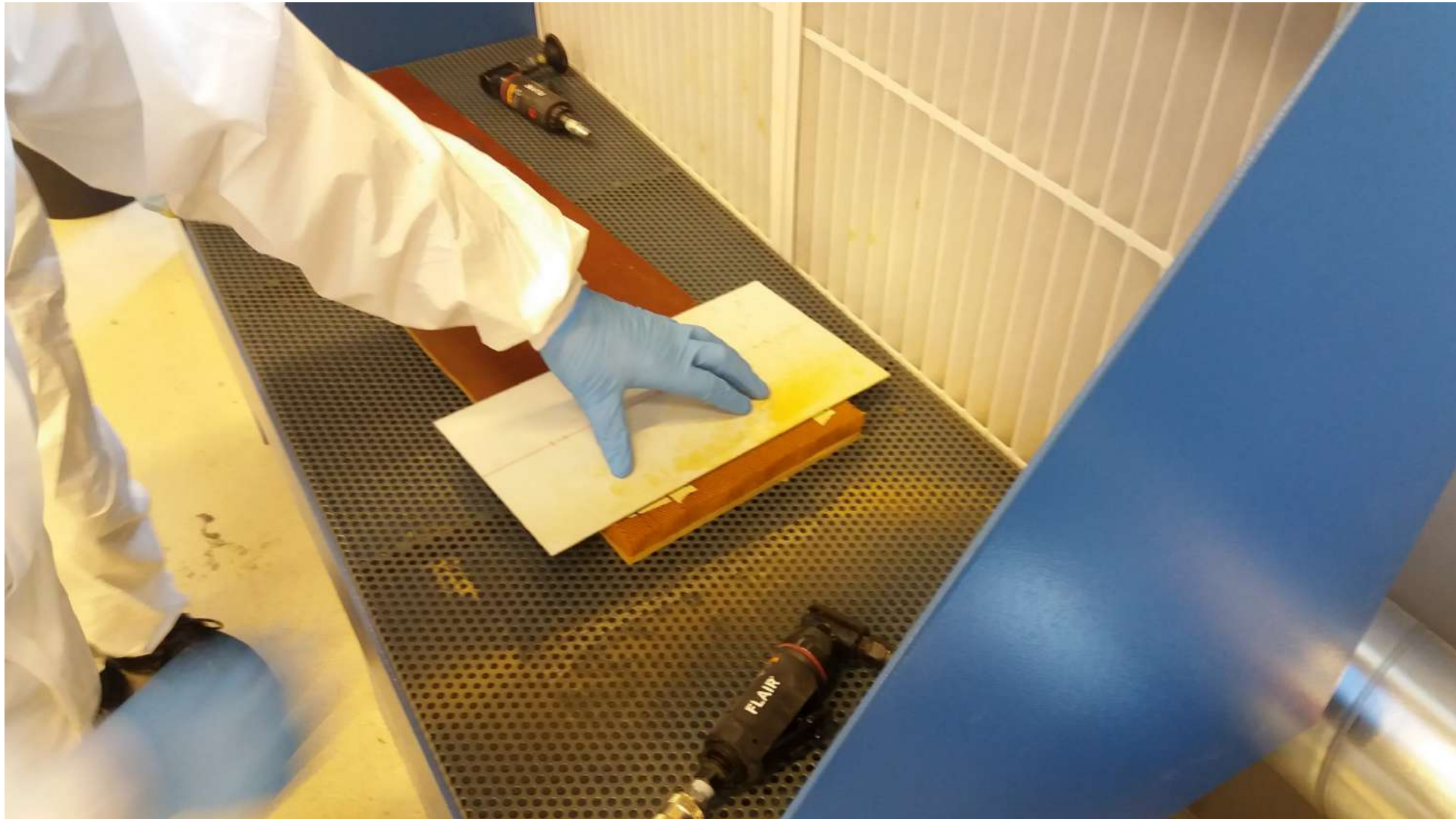




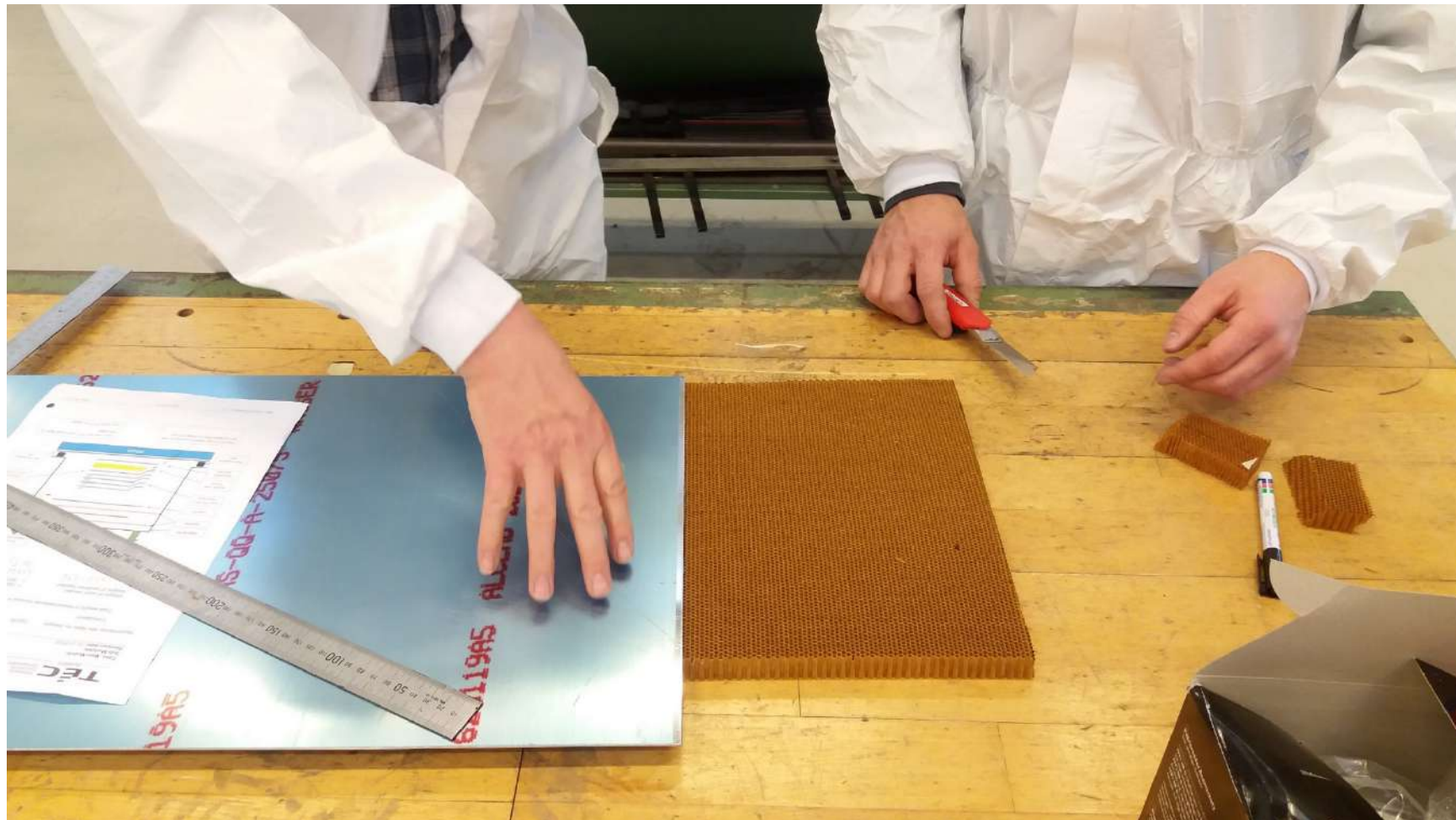


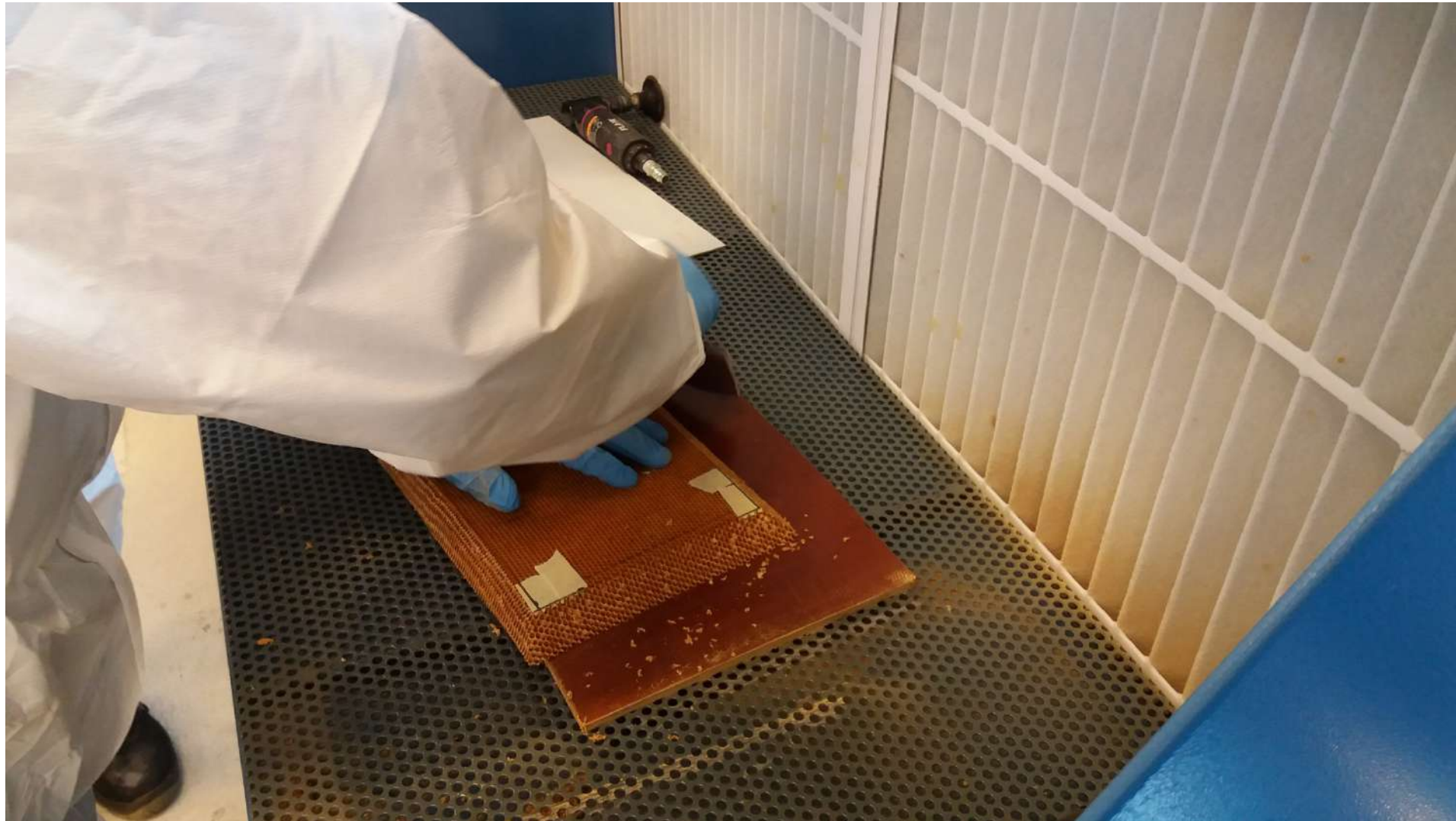


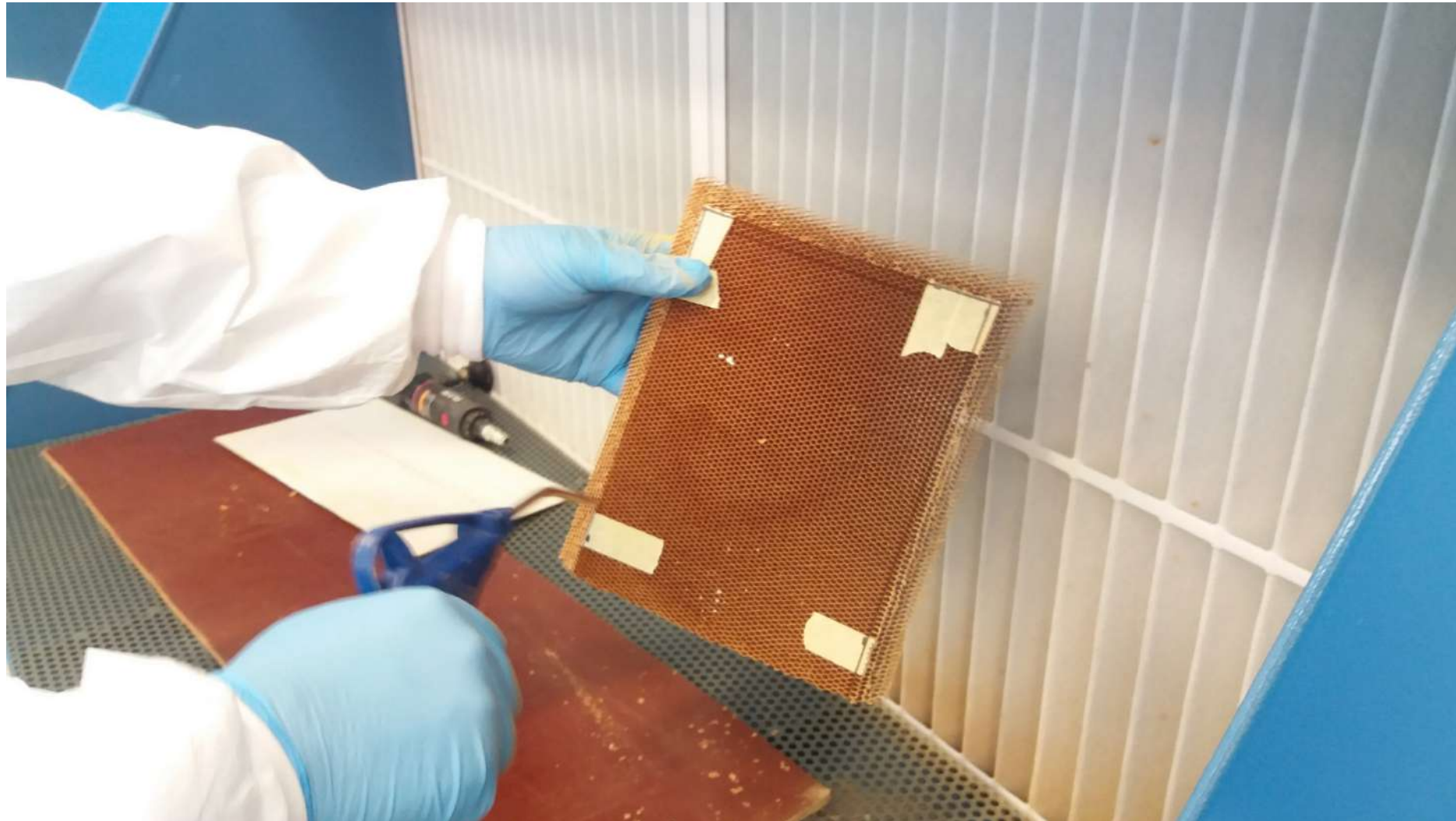


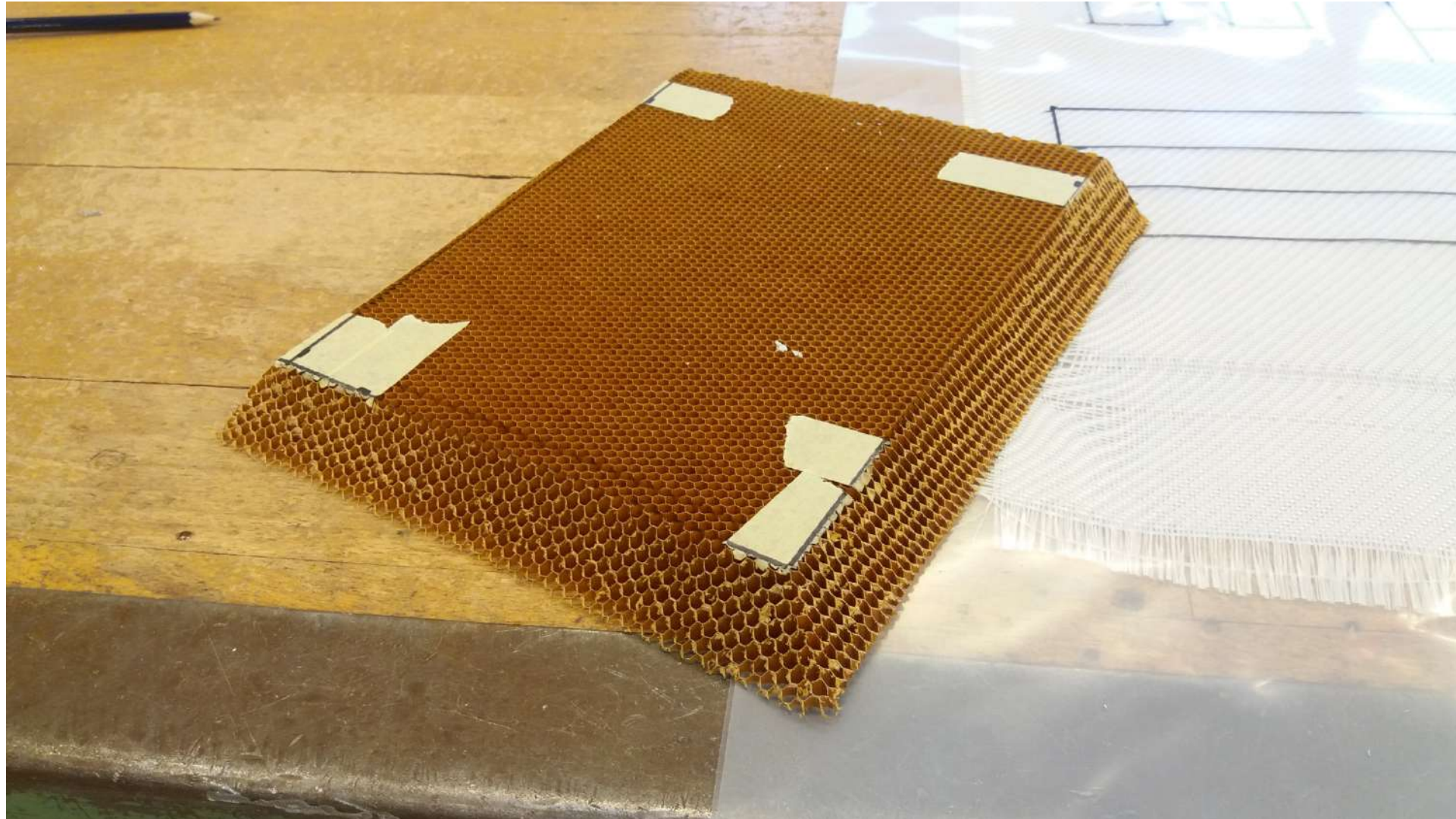






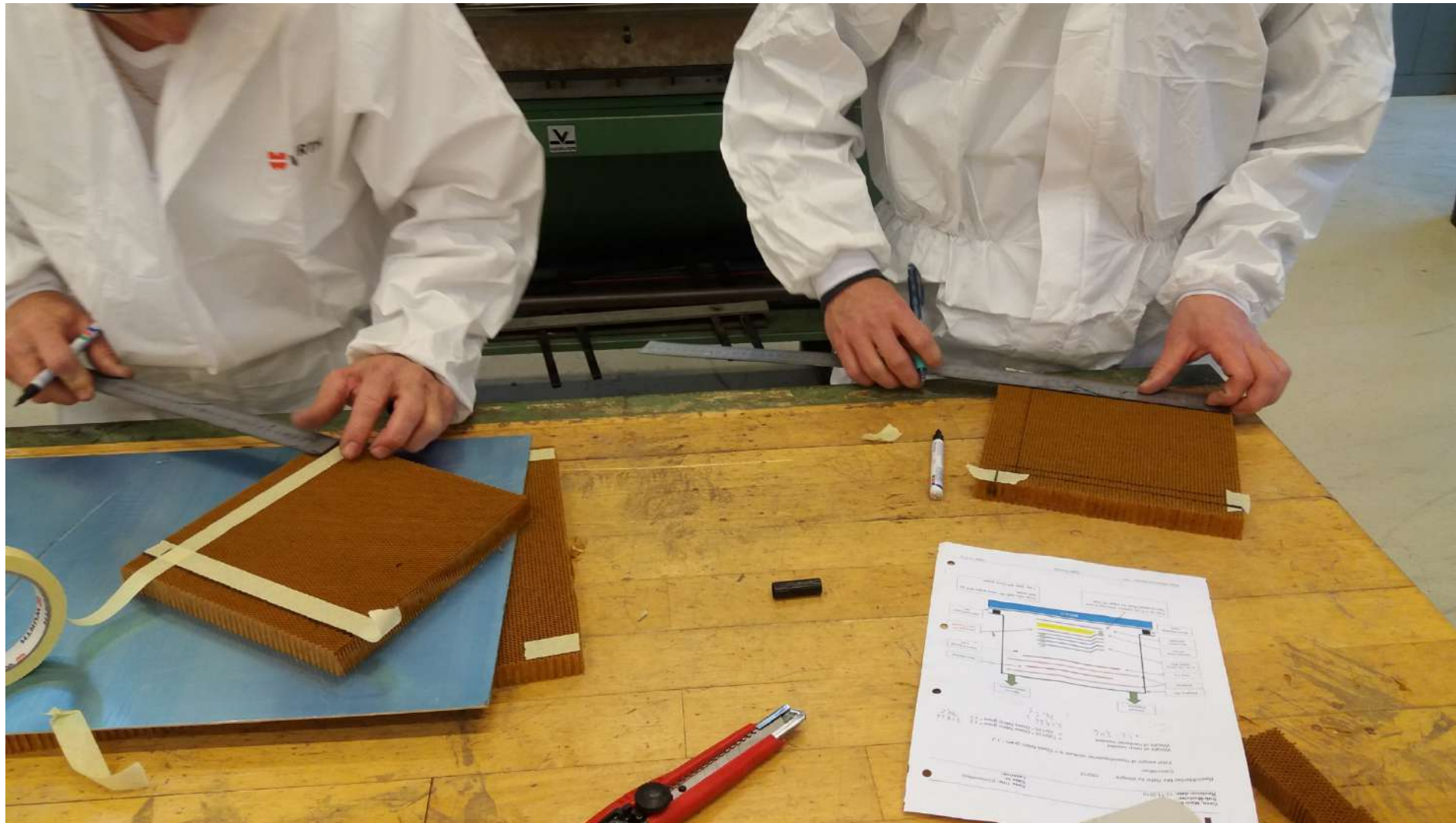


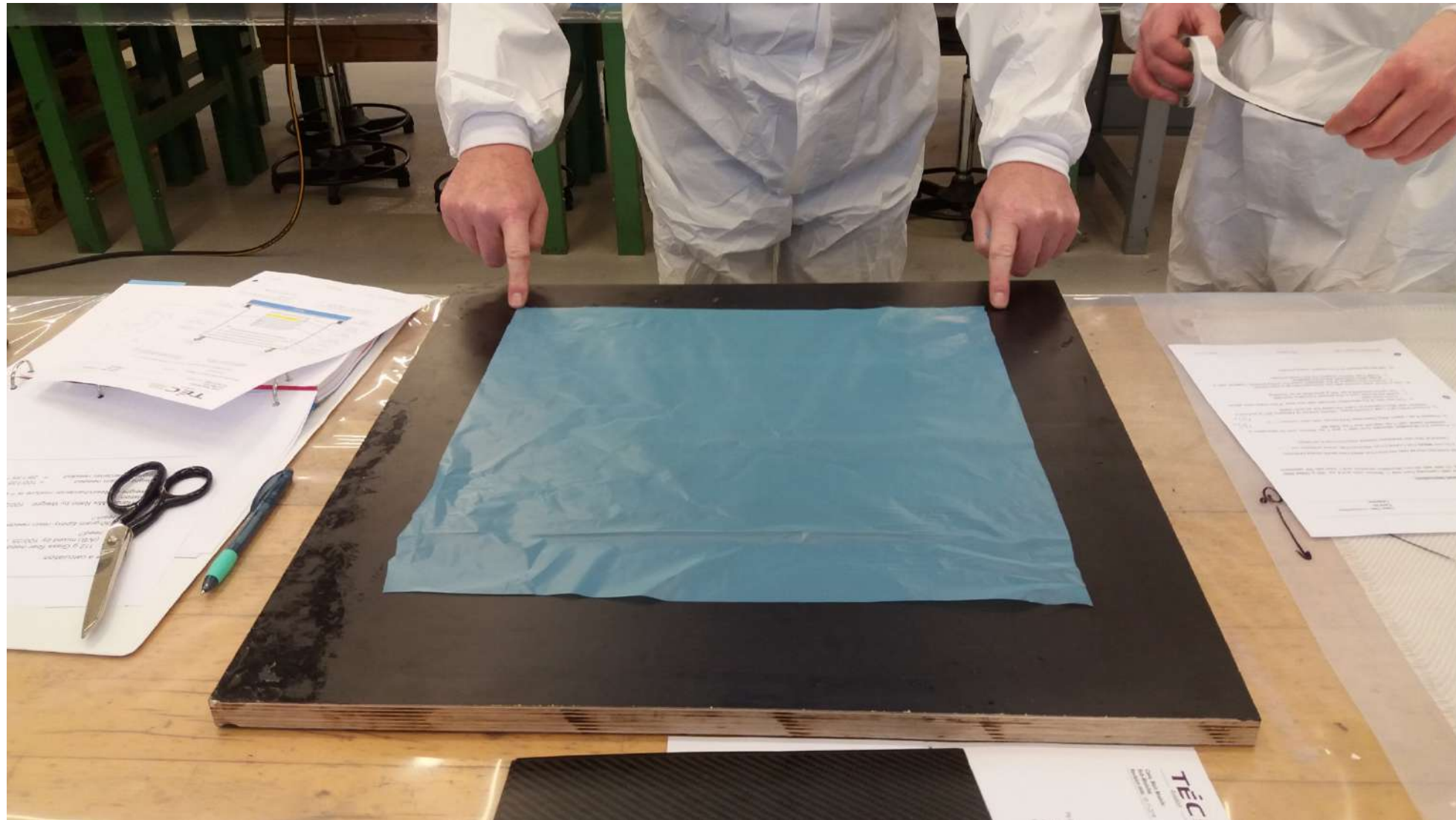




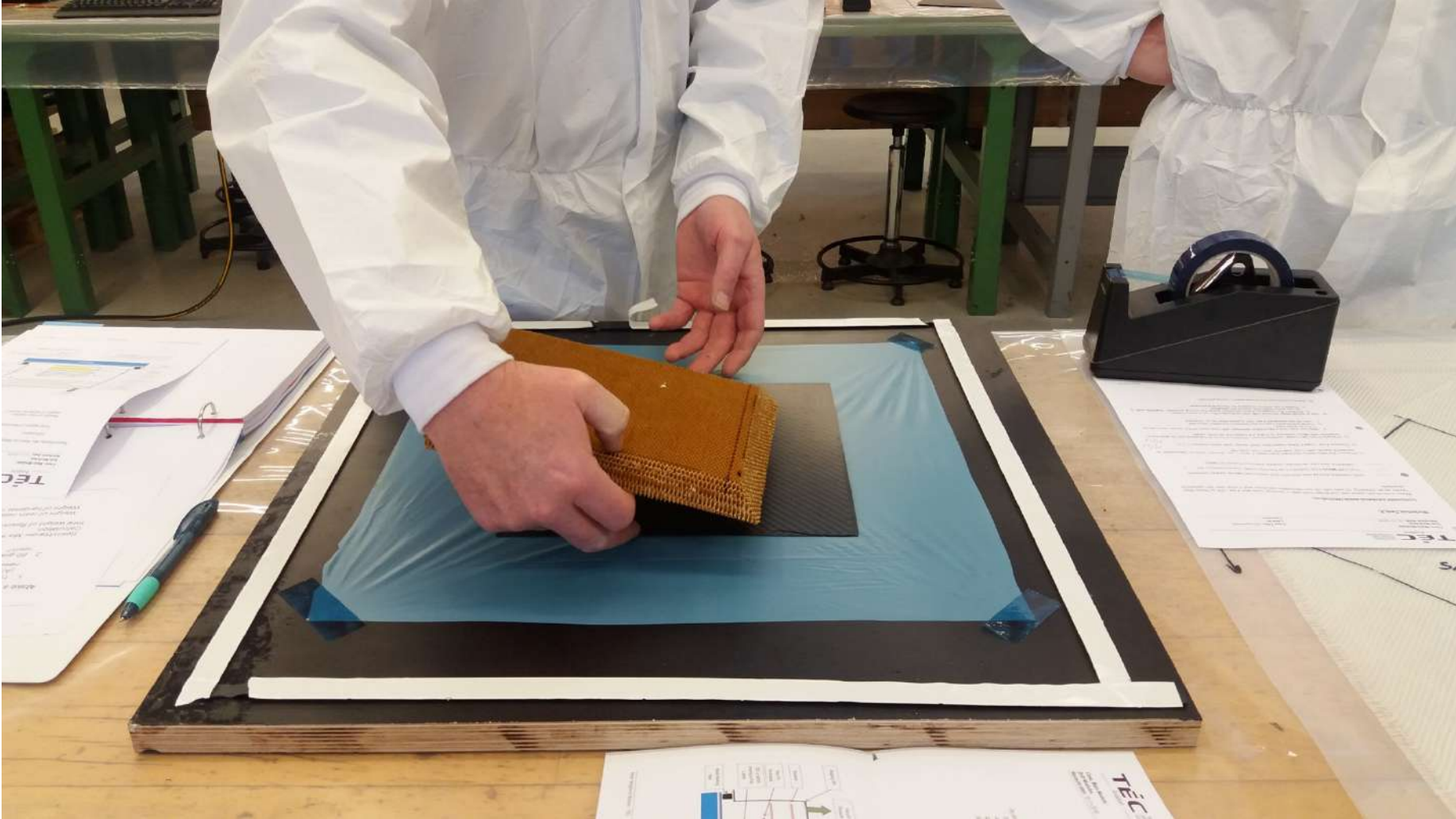


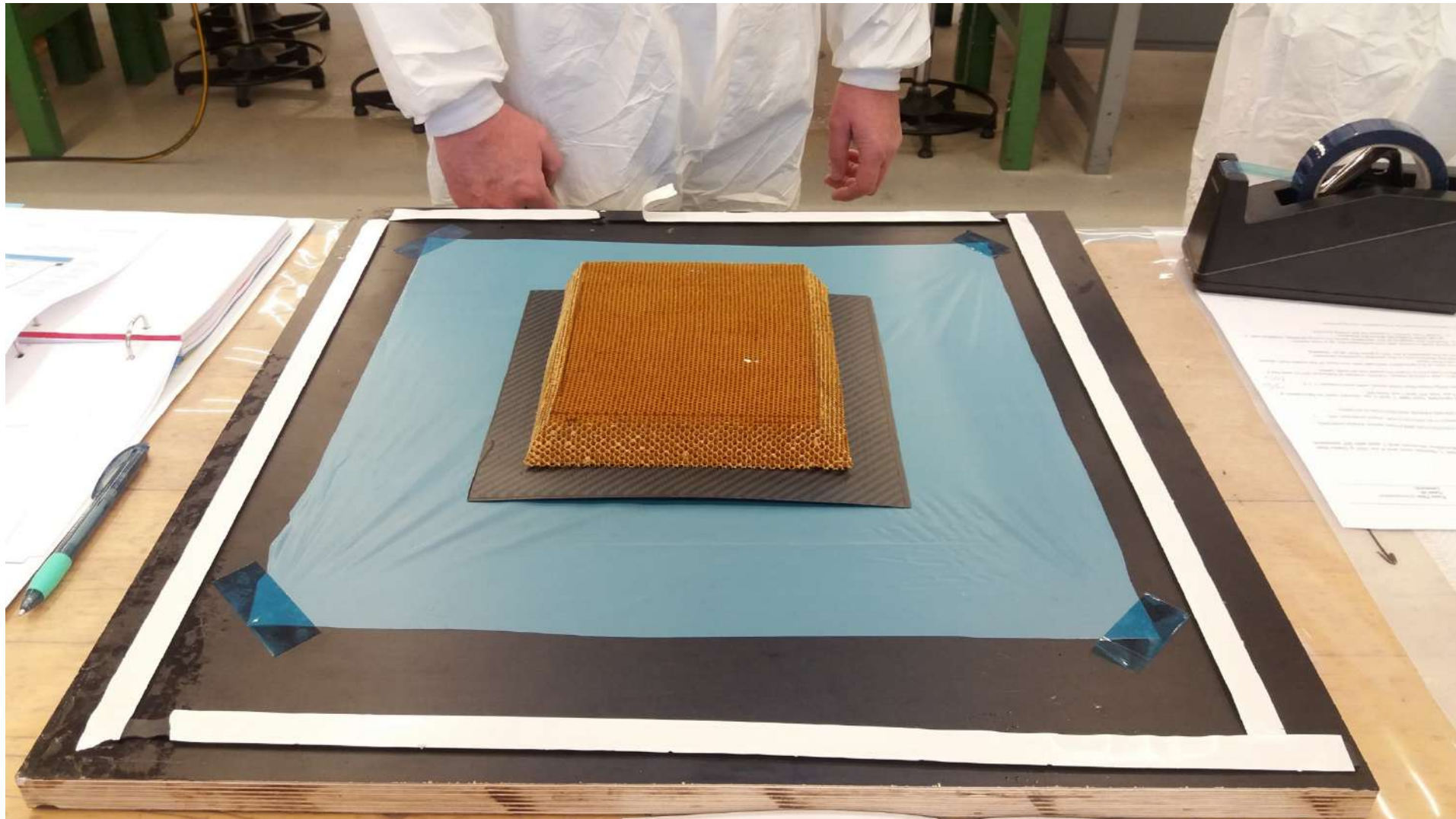


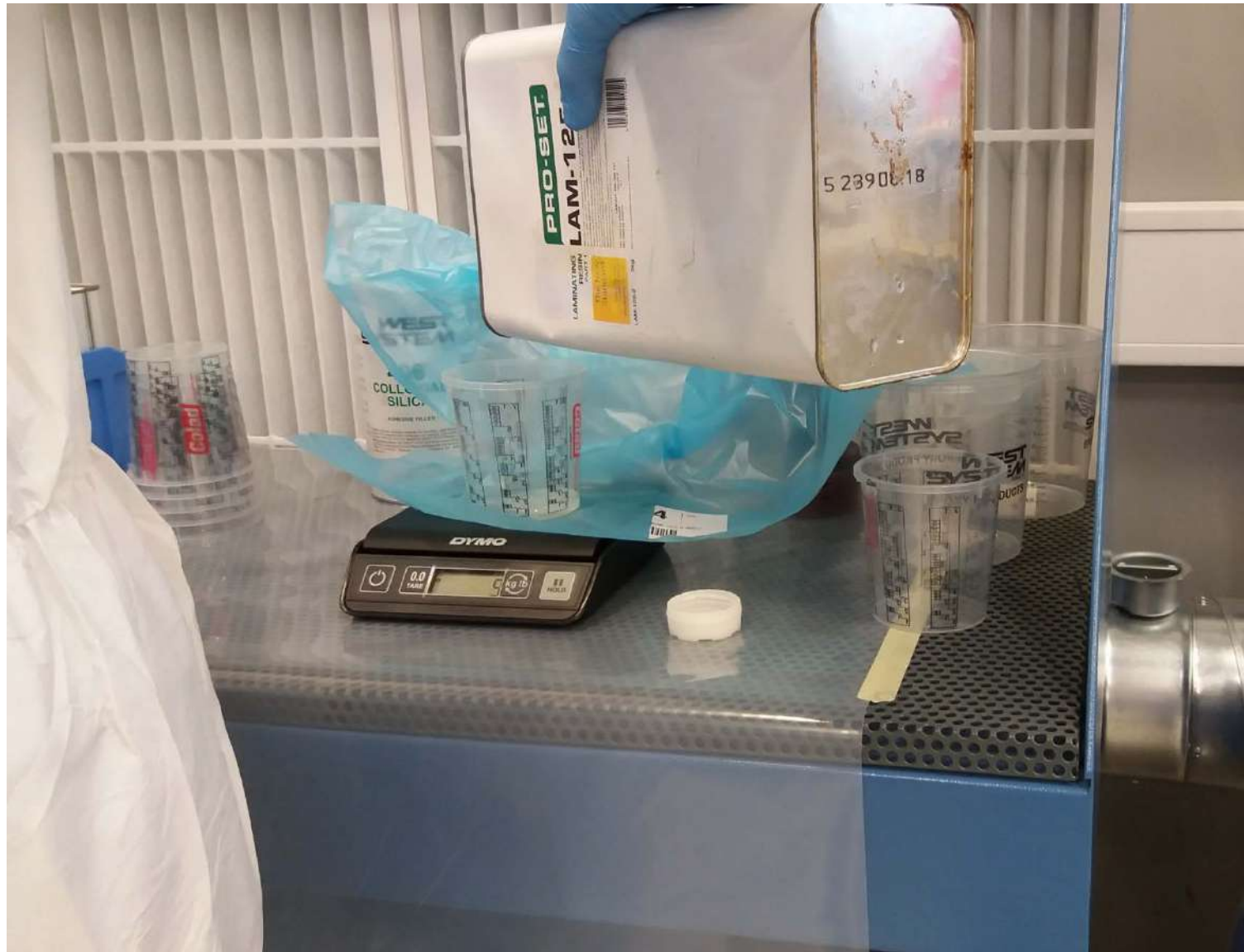


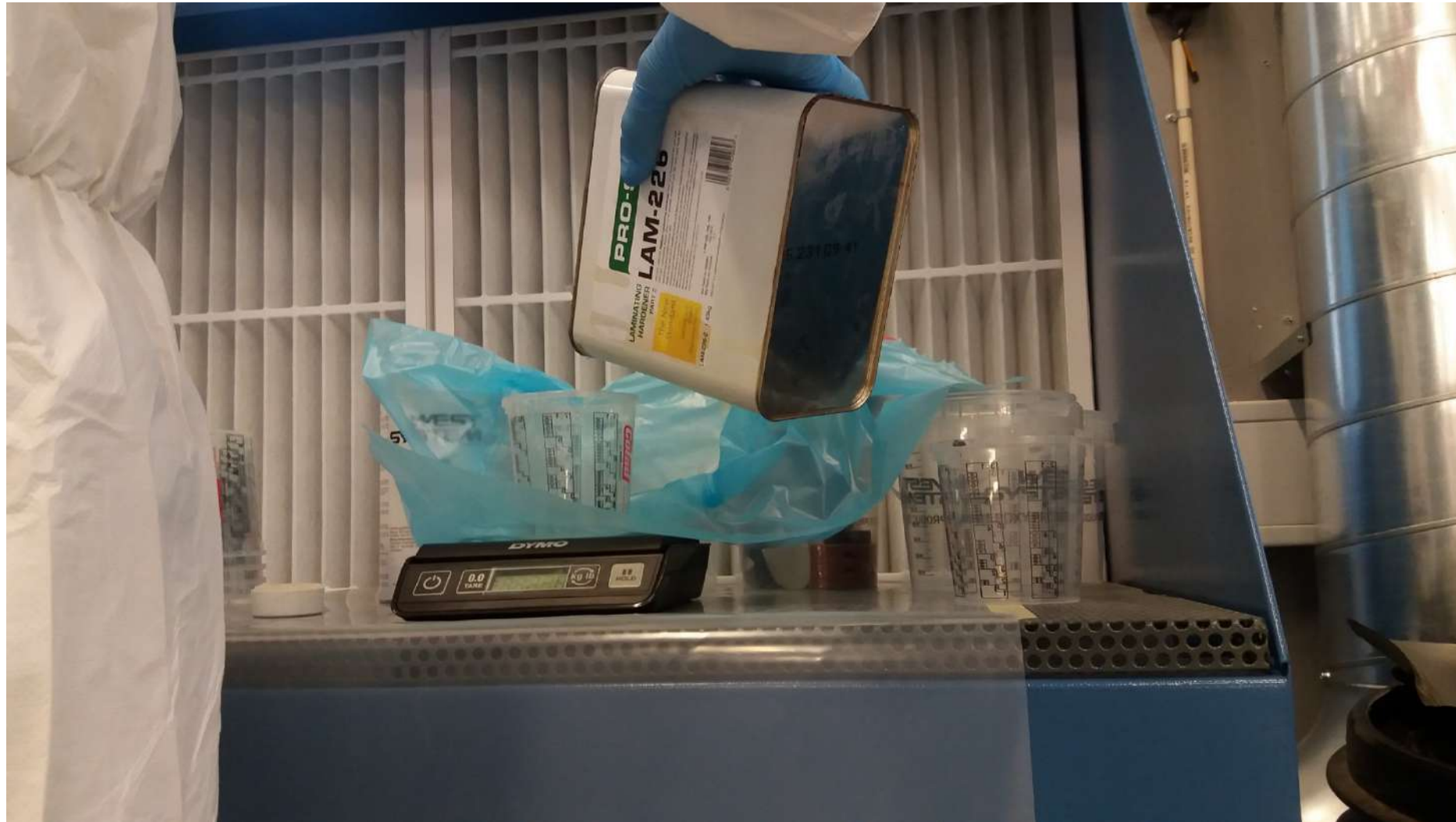


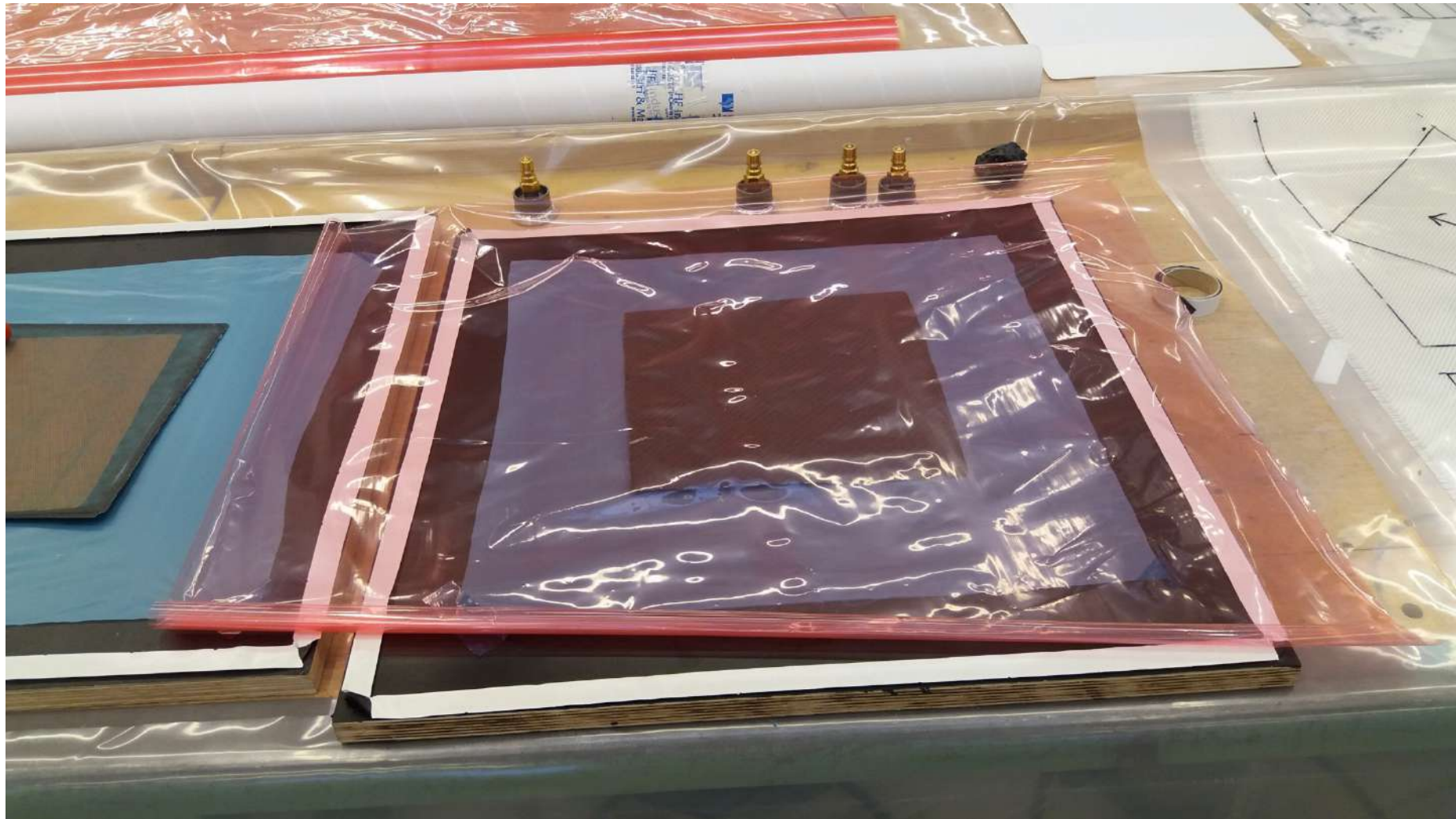


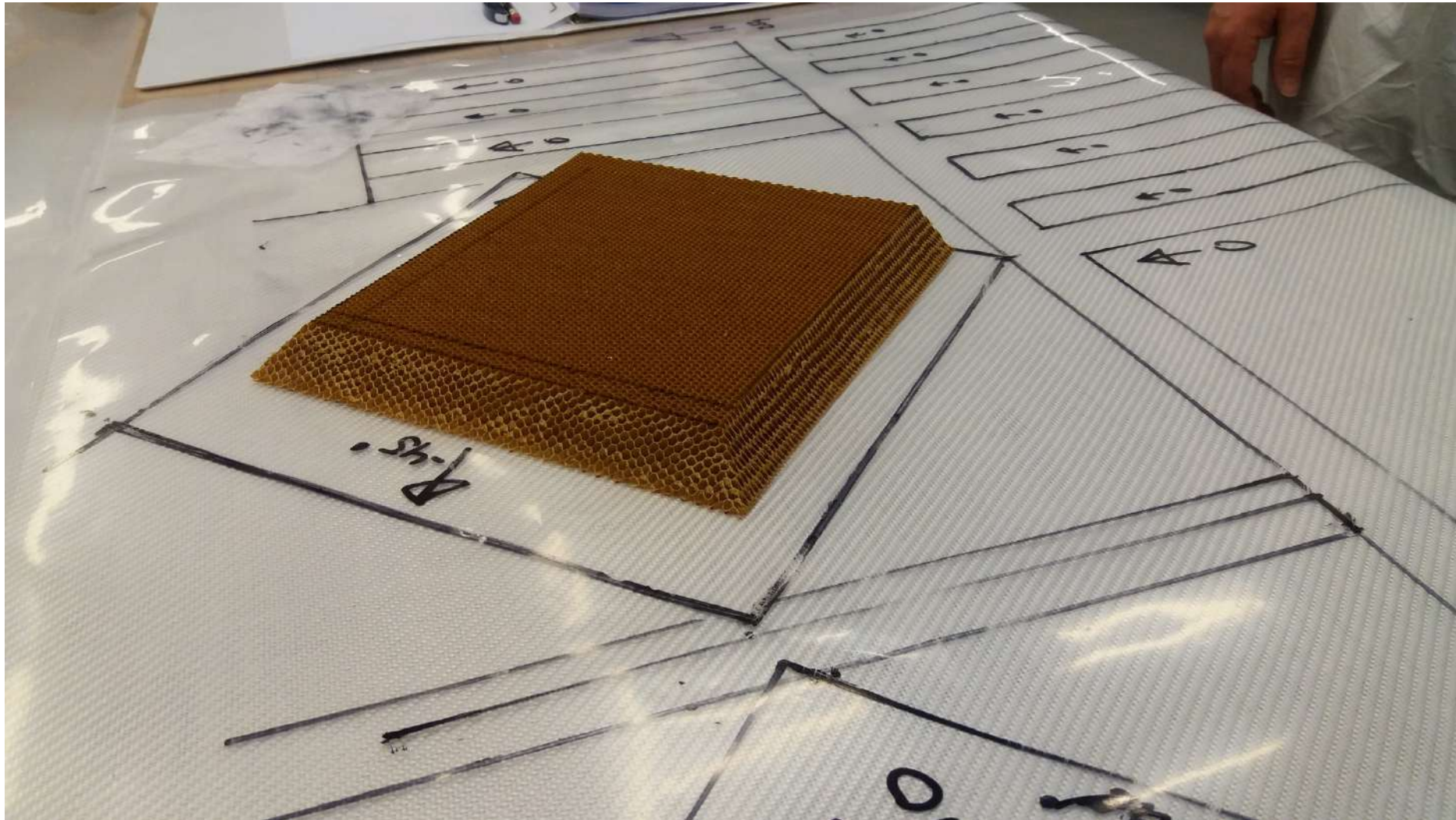








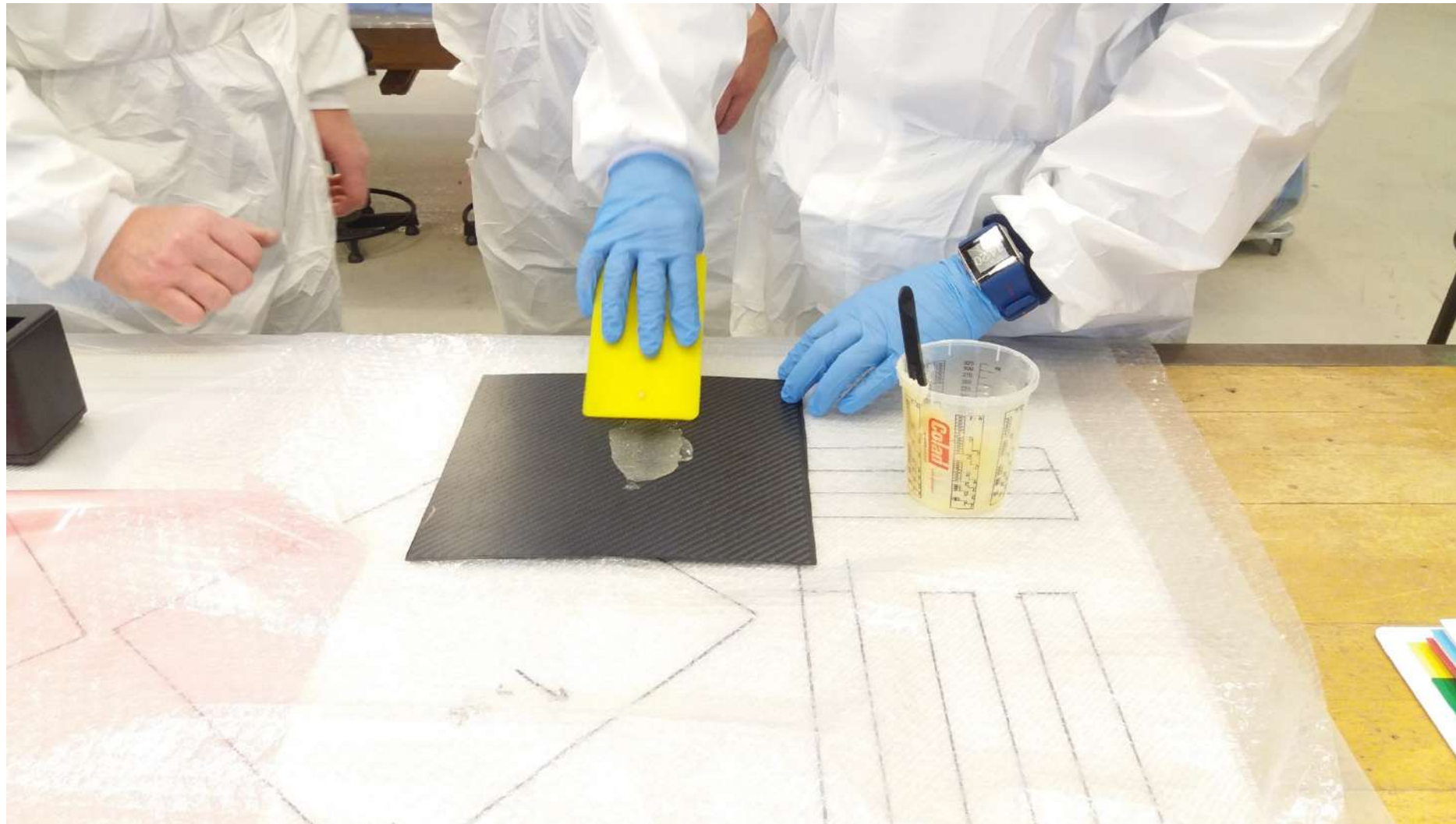




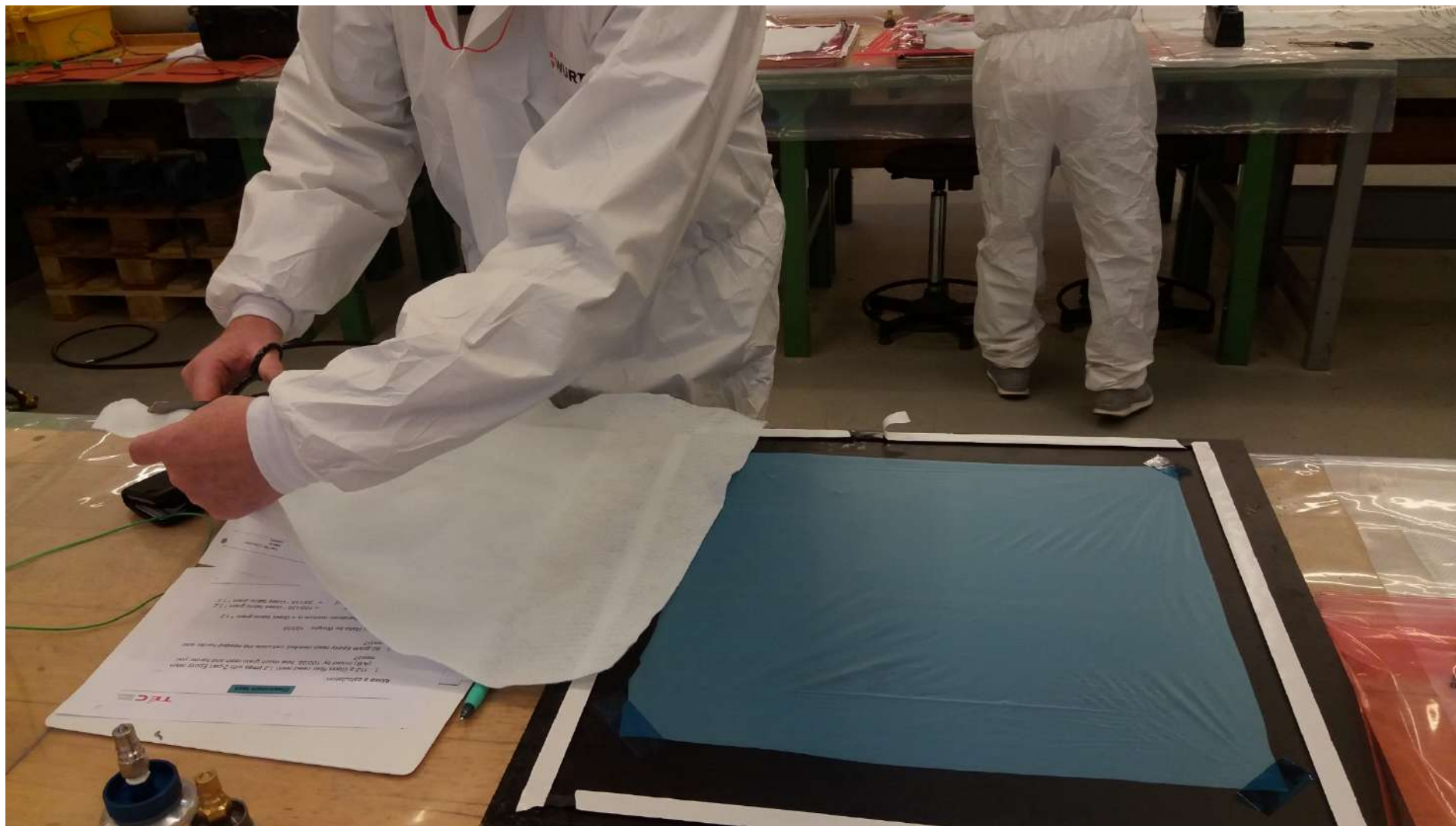


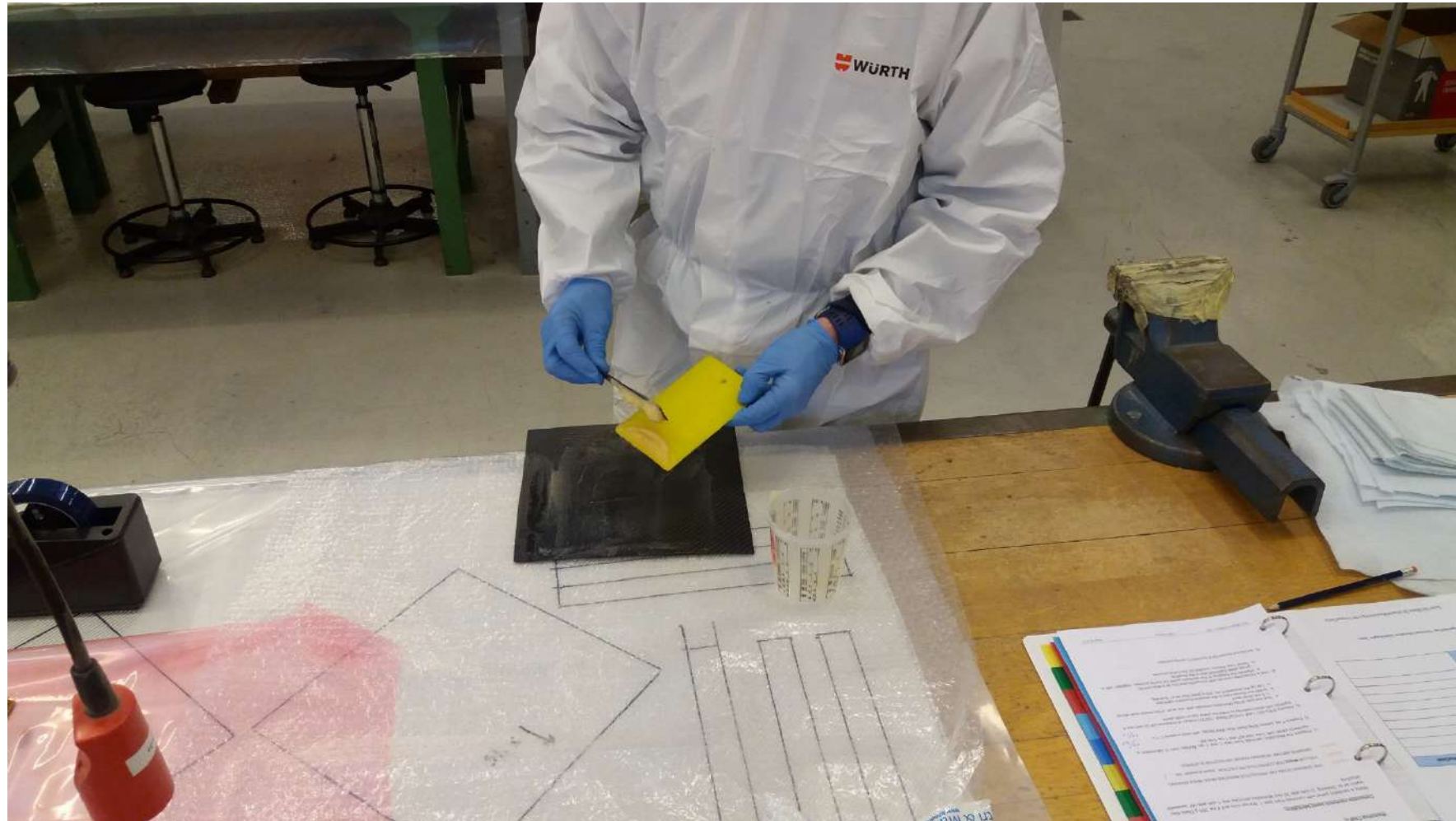




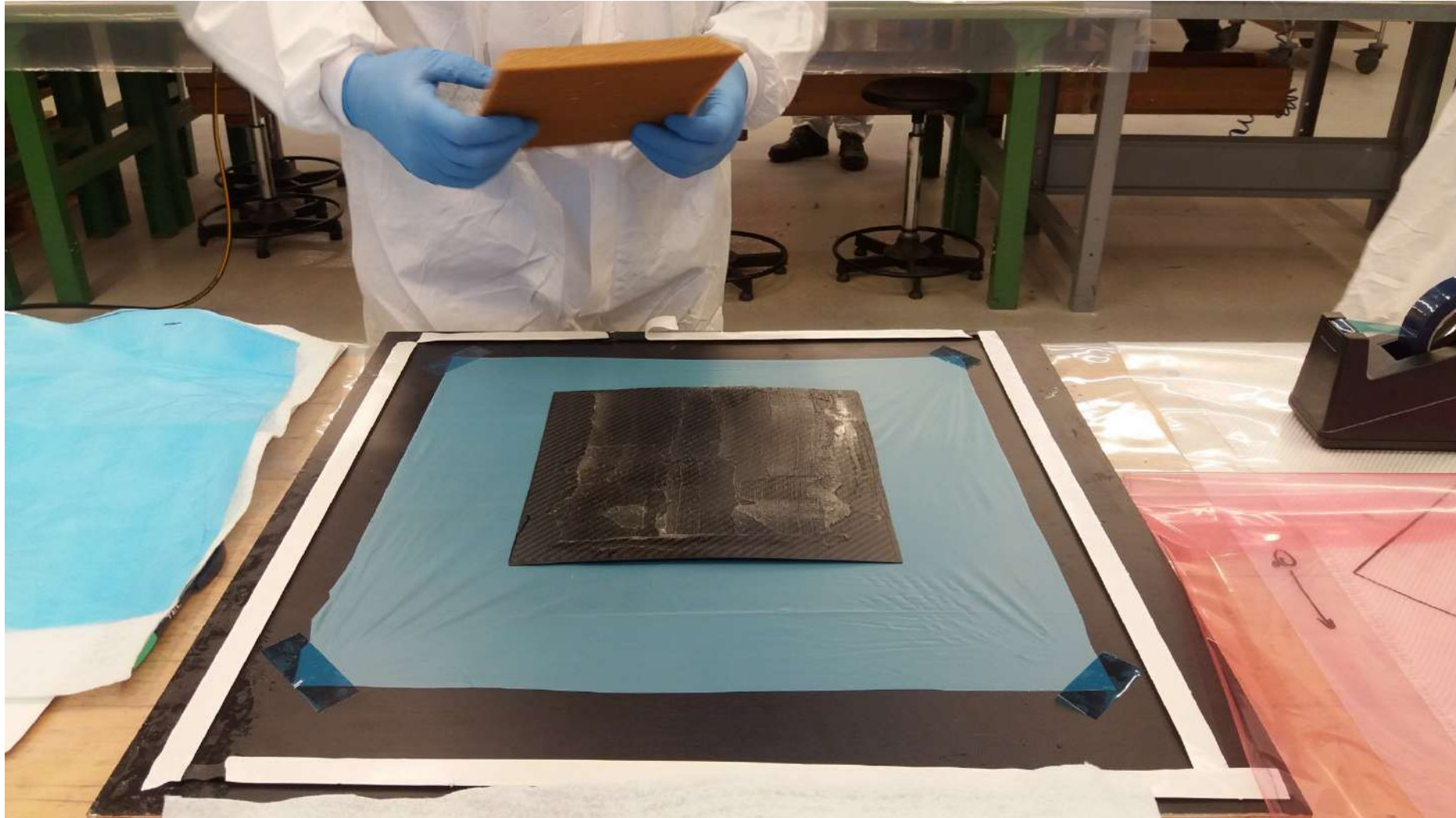


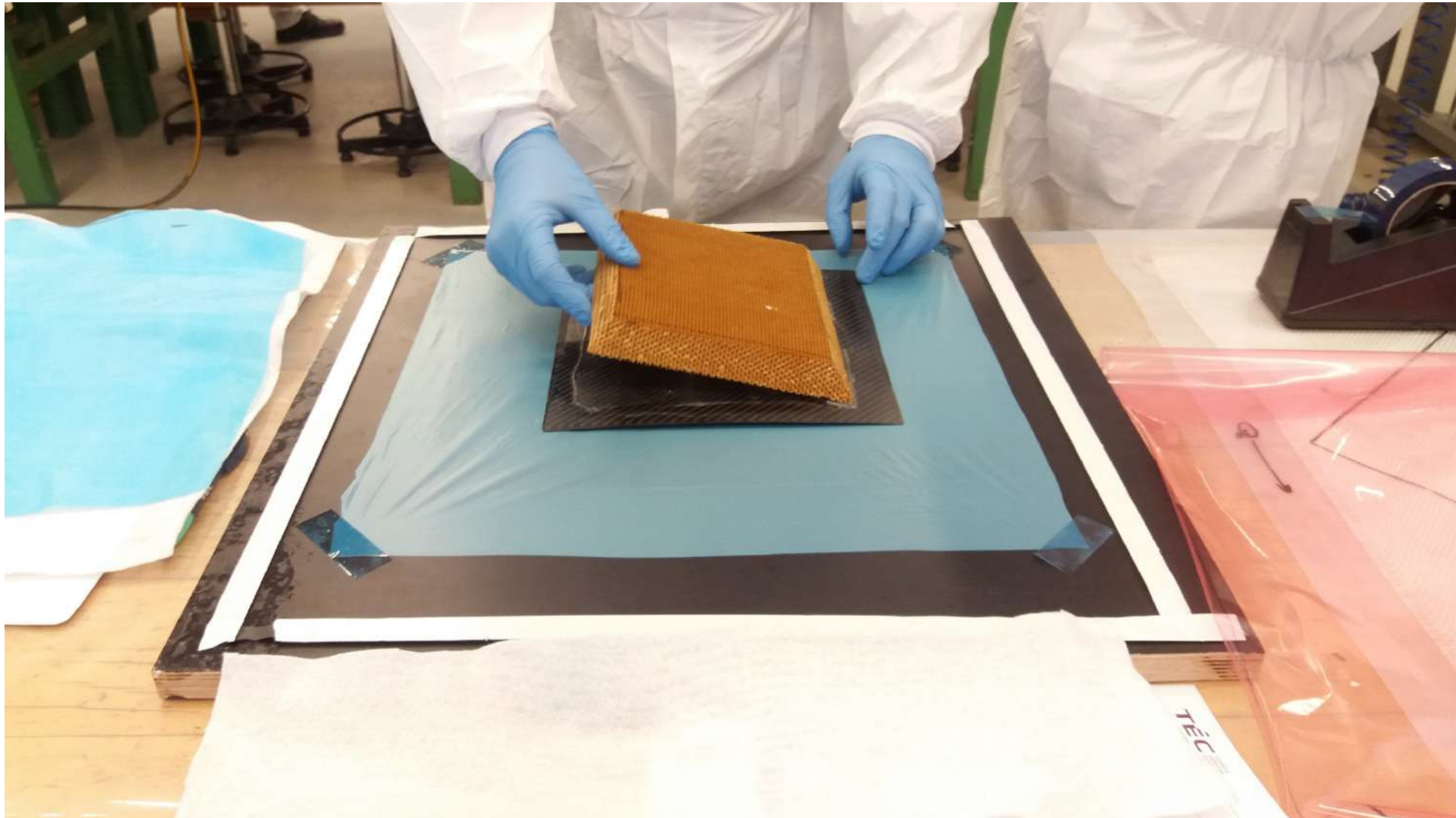












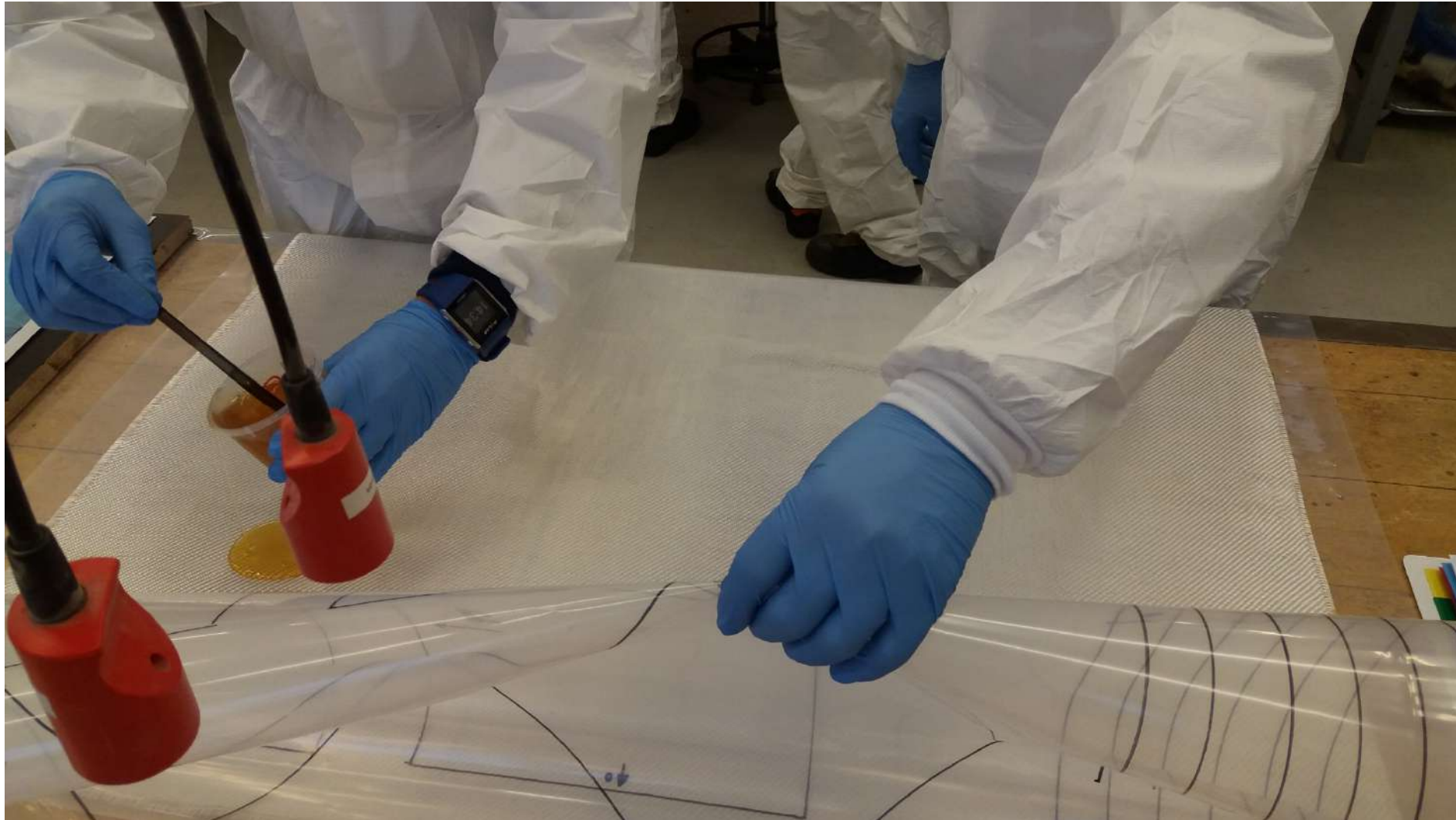






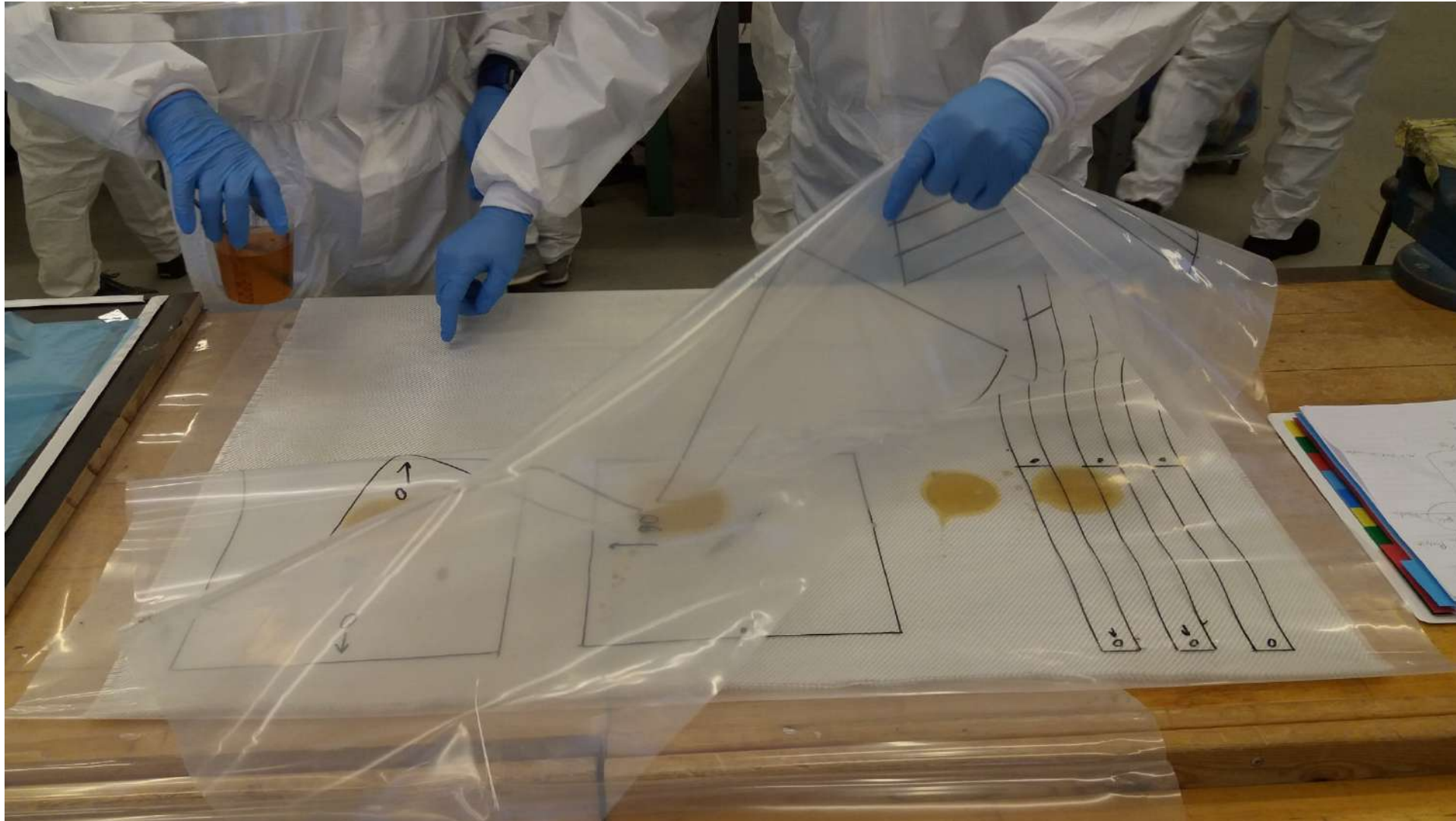
