

CENTROTECNICA
stress to ensure

the **Direct Coupling Solutions**

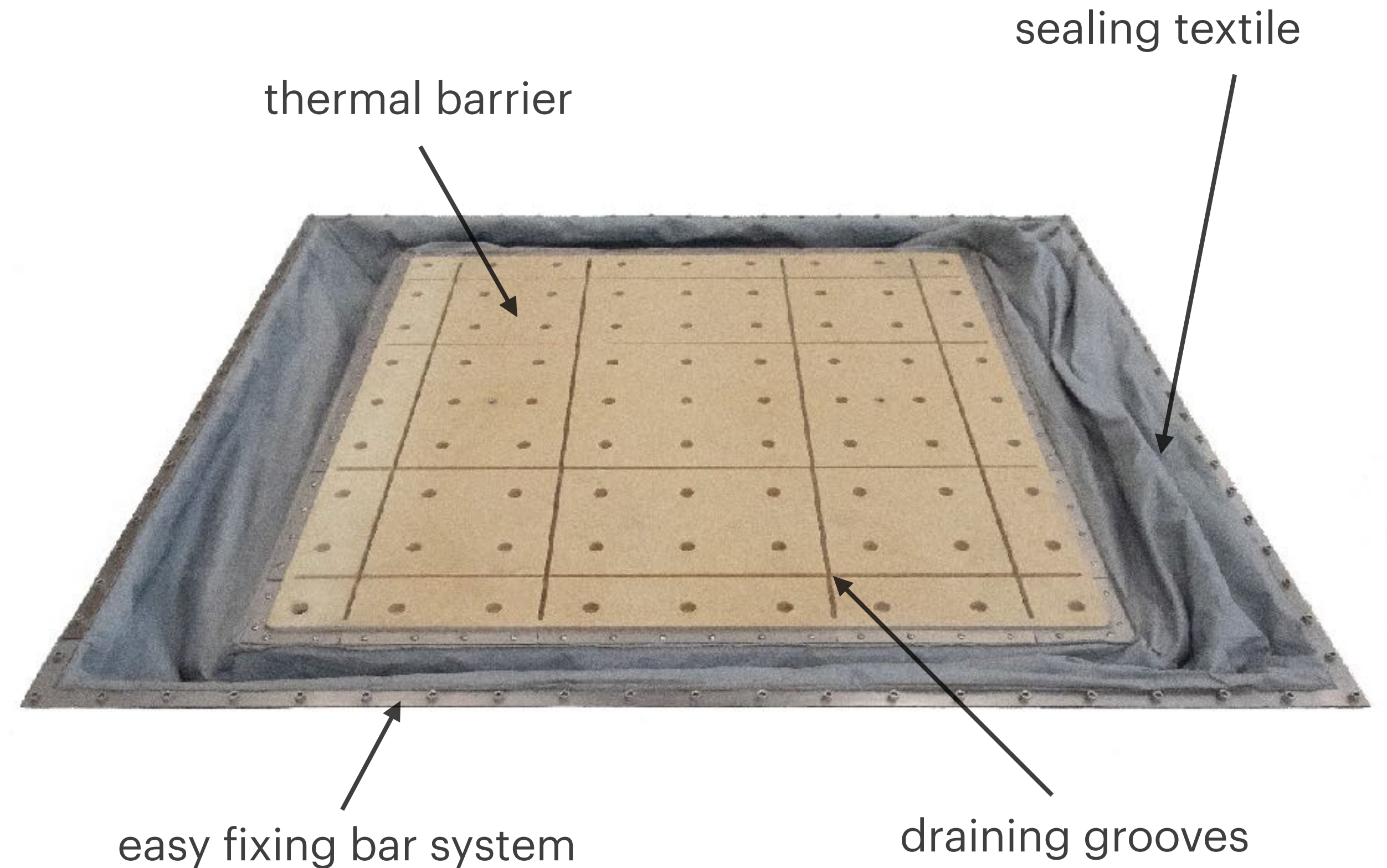
THE BEST WAY TO COUPLE SLIP TABLE AND CLIMATIC CHAMBER

STS: STANDARD DIRECT COUPLING SOLUTION - SIMPLE AND RELIABLE

The most recommended solution for tests with very high temperatures and humidity levels.

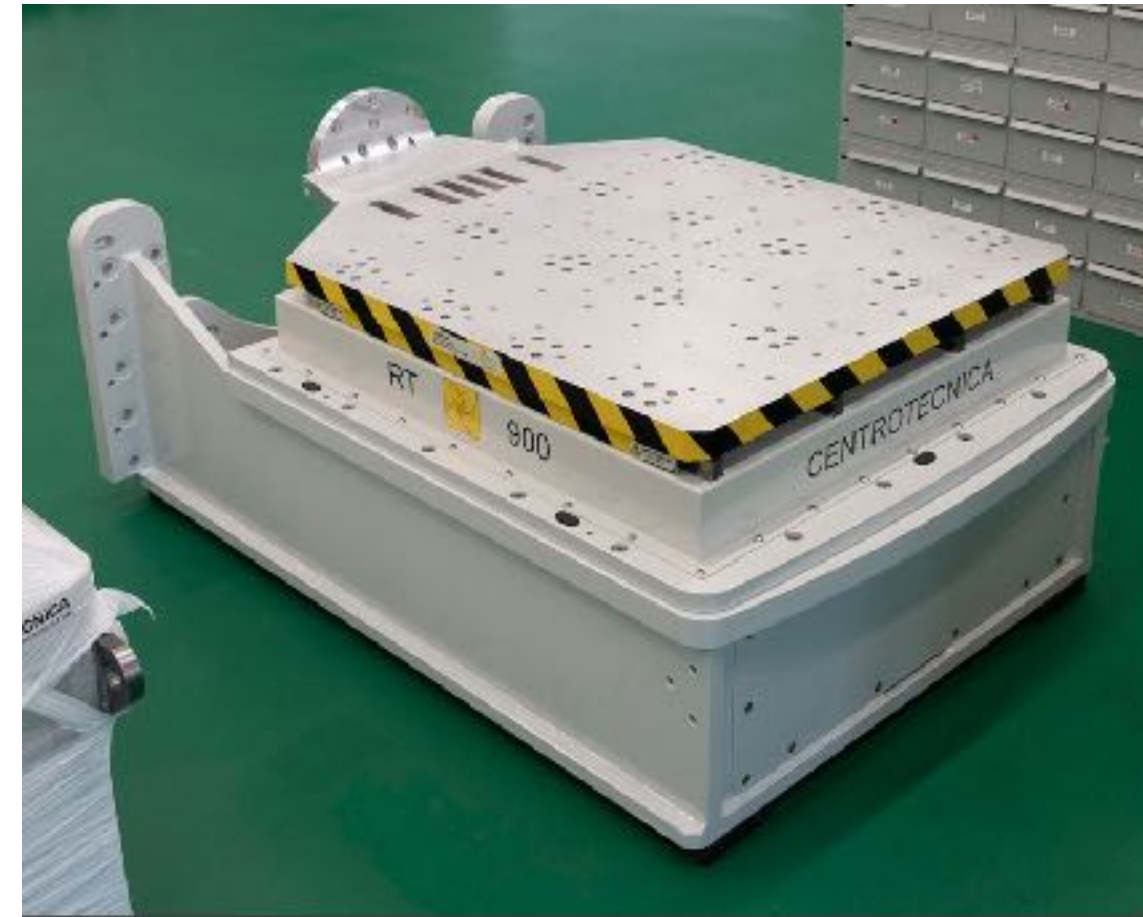
KEY FEATURES

- Suitable for both RT and VST or any other slip table on the market
- Thermal barrier provided with draining grooves
- Minimum thermal inertia (only the sample is exposed to climatic test)
- Thermal insulated floor directly coupled to climatic chamber
- Ideal solution for humidity test (minimized condensation effect)
- Large temperature range: -70°C / +220°C
- Suitable for interchangeable slip tables with different thermal barrier and textiles
- The STS allows a single operator to install a thermal barrier, even a large one, quickly and with little effort



STS: OPERATIONAL SIMPLICITY AS A STRONG POINT

A single operator is able to perform the coupling operation without the need of physical efforts.



