

COURSE - DAY III



Repair 2 - Repair of Damage That is More Than 0.50 Inch (12.70 mm) in Diameter in One Skin and the Honeycomb Core

WARNING: MAKE SURE THAT THE FLIGHT CONTROL SURFACES ARE CORRECTLY BALANCED AFTER YOU REPAIR THEM. IF YOU DO NOT OBEY, FLUTTER CAN OCCUR AND CAUSE DAMAGE TO THE STRUCTURE. REFER TO SRM 51-60-00 FOR THE CONTROL SURFACE BALANCING PROCEDURES.

CAUTION: DO NOT USE 350°F (177°C) CURE REPAIR MATERIALS ON 250°F (121°C) CURED PARTS. IF YOU DO NOT OBEY, THE REPAIR WILL BE UNSATISFACTORY.

REFER TO THE SPECIFIED COMPONENT REPAIR SUBJECT FOR THE MATERIALS AND PROCEDURES APPROVED FOR THIS REPAIR. IF YOU DO NOT OBEY, THE REPAIR WILL BE UNSATISFACTORY.

1. Applicability

- A. Repair 2 is applicable to damage to one skin of a honeycomb panel.
- B. Repair 2 is a typical repair that is applicable to all fiber reinforced laminates and honeycomb sandwich components.
- C. Repair 2 is not applicable to radomes or floor panels. Refer to SRM 53-10-72 for the data about radomes and SRM 53-00-50 for the data about floor panels.

2. General

- A. Repair 2 is a Category A damage tolerant repair. Refer to SRM 51-00-06 for the definitions of the different categories of repairs.
- B. Refer to Figure 201 for the layout of the repair parts.

3. References

- A. SRM 51-00-06, General - Structural Repair Definitions
- B. SRM 51-60-00, General - Control Surface Balancing Procedures
- C. SRM 53-00-50, Repair General - Composite Floor Panel Repairs
- D. SRM 53-10-72, Repair General - Nose Radomes

4. Repair Instructions

- A. Find the limits of the damage. Refer to Repair General, Paragraph 4.A.

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4. Repair Instructions (continued)

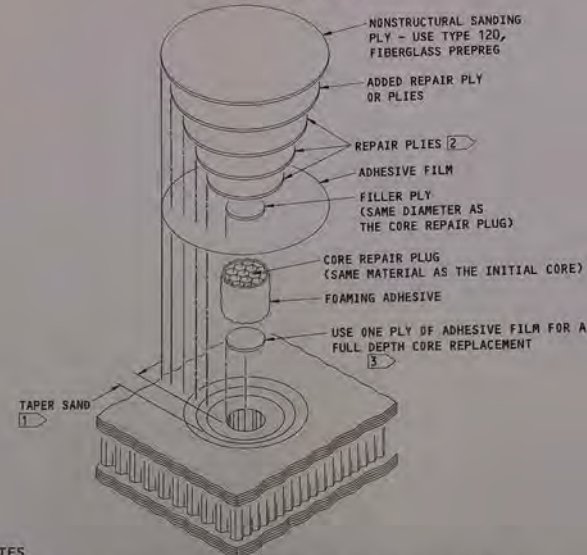
- B. Remove the damage as given in Repair General, Paragraph 4.B. Make sure that you remove all of the water or other unwanted material as given in Repair General, Paragraph 4.C. The damaged area must be fully dry.
- C. Prepare the damaged area as given in Repair General, Paragraph 4.E.
- D. Cut out, clean, and install the honeycomb core plug as given in Repair General, Paragraphs 4.F, 4.G, and 4.H.

NOTE: Refer to Repair 11 for an alternative core repair procedure.

- E. Cure the honeycomb core plug as given in Repair General, Paragraph 4.I.
- F. Clean the repair surface as given in Repair General, Paragraph 4.E.(3).
- G. Prepare and install the adhesive film and repair plies as given in Repair General, Paragraphs 4.J and 4.K.
- H. Install the vacuum bag system as given in Repair General, Paragraph 4.L.
- I. Cure the repair as given in Repair General, Paragraph 4.M.
- J. Examine the completed repair as given in Repair General, Paragraph 4.N.
- K. Apply the finish to the repair area as given in Repair General, Paragraph 4.O.

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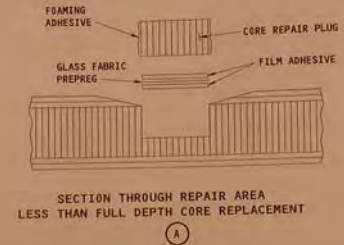
NOTES

- 1 REFER TO REPAIR GENERAL, FIGURES 202 AND 203 FOR THE NECESSARY TAPER AND OVERLAP.
- 2 FIND THE NUMBER OF STRUCTURAL PLYS, PLY ORIENTATION, AND THE INITIAL MATERIAL IN THE SPECIFIED COMPONENT STRUCTURE IDENTIFICATION. REFER TO REPAIR GENERAL, TABLES 202 AND 203 FOR THE REPAIR MATERIALS.
- 3 FOR A LESS THAN FULL DEPTH CORE REPLACEMENT:
 - USE ONE PLY OF GLASS FABRIC BETWEEN TWO PLYS OF ADHESIVE FILM FOR ARAMID/NOMEX HONEYCOMB.
 - USE ONE PLY OF CARBON FABRIC BETWEEN TWO PLYS OF ADHESIVE FILM FOR CARBON HONEYCOMB.

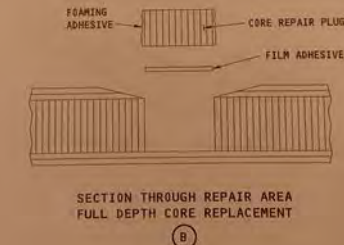
Repair 2 - Layout of the Repair Parts
Figure 201 (Sheet 1)

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SECTION THROUGH REPAIR AREA
LESS THAN FULL DEPTH CORE REPLACEMENT
(A)



SECTION THROUGH REPAIR AREA
FULL DEPTH CORE REPLACEMENT
(B)

Repair 2 - Layout of the Repair Parts
Figure 201 (Sheet 2)

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AIRBUS

Customer: ENV
Type: A330
Rev. Date: Apr 01, 2016

Manual: SRM
Selected effectivity: ALL

51-77-13 REPAIR OF COMPOSITE AND METAL-
LIC SANDWICH STRUCTURES (Revdate = Jan 01/14)

(3) Hot Bond Repair with two sided access - no thickness limit (Refer to Figure 003 (sheet 1 thru 4))

NOTE: This repair is applicable to curved or flat surfaces with skin and honeycomb core damage. Access must be available to both sides of the surface.

There are risks when working with composite repair materials. To reduce these risks to a minimum read and obey the warnings given in Paragraph 1.E.

(a) Prepare and dry the repair area (Refer to Chapter 51-77-11, Paragraph 4.M.(2)).

(b) Prepare and dry the honeycomb core plug (Item 4, Repair Materials List and refer to Chapter 51-77-11, Paragraph 4.I.).

(c) Install the core plug (Refer to Chapter 51-77-11, Paragraph 5.G.).

(d) Bag the repair with a vacuum bag and install heating equipment at both surfaces (Refer to Chapter 51-77-11, Paragraph 5.D.) and cure at the required temperature and vacuum for the recommended time (Refer to Chapter 51-77-11, Paragraphs 5.E. and 6.B.(5) and (6)).

NOTE: When required by the specific chapter, close the top surface of the honeycomb core cells in accordance with Chapter 51-77-11, Paragraph 5.H.

WARNING: BONDING AND ADHESIVE COMPOUND IS DANGEROUS.

(e) Prepare the prepreg repair plies (Item 2 or 3, Repair Materials List and refer to Chapter 51-77-11, Paragraph 4.C.) and adhesive film (Refer to Chapter 51-77-11, Paragraph 6.B.(6) and 4.B.).

(f) Position the prepreg repair plies (and the adhesive film) in the repair area (Refer to Chapter 51-77-11, Paragraph 5.B.).

(g) Install the vacuum bag and heating equipment (Refer to Chapter 51-77-11, Paragraph 5.D.).

(h) Cure at the required temperature and vacuum for the recommended time (Refer to Chapter 51-77-11, Paragraphs 5.E. and 6.B.(6) and (9)).

(i) Remove the vacuum bag and heating equipment.

(j) Inspect the repair (Refer to Chapter 51-77-10, Paragraph 5.).

(k) Remove any resin remnants from the border areas of the repair, use abrasive cloth. Start with 280 grade and finish with 400 grade.

(l) Clean the repair area with cleaning agent (Material No. 11-003 or 11-004 and refer to Chapter 51-77-11, Paragraph 4.E.).

(m) If required, restore the surface protection (Refer to Chapter 51-75-12).

Figure 003 (sheet 2) / 51-77-13 Hot Bond Repair with two sided access - no thickness limit Option B (applicable if skin thickness >1mm (0.04in.)).

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Figure 003 (sheet 2) / 51-77-13 Hot Bond Repair with two sided access - no thickness limit Option B (applicable if skin thickness >1mm (0.04in.)).

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51-77-13 REPAIR OF COMPOSITE AND METAL-
LIC SANDWICH STRUCTURES (Revdate = Jan 01/14)

Figure 003 (sheet 3) / 51-77-13 Hot Bond Repair with two sided access - no thickness limit Option C (applicable if skin thickness >1mm (0.04in.)).

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51-77-13 REPAIR OF COMPOSITE AND METAL-
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Figure 003 (sheet 4) / 51-77-13 Hot Bond Repair with two sided access - no thickness limit Option D.