- Pull back the top layer of nylon film and pour the resin directly in the center and around of the dry fabric. This should create a puddle of resin, do not drizzle the resin all over the fabric.
- Pull the top layer of nylon film over the dry fabric. As the resin saturates the fabric use your plastic sweep to pull/sweep the resin to the outside edges.
- Remember you want to start this process with light pressure. As you see the resin saturating the fabric and becoming more transparent you will see the undesirable air bubbles.
- By applying gradual pressure to your sweep, pull as much air as possible out of the fabric without pulling too much out, which can cause a resin starvation issue.
- We want even resin content without air. you have to sweep the resin from the middle to the edges while the dry fabric is absorbing the resin. If you sweep the resin too fast you may end up with inconsistent resin content throughout the fabric. Start light at first, as you see the resin saturating the fabric, go back over and pull out the excess resin on the second sweep.

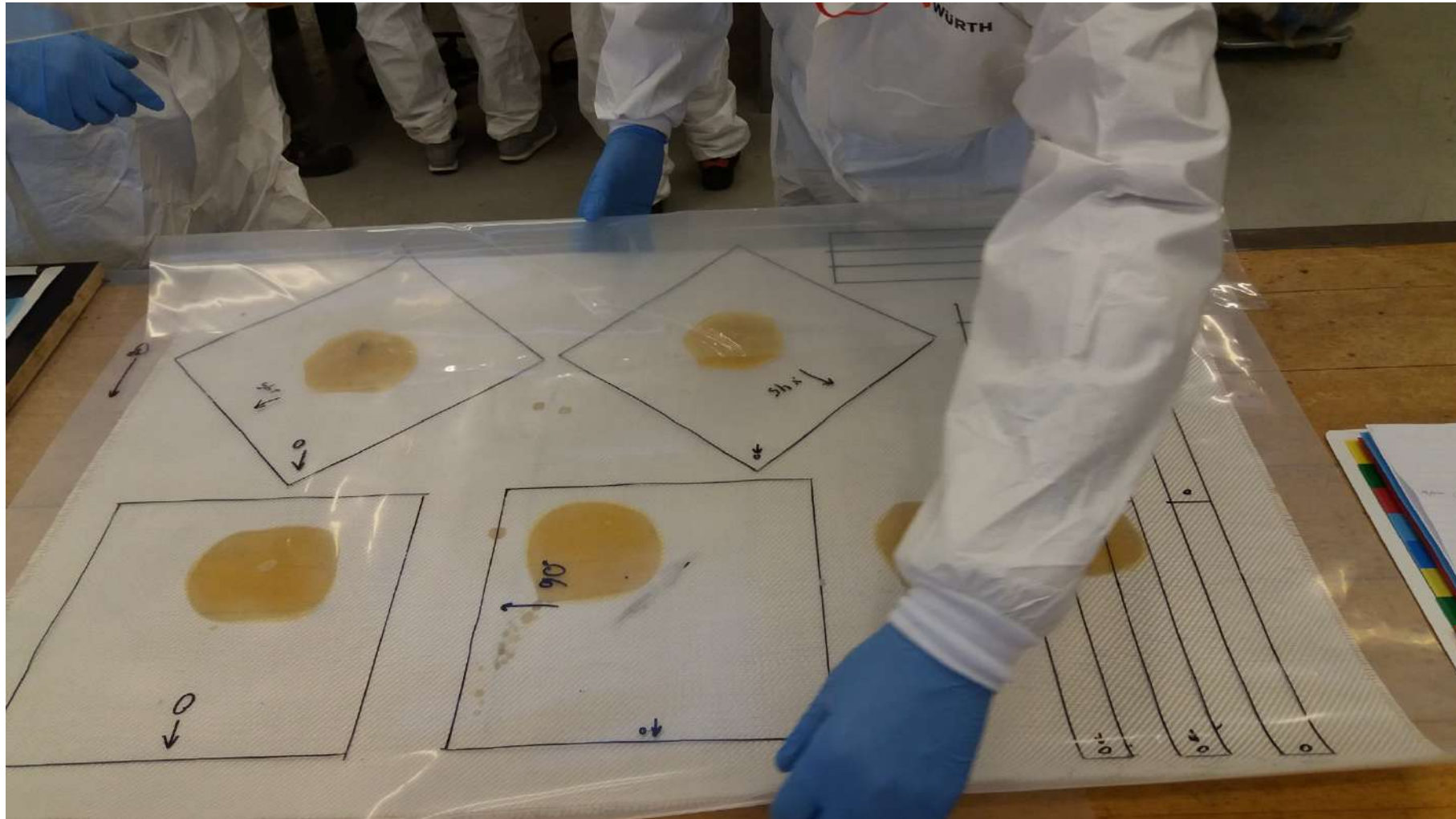
- Pull back the top layer of nylon film and pour the resin directly in the center and around of the dry fabric.

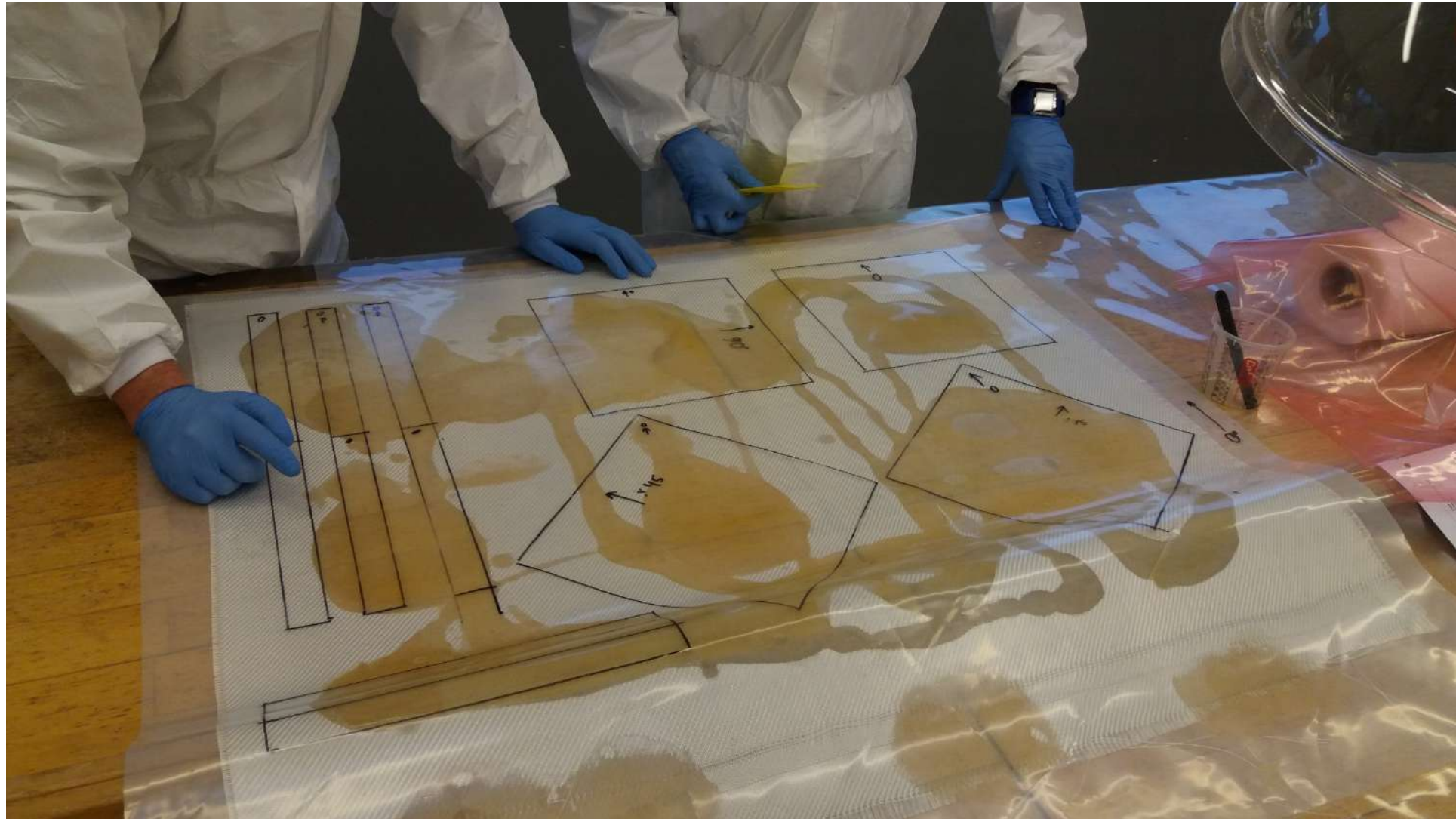




- Pull the top layer of nylon film over the dry fabric. As the resin saturates the fabric use your plastic sweep to pull/sweep the resin to the outside edges.

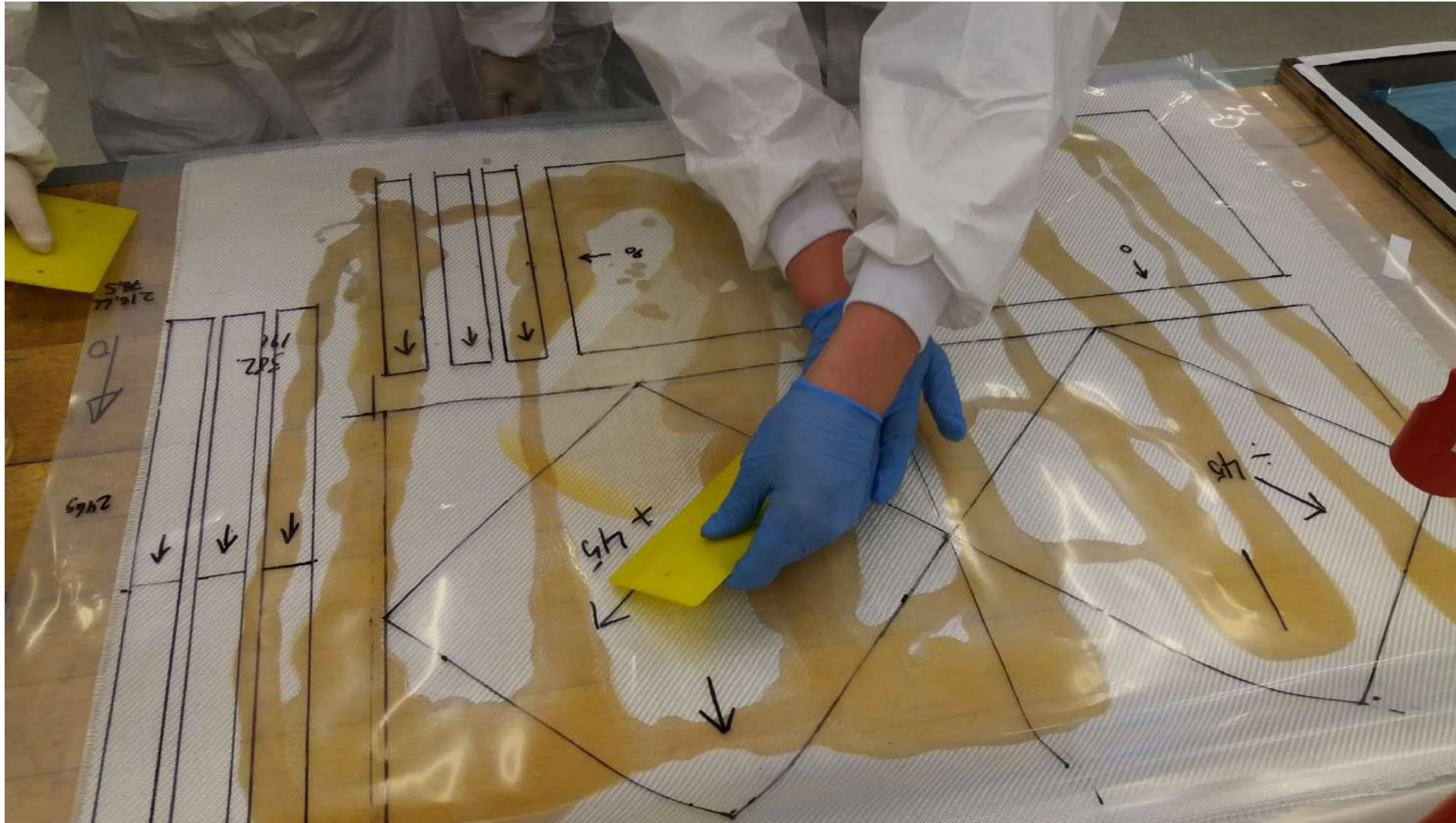








- Sweep resin between nylon films. Remember you want to start this process with light pressure. As you see the resin saturating the fabric and becoming more transparent you will see the undesirable air bubbles.



- By applying gradual pressure to your sweep, pull as much air as possible out of the fabric without pulling too much out, which can cause a resin starvation issue.





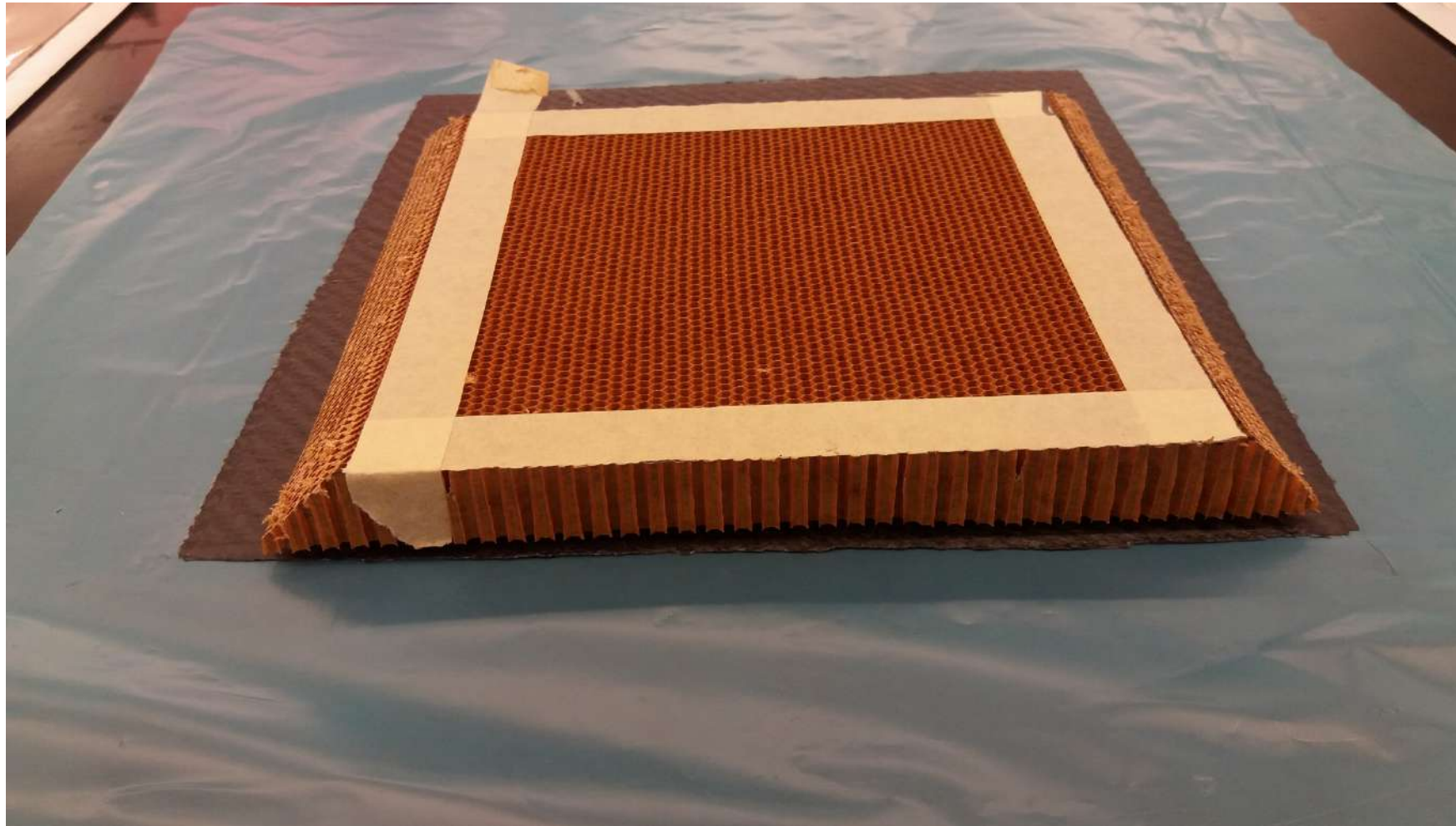




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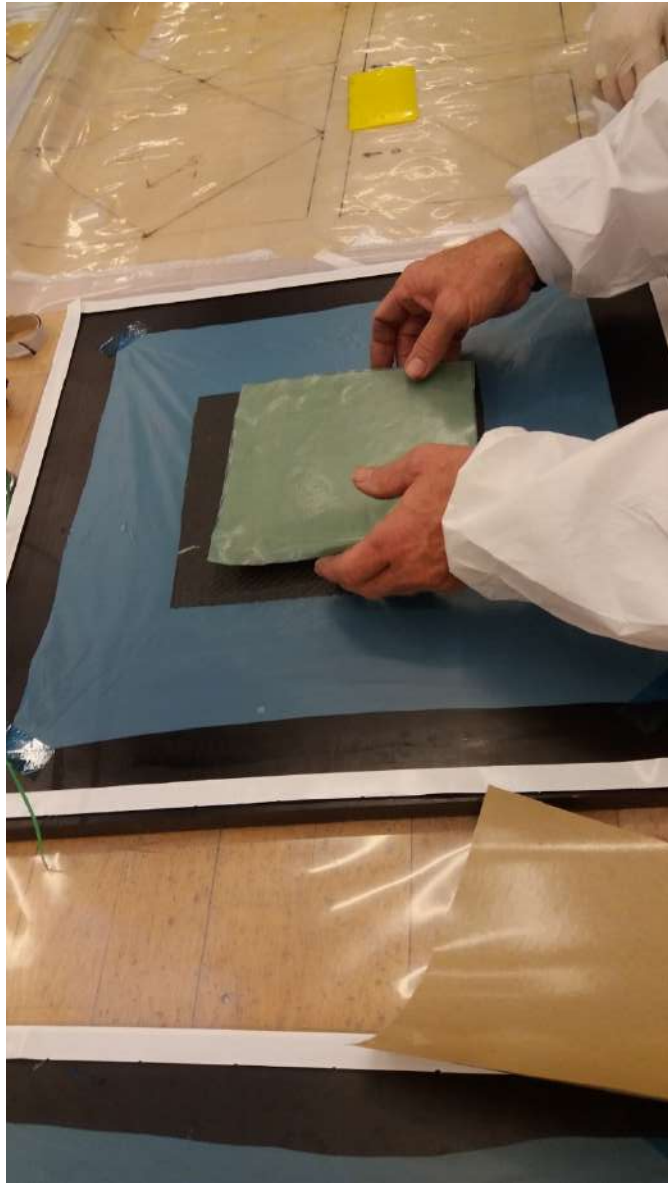


