Cleaning Procedure for the Guarded Hot Plate Apparatus EP500

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by

Hicham Johra

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1. Foreword

The aim of this technical report is to provide a simple guideline for the regular cleaning and maintenance of the Guarded Hot Plate Apparatus EP500 from Lambda-Messtechnik GmbH Dresden [1], at the Building Material Characterization Laboratory of Aalborg University - Department of Civil Engineering [2].

2. Introduction

The Guarded Hot Plate Apparatus EP500 (see *Figure 1*) is a desktop device allowing easy and reliable steady state measurement of the thermal conductivity of common building materials such as concrete blocks, bricks, wood panels, plasterboard or insulation panels.

The Guarded Hot Plate Apparatus operation involves the induction of a temperature gradient between the lower and upper surface of the tested sample. Consequently, heating and cooling elements are placed in the lower and middle components of the apparatus. A set of electrical fans are circulate the air around these heating and cooling elements. To avoid dust accumulation inside the instrument, filters are placed on those electrical fans. It is therefore very important to regularly remove the dust from those filters and verify that the electrical fans are working properly.

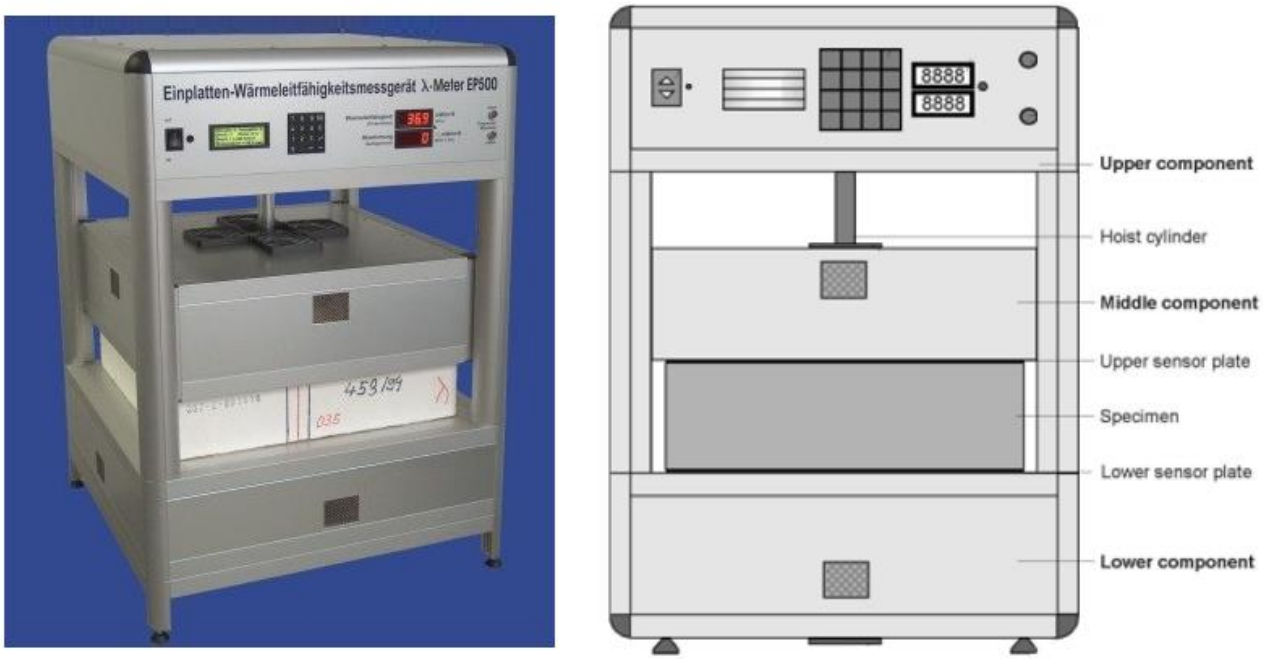

Figure 1: *The Guarded Hot Plate Apparatus EP500.*

It is recommended to clean regularly the dust and potential dirt on the Guarded Hot Plate Apparatus, especially on the measurement surfaces of the lower and middle components, and to remove the dust from the electrical fan filters. This simple cleaning procedure should be conducted before each measurement campaign and once a month during long measurement campaigns, to insure that the apparatus will operate correctly and that none of its components get damaged.

