

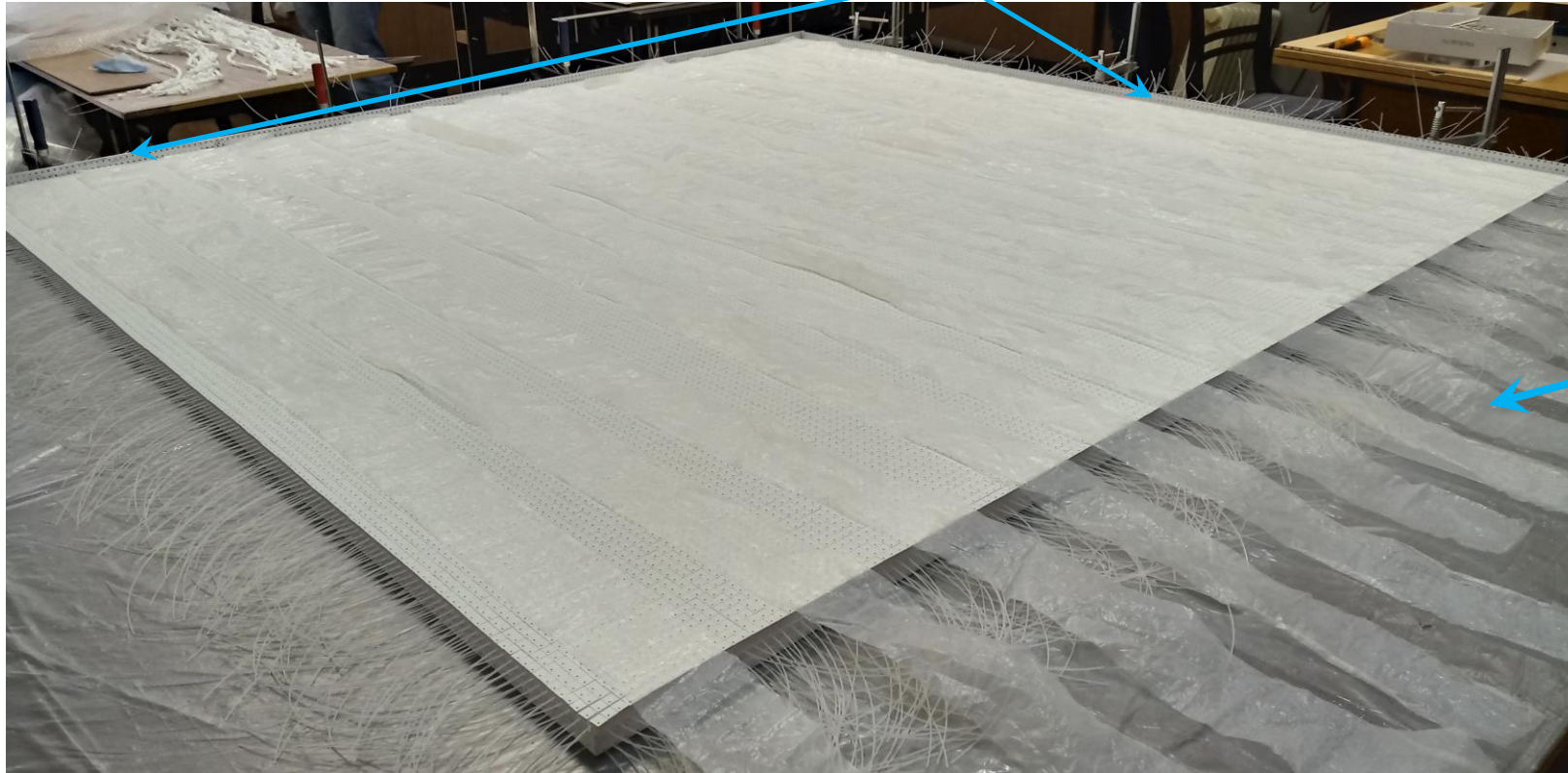
Horizontal pitch SFGD

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3D assembling of 5 full size layers

Two aluminum corners with matrix of holes (pitch = 10.30 mm)