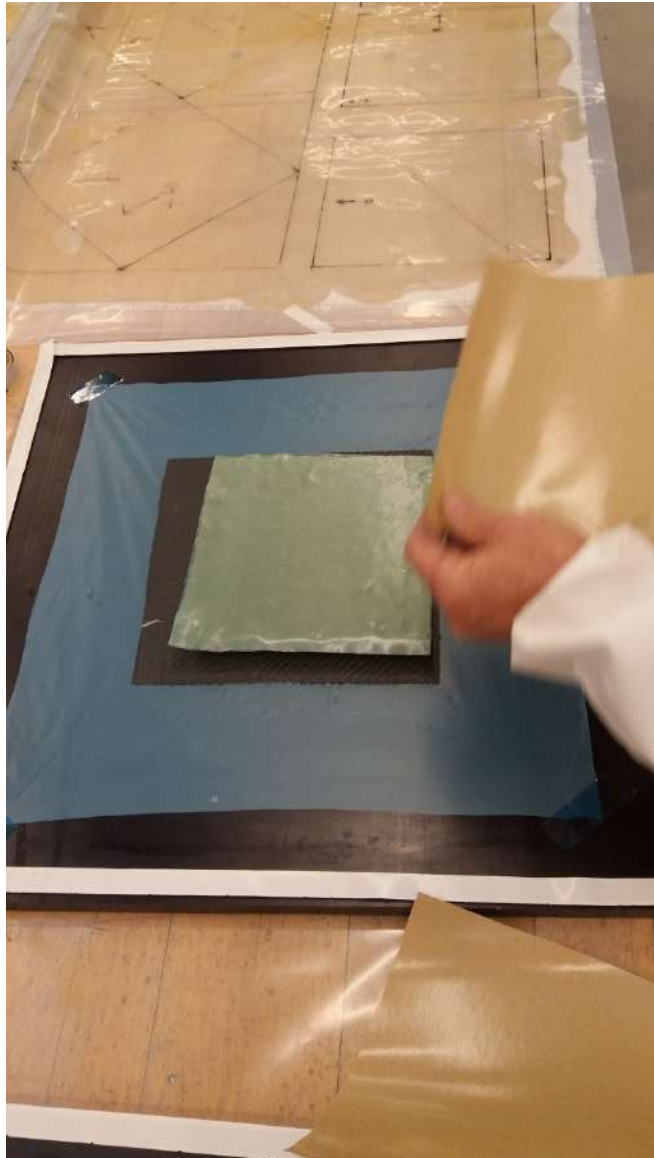
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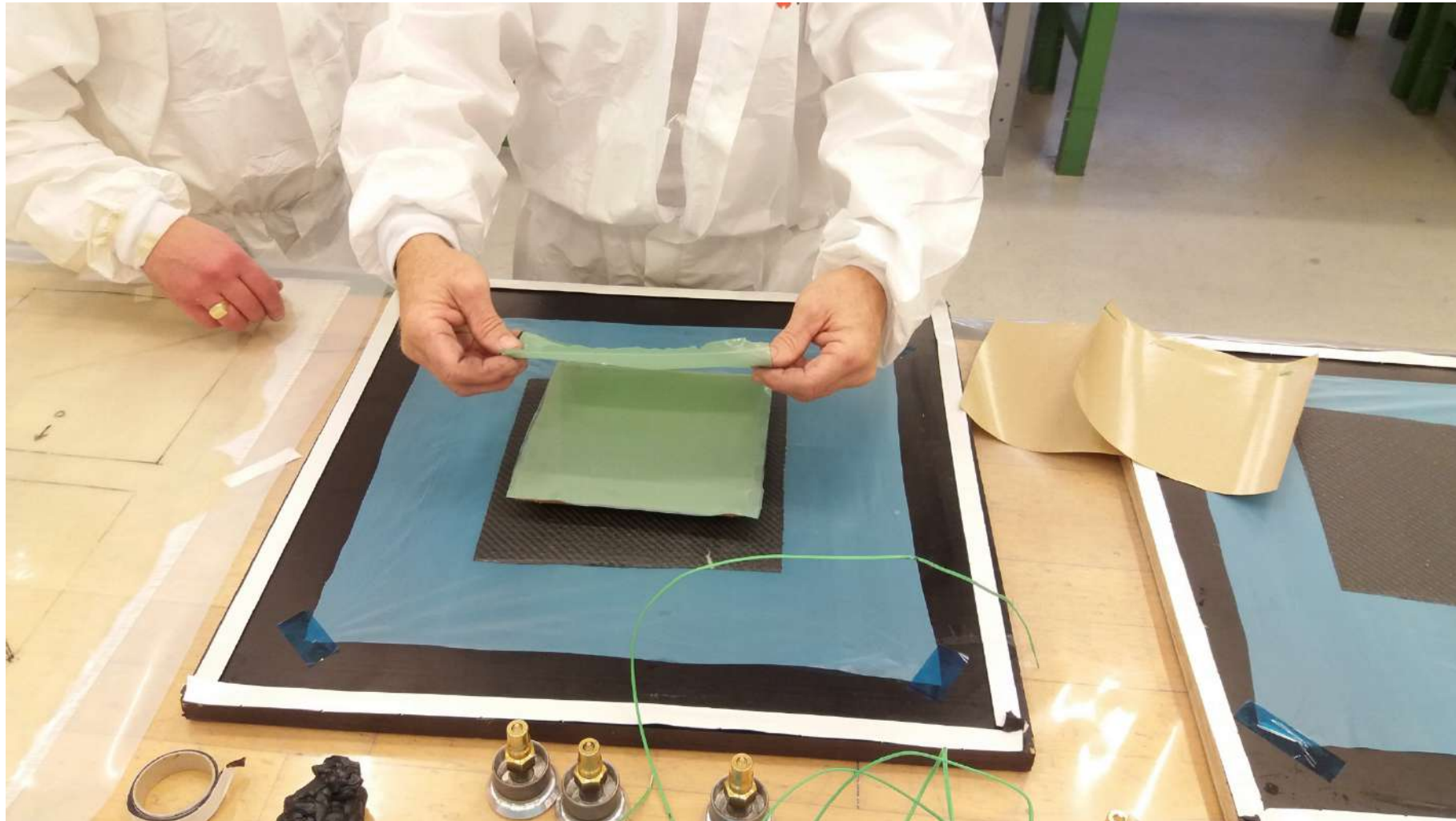






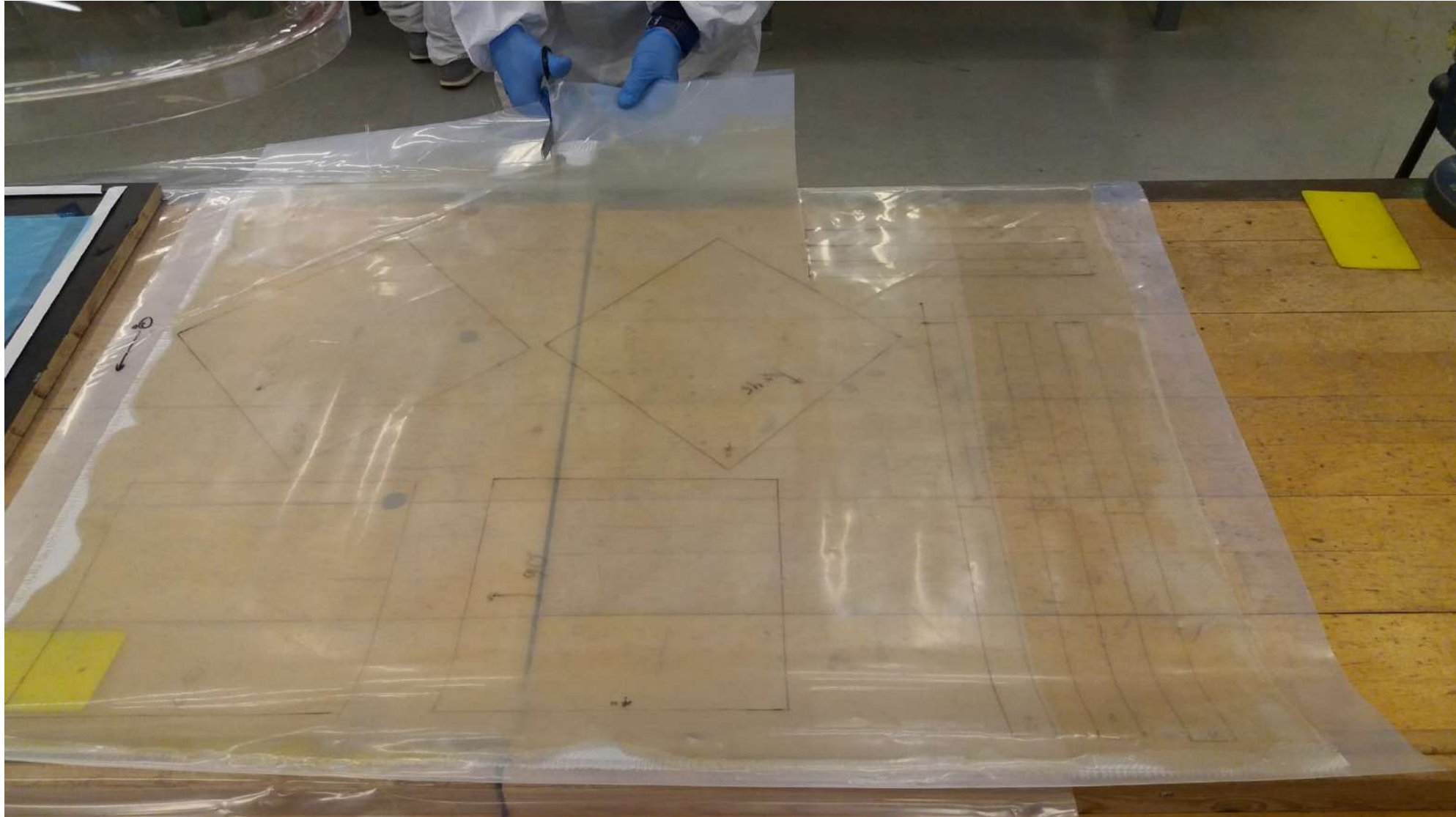






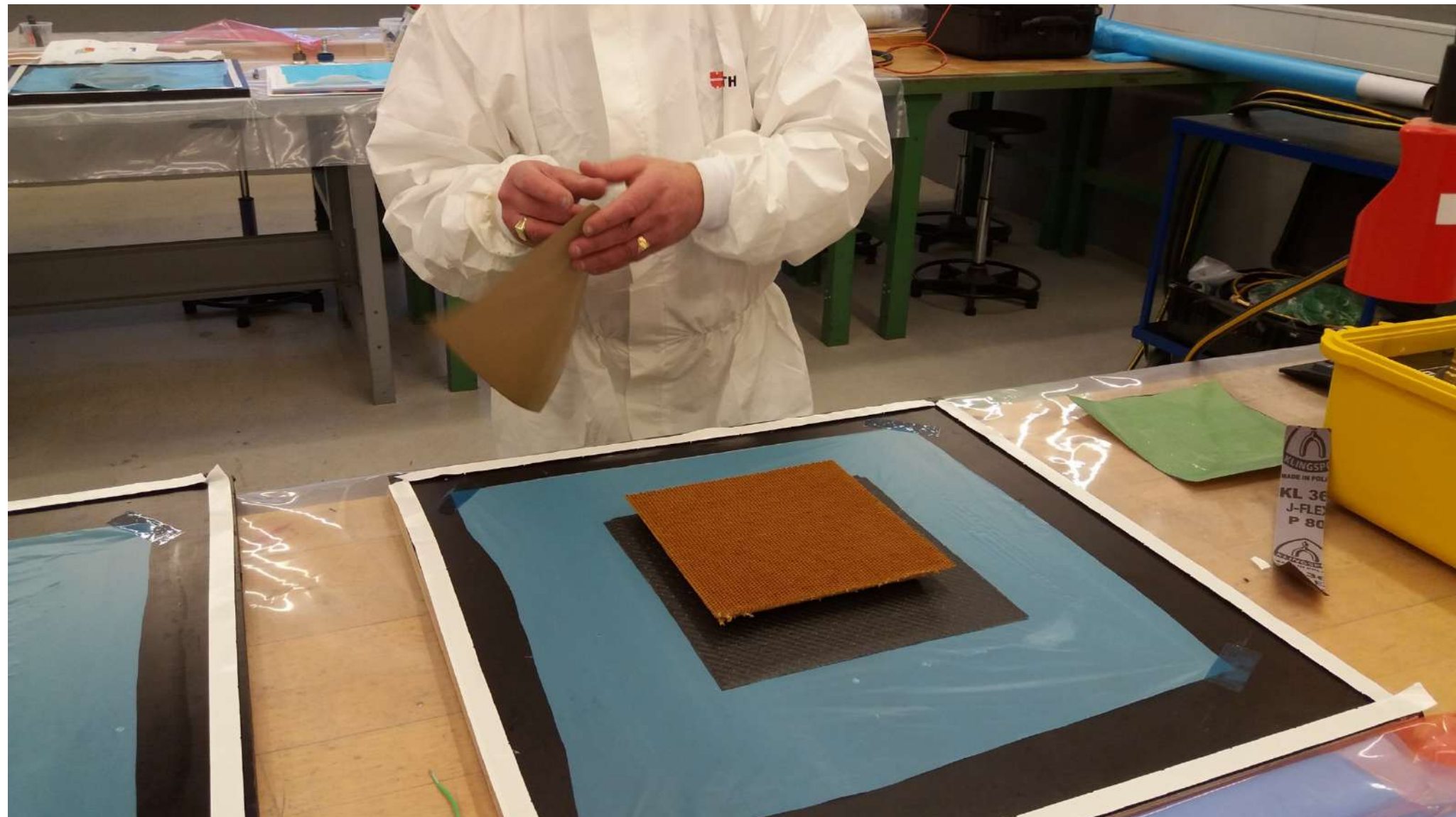
Cut out your ply templates located on the top sheet of nylon film. Take care to use sharp scissors or sharp knives. Also use a straight edge with a hand guard. Sharp blades will help in keeping the saturated fabric between the nylon films until you are ready to apply the material to the tool. Each ply should be numbered, and stacked in sequence next to the lay-up tool.

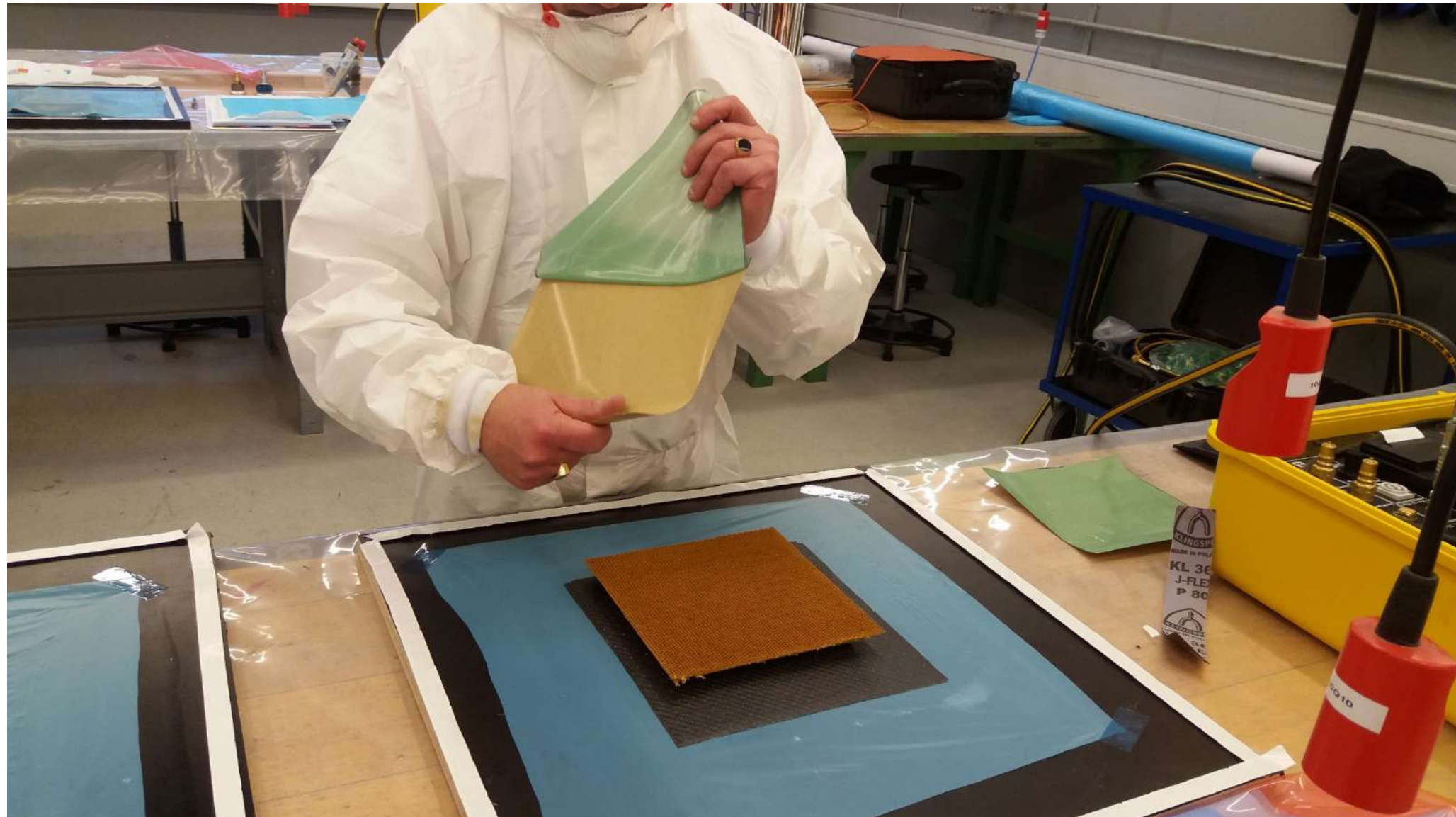


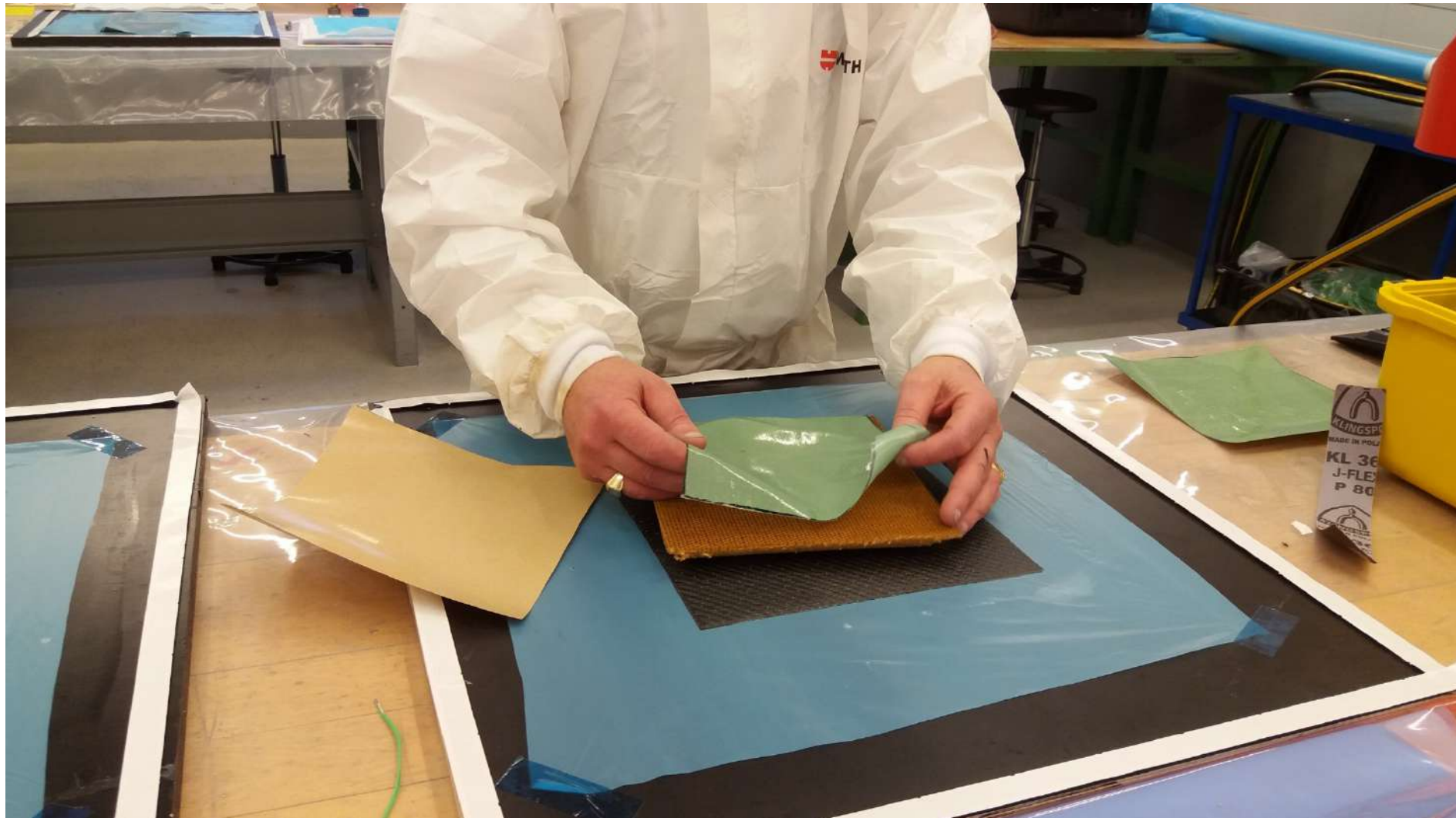












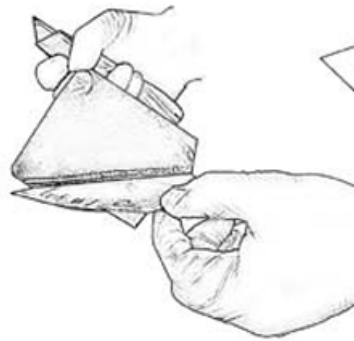


The process of Plies Locating on mould (next slides)

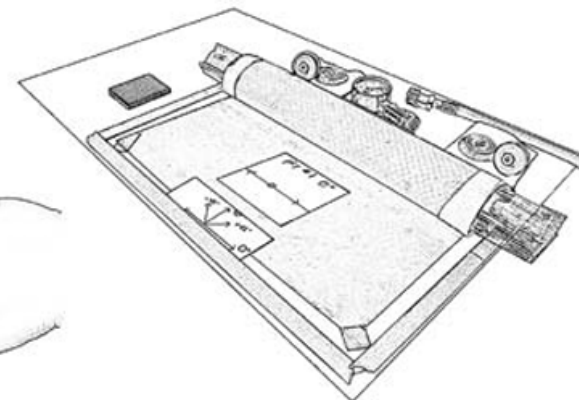
- ❑ Remove the bottom layer of nylon film exposing the impregnated fabric. Turn ply over with the ply number and the ply orientation side up.
- ❑ Locate the first ply and verify that the orientation is correct.
- ❑ Press material in place using the nylon film.
- ❑ Once the ply is in place remove the top, second layer of nylon film. Set nylon film aside so that you can count and confirm all nylon film has been removed prior to the bagging process.
- ❑ Repeat the above process until all plies have been laid up in the proper sequence and orientation.
- ❑ Then you are ready to start the bagging process.