3. Step-by-step cleaning guideline

3.1. Make sure that no one is currently using the Guarded Hot Plate Apparatus

If the Guarded Hot Plate Apparatus has a test sample inside, contact the person running the current measurement to know when it will be possible to stop the latter in order to clean the apparatus.

3.2. Clean top surface and side surfaces of the apparatus

Remove dust and dirt from the top surface of the upper component and from the side surfaces of the entire apparatus (see *Figure 2*). Use a soft and clean (dry or moist) fabric with soap if necessary but no cleaning solvents.

Figure 2: *Top surface and side surfaces of the apparatus to be cleaned up.*

3.3. Power up the apparatus

If the apparatus is not running (switched off), power up the apparatus by pressing the power switch located on the rear panel of the apparatus (see *Figure 3*).

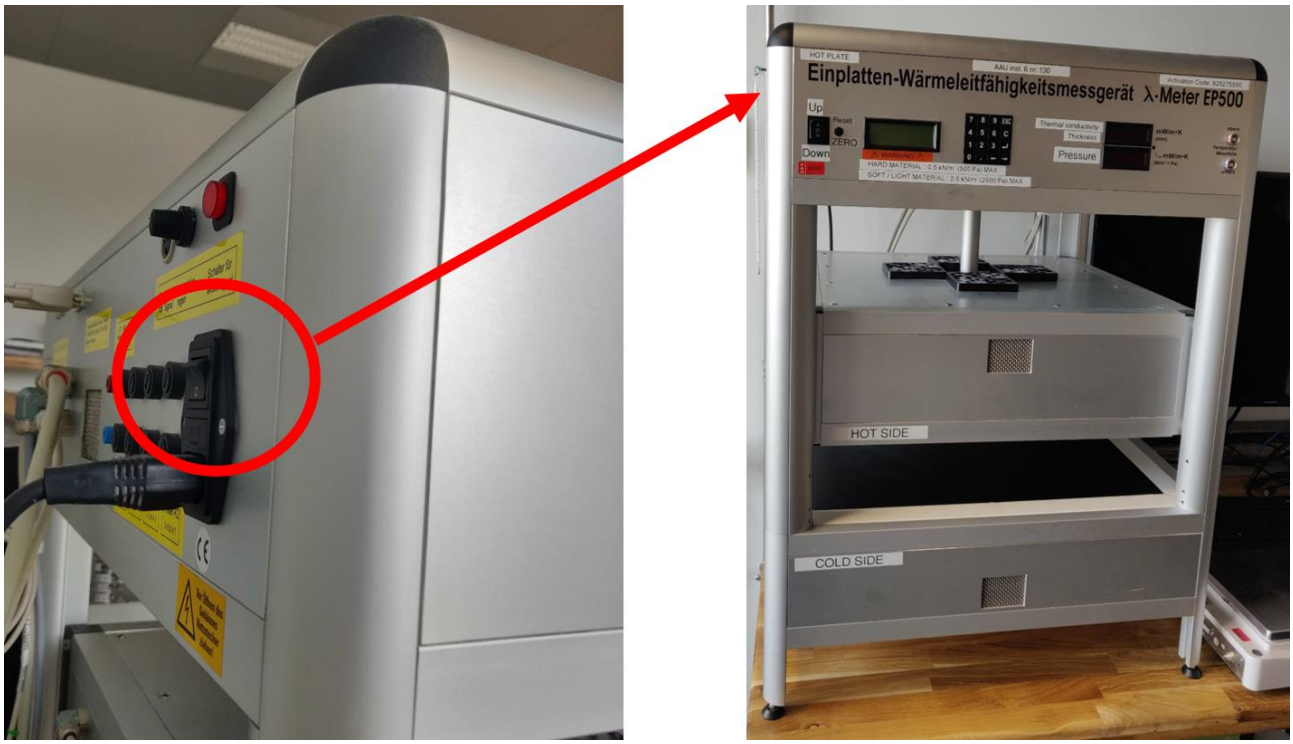

Figure 3: *Power switch button on the rear panel of the Guarded Hot Plate Apparatus (left). Location of the power switch button seen from the front of the Guarded Hot Plate Apparatus (right).*

3.4. Close the apparatus

In order to reach the filters of the ventilation system on the top of the middle component (see *Figure 1*), the apparatus has to be closed. To do so, make sure that there is no object or debris in between the lower and middle component of the apparatus (see *Figure 4*).