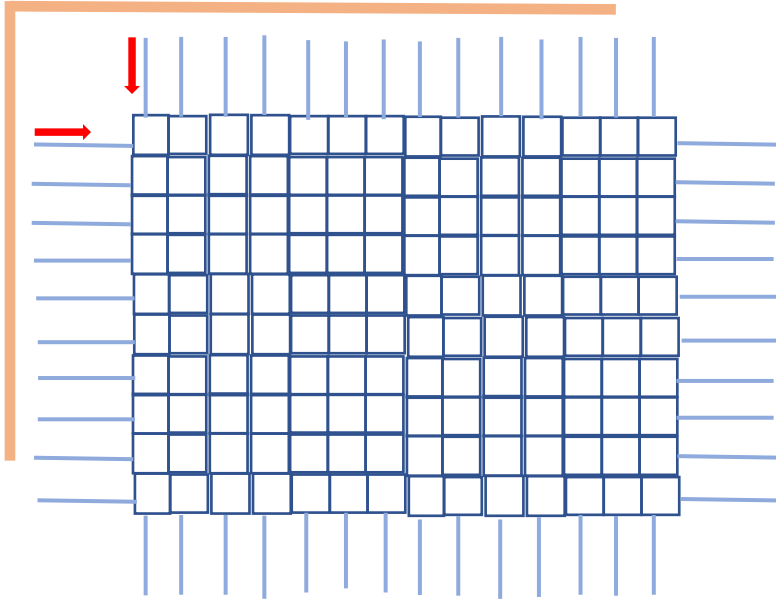


Teflon tape

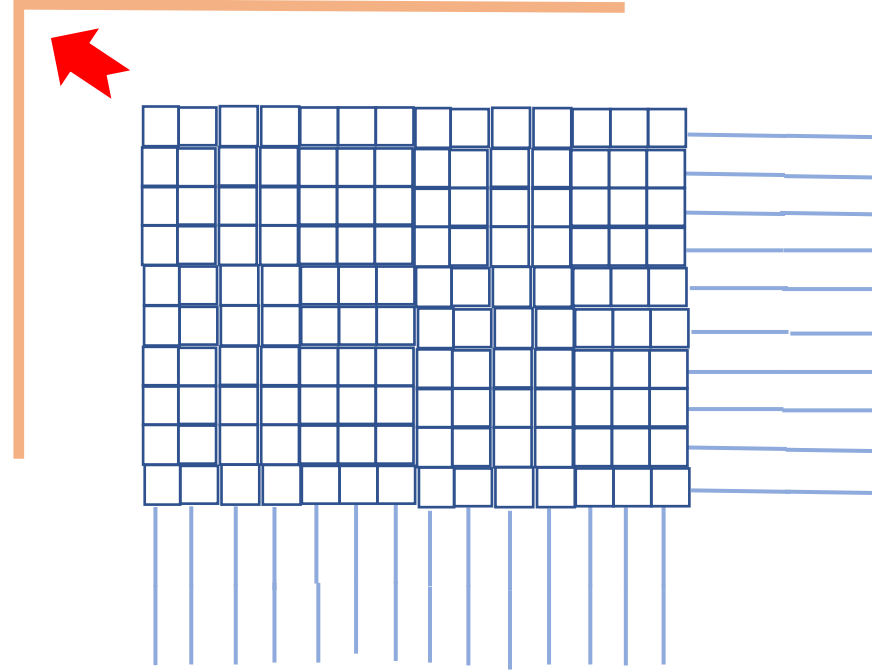
Teflon tapes were used to slide layers over layers.

Adjusting the full-sized layers into the frame

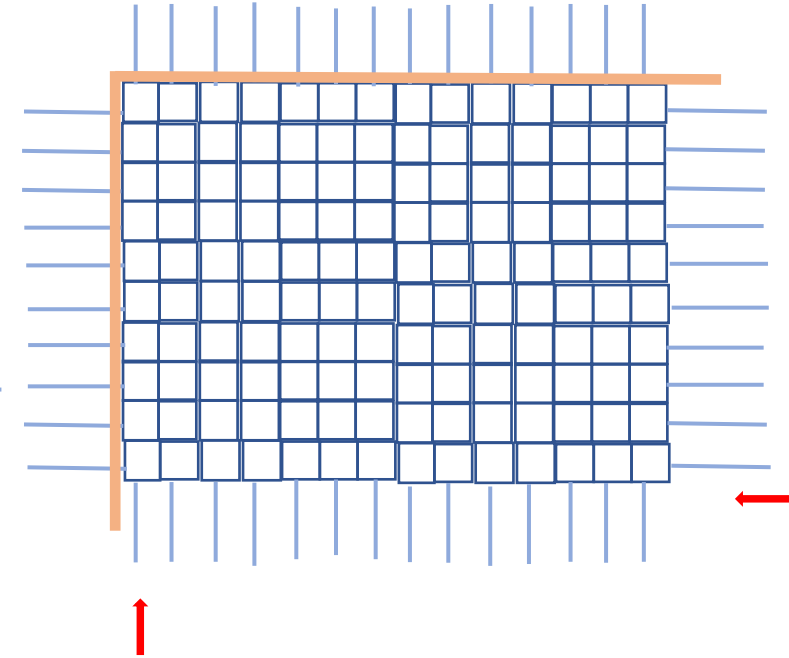
Corner frame



The fishing lines are pulled back as shown.