Cutting plies



Remove bottom
layer of parting film

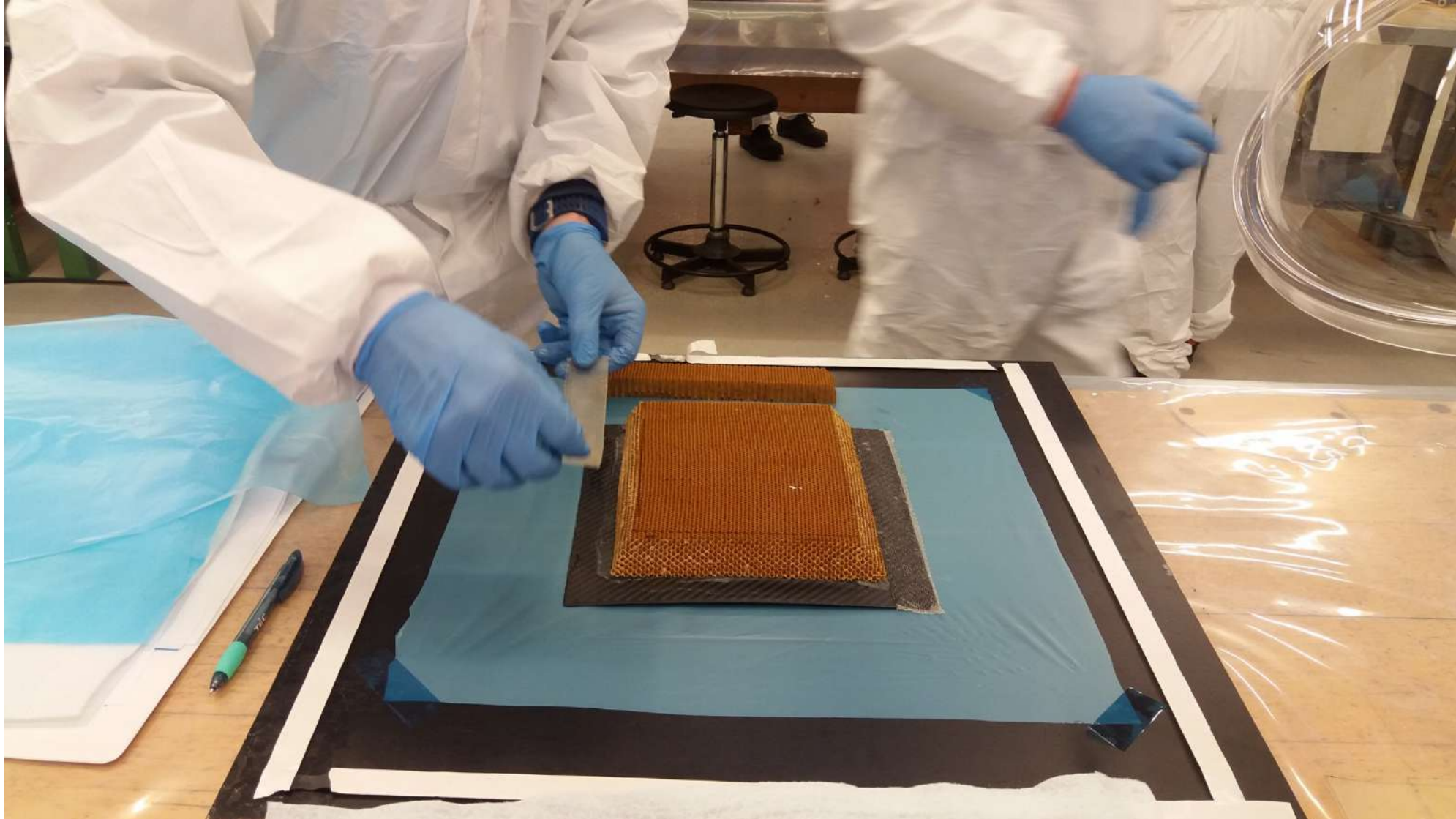


Locate plies on table and
remove top layer of parting film

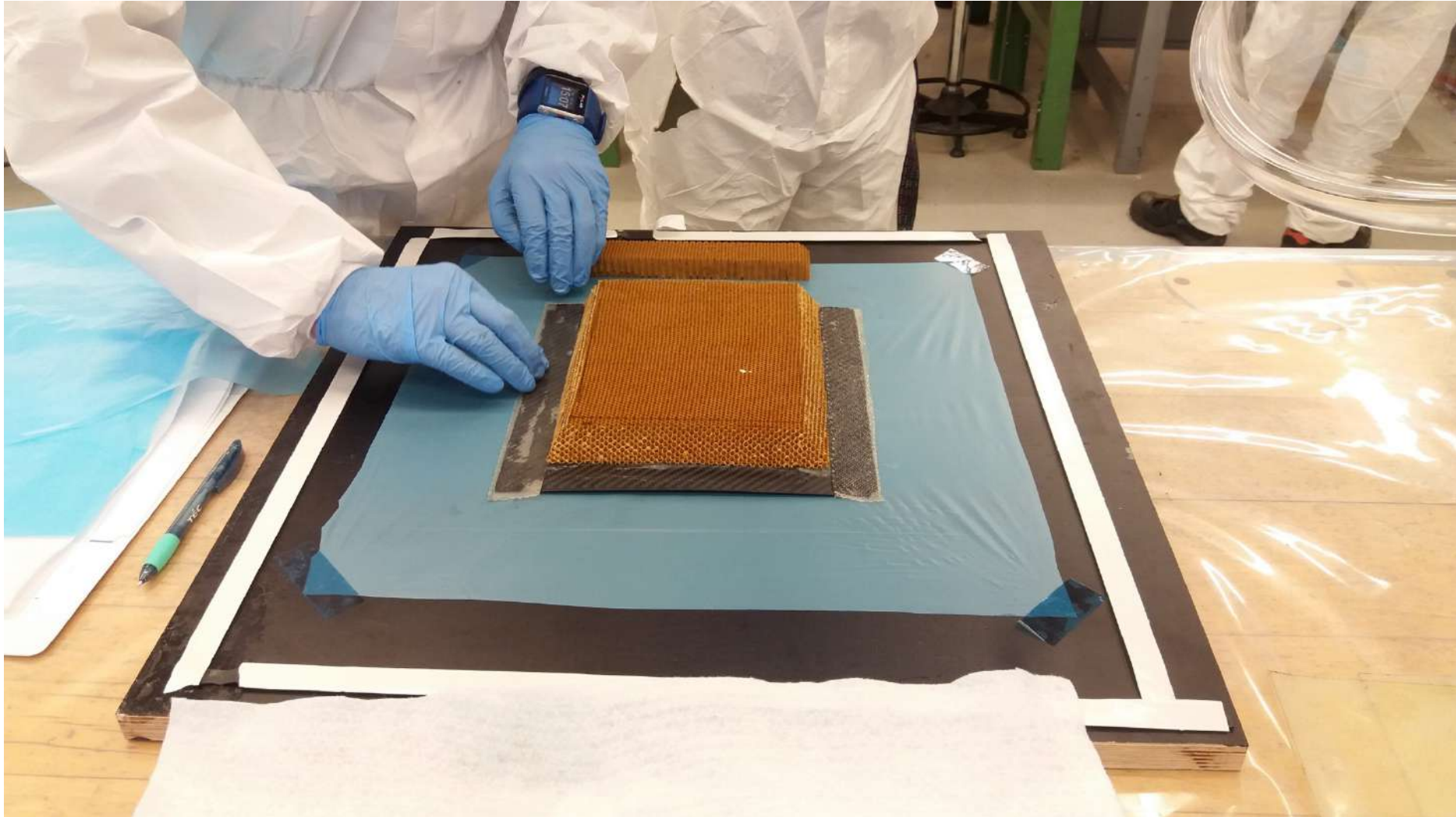
Process : All plies have been laid up in the proper sequence and orientation according to task diagram