Figure 4: *No object of debris in between the lower and middle component of the apparatus.*

Press the "down" button (continuous pressing) to close the apparatus (see *Figure 5*).

Figure 5: *Press the "down" button to close the apparatus.*

3.5. Verify and clean the ventilation filters on the top of the middle component

The top surface of the middle component of the apparatus can accumulate a lot of dust. Remove the dust and dirt on the top surface of the middle component of apparatus. Use a soft and clean (dry or moist) fabric with soap if necessary but no cleaning solvents.

Dismount the 4 ventilation filters located on the top of the middle component (see *Figure 6*).

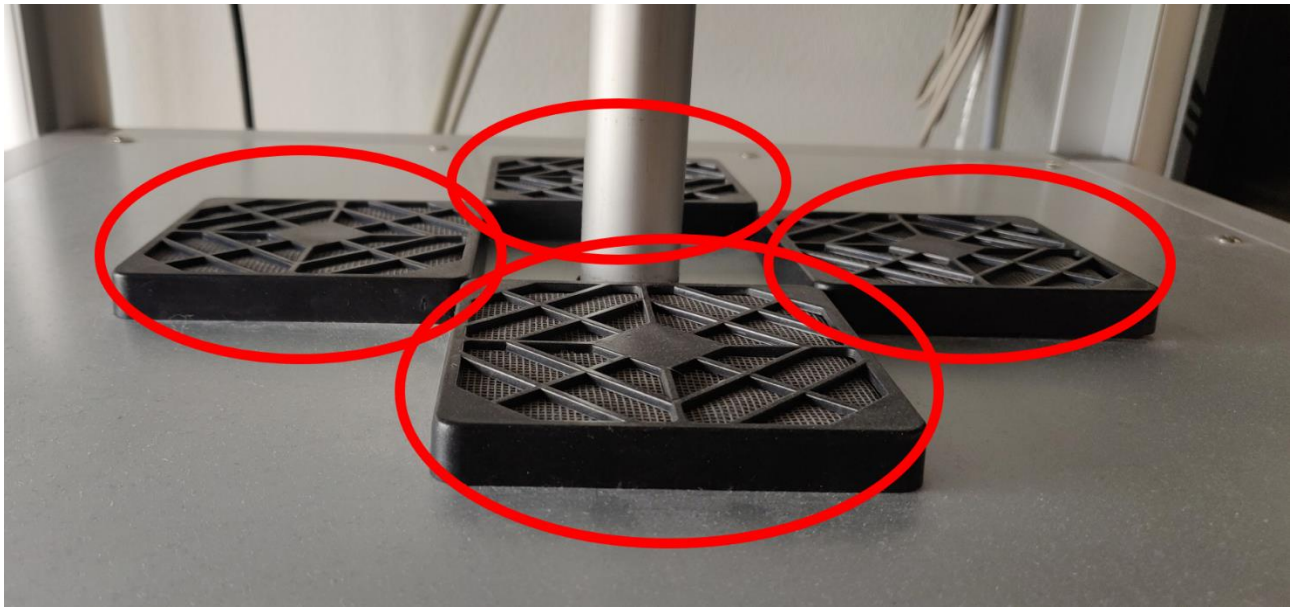

Figure 6: *The 4 ventilation filters on the top of the middle component of the apparatus.*

The plastic covers of the filters can easily be removed by asserting pressing on their side with the fingers (see *Figure 7*).

Figure 7: *Dismounting the plastic cover of the ventilation filters.*

Verify with your hand that air is circulating through the vent: hover over the vent with the hand to feel if there is air exhaust or not. If there is no air circulation, contact the person in charge of the apparatus (see *Contact person section on page 21*).

3.6. Clean the upper filters

Remove the filter pad from plastic cover to clean it. Remember to place back the metal grid in between the plastic cover and the filter pad before putting the plastic cover back on the apparatus vent (see *Figure 8*).