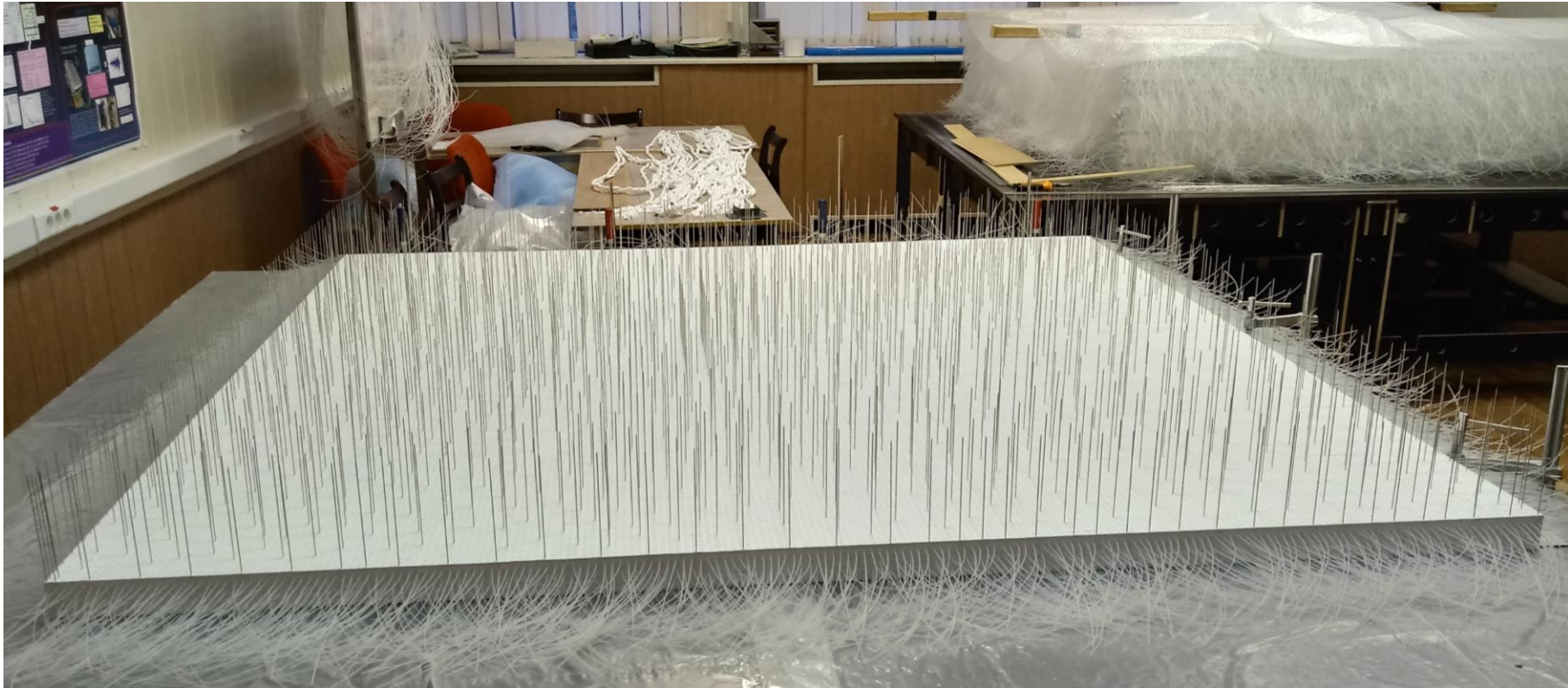


The layer is pushed into the frame corner.