1 - any slip table



2 - positioning



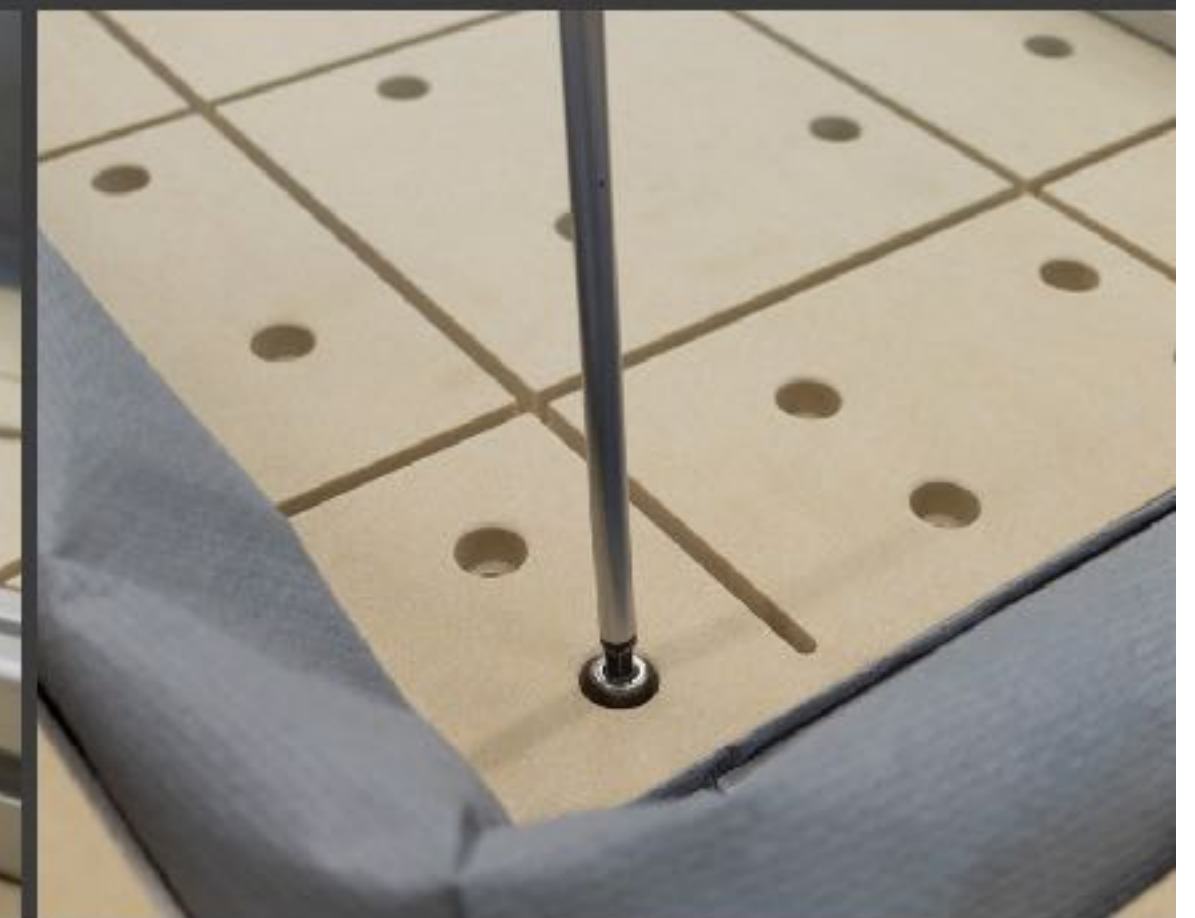
3 - aligning



4 - releasing



5 - special tool removing



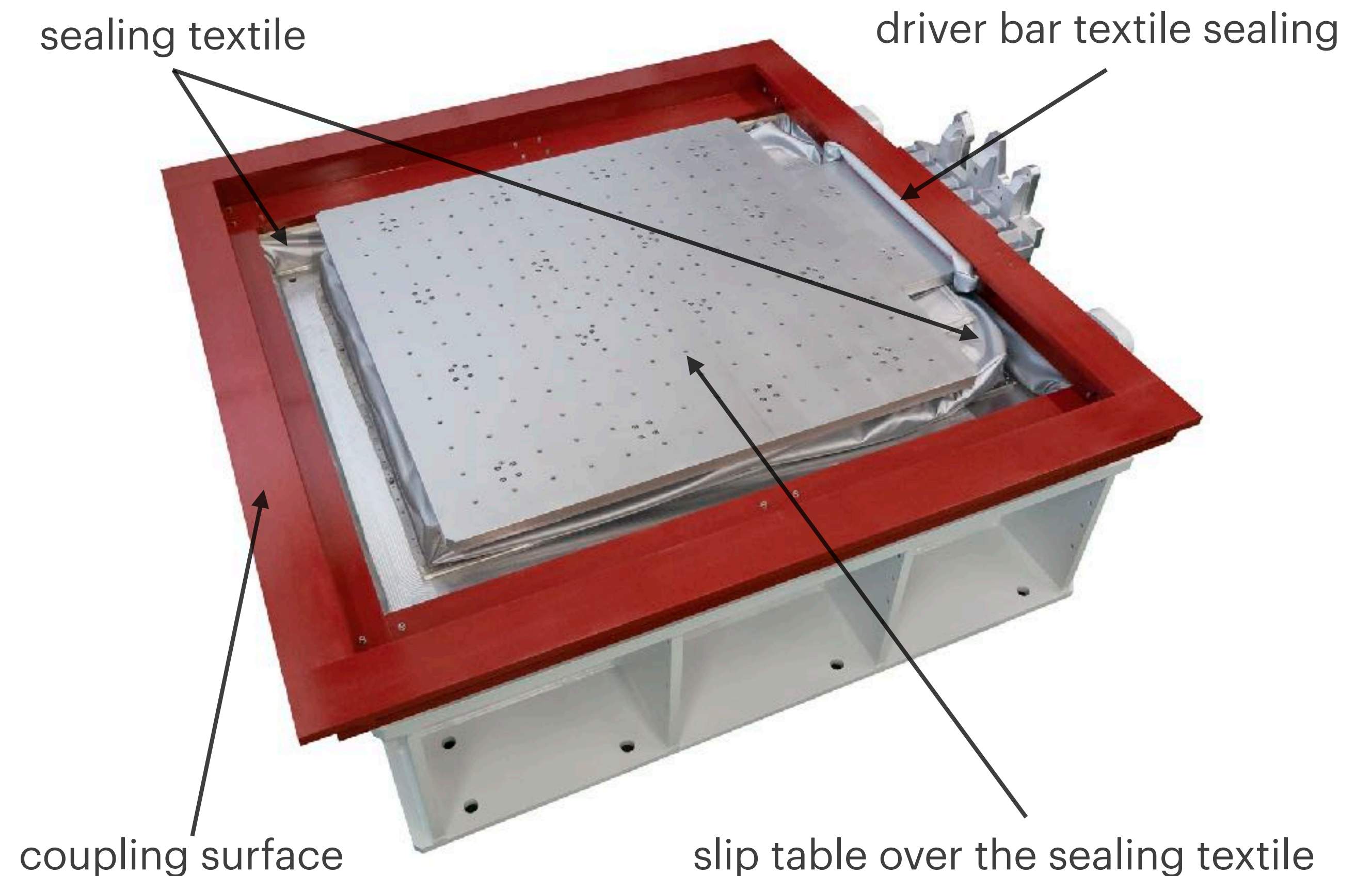
6 - fastening

HFS: HIGH FLEXIBILITY DIRECT COUPLING SOLUTION - FOR **RT** SLIP TABLES ONLY

It is the fastest way to setup for climatic tests and the best solution to cover the widest possible test range.