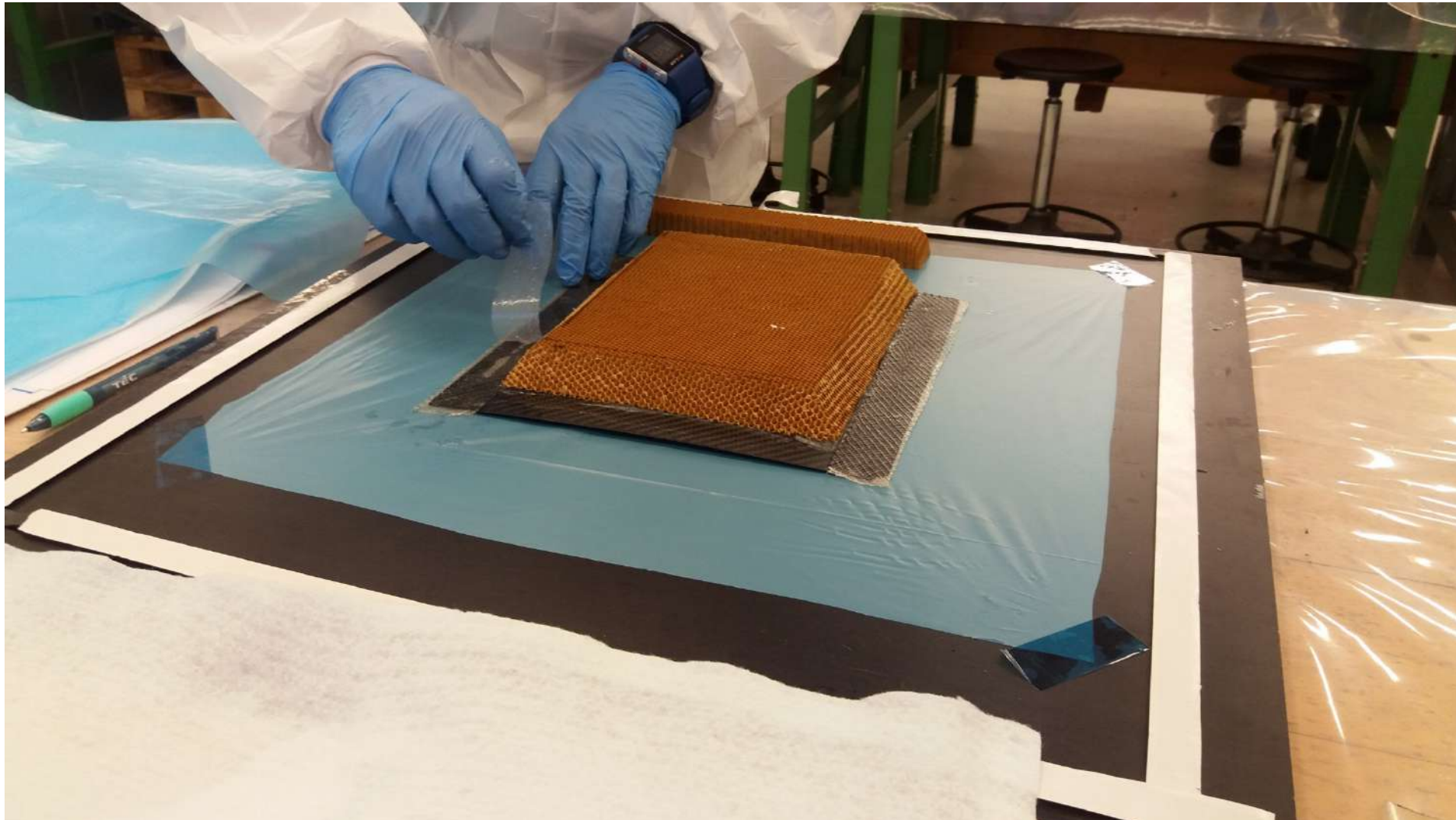
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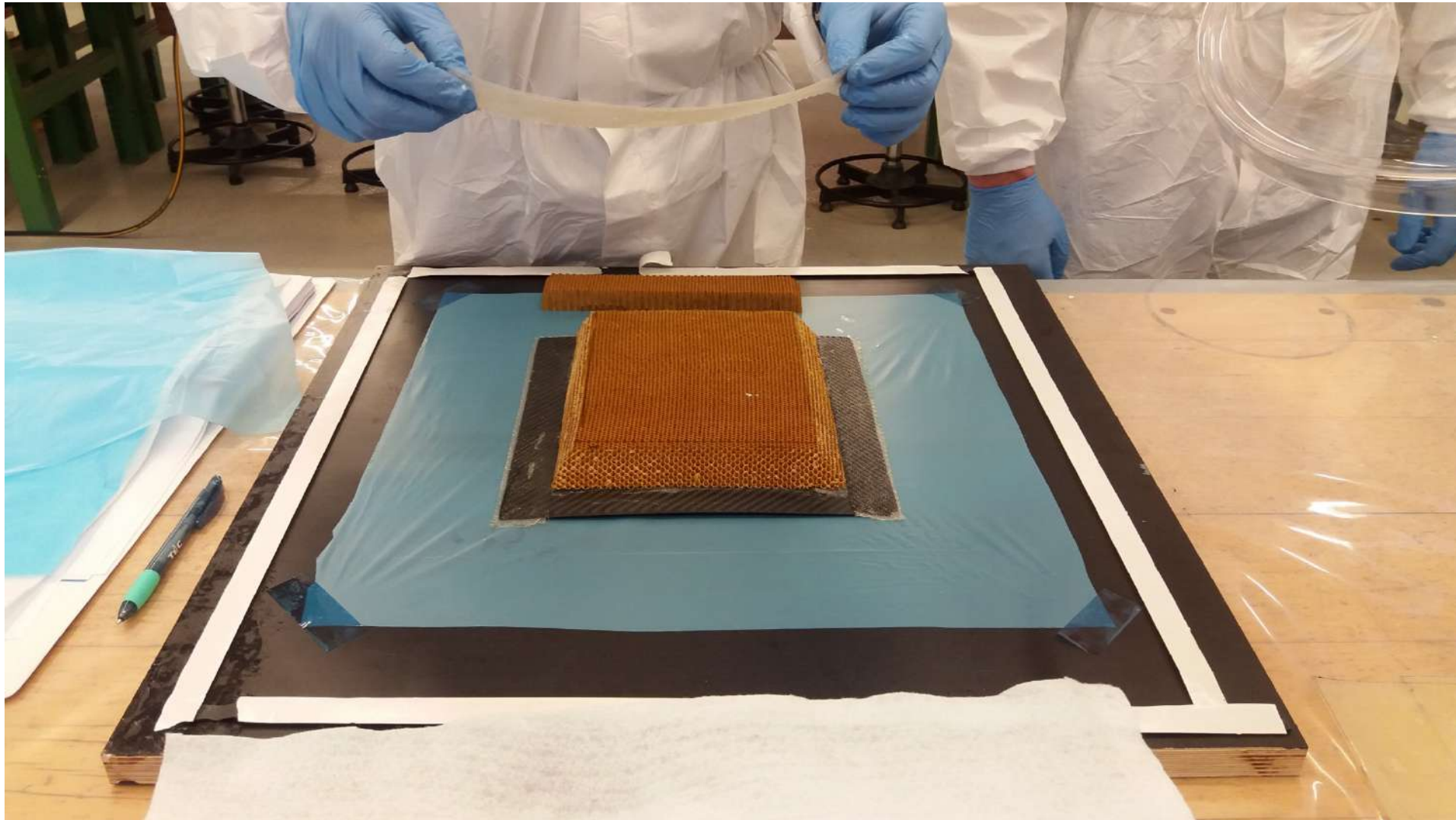
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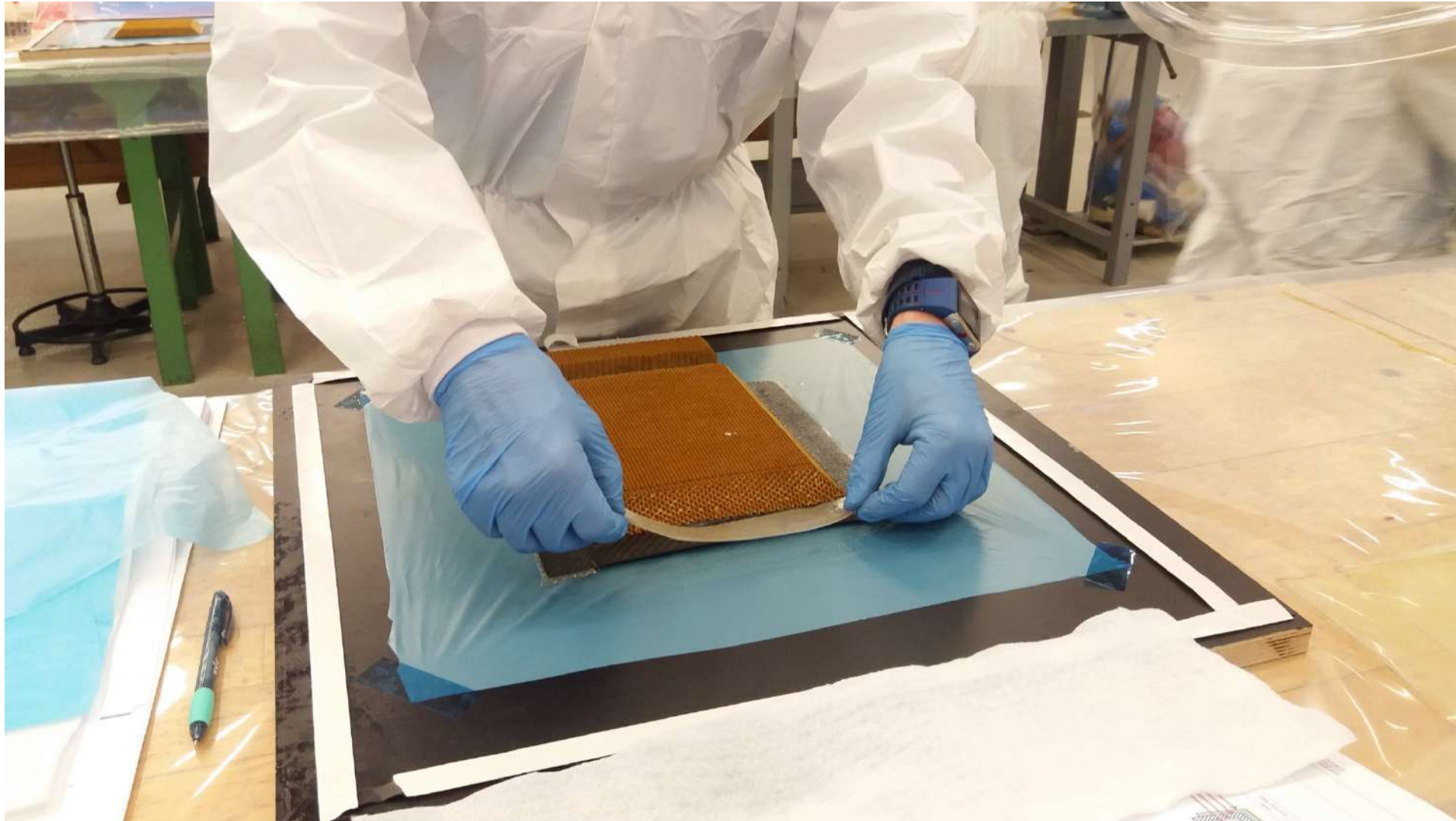
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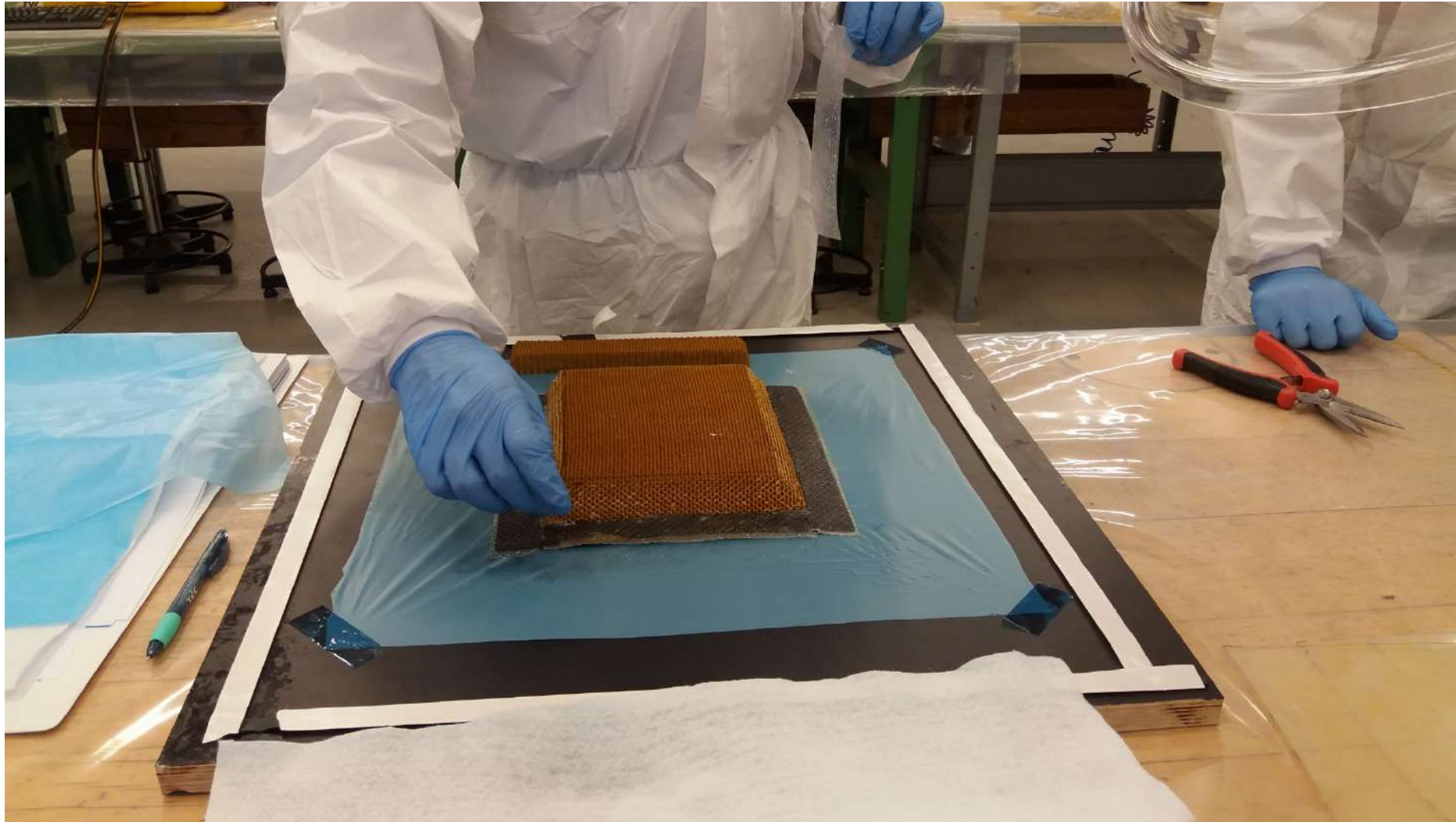
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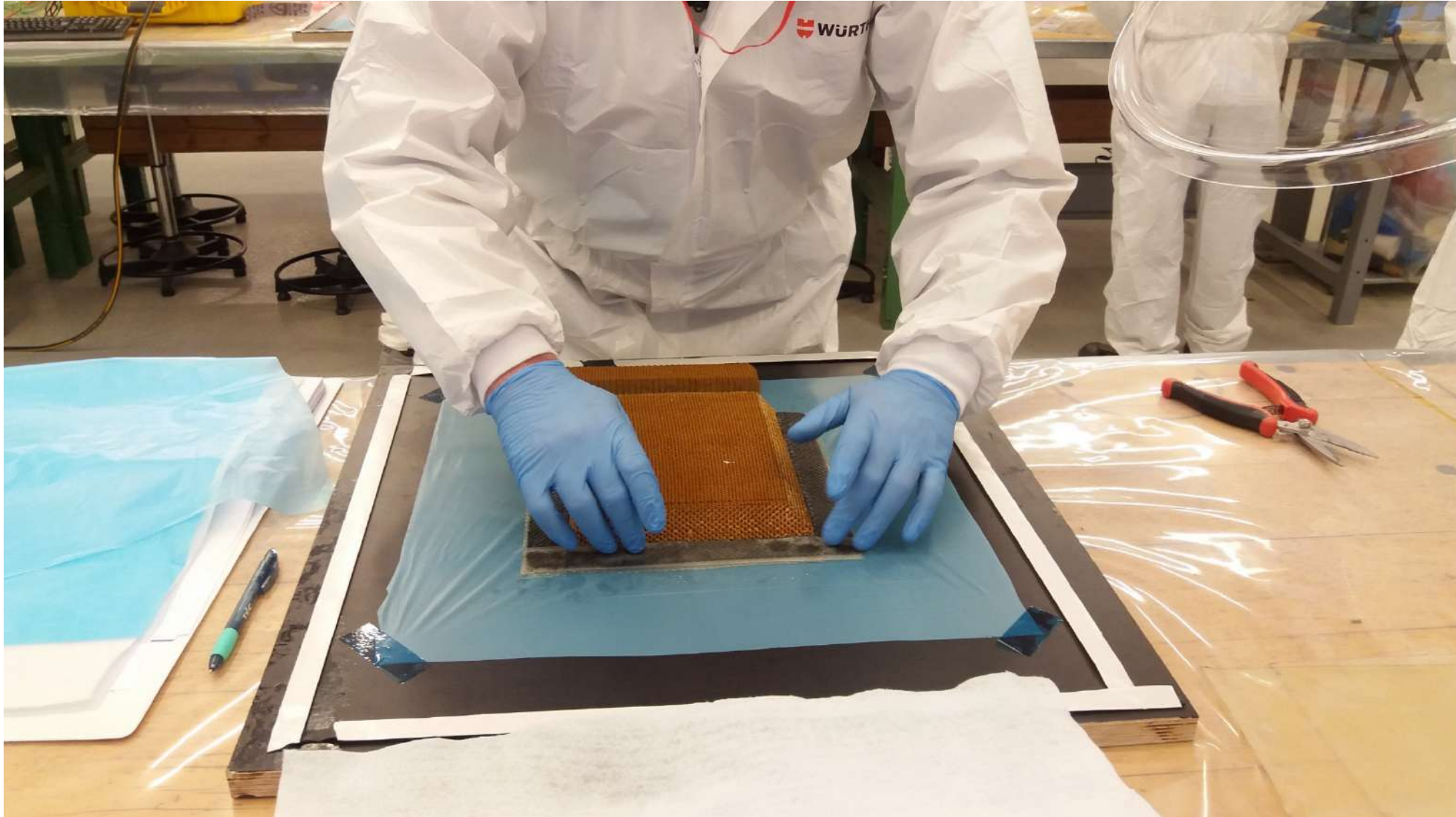
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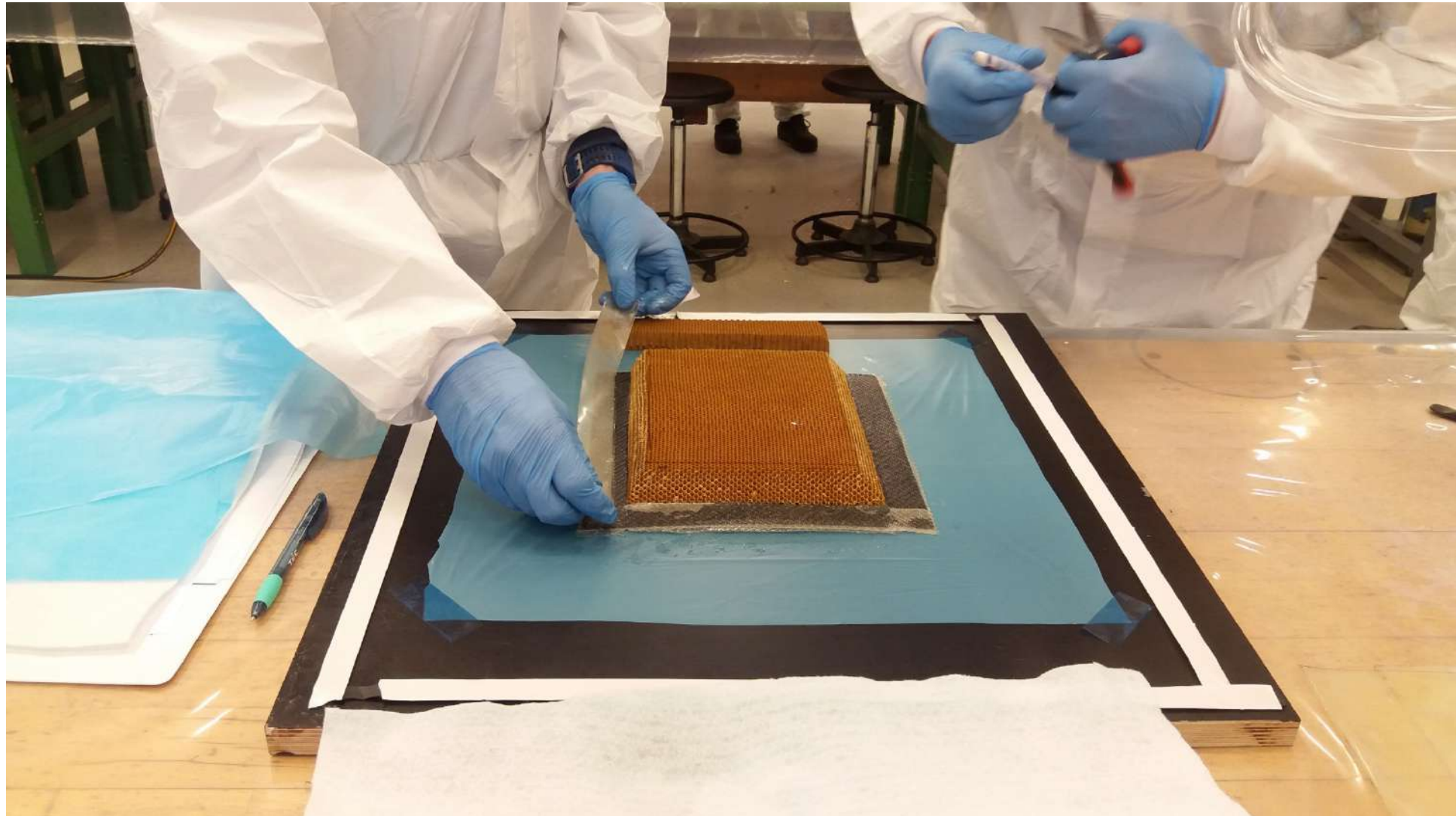
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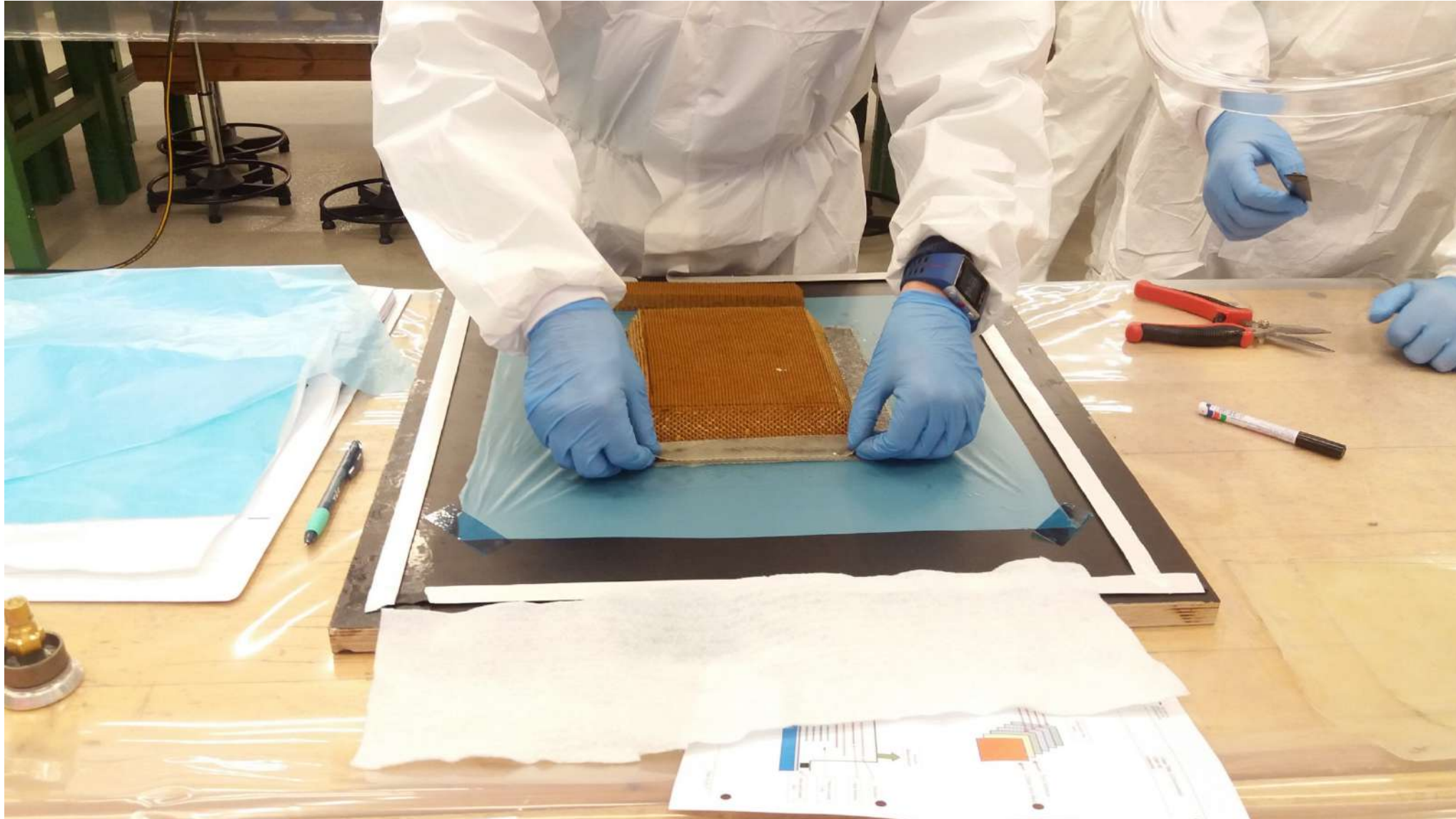