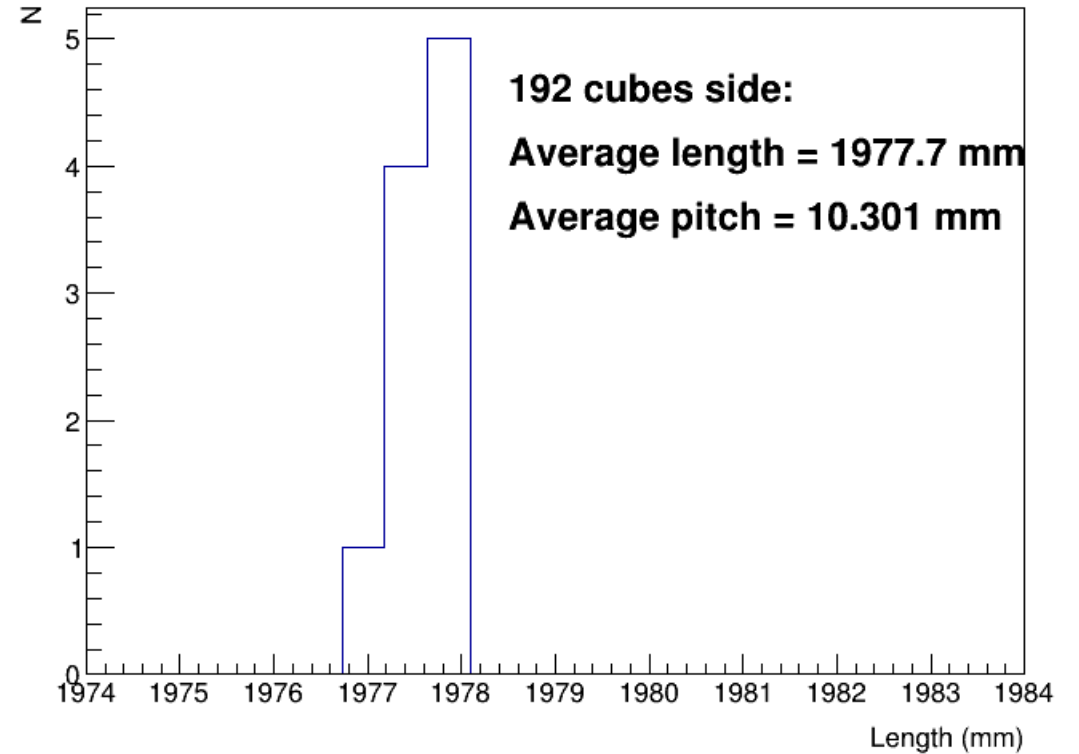
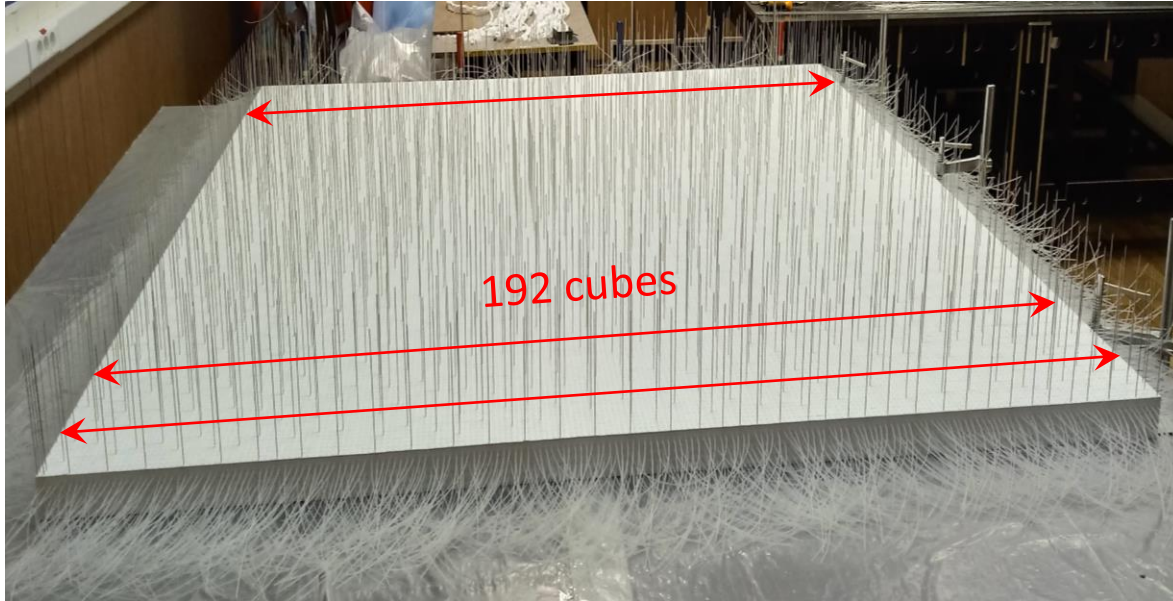
The fishing lines are pushed back through the holes in the frame.

Merging of 5 full-sized layers (184x192 cubes)



Two layers are merged simultaneously. Merging means the vertical alignment of holes. All 5 layers are aligned with 1.4 mm diameter needles.

Side length measurement



We measured the length of 192 cubes.