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Task Day 3:

Composite sandwich panel one side Repair with core replacement

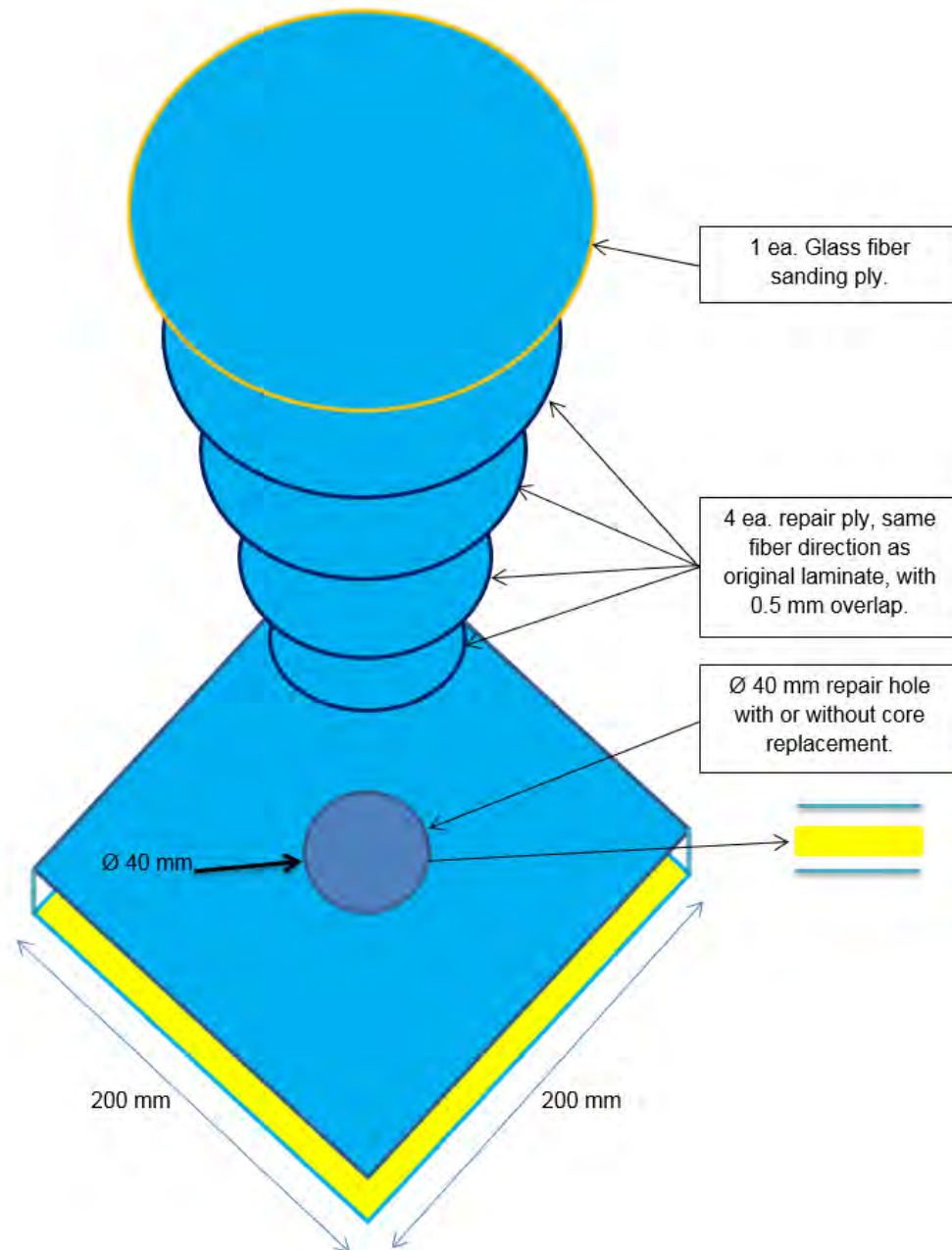
Repair for damage below 2" in diameter.

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.

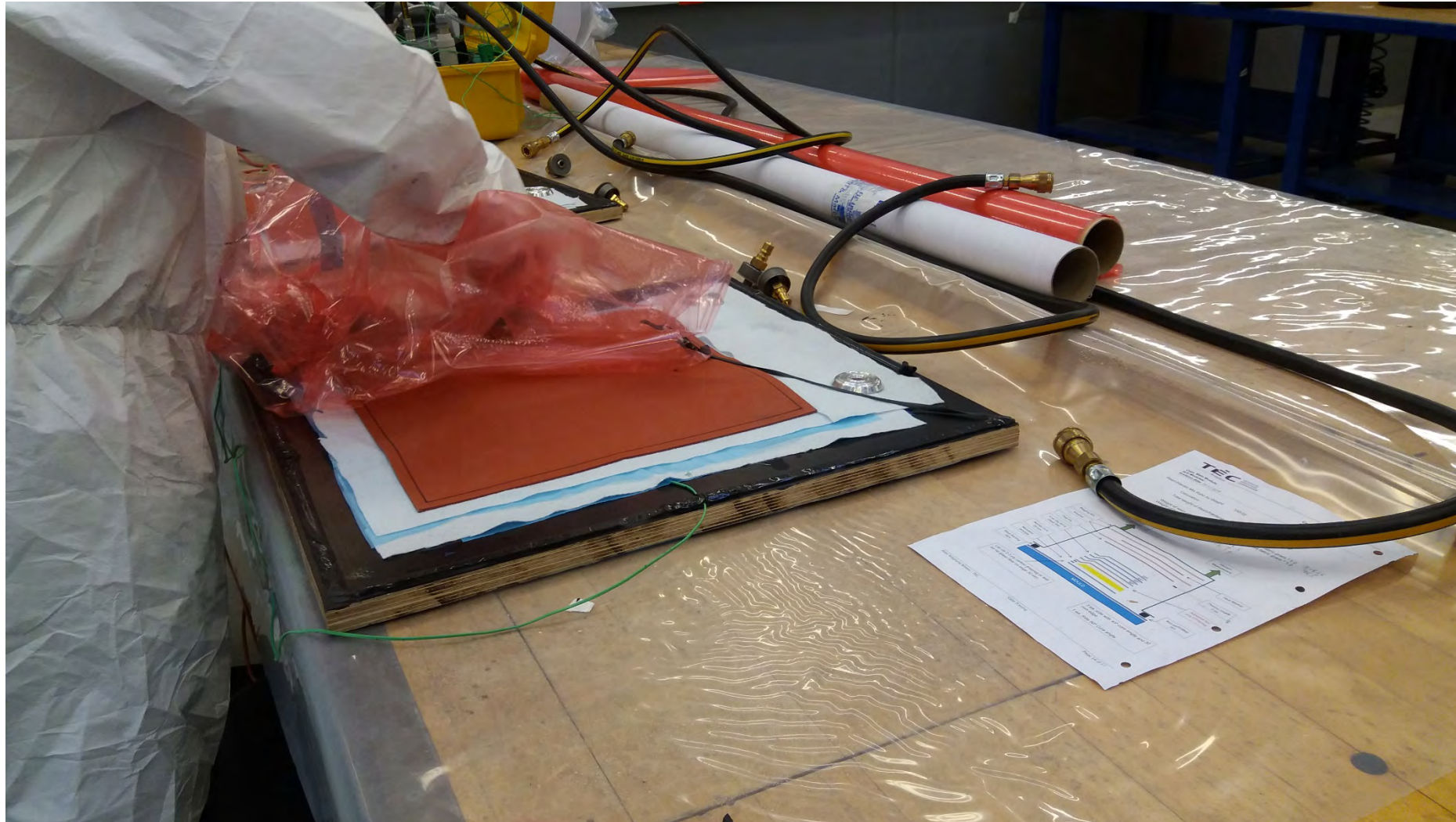
- 1) Clean up the damage area by removing the damage laminate to the non-broken Nomex core or if the Nomex core is broken perform replacement of the Nomex core.
- 2) Use a cup drill to make a clean round repair area. (40 mm)
- 3) Remove paint and primer in repair area by sanding.
- 4) Perform step sanding with 0.5" segregation for each layer.
- 5) If Nomex Core is damaged, remove the core.
- 6) Prepare the new core and wet install it with resin laminate adhesive with micro balloons.
- 7) Prepare the repair layers 4 ea. and 1 ea. sanding ply, with 0.5" overlap on each layer.
- 8) Use a mould plate covered with non-perforated film as a resin barrier.
 - a. Perform the bagging of the sandwich panel for curing process.
 - b. Install 3 ea. thermo couplers for the curing process.
- 9) Consult the teacher for set the hot bonder for 8 hours, 60°C curing process.
- 10) Perform post inspection after cure process. TAP TEST.