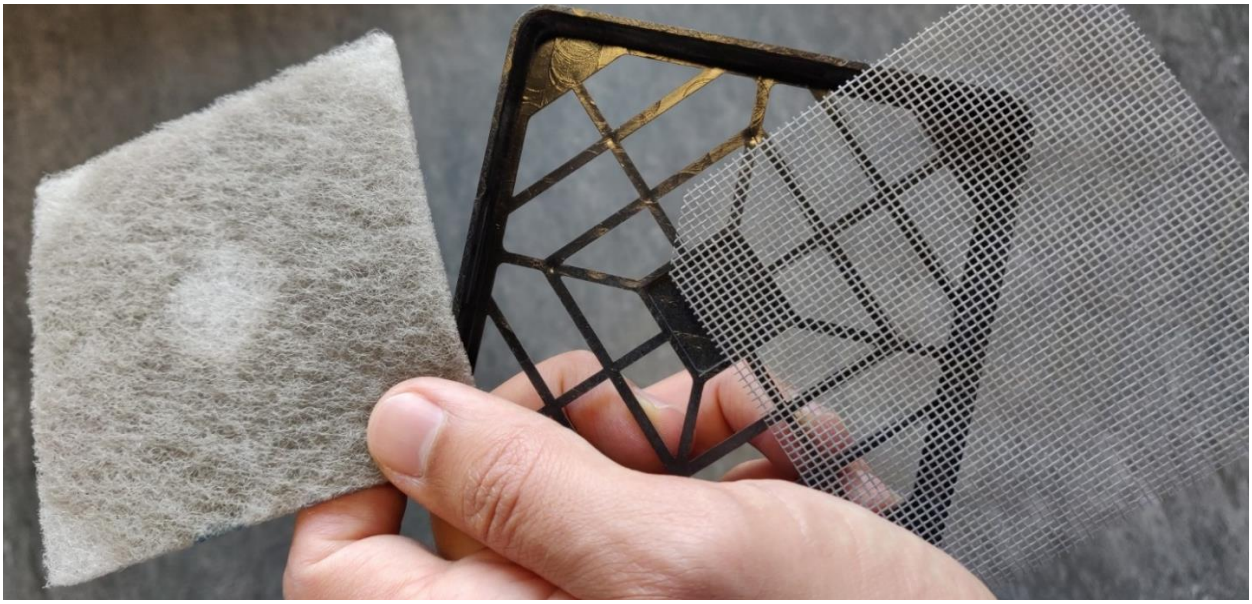

Figure 8: *Ventilation filter (left), plastic cover (center), metal grid (right).*

Use pressurized air to blow the dust off the filter pads (see *Figure 9*).

Figure 9: *Pressurized air to clean up filter pads.*

If the filter pad is too dirty and cannot be cleaned with pressurized air, a new clean filter pad should be used to replace the old one (see *Figure 10*).

Figure 10: *New clean filter pads.*

After cleaning filter pads, the plastic cover and the metal grid should be placed back correctly on the vent. Put back the plastic cover by pressing on it until a click sound is heard.

3.7. Verify and clean the ventilation filters on the bottom of the lower component

Dismount the ventilation filters located on the bottom of the lower component under the apparatus (see *Figure 11*).

Figure 11: *Reach the ventilation filter under the lower component of the apparatus.*

Dismount the ventilation filter by removing the 4 screws with the appropriate screwdriver (see **Figure** *12*).