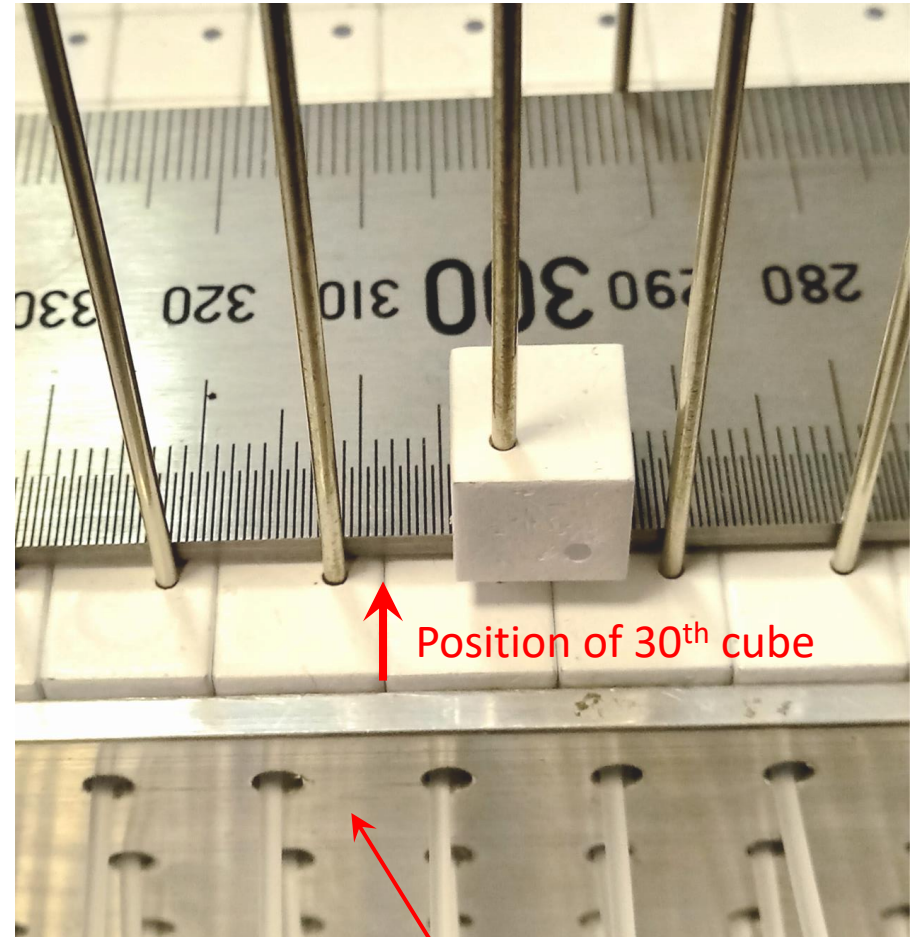
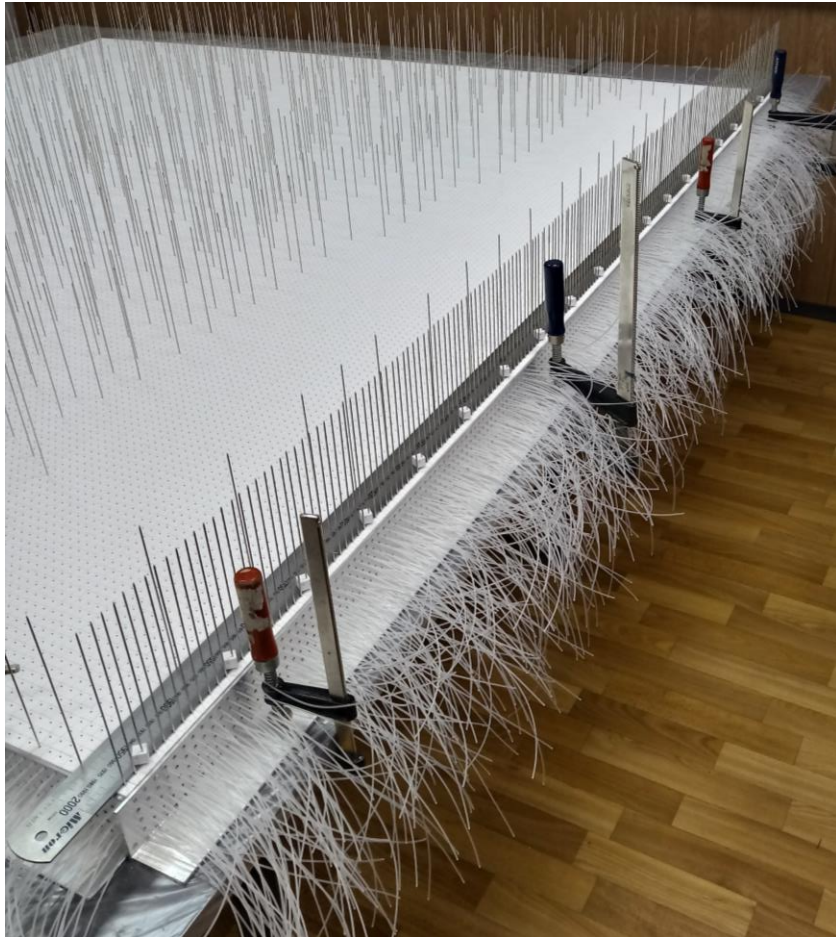
10 measurements were done in different positions using a metallic ruler with 0.5 mm accuracy.