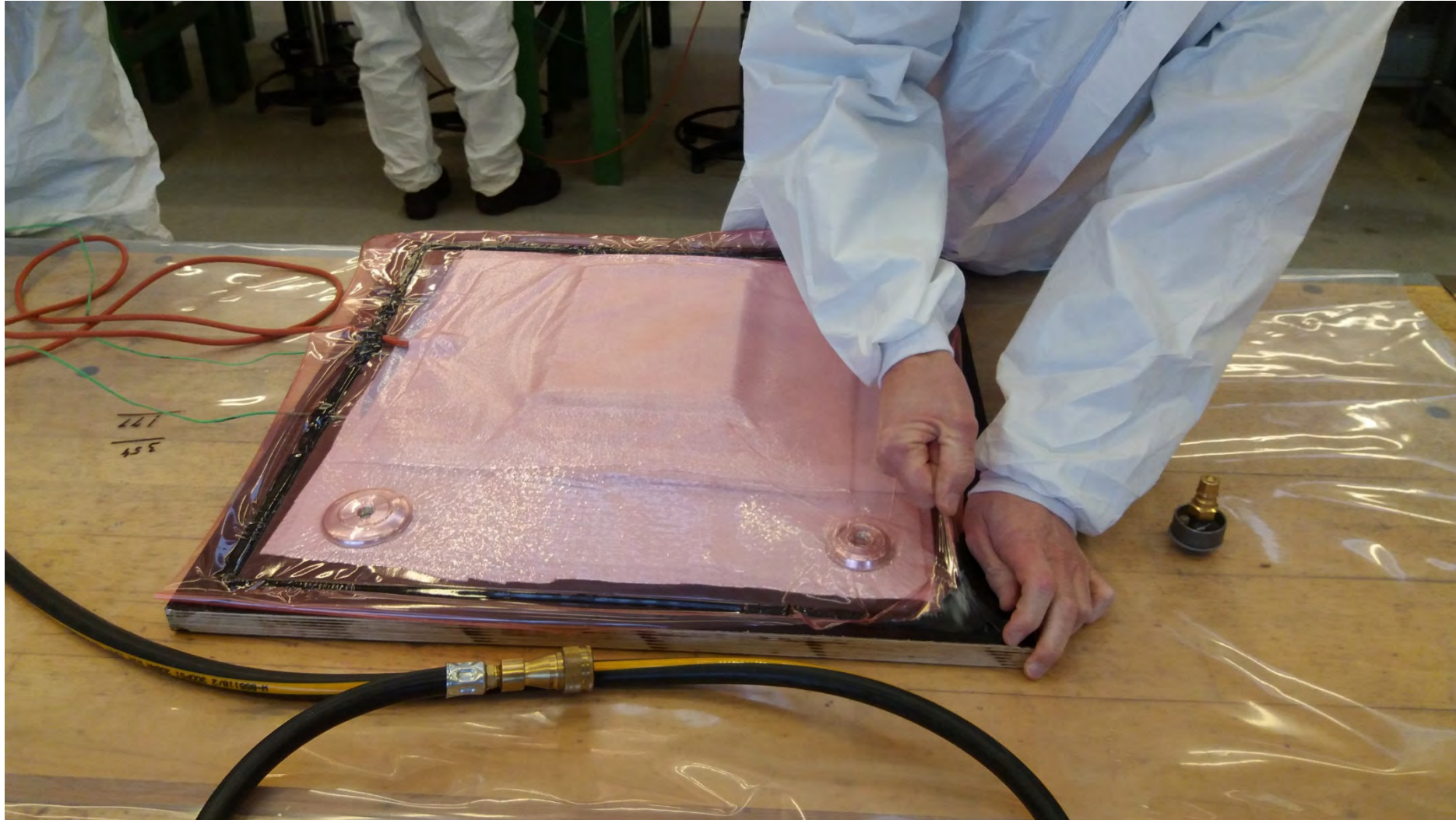


Debugging the Part of pervious task:

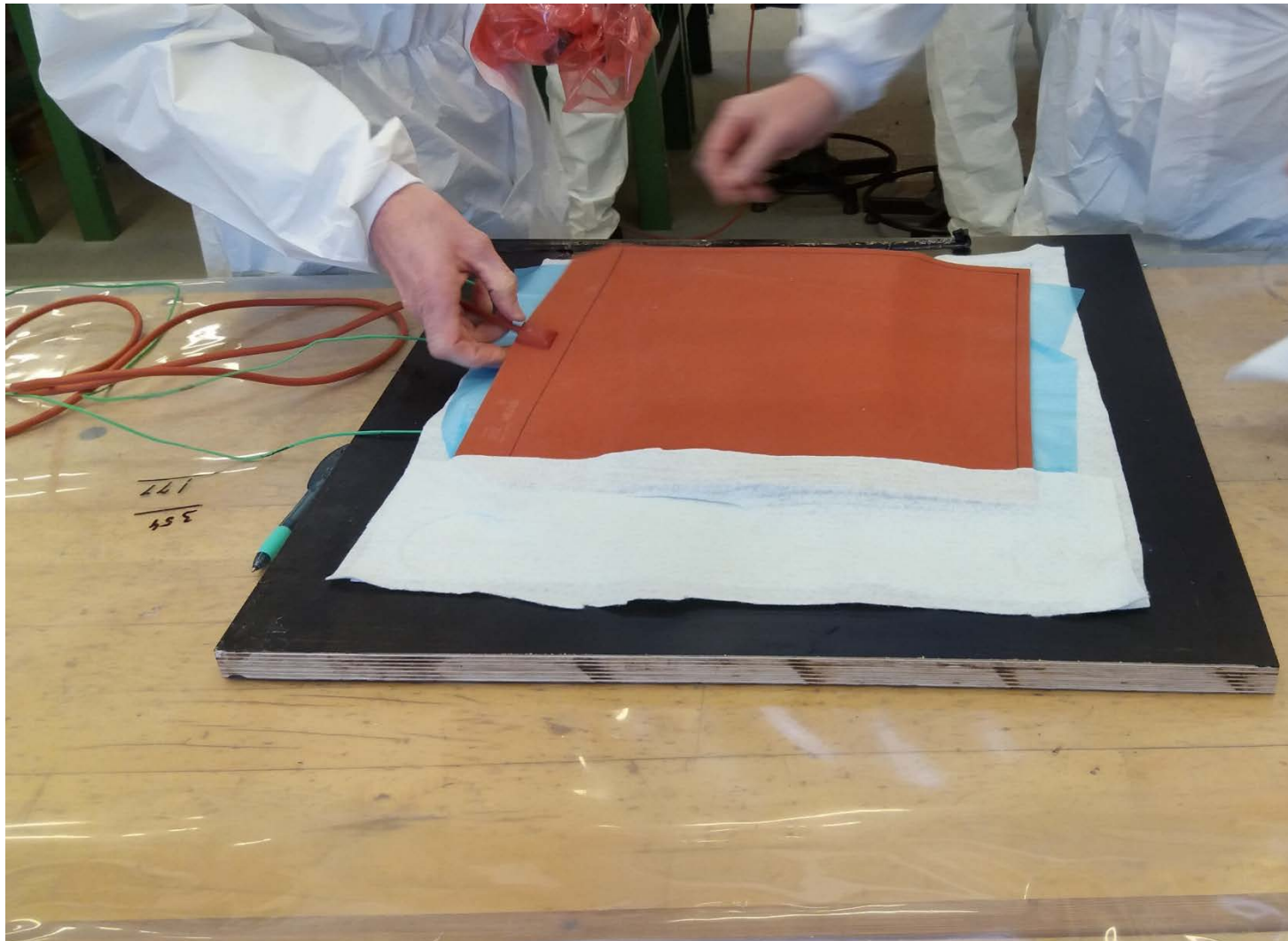
- ☐ You have to debug the part after it has been properly cured and cooled. The best way to do this is to cut out the top nylon bag around the edge of the sealant tape. This will allow you to remove the individual layers of bagging material. Take care not to damage the part by pulling material that may be bonded to the actual part. If you find that resin has adhered to some of the bagging material simply cut the bagging material as short as possible with your scissors.
- ☐ Once the part has been removed from the tool, take time to locate the vacuum probe base and probe top.
- ☐ The debugged part may have very sharp edges of resin flashing. These sharp edges should be covered with tape to protect the edge of the part from delamination caused by unexpected impact, and protect the individual from lacerations while handing the part prior to and during the trimming process.