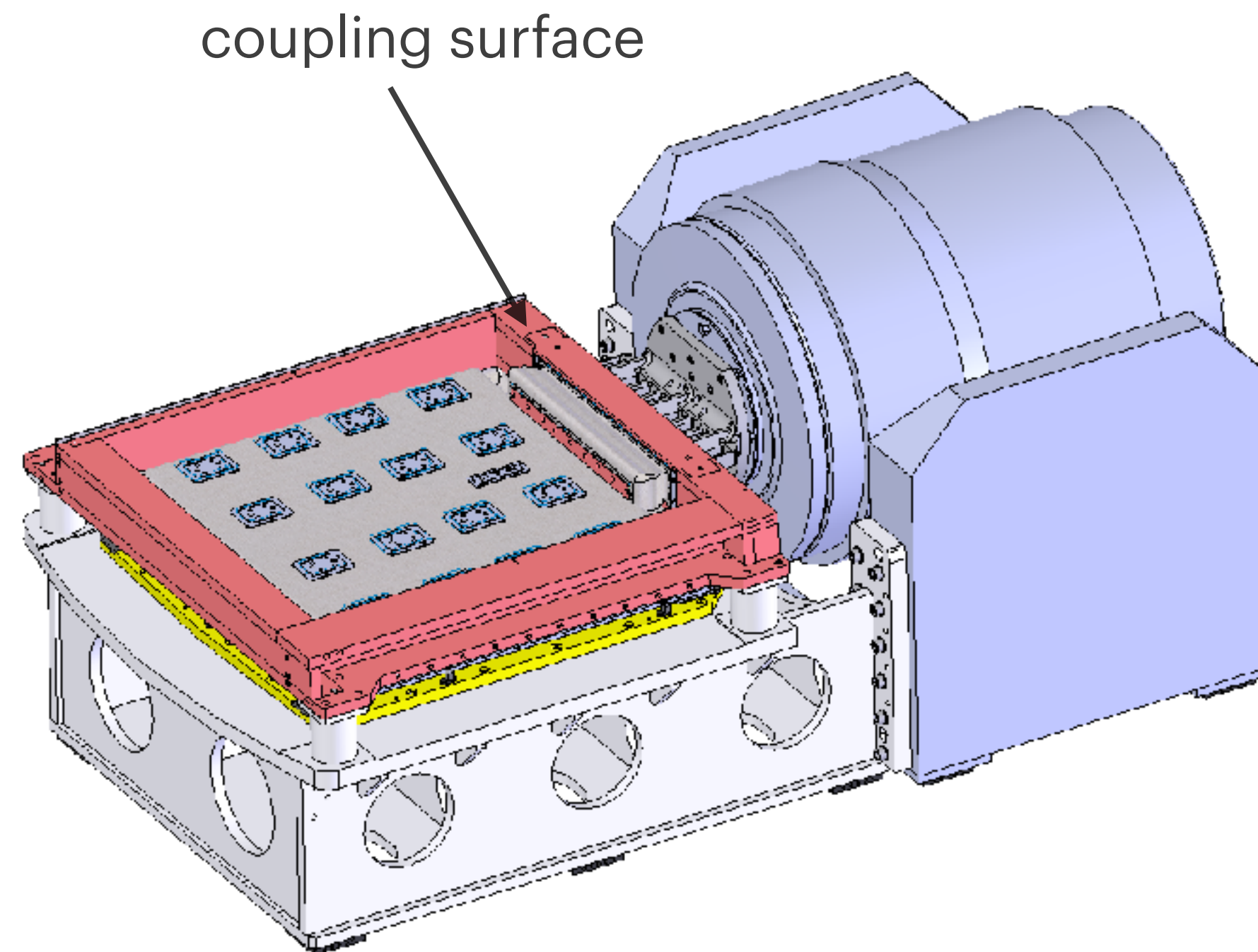
KEY FEATURES

- Thermal barrier are below the slip plate
- Reduced moving mass
- Test flexibility and fast test setup
- Best test conditions (both DUT, fixture and plate exposed to temperature)
- Very low bending level (negligible ΔT between table and fixture)
- Min. temperature range: -40°C (-70°C with top insulation option)
- Max. temperature range: $+160^{\circ}\text{C}$ ($+220^{\circ}\text{C}$ with top insulation option)
- Thermal insulated floor for direct coupling with test chamber
- Humidity can be limited by condensation without the top insulation option
- Suitable for water spray safety feature when testing lithium batteries
- Can be converted in HIS, High Insulation Solution (with top barrier and sealing)



HFS: OBTAINING A FULLY INSULATED ENVIRONMENT

A fully insulating floor is coupled with the thermal chamber. Using insulating textiles the HFS provides a fully closed room.



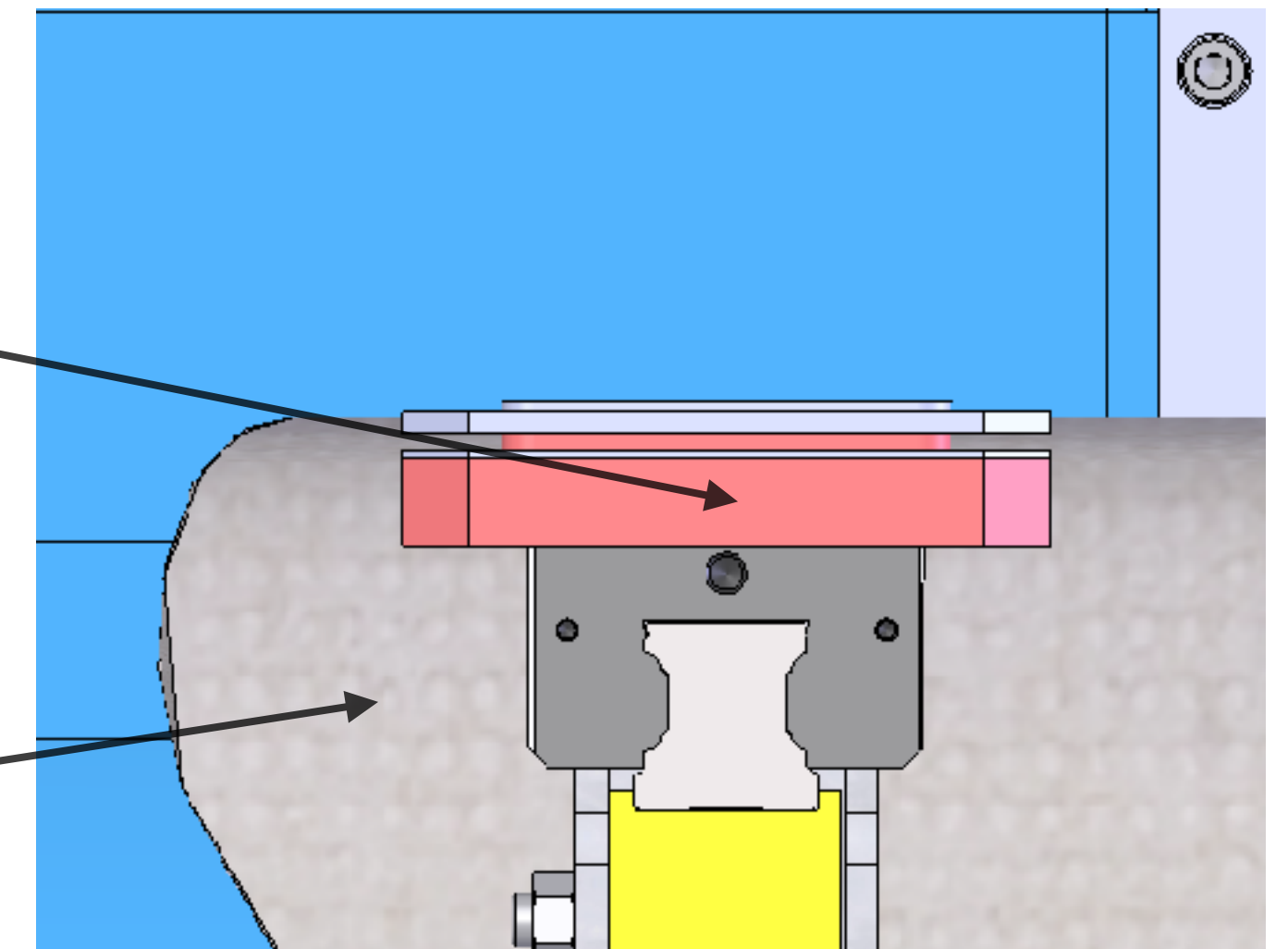
HFS: THE MOVING THERMAL BARRIER

Also the moving parts and the bearings are fully protected with an insulating textile ensuring a long lasting and a few maintenance system.

Minimum thermal conduction using a thermal isolated material above the bearings. The conductive material are never in contact with each other.