Average length = 1977.7 ± 0.1 mm

Max length = 1978 mm

Min length = 1977 mm

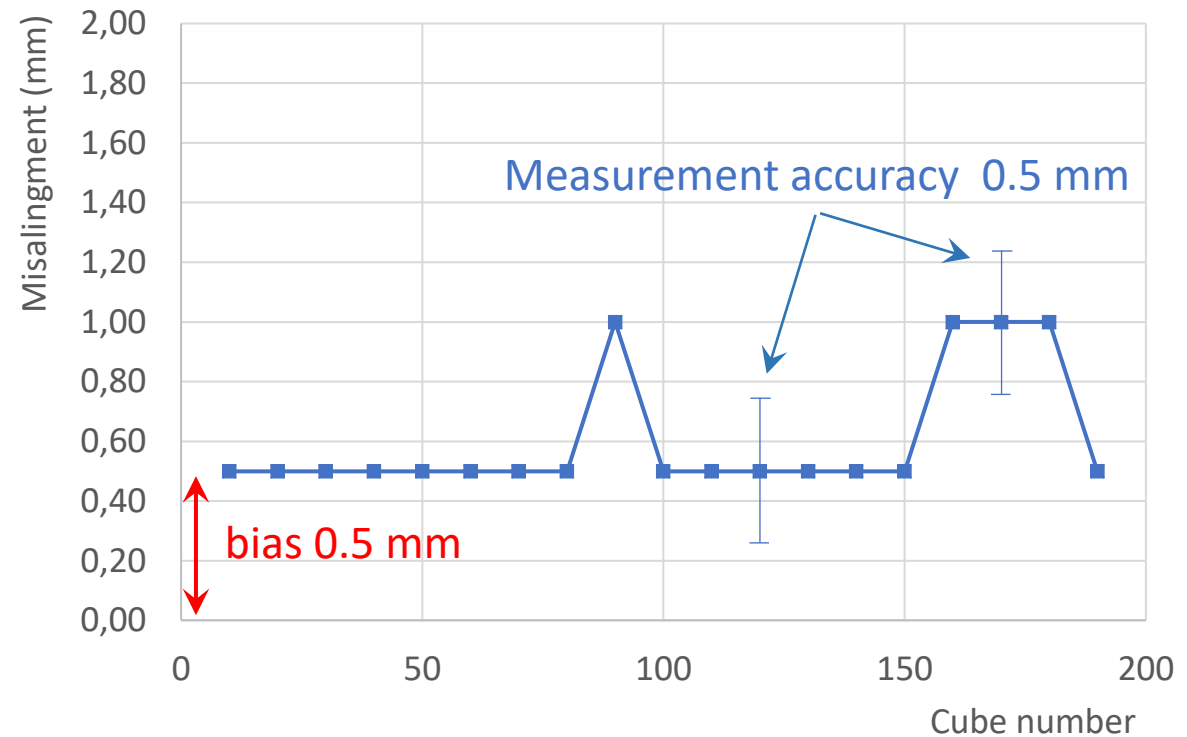
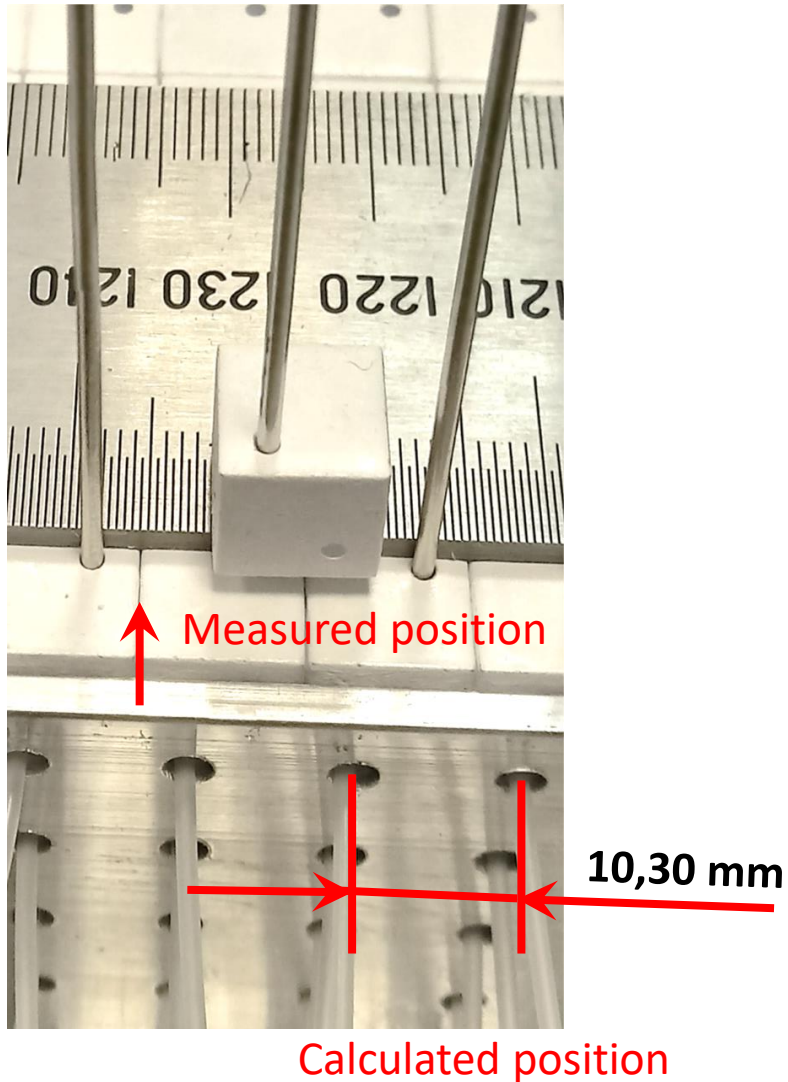
Measuring the horizontal pitch gradient