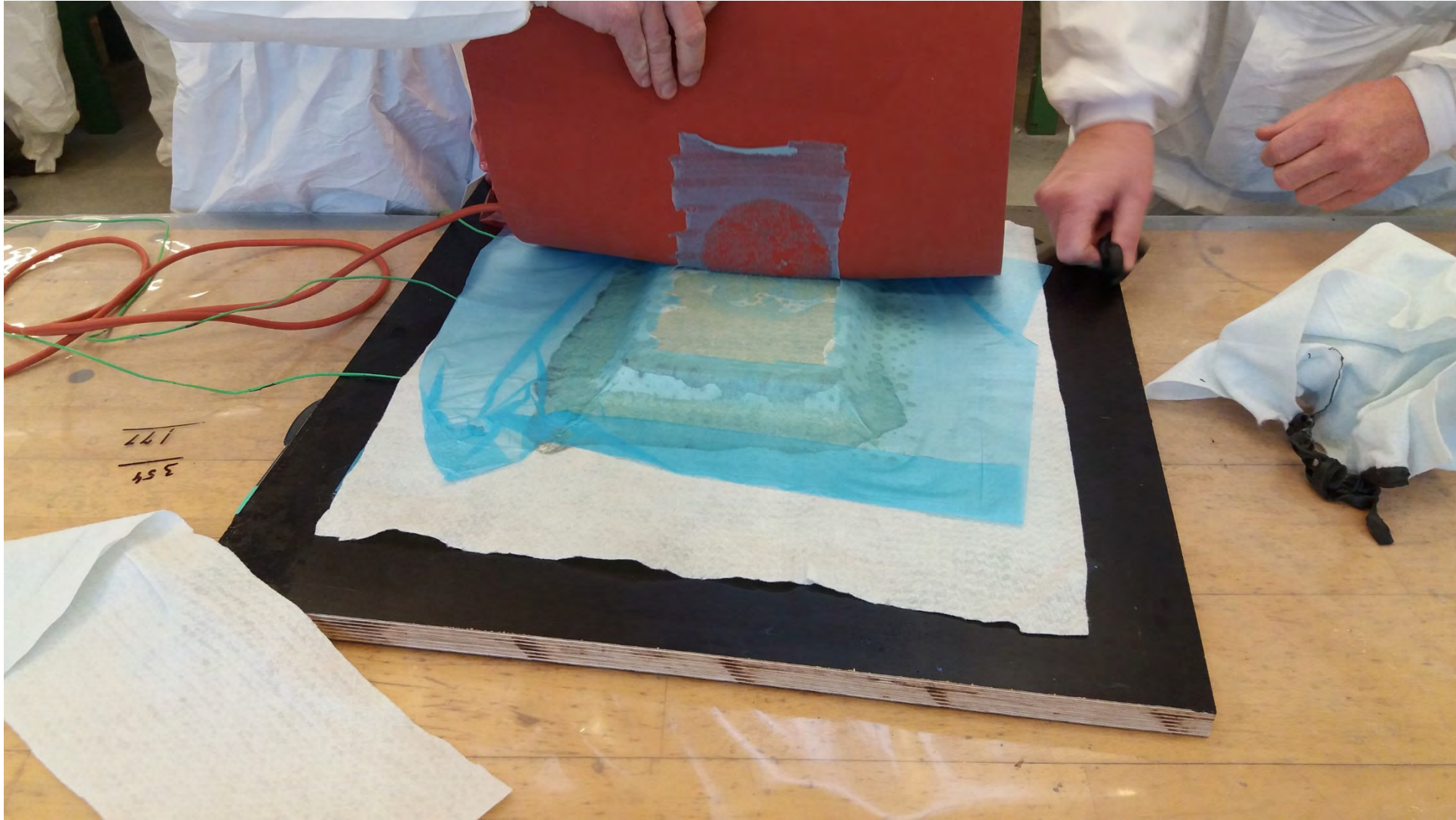
Debugging the Part of pervious task



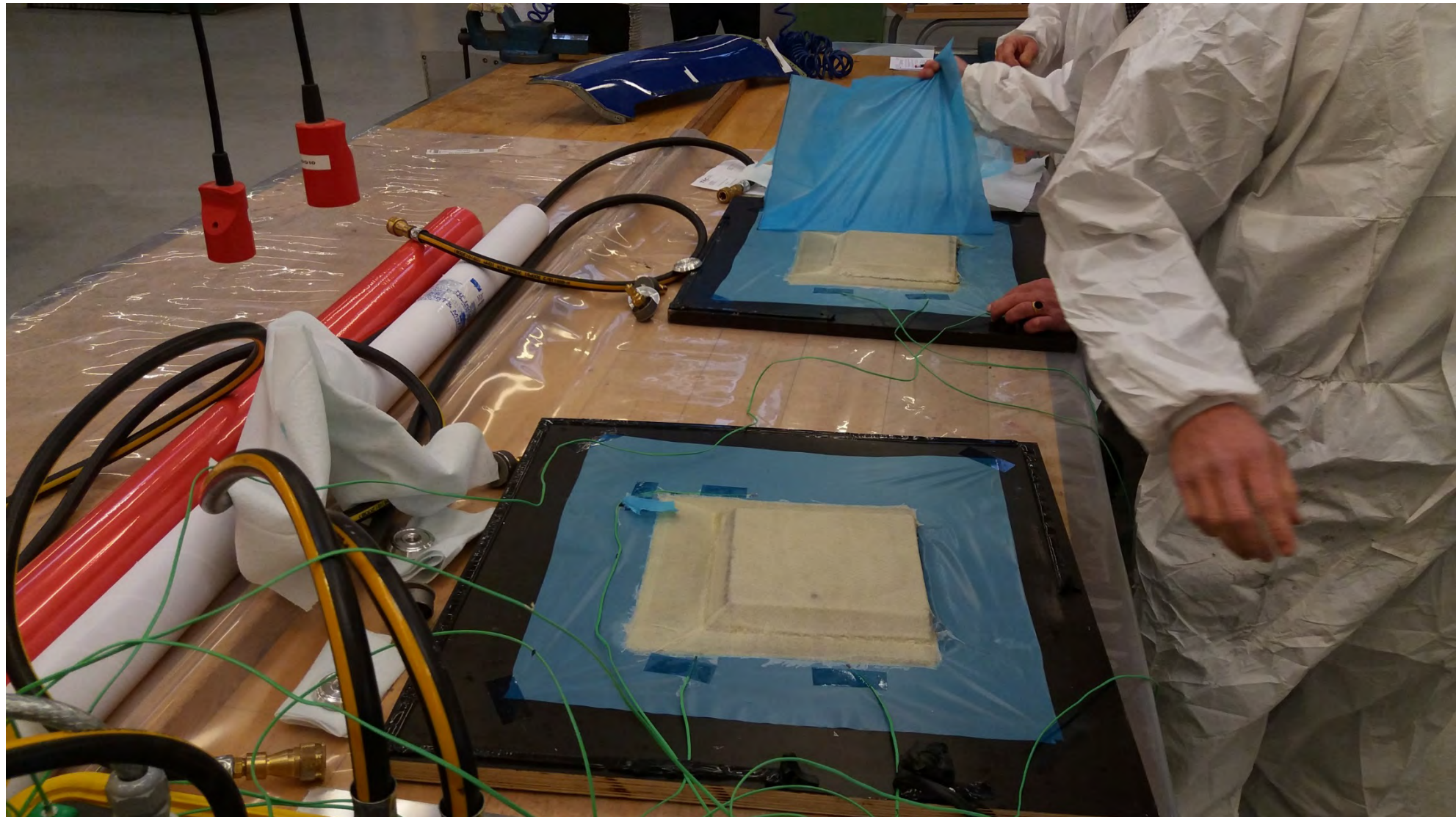


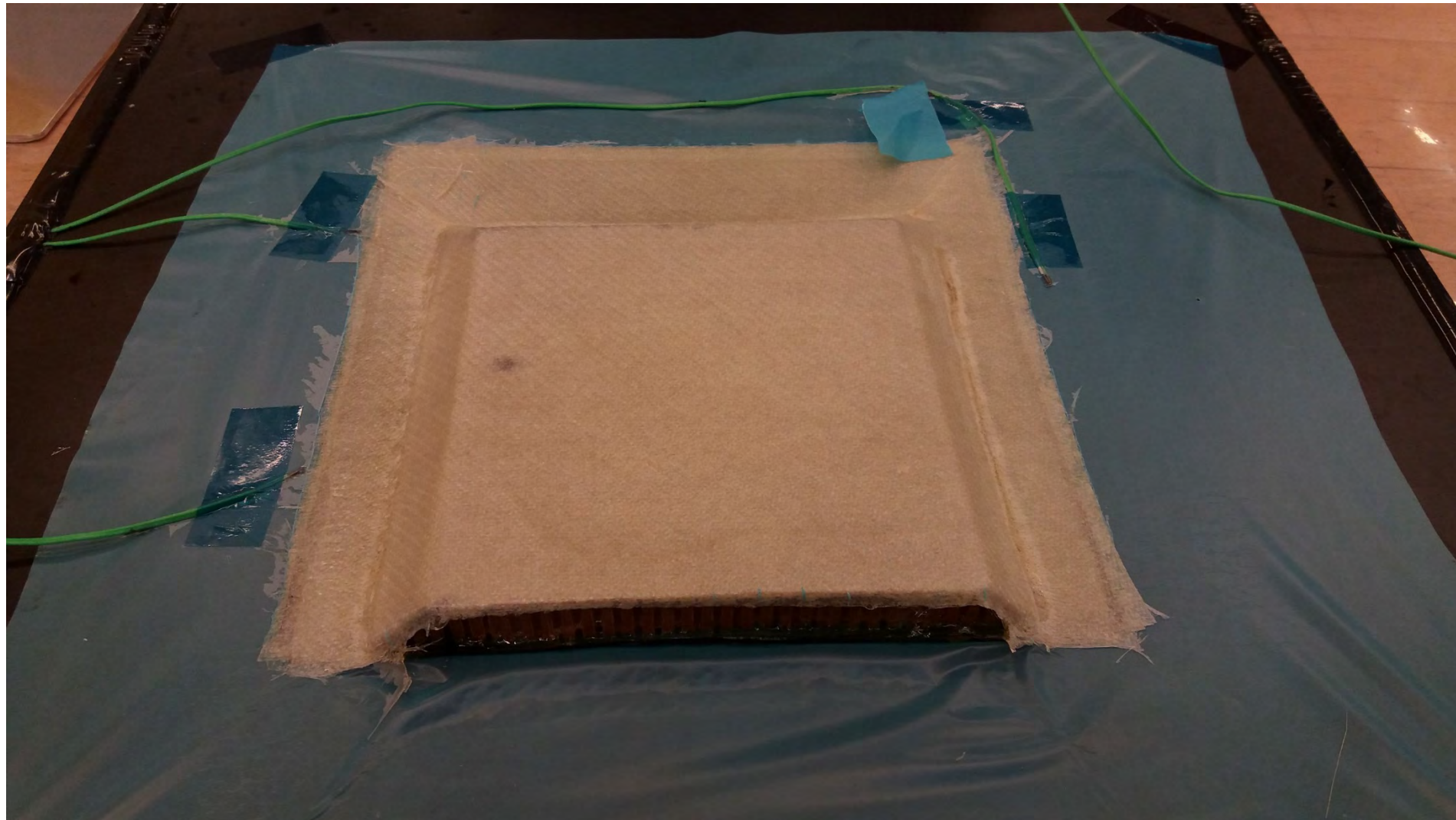


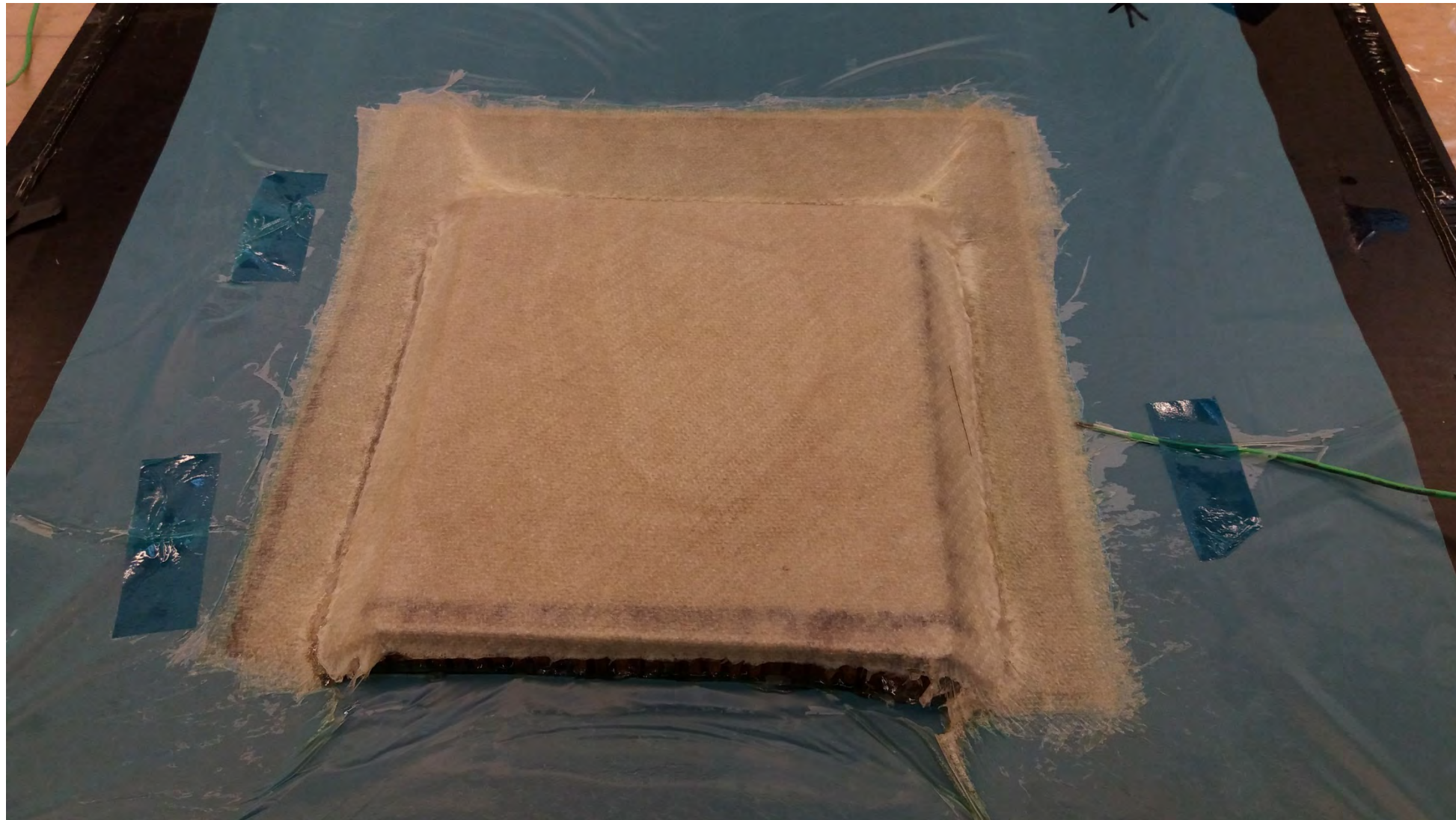














Trimming the Part :

Trimming composite parts will require special cutters and drills.