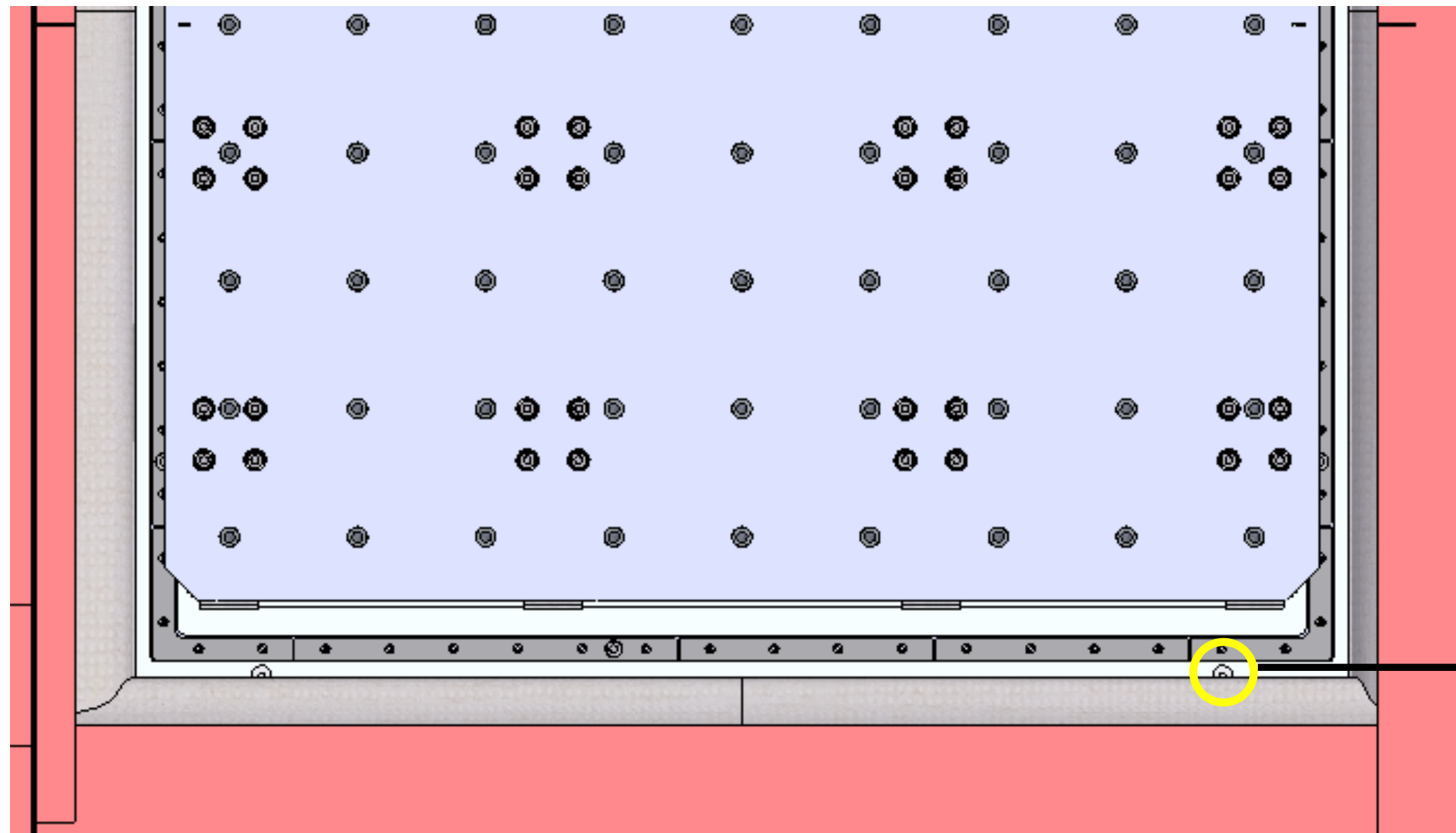


thermal barrier
moving thermal parts
isolated area

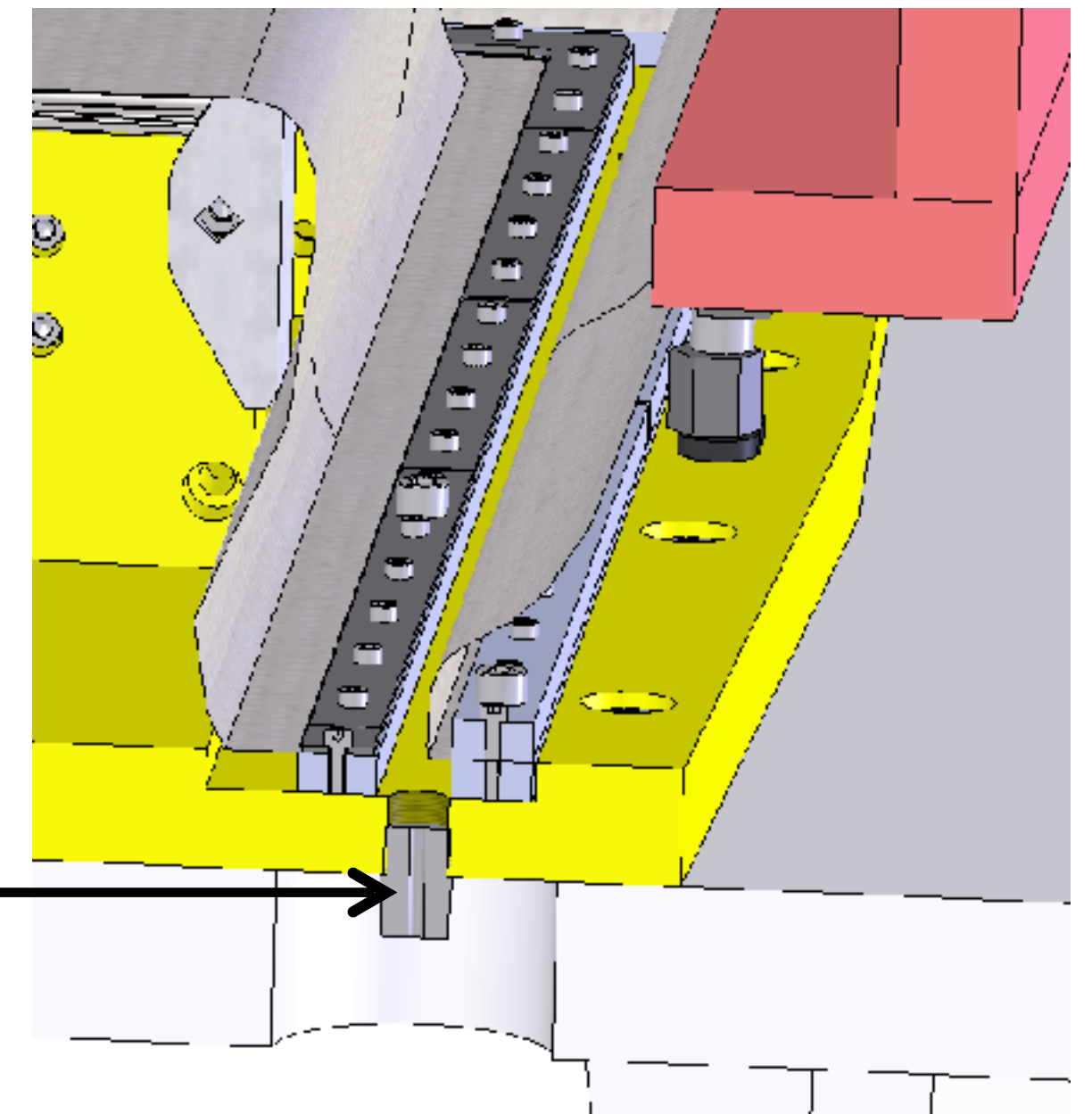


HFS: WATER DRAINING SYSTEM INTEGRATED

Several outlets allow the condensation water to be drained into the lowest volume and then drained through proper fittings and pipes. This solution makes the system suitable for water spray safety.



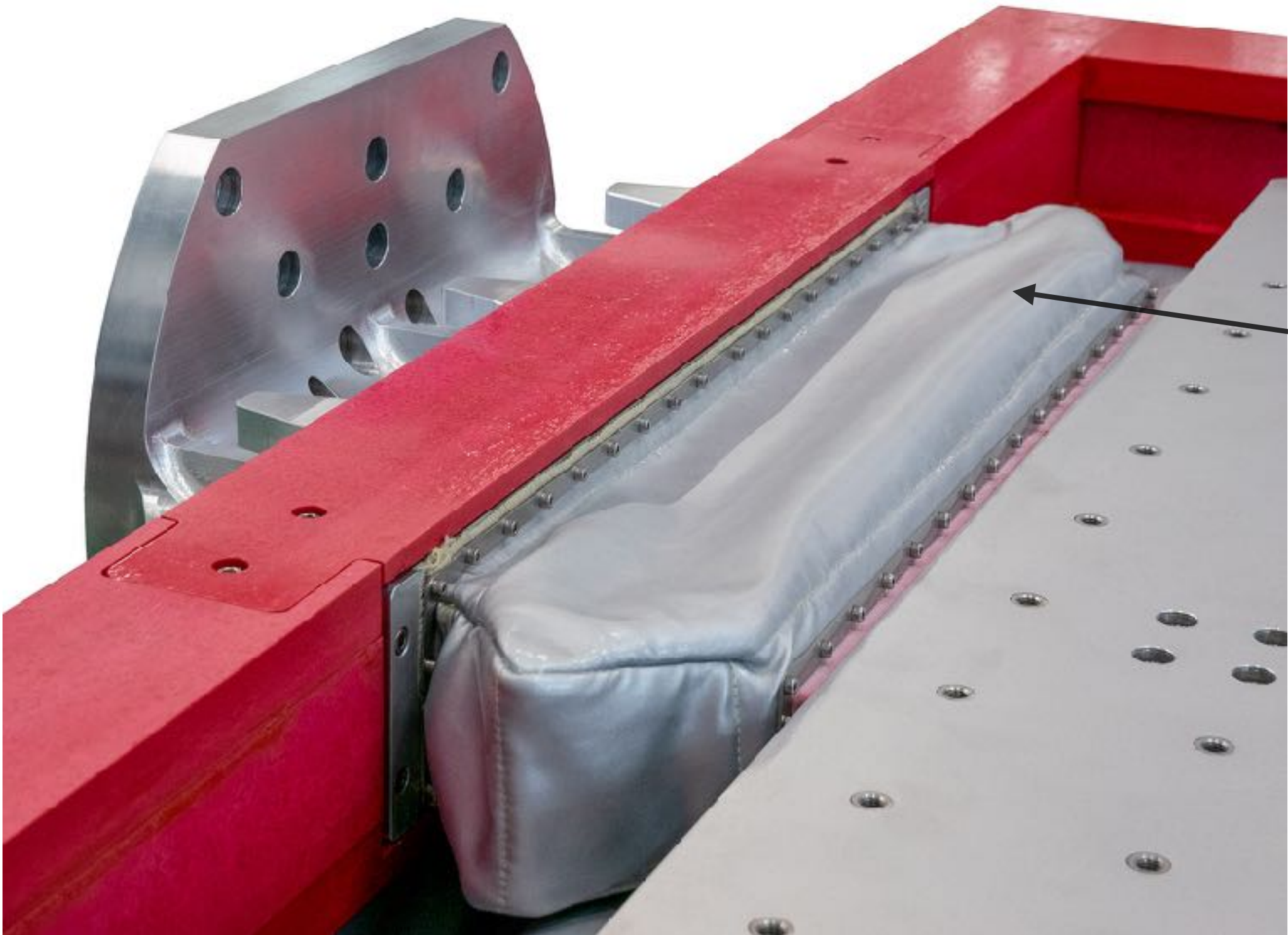
water draining system



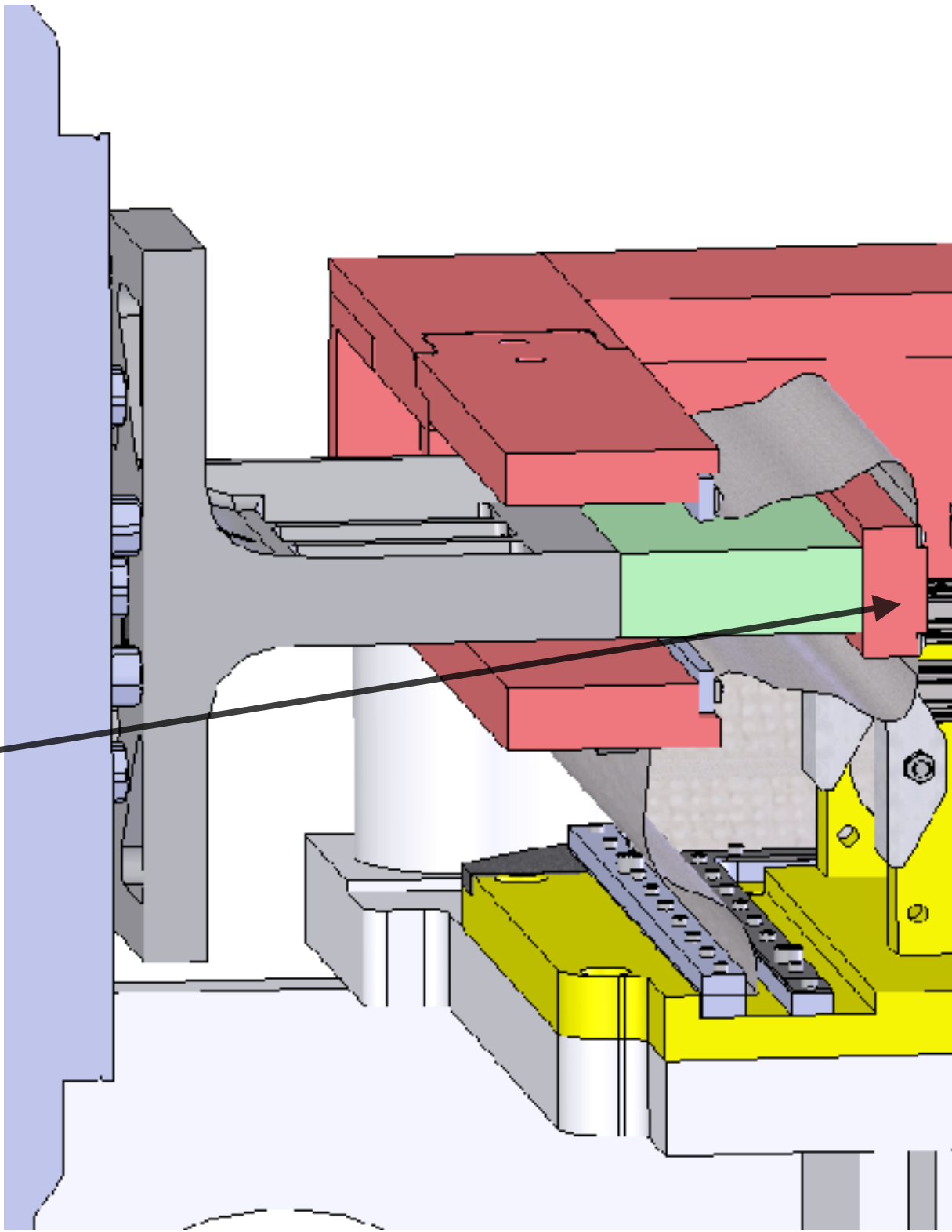
HFS: SHAKER THERMAL ISOLATION

Between the table and the driver bar a small thermal barrier is mounted to prevent the shaker heating the table.

An insulating textile ensures the chamber is sealed.



Textile driver bar seal
driver bar thermal barrier



HFS: TABLE PLATE MOUNTING

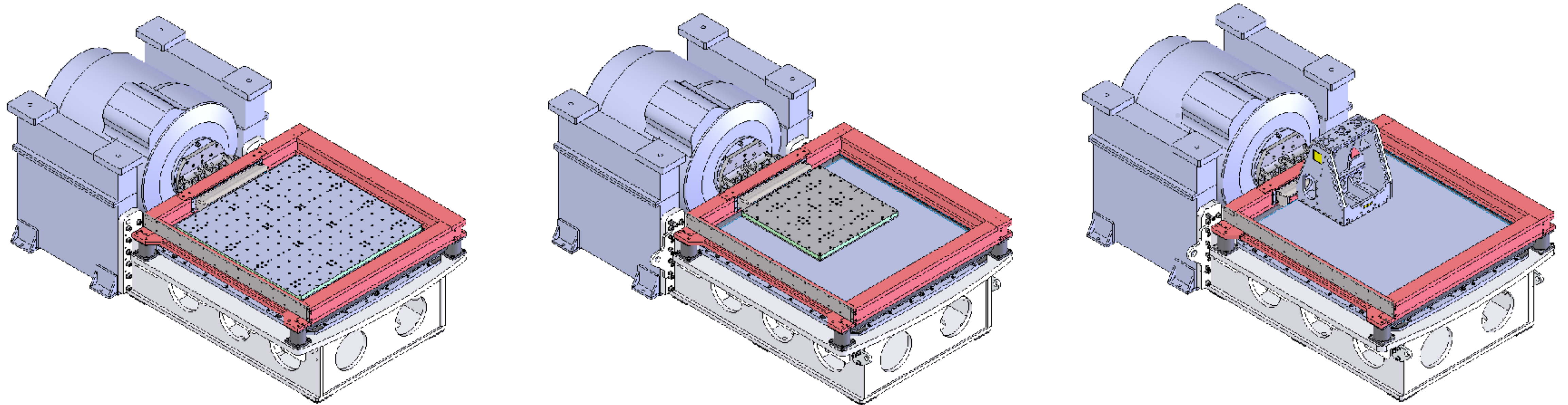
The top plate can be directly mounted on the bearings and connected to the driver bar.



HFS: HIGH FLEXIBILITY DIRECT COUPLING SOLUTION

For **high acceleration** tests on small test objects, a smaller slip table can be used. The set-up switch from large to small and vice versa can be performed in few minutes.

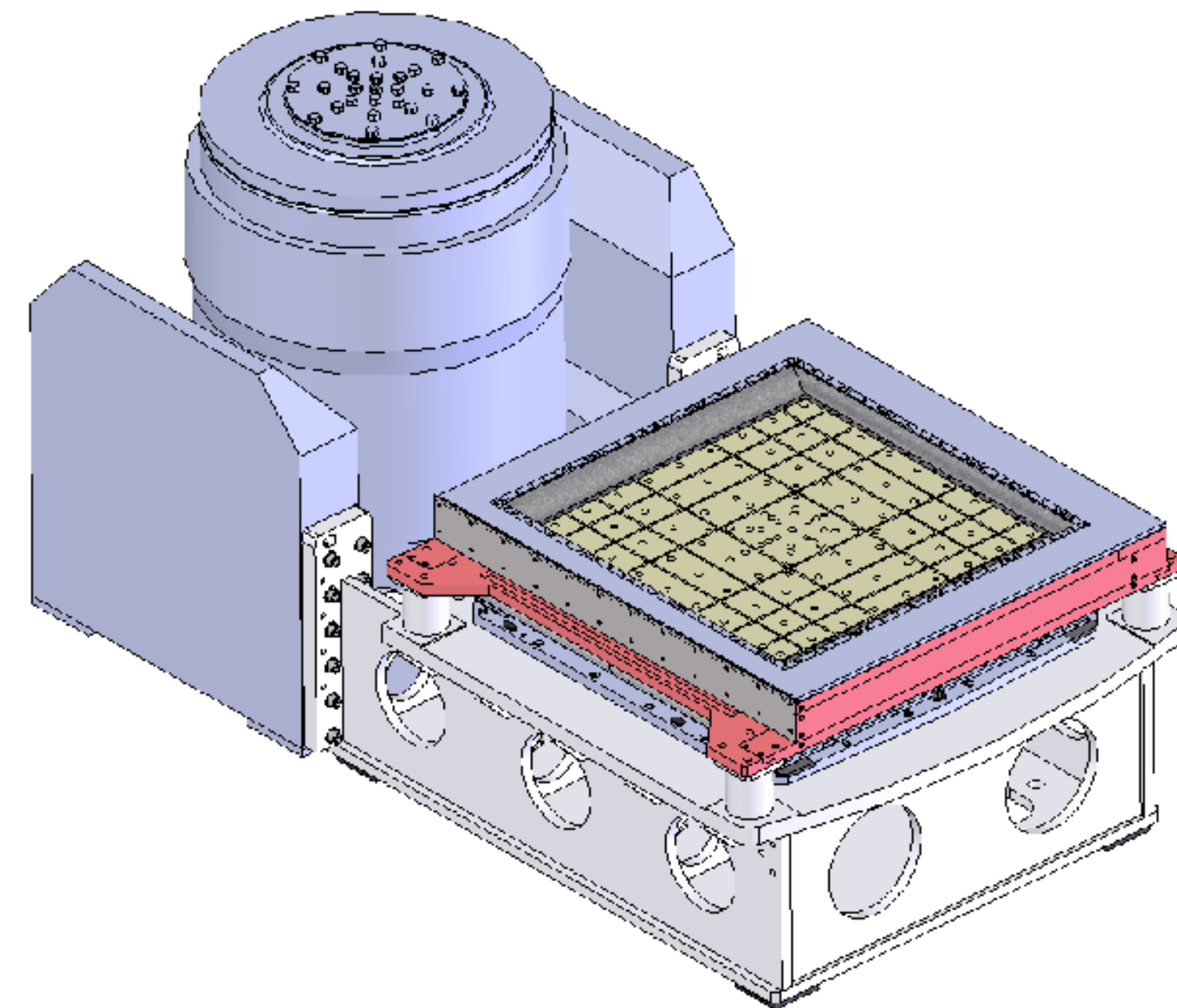
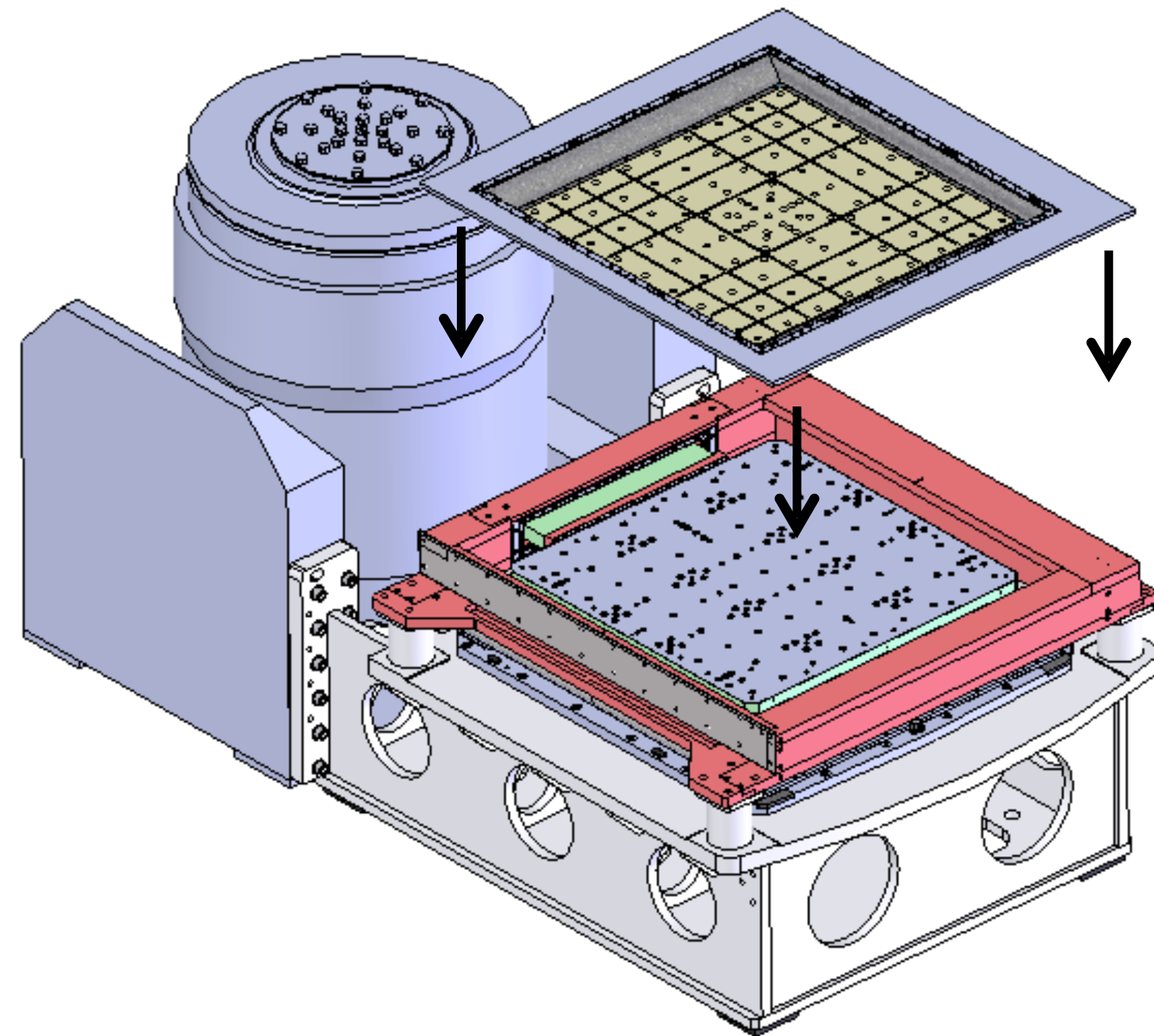
A **further advantage of the HFS** is the possibility to design a fixture to be mounted directly on the bearings and connected to the driver bar with a huge saving of mass and thermal inertia. Standard fixtures can be adapted for this purpose too.



HFS: HIGH HUMIDITY TOP INSULATION (OPTION)

High humidity at high temperature is somehow a challenge, because condensation on the fixture or slip plate can easily dry the air limiting the maximum achievable humidity.

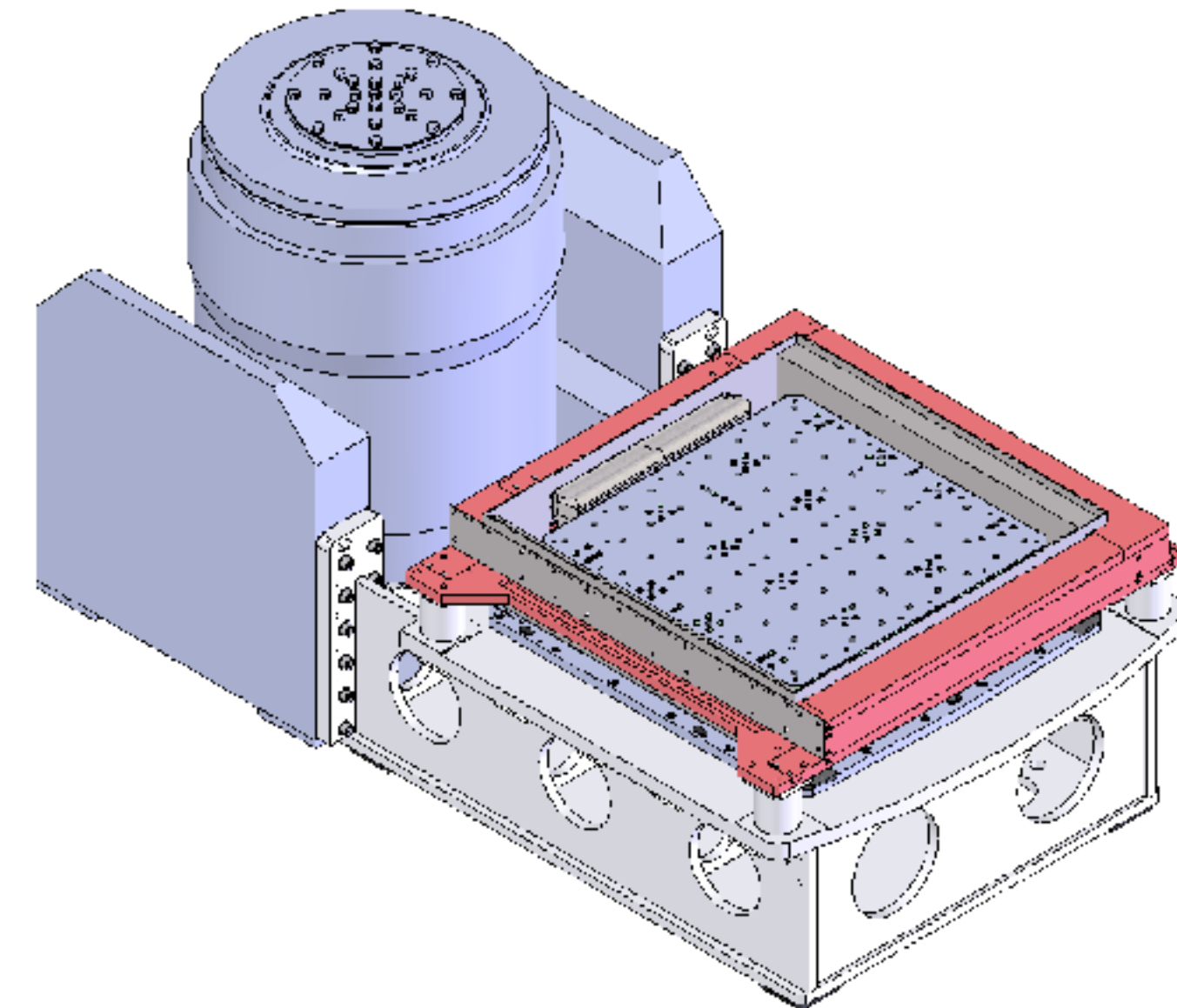
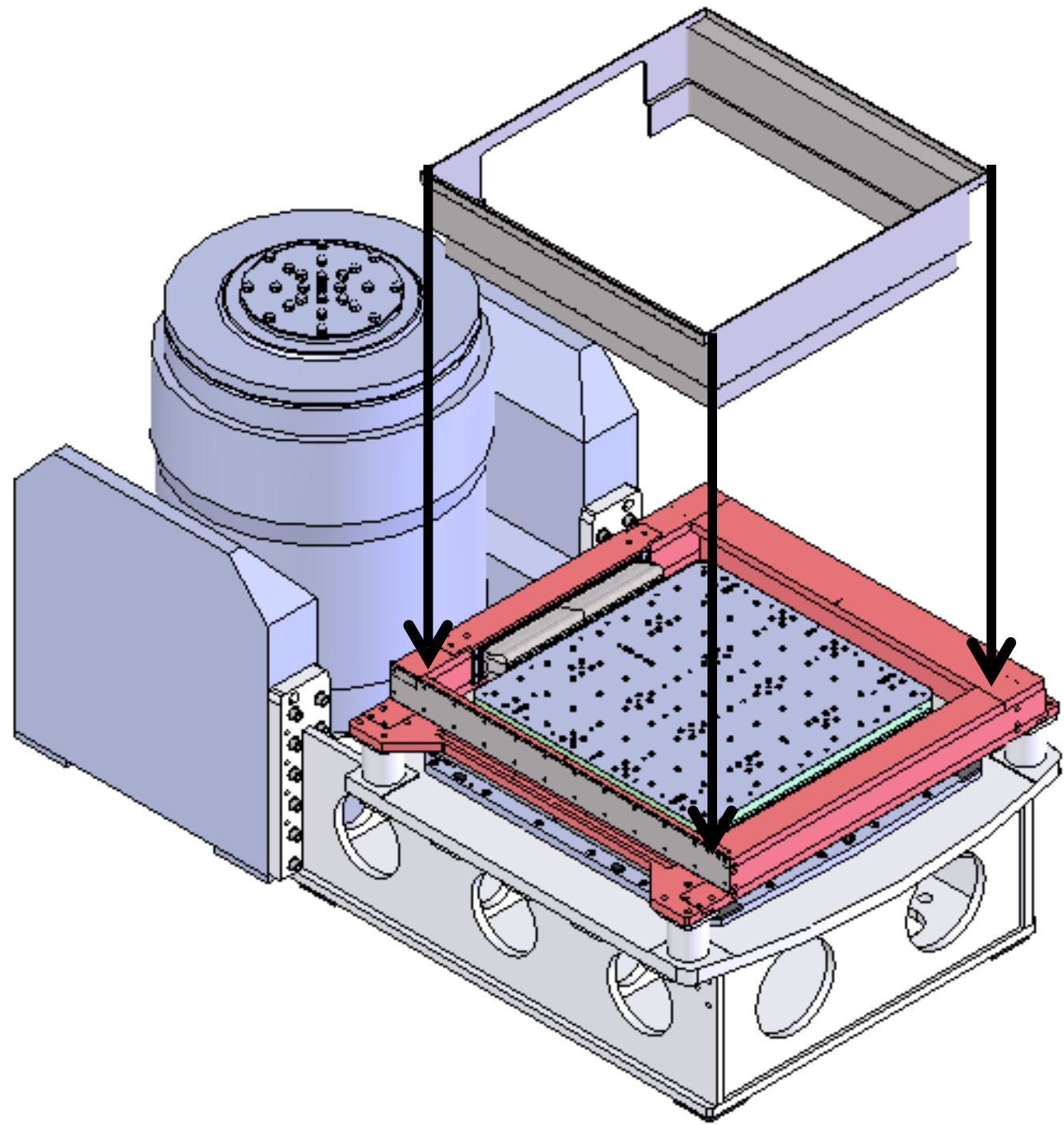
In this case an optional thermal barrier with insulating textile can be mounted over the slip plate to exclude the contact between air and table.



HFS: BATTERY TEST COVER (OPTION) - 1

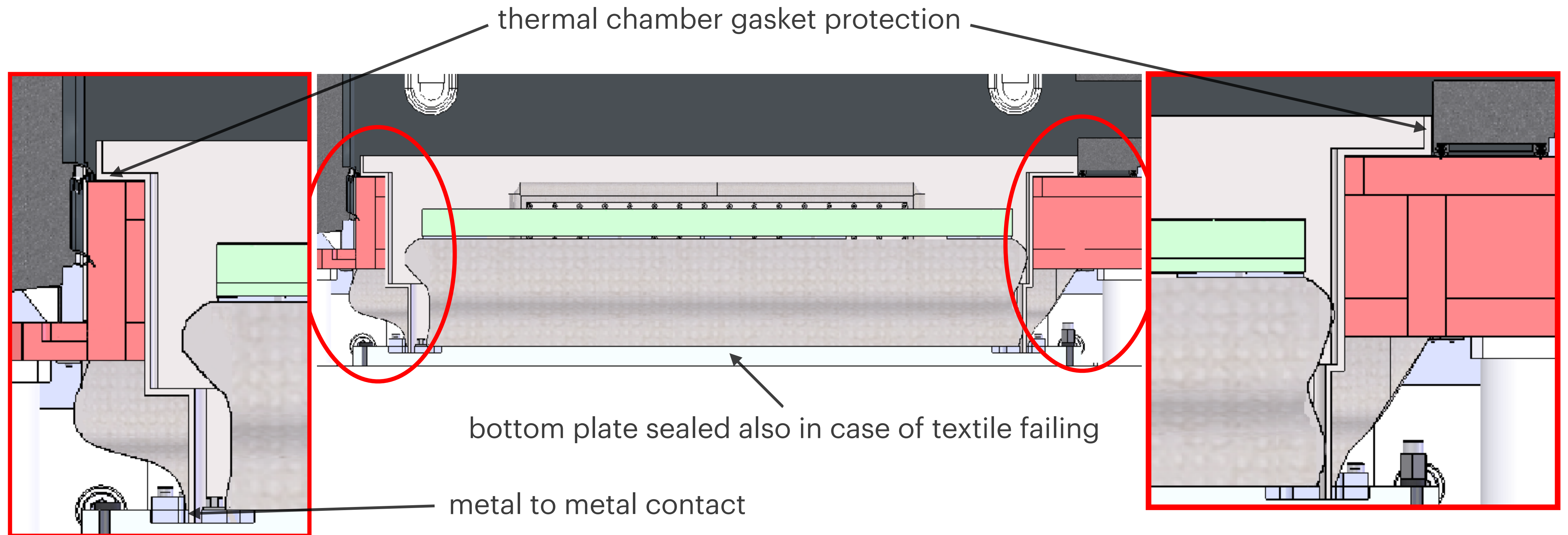
Battery testing has often high hazard levels. The system can be exposed to flying parts and flames and it must keep safe the external environment and protect the shaker.

To achieve this safety requirements a special metal cover is designed to be used during this tests. The cover prevents failure on the external isolated textile isolating as much as possible the test environment.



HFS: BATTERY TEST COVER (OPTION) - 2

The safety cover not only protects the textiles but offers also protection to the insulating fiberglass floor and the thermal chamber gasket.



BSS: DIRECT COUPLING BATTERY TEST SAFETY SOLUTION - FOR RT SLIP TABLES

The easiest way to perform battery tests, especially for large items or many samples at a time.

KEY FEATURES

- Thermal barrier on top of the slip plate
- Reduced moving mass thanks to different table configurations
- No insulating textiles
- Min. temperature range: -40°C
- Max. temperature range: +220°C
- Thermal insulated floor for direct coupling with test chamber
- Minimum thermal inertia (only DUT is exposed to thermal chamber)
- Suitable for high flow water mist safety feature when testing lithium batteries

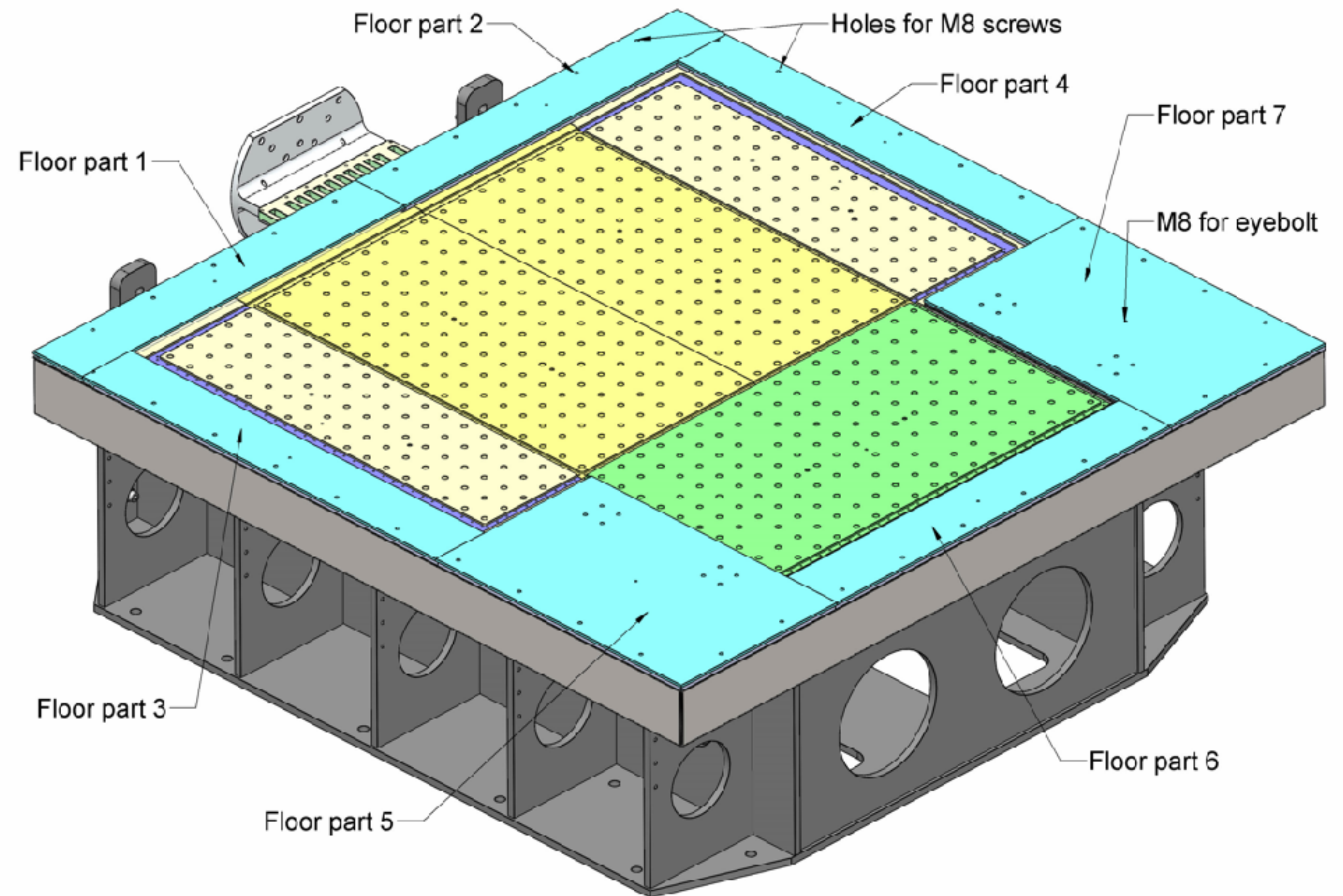


BSS: THE INSULATION SYSTEM

A steel frame is coupled with the thermal chamber creating a closed room.