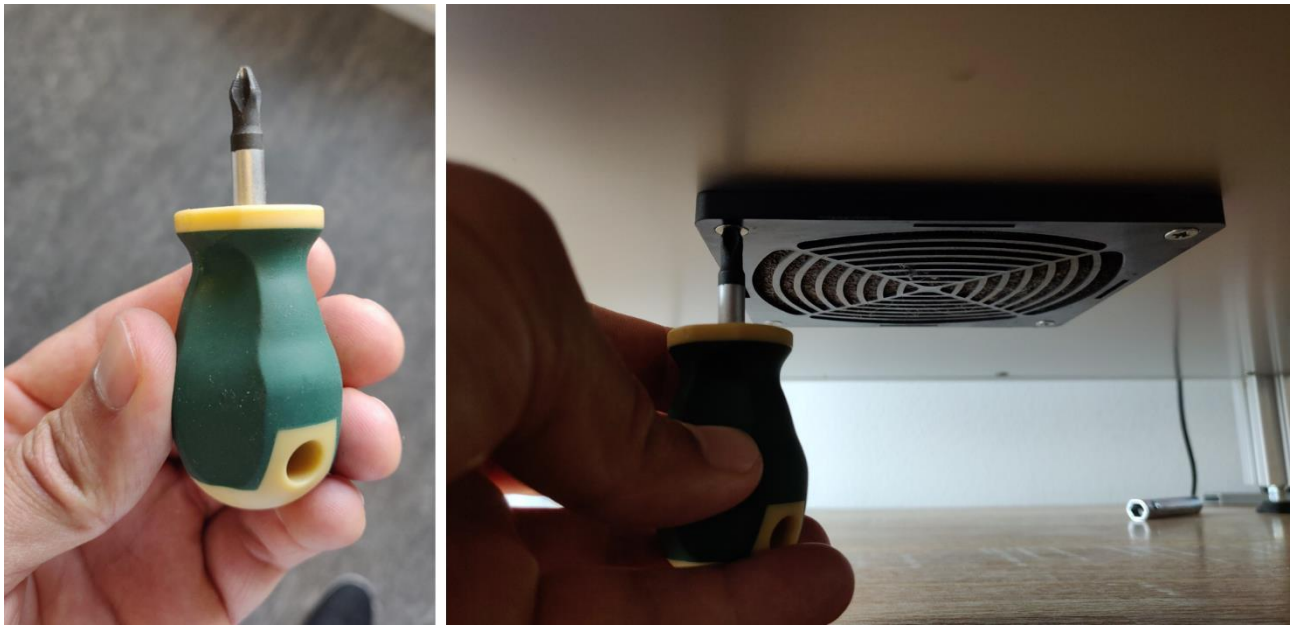

Figure 12: *Dismount the bottom ventilation filter with the appropriate screwdriver.*

Once the bottom filter is dismounting, verify visually that the bottom ventilation fan is spinning (see *Figure 13*). If the ventilation fan is not working, contact the person in charge of the apparatus (see *Contact person section on page 21*).

Figure 13: *Ventilation fan spinning correctly.*

3.8. Clean the bottom filters

Use pressurized air to blow the dust off the filter pads (see *Figure 14*). If the filter pad is too dirty and cannot be cleaned with pressurized air, a new clean filter pad should be used to replace the old one. After cleaning the filter, mount it back on the lower component with the appropriate screwdriver (see *Figure 12*).