The trimming process will depend on the part size, thickness, type of material, and the final part configuration being trimmed.

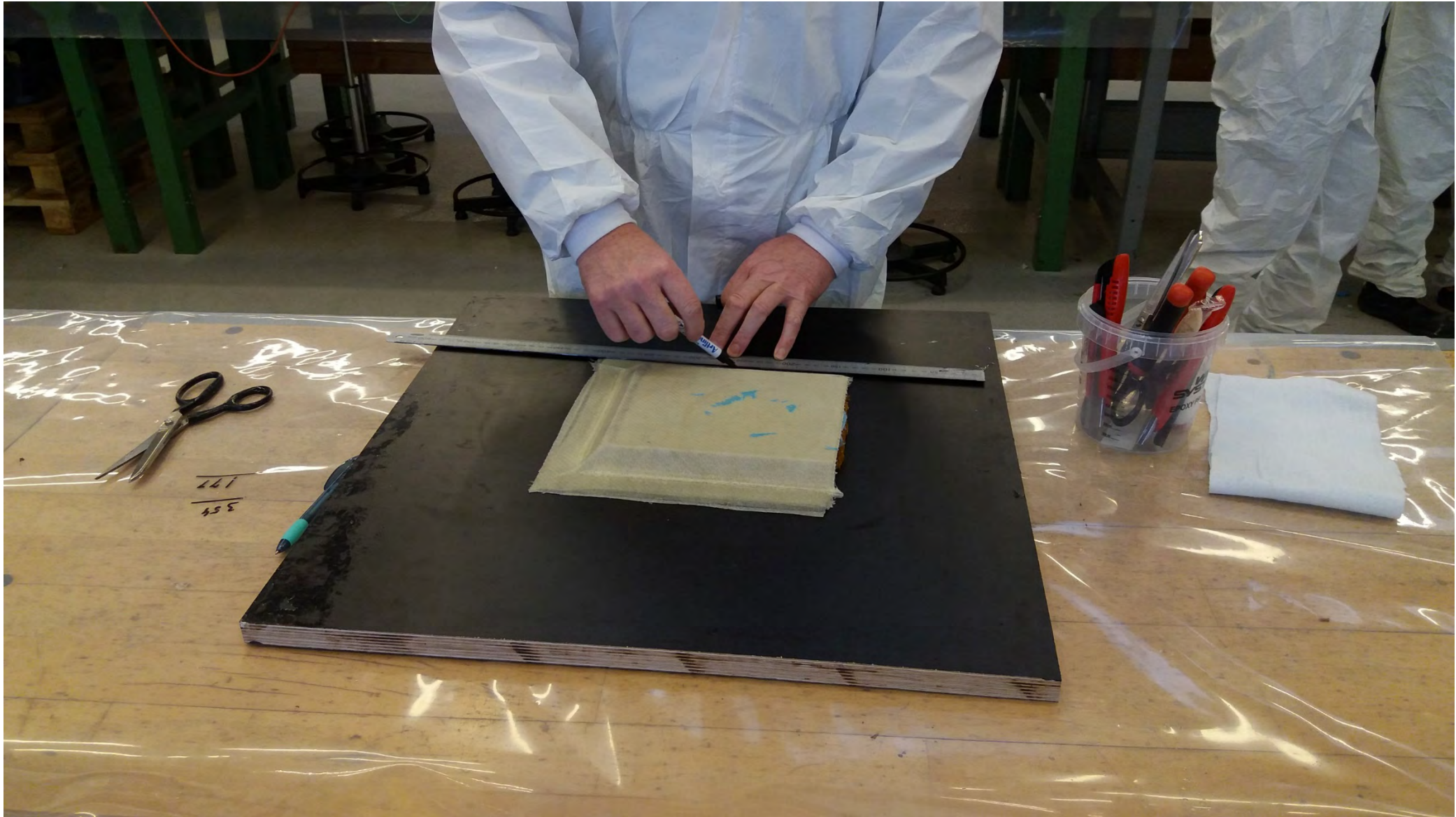
A small part may be trimmed using a hand held die grinder, while a larger part may be trimmed on the band saw, table saw, or a table router.

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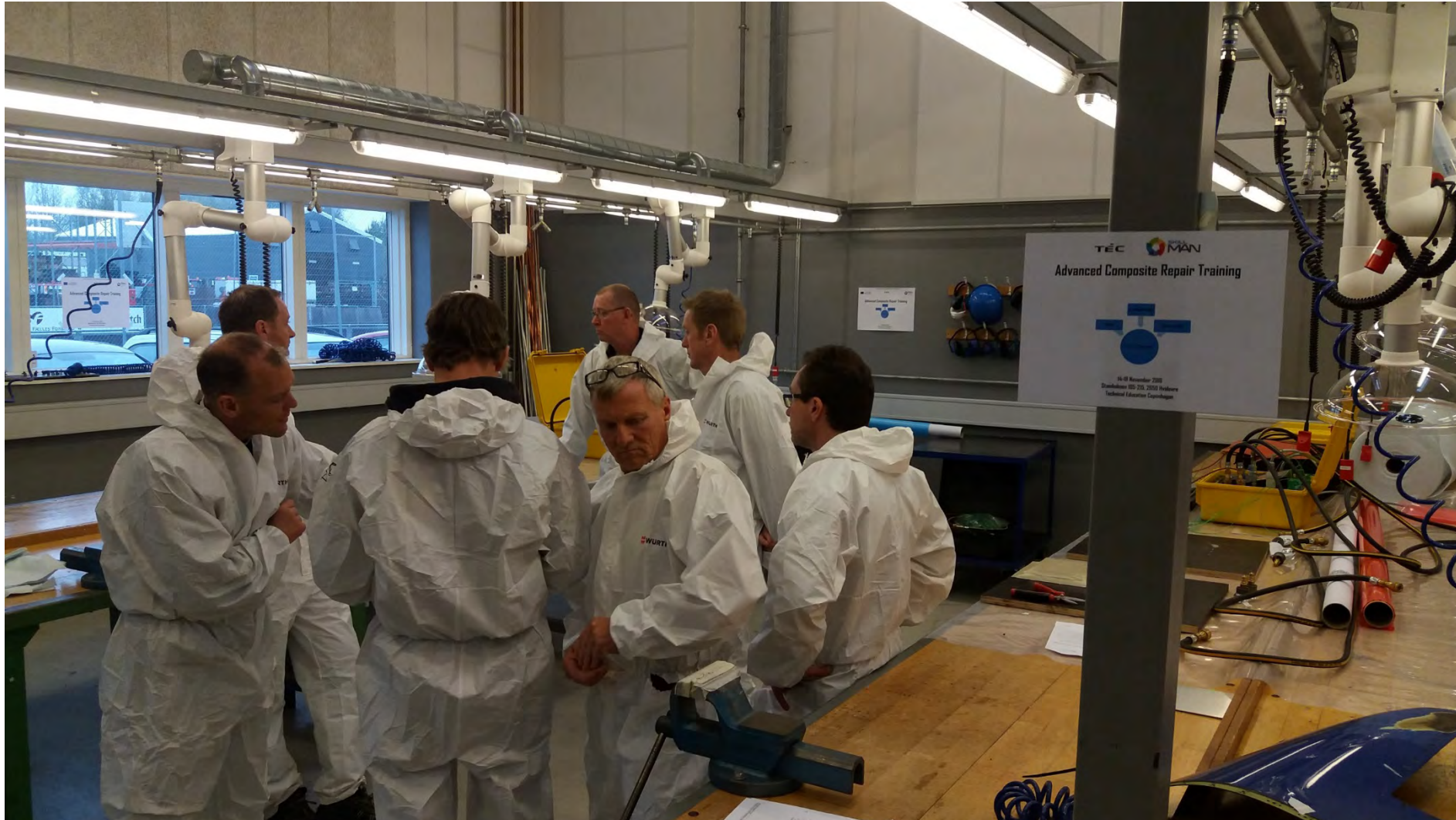