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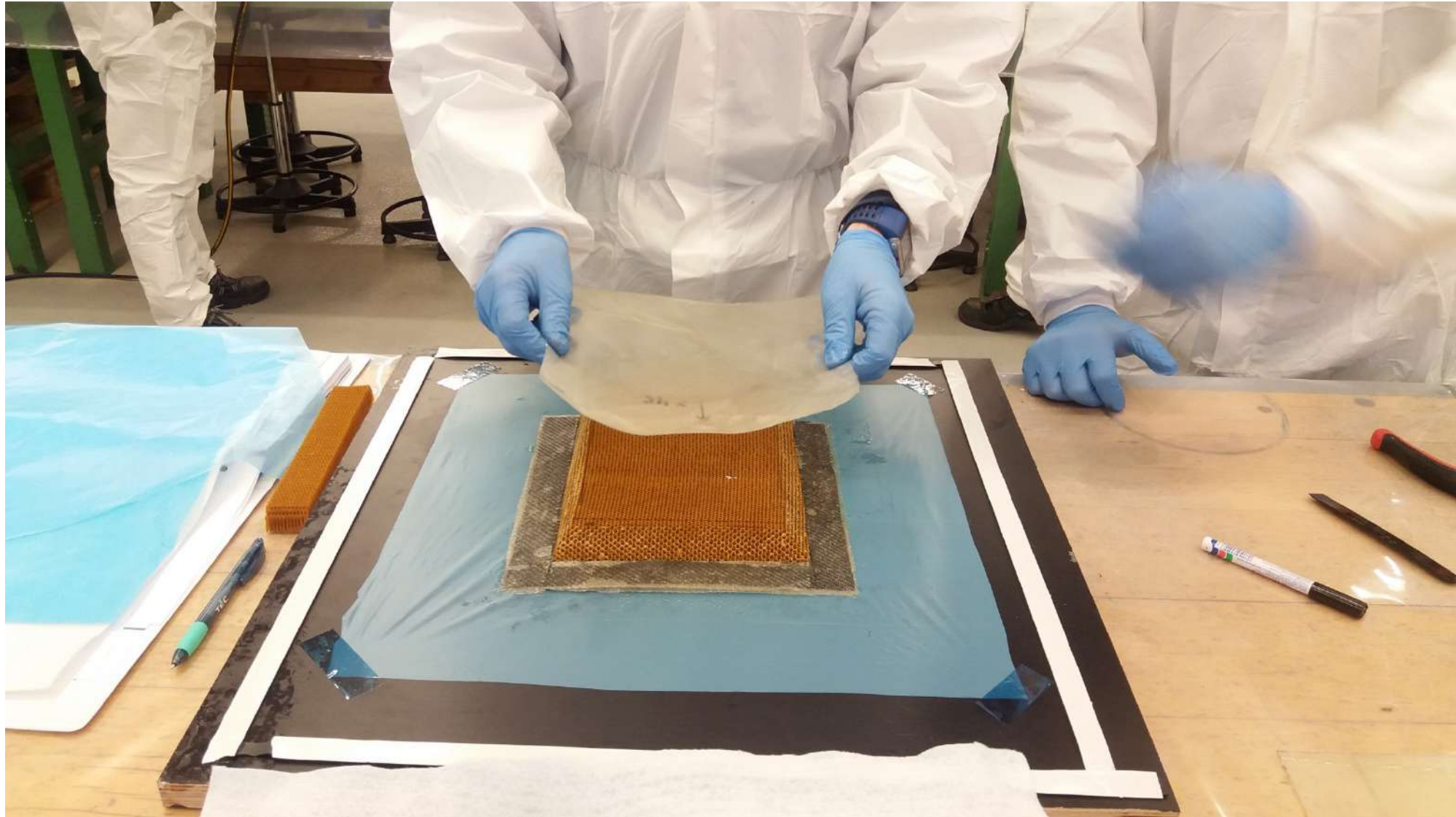
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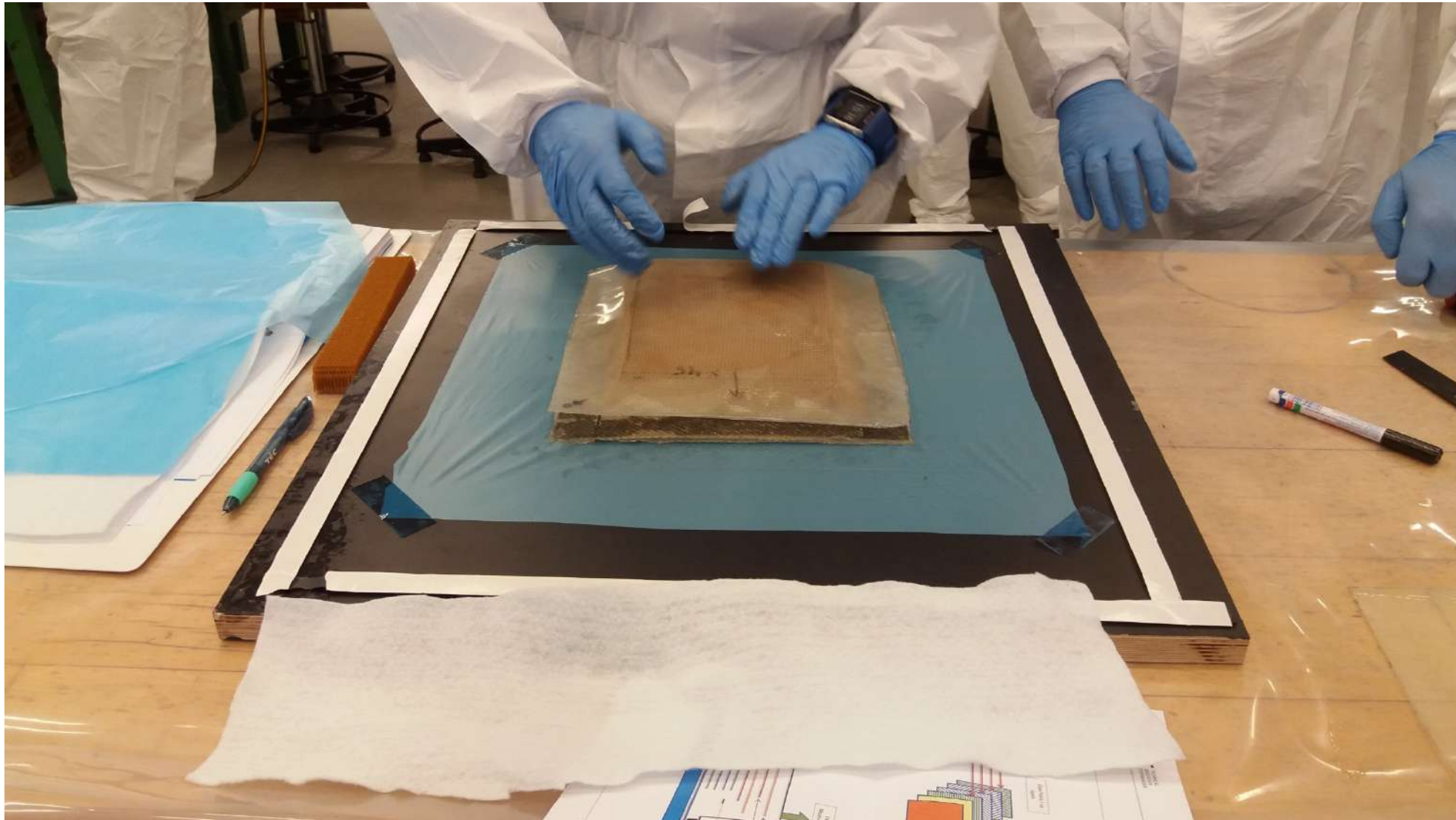
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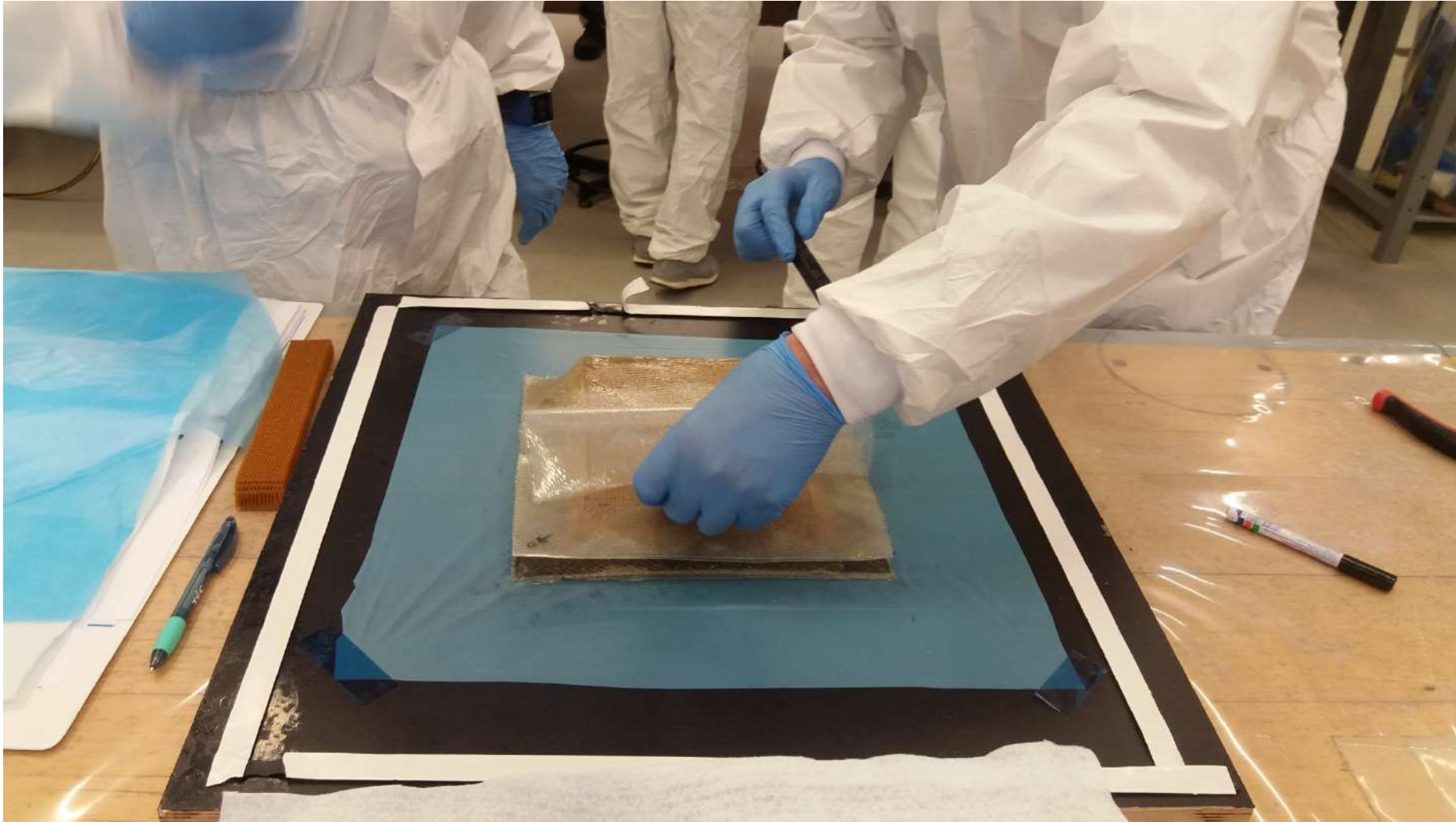
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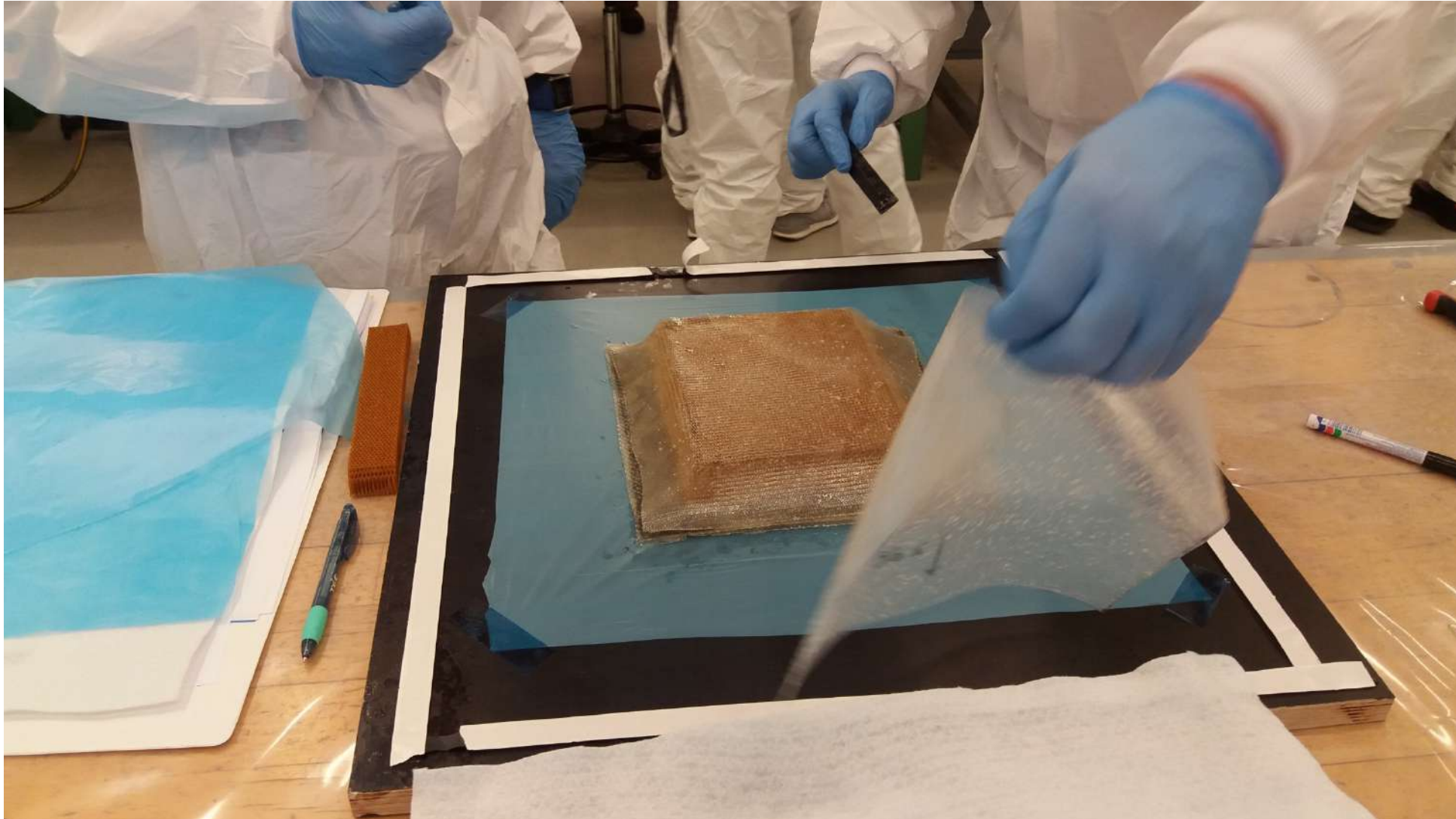
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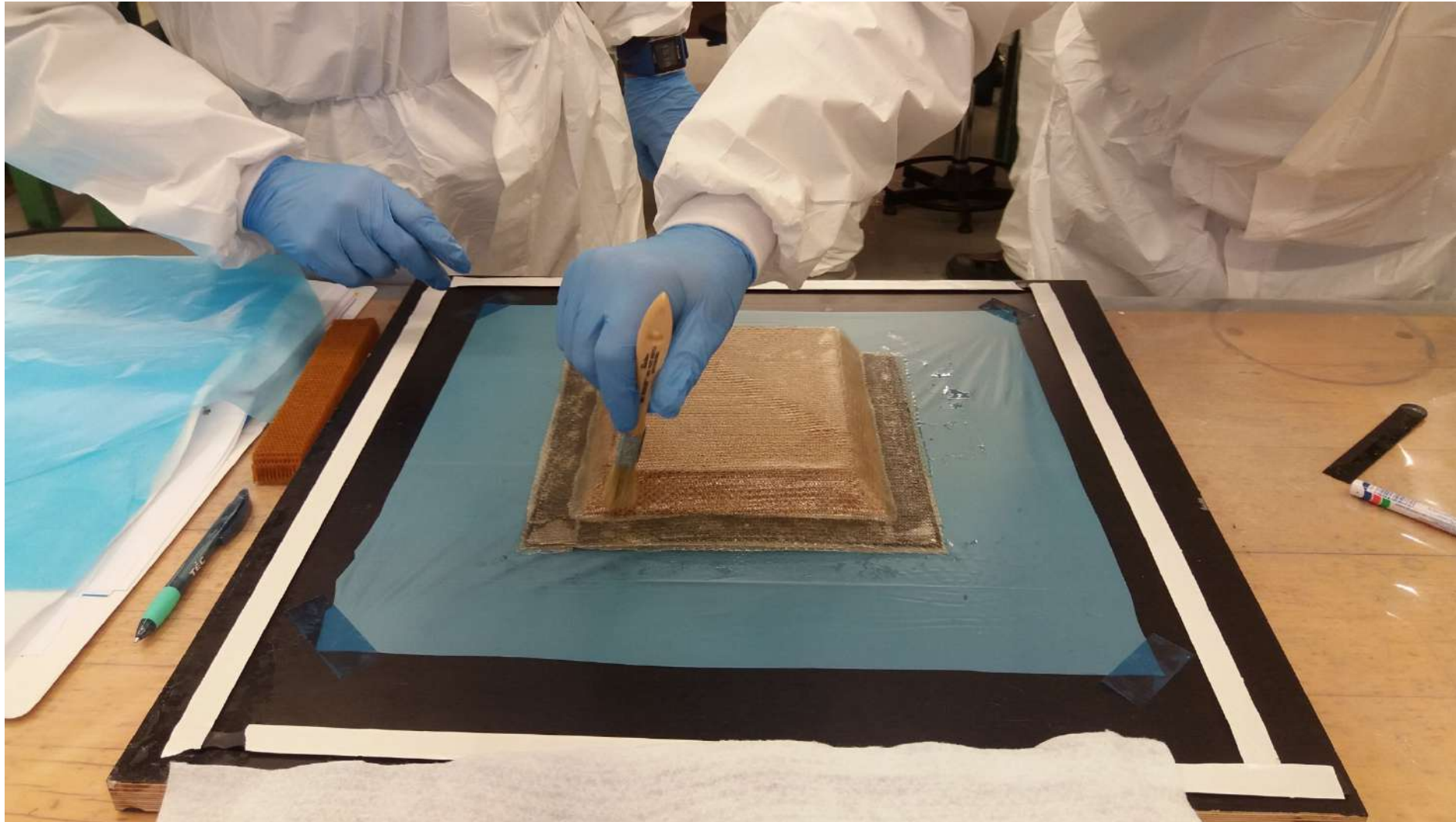
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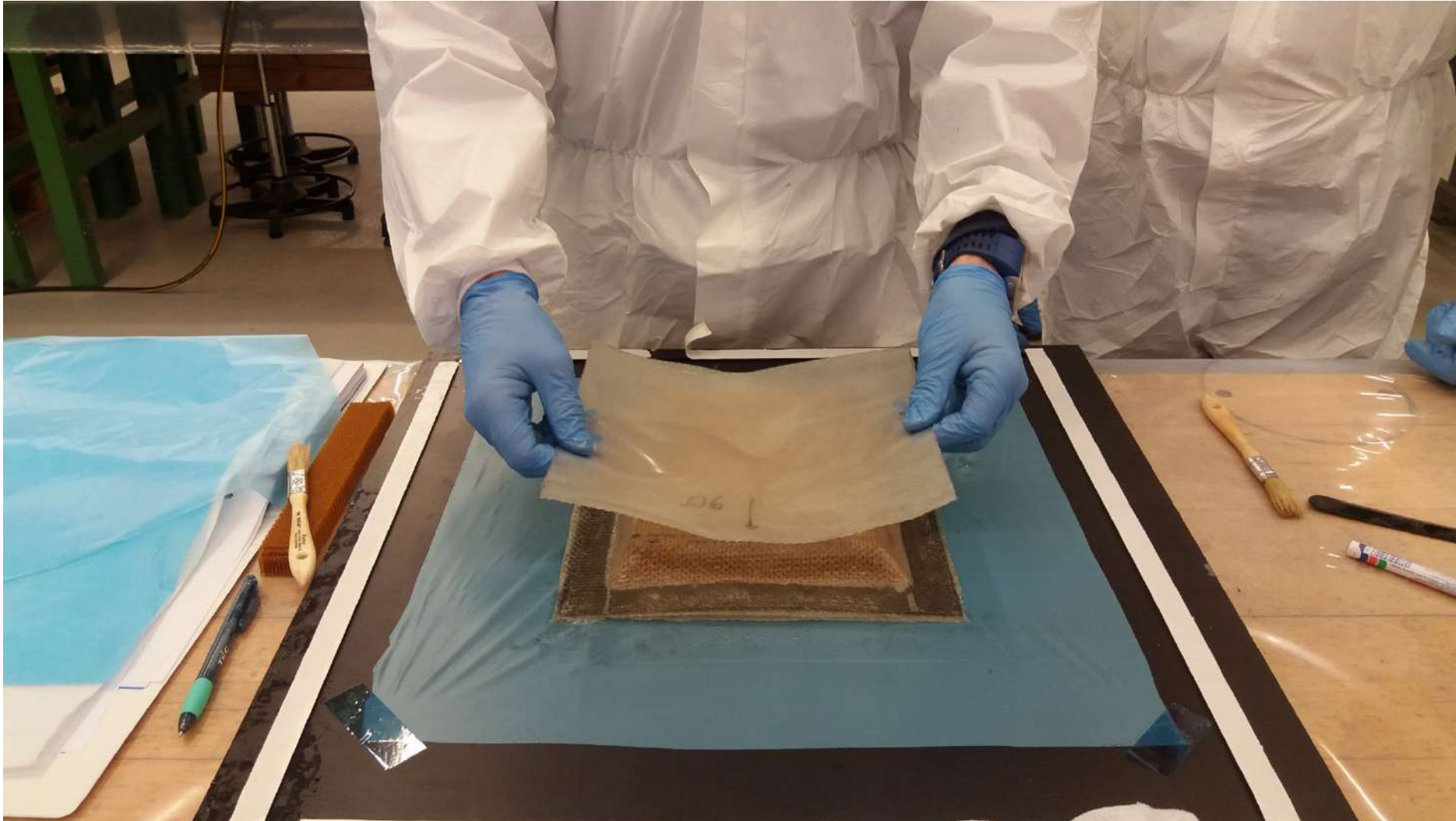