The position of every 10th cube was measured as a border between cubes.
The total length of 192 cubes is 1978.0 mm in this position.

Corner frame

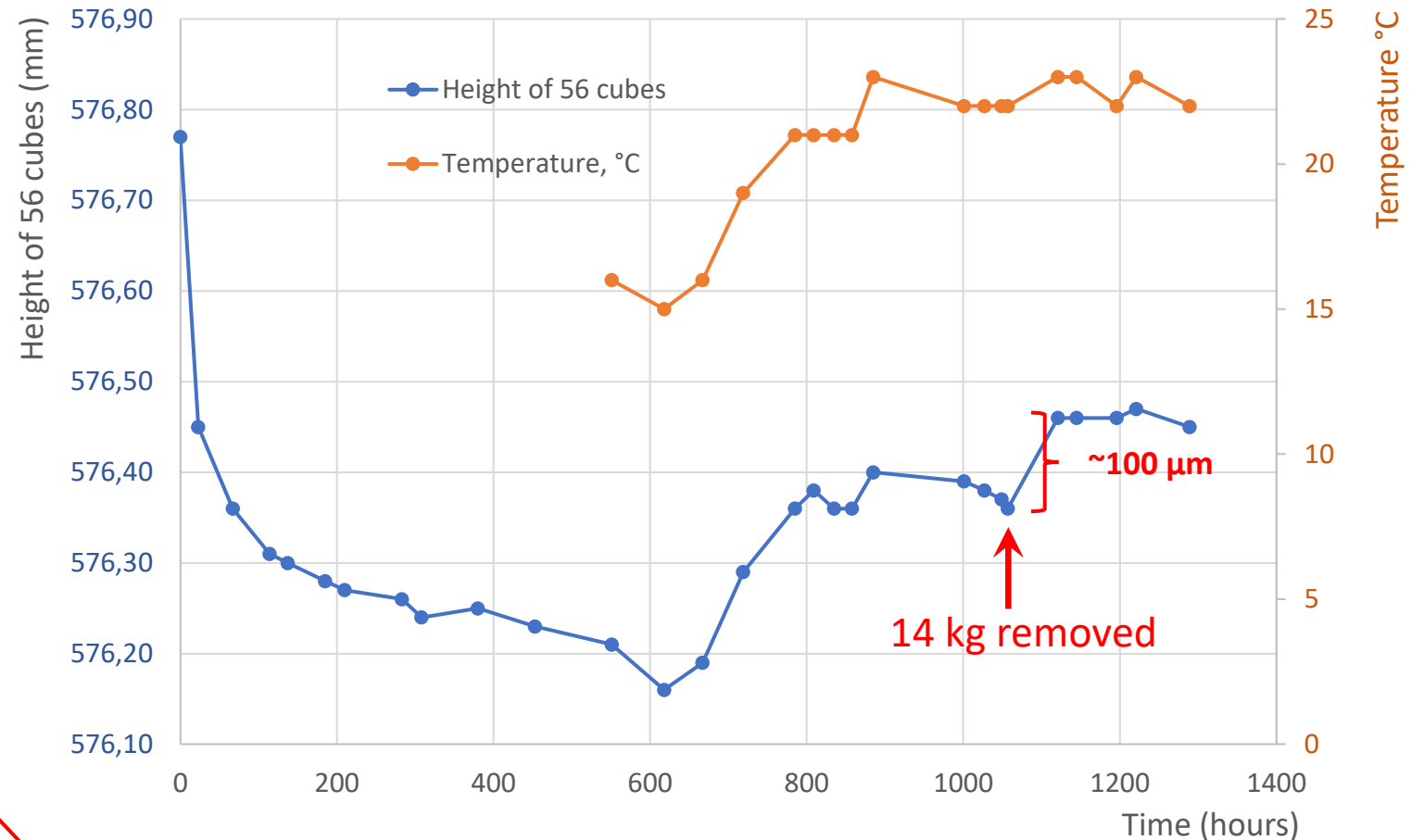
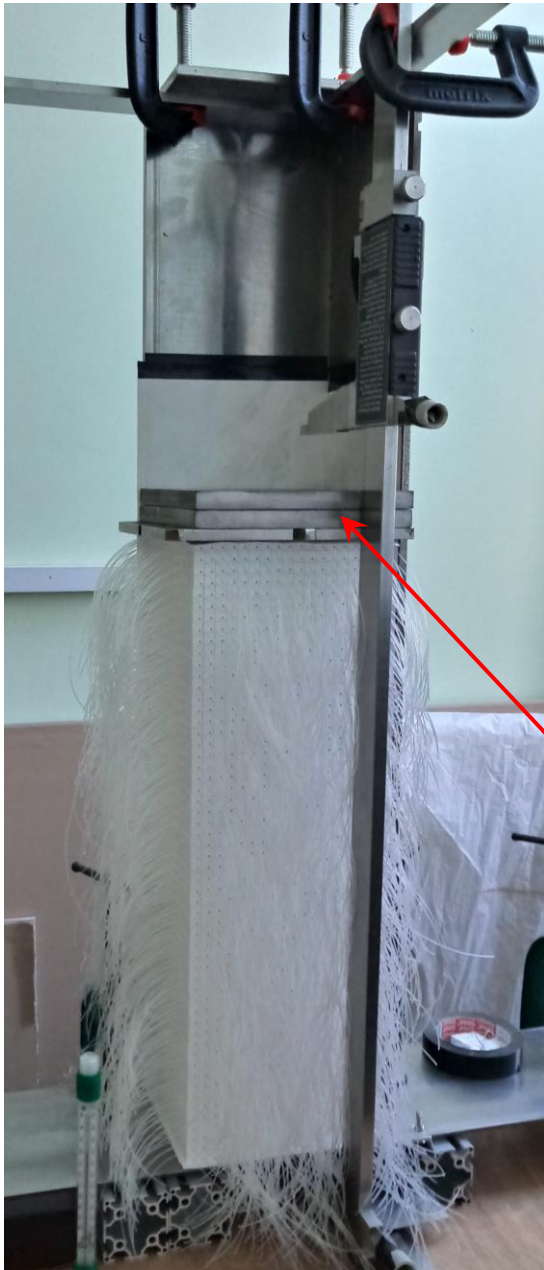
Horizontal misalignment



The misalignment was calculated as deviation between the measured and calculated position for pitch = 10.30 mm. The constant bias of 0.5 mm is explained as difference between total measured length of 1978.0 mm (in this position) and total calculated length of $10.30 \times 192 = 1977.6$ mm.

Misalignment is within measurement accuracy.

56 layers height over time



An **additional load** of 14 kg was placed on top of the layers in the beginning of the test. The total height of 56 layers was increased by about 100 μm after removing the load. The total height is stable while temperature is stable.

Summary

Our suggestion:

Horizontal pitch = **10.301 mm**

Vertical pitch = **10.28 mm**