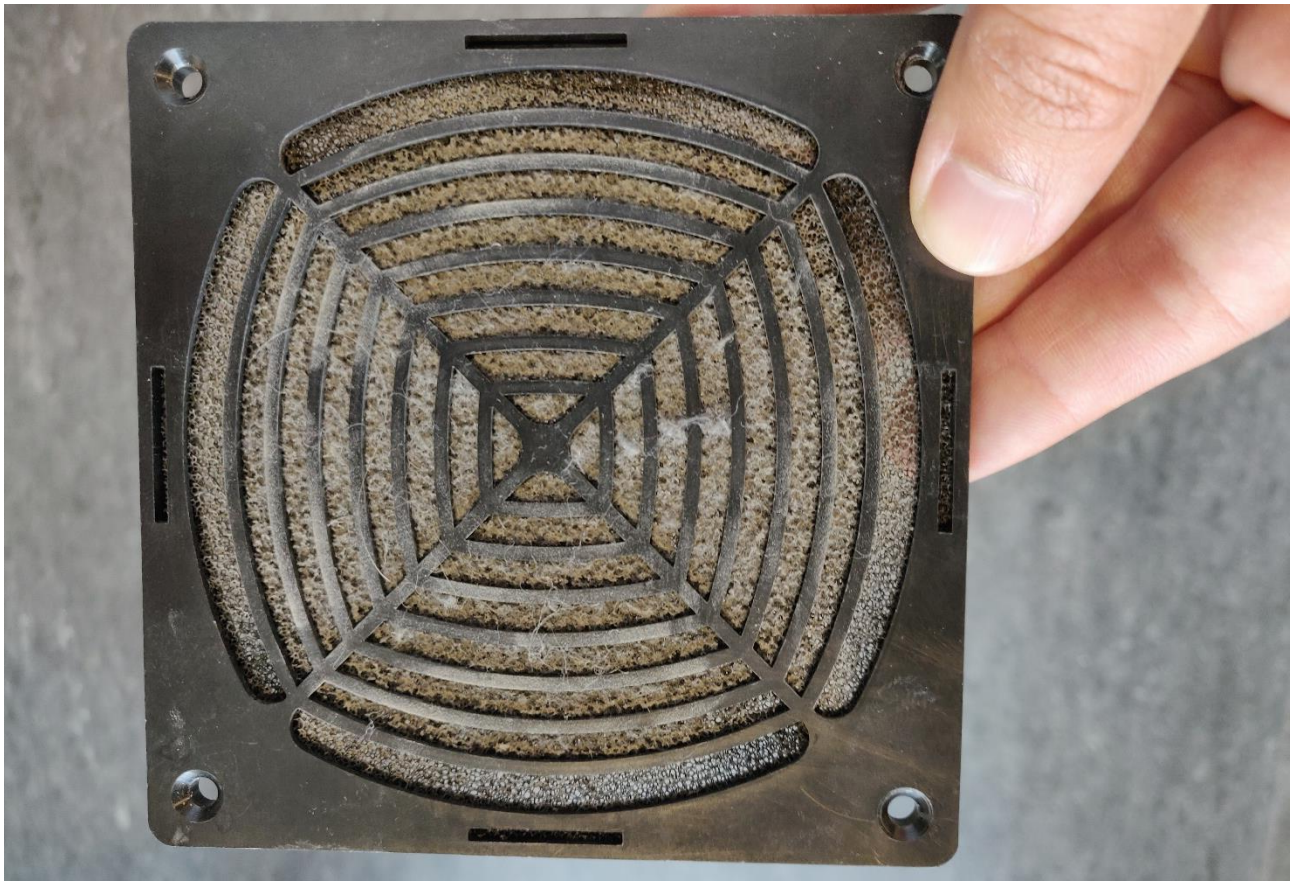

Figure 14: *Dirty bottom ventilation filter.*

3.9. Open the apparatus

In order to reach the measurement surfaces of the apparatus (see *Figure 15*), the middle component (see *Figure 1*) must be lifted up to maximum (or at least 200 mm of opening). In order to open the middle component, hold pressing the up button (see *Figure 16*) until the apparatus is sufficiently opened to reach both upper and lower measurement surfaces (black coating).

Figure 15: *Measurement surfaces of the Guarded Hot Plate Apparatus.*

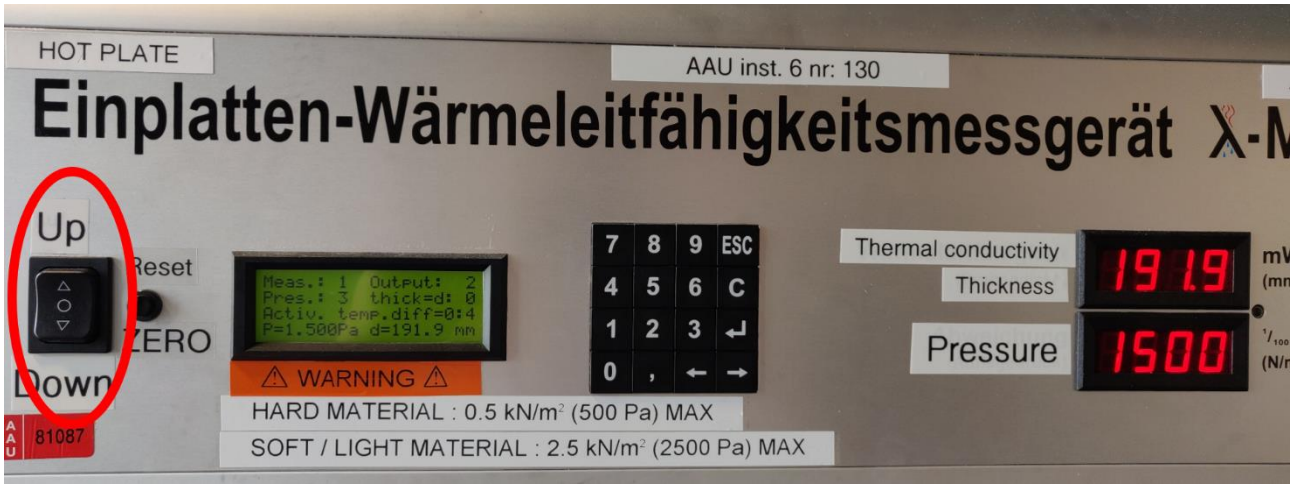

Figure 16: *Press the "up" button to open the middle component of the apparatus.*