Process : All plies have been laid up in the proper sequence and orientation according to task diagram





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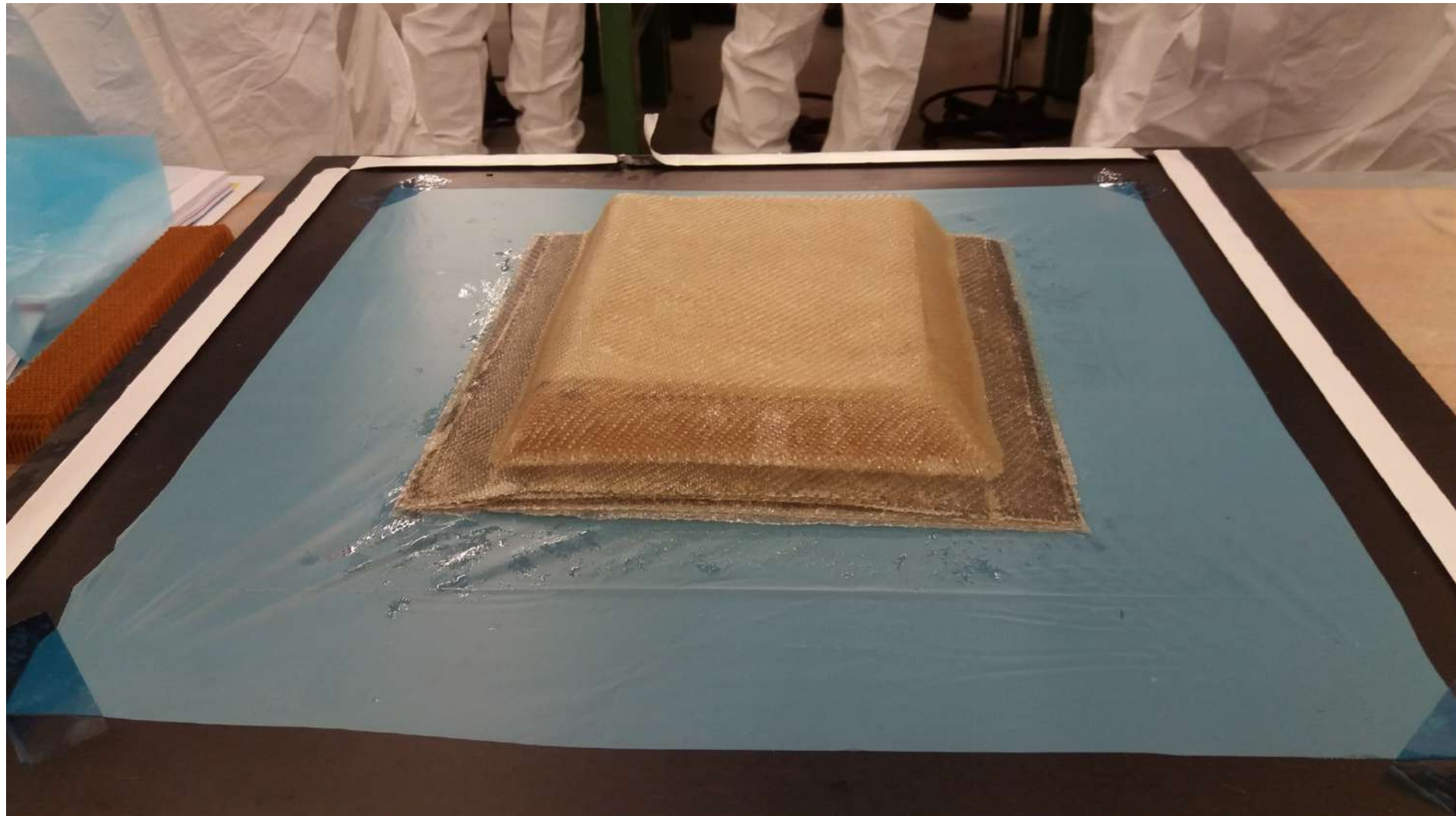


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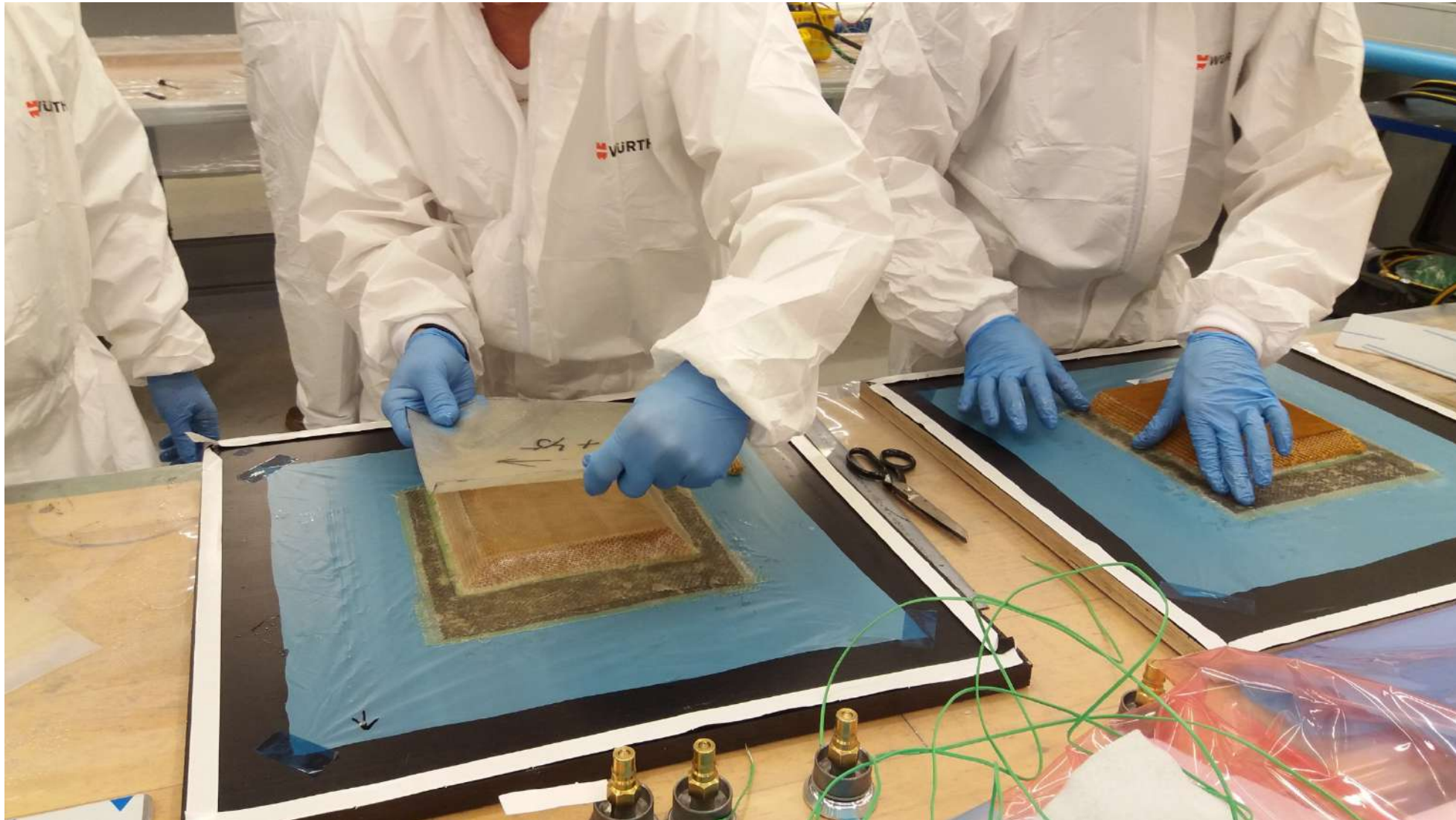




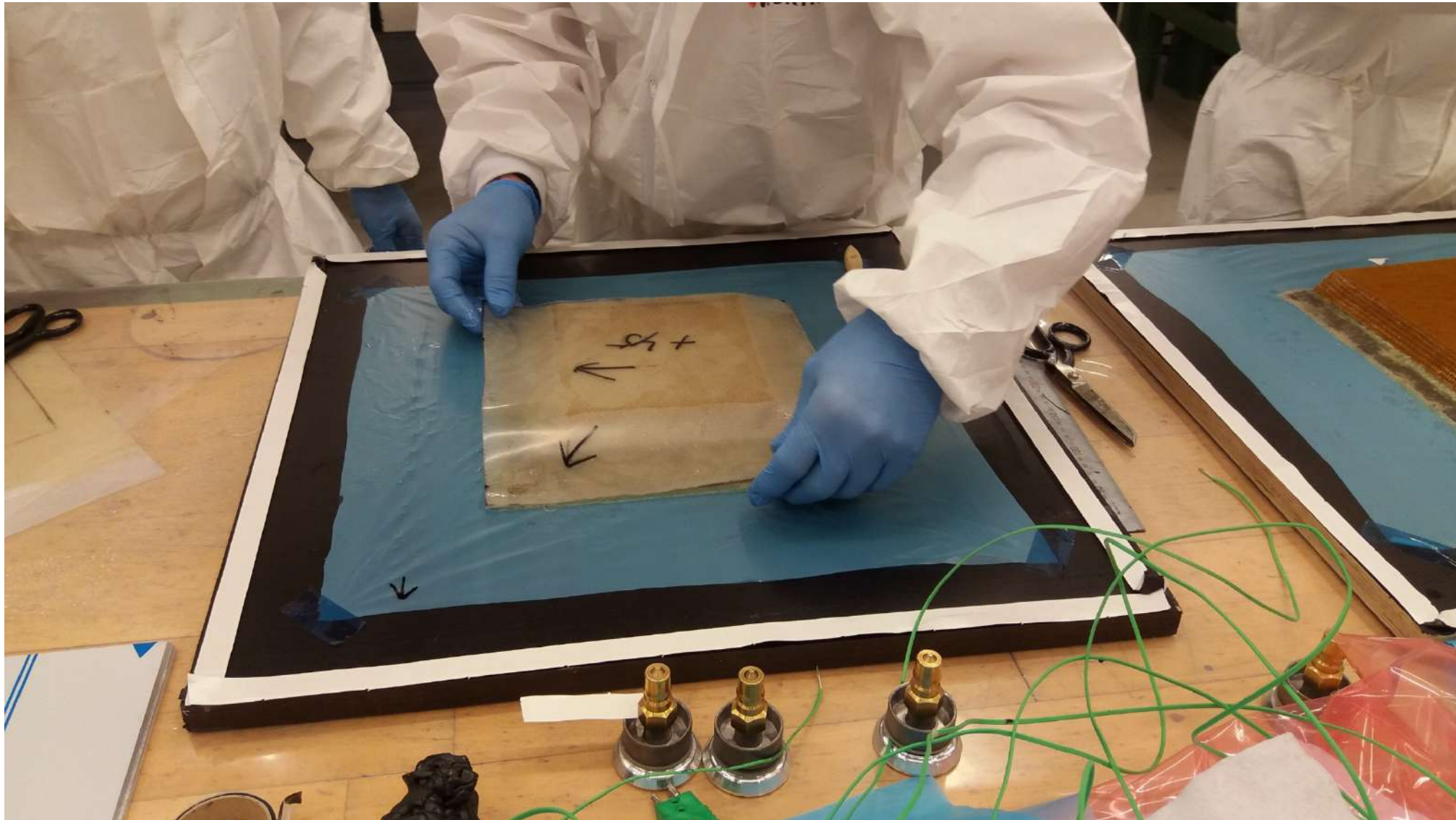




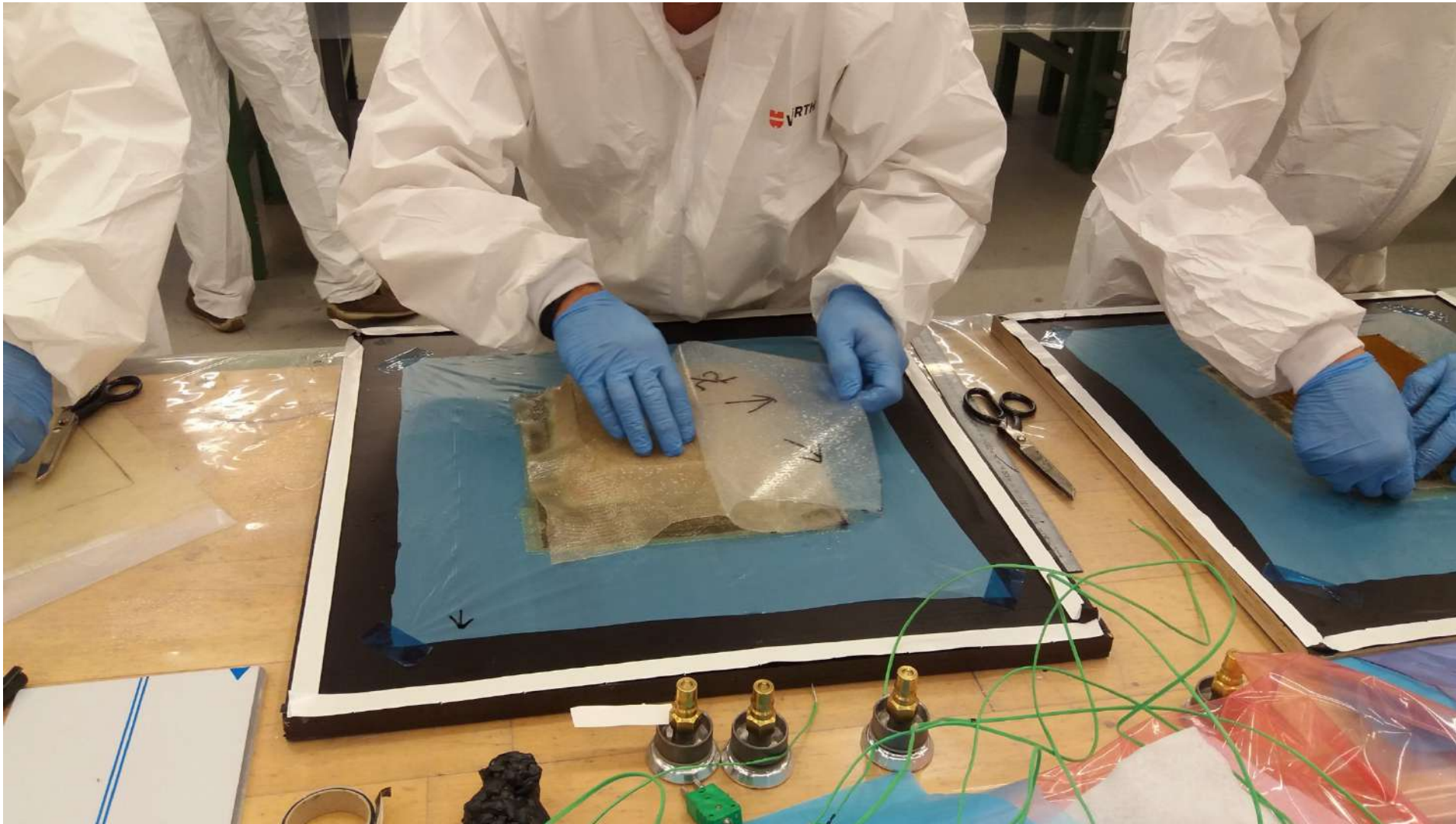
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