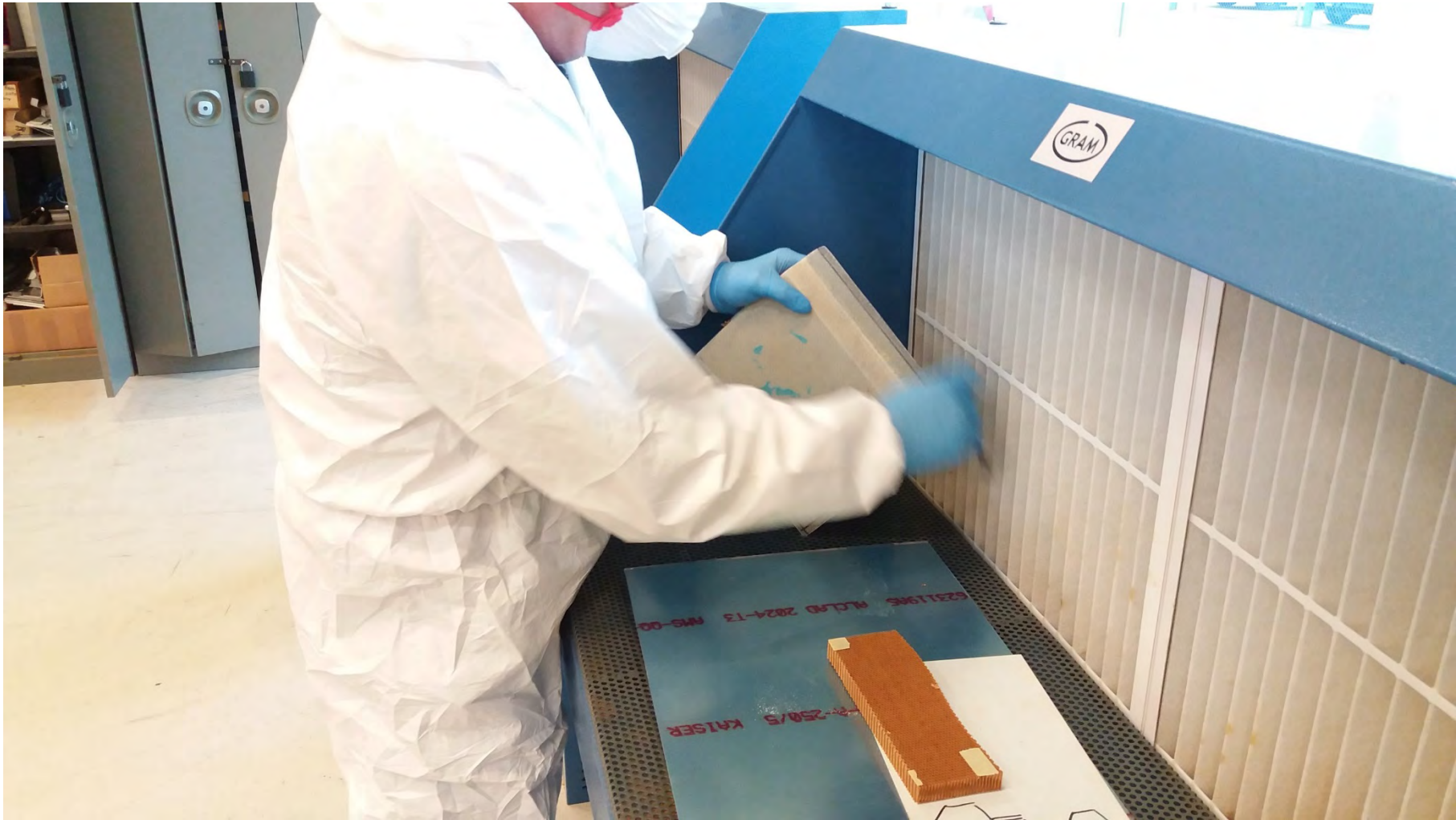






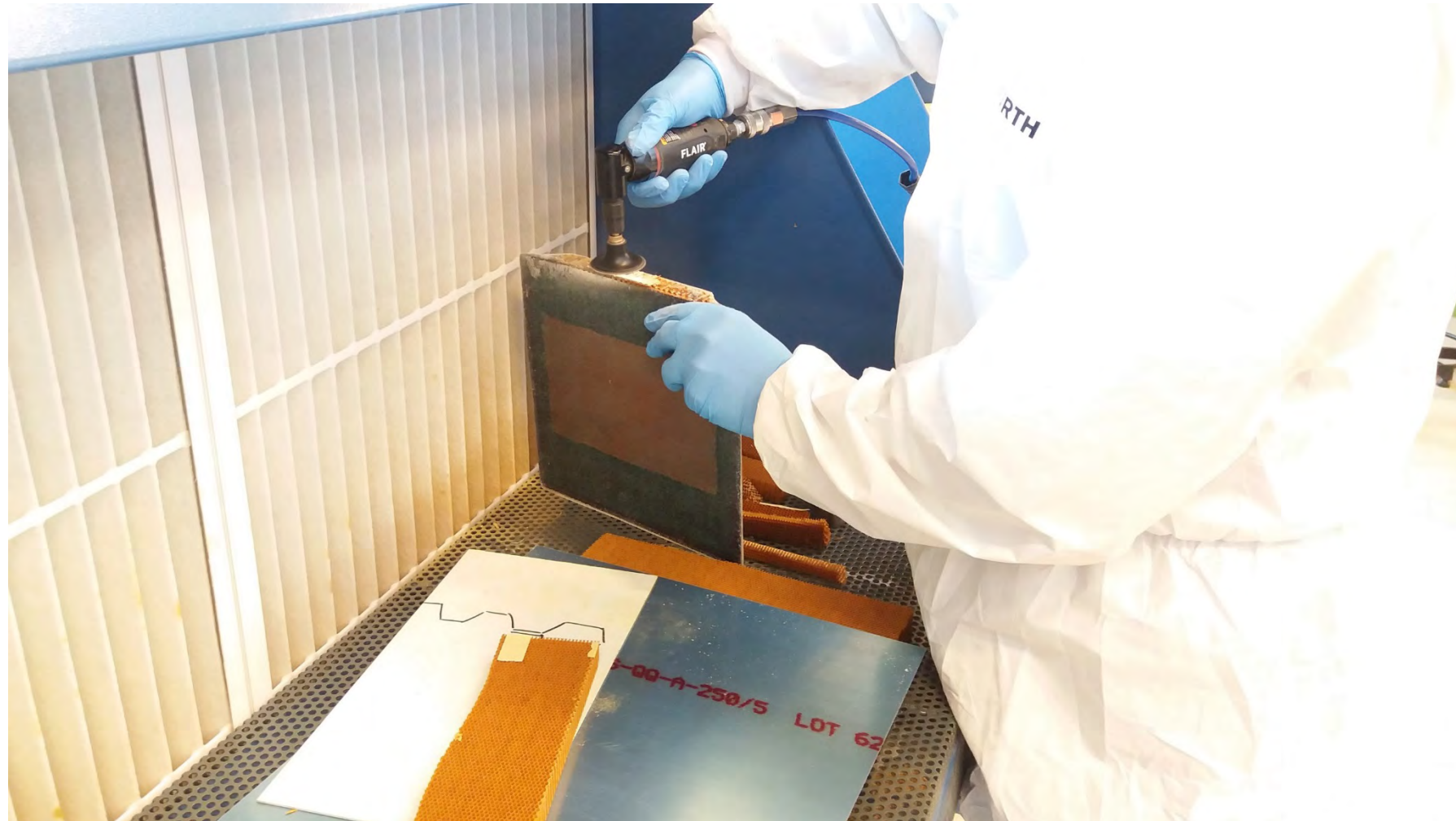


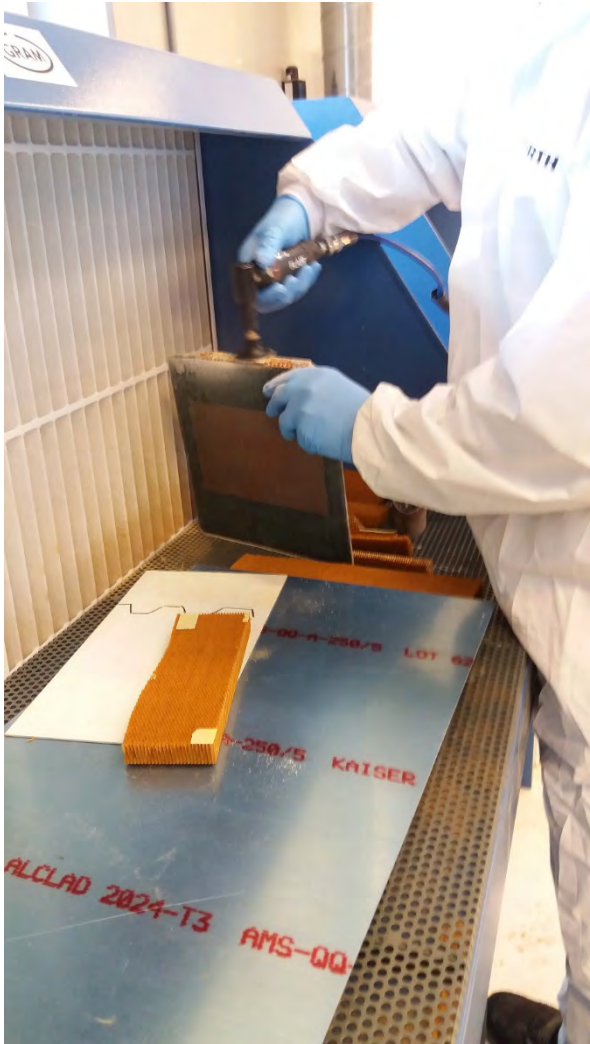


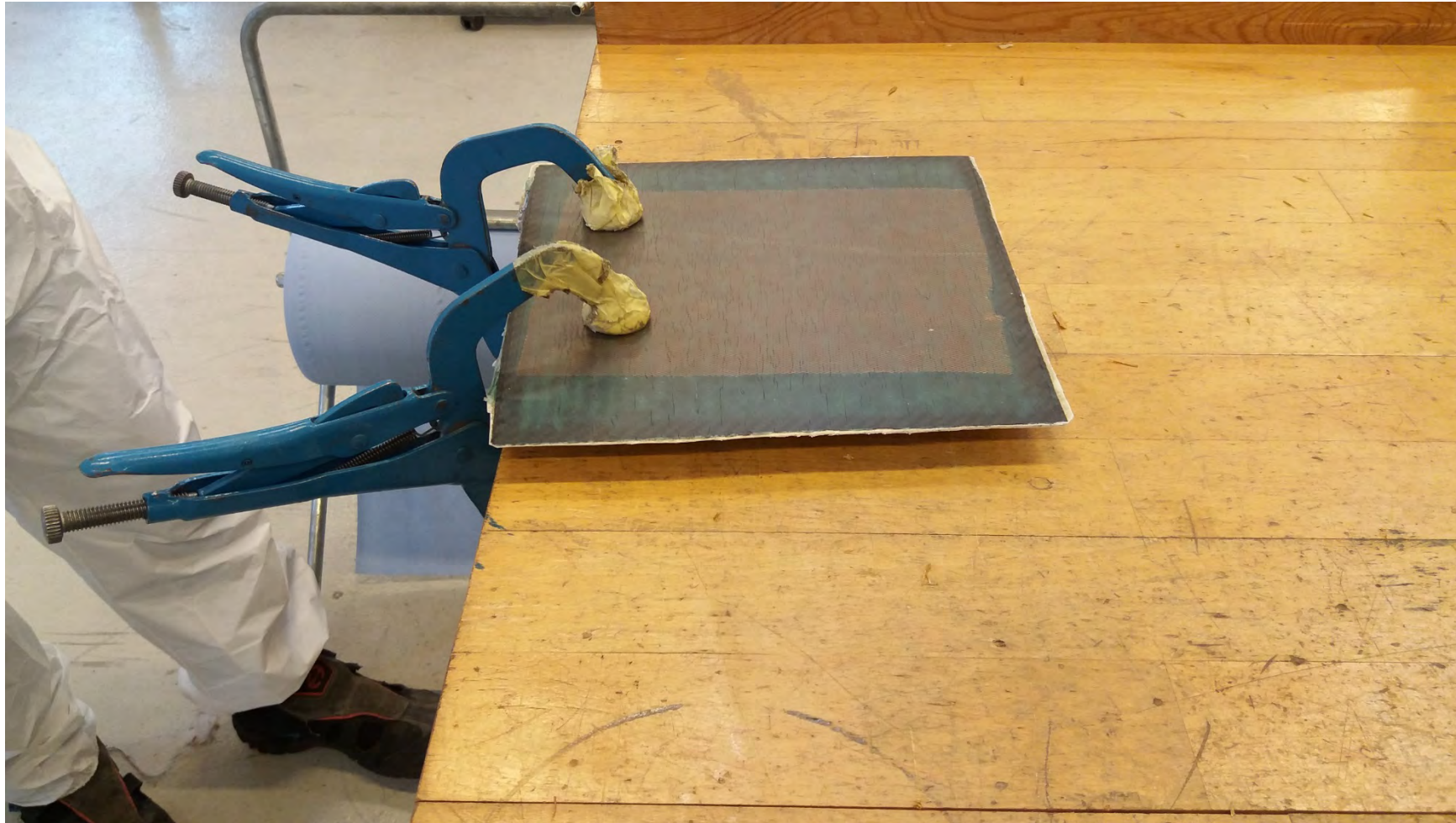