3.10. Clean the 2 measurement surfaces

The 2 measurement surfaces of the apparatus (see *Figure 17*) are fragile and should therefore be treated with great care. Remove carefully any debris, dust or dirt from the measurement surfaces without scratching the black coating. Use a soft and clean (dry or moist) fabric with soap if necessary but no cleaning solvents.

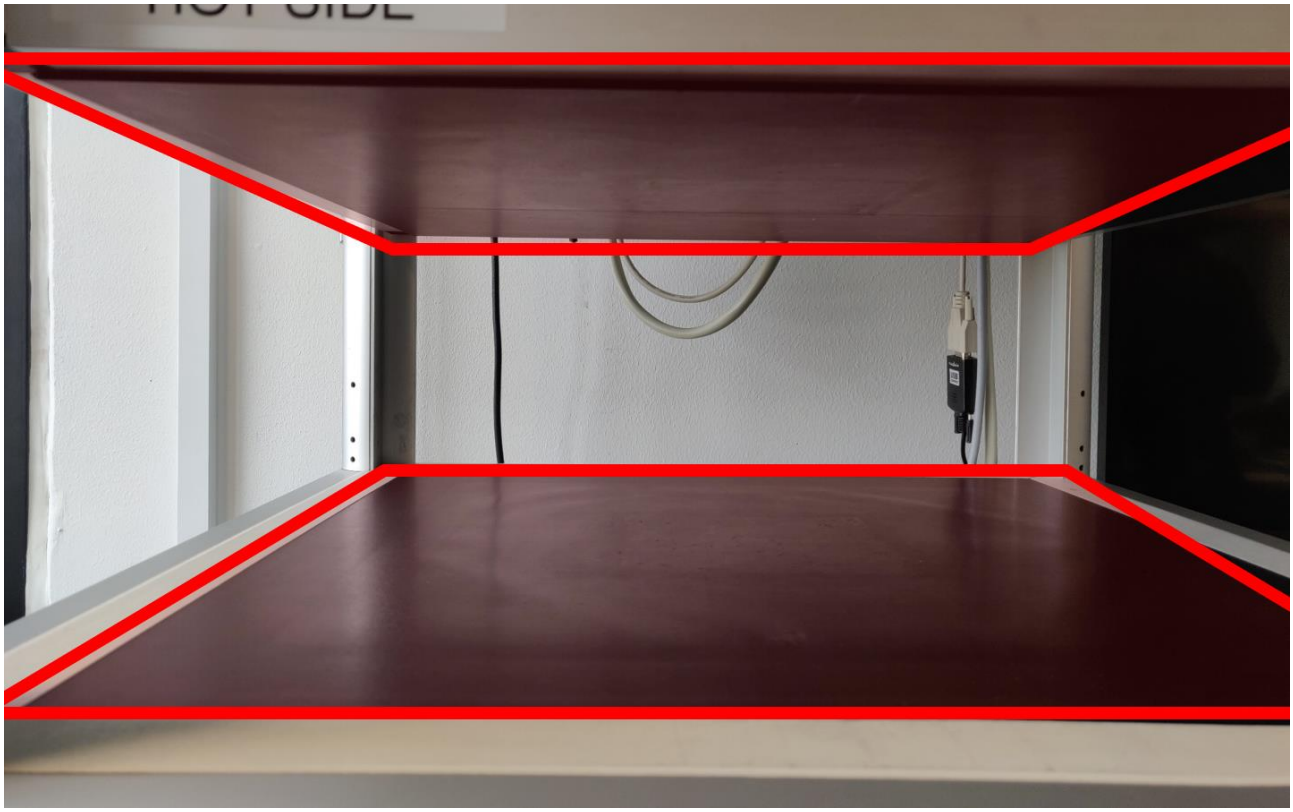

Figure 17: *Measurement surfaces of the Guarded Hot Plate Apparatus which have to be cleaned up carefully.*

3.11. Switch off the apparatus

Turn the apparatus off (see *Figure 18*).