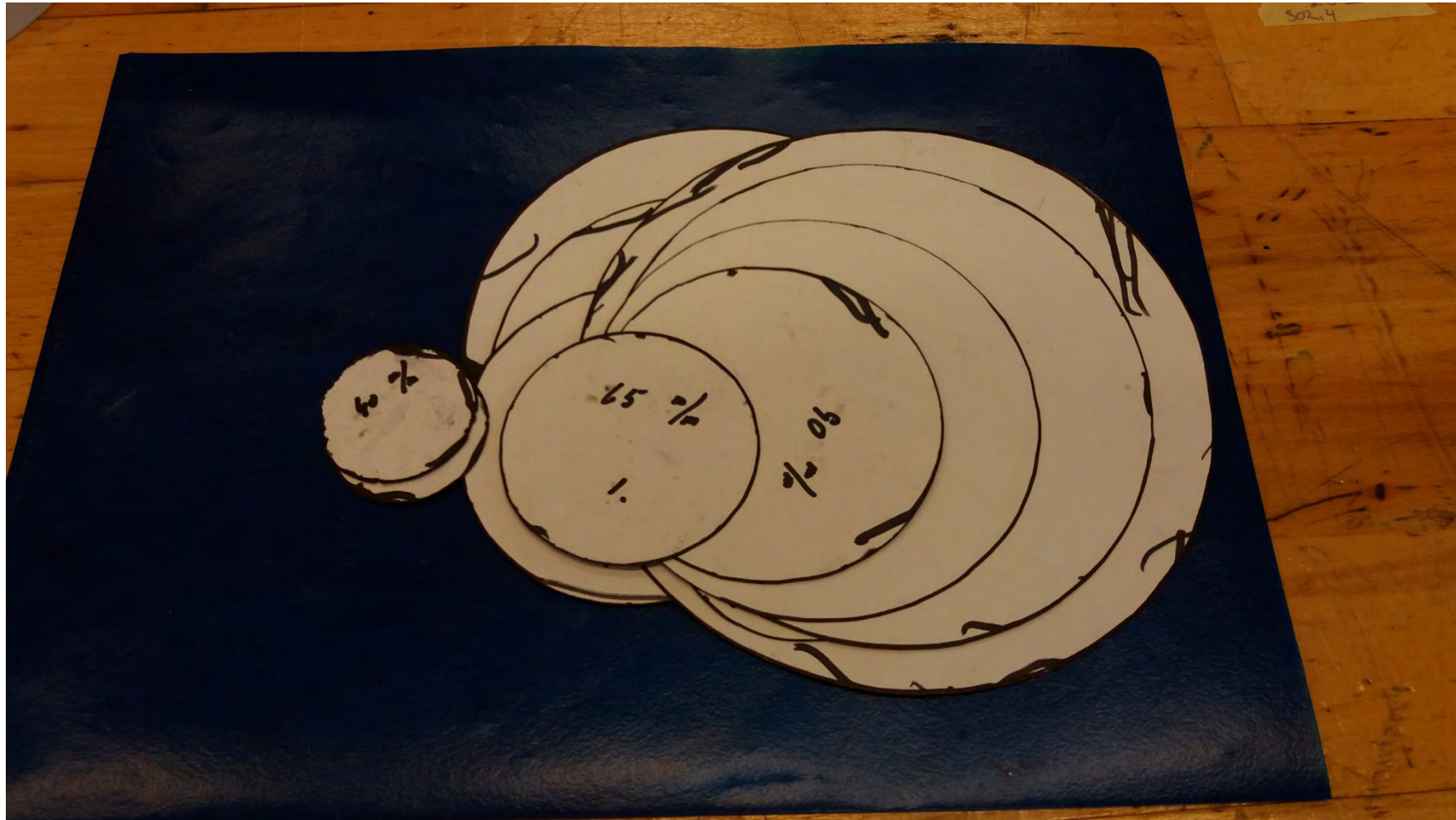








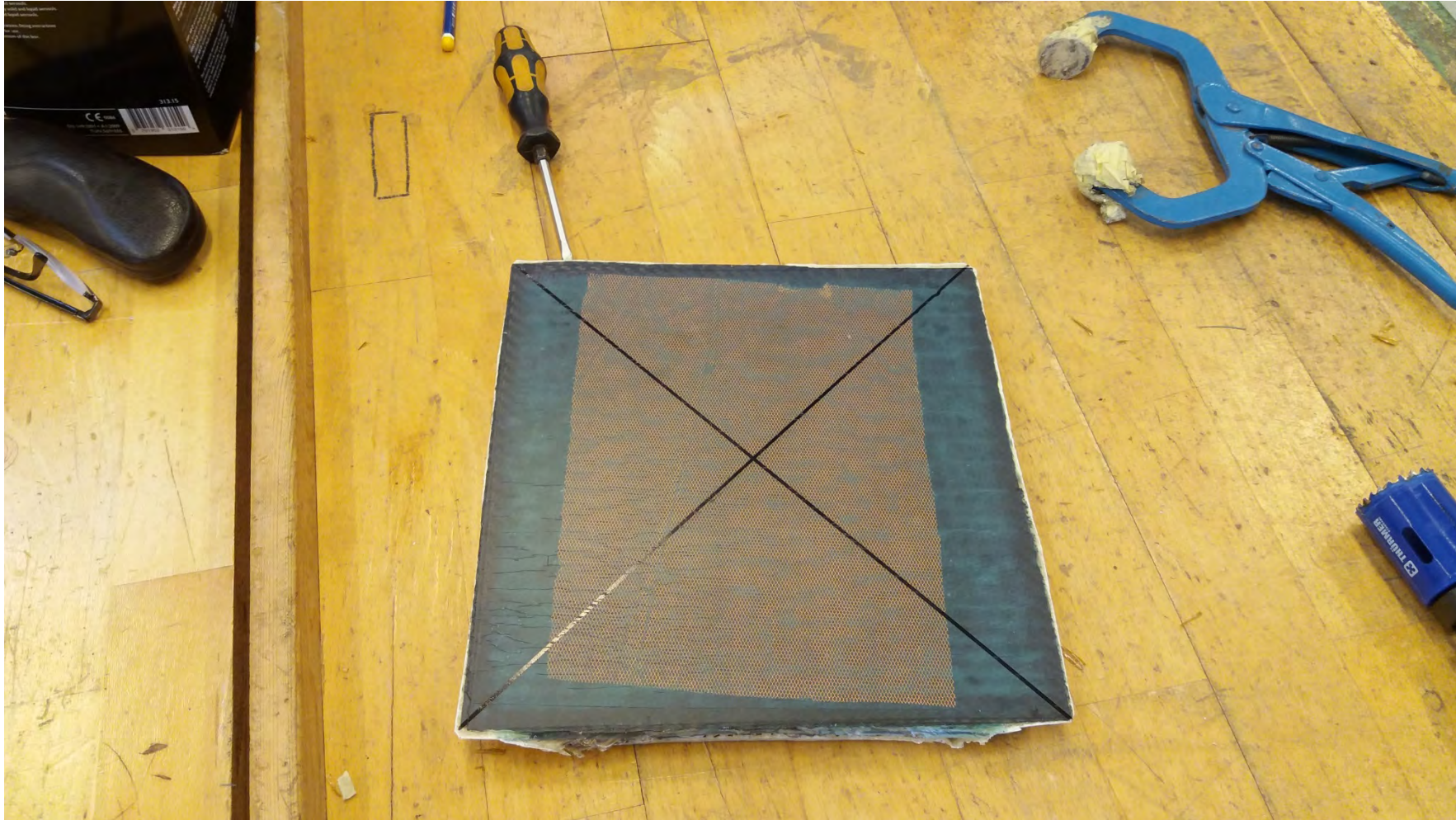
















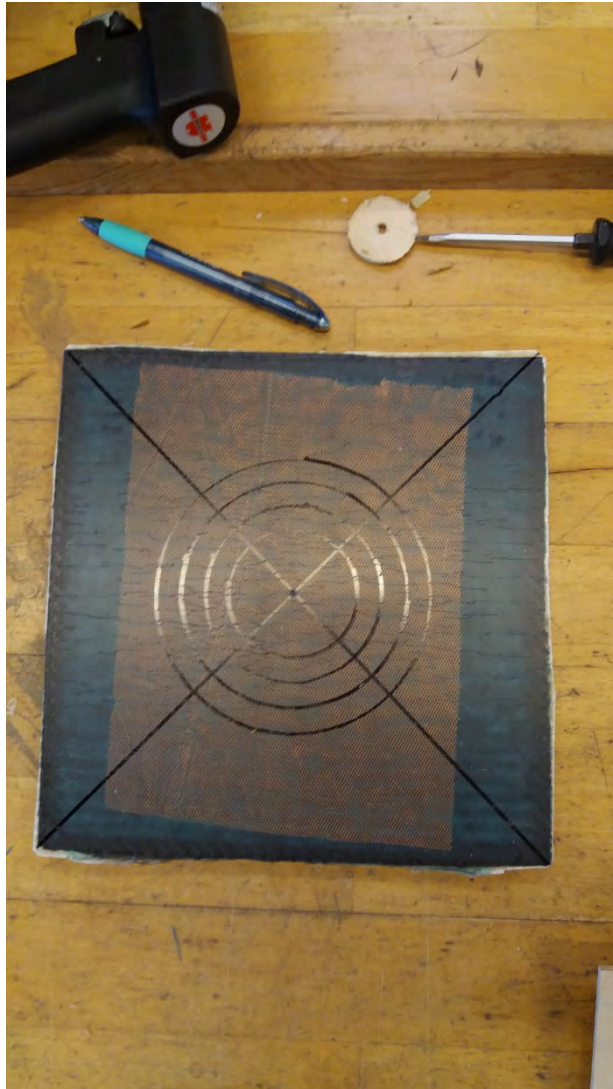






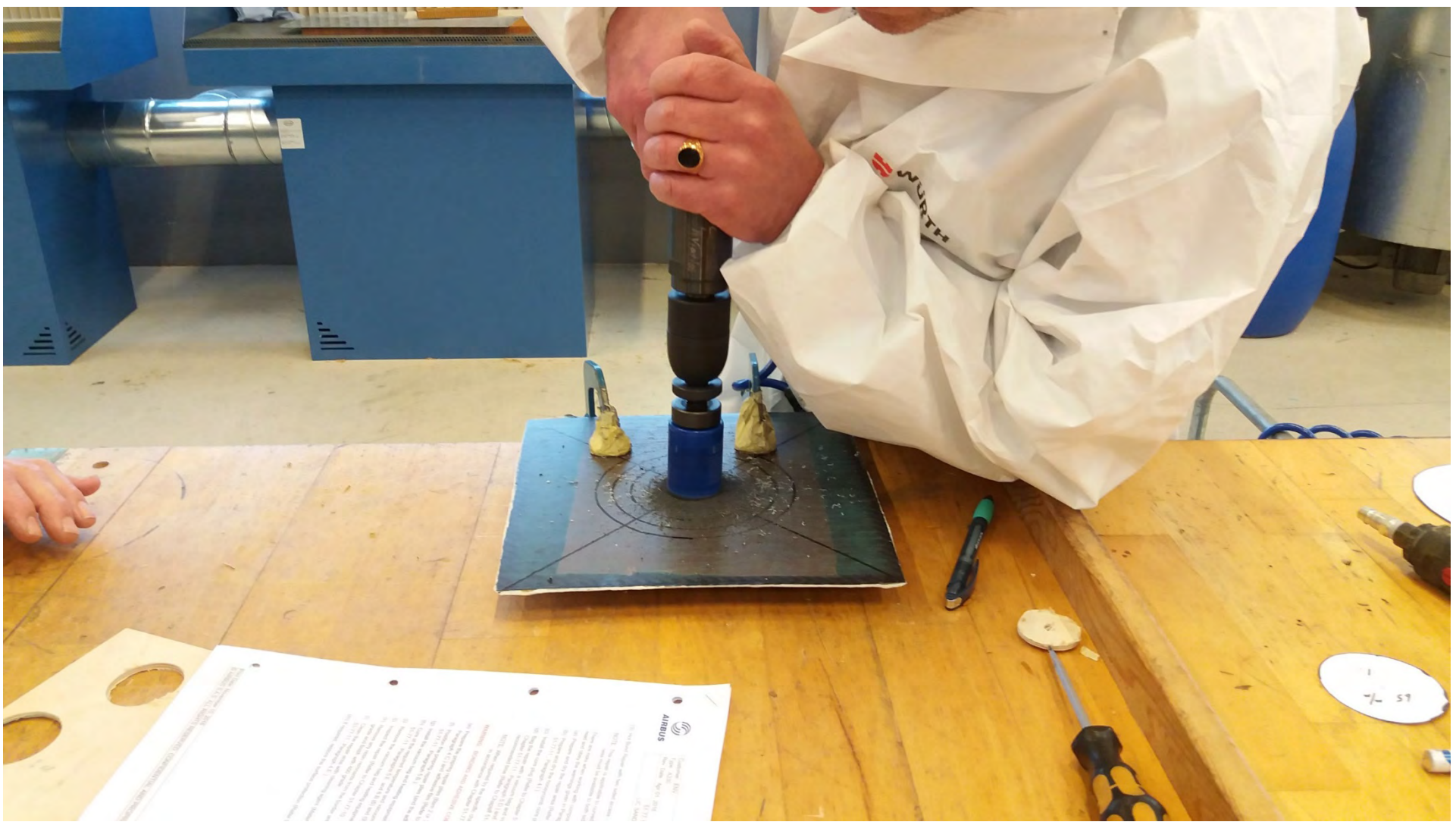


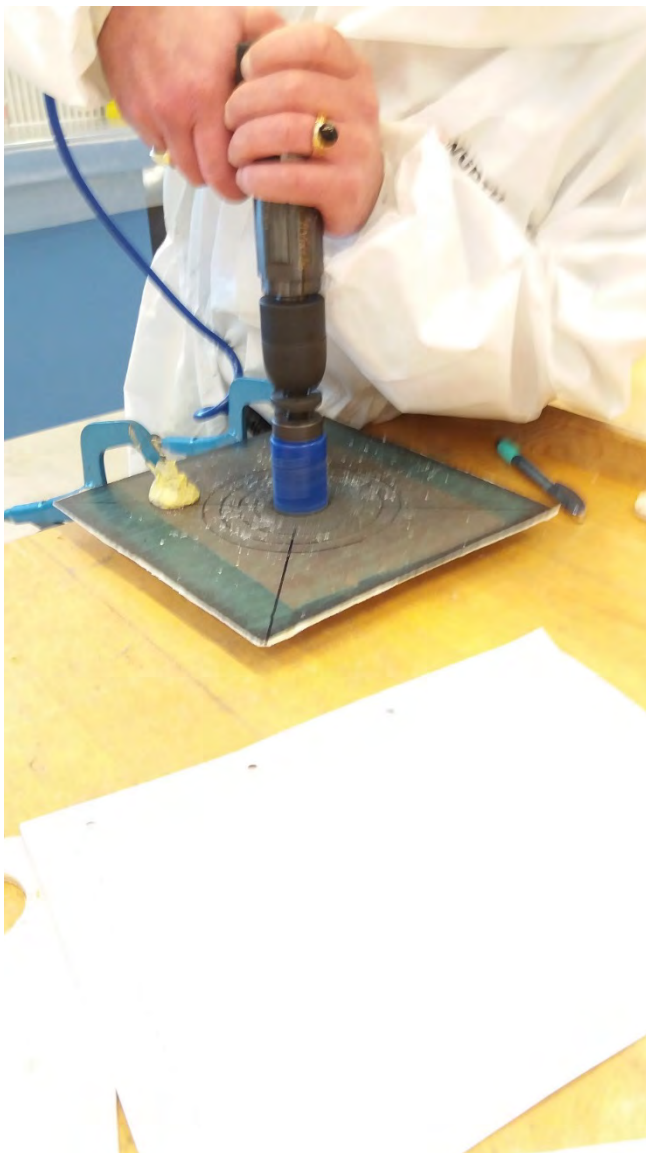












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