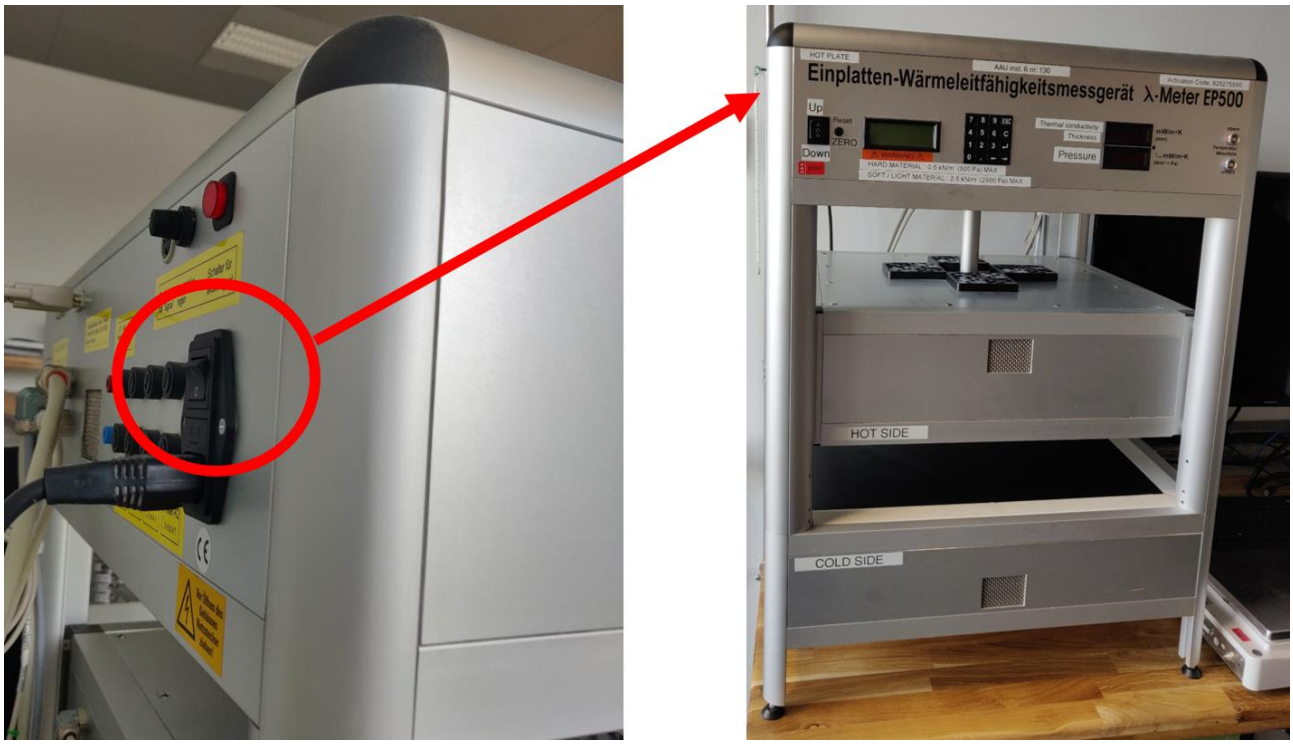

Figure 18: *Power switch button on the rear panel of the Guarded Hot Plate Apparatus (left). Location of the power switch button seen from the front of the Guarded Hot Plate Apparatus (right).*

3.12. Clean the table around the apparatus

Clean the dust and dirt on the table around and under the apparatus.

4. Contact person

In case of problems or further questions, please contact:

Hicham Johra

Email: hj@civil.aau.dk

References

[1] http://www.lambda-messtechnik.de/en.html

[2] Building Material Characterization Laboratory of Aalborg University, Department of Civil Engineering, Aalborg, Denmark.
https://buildingmaterials.civil.aau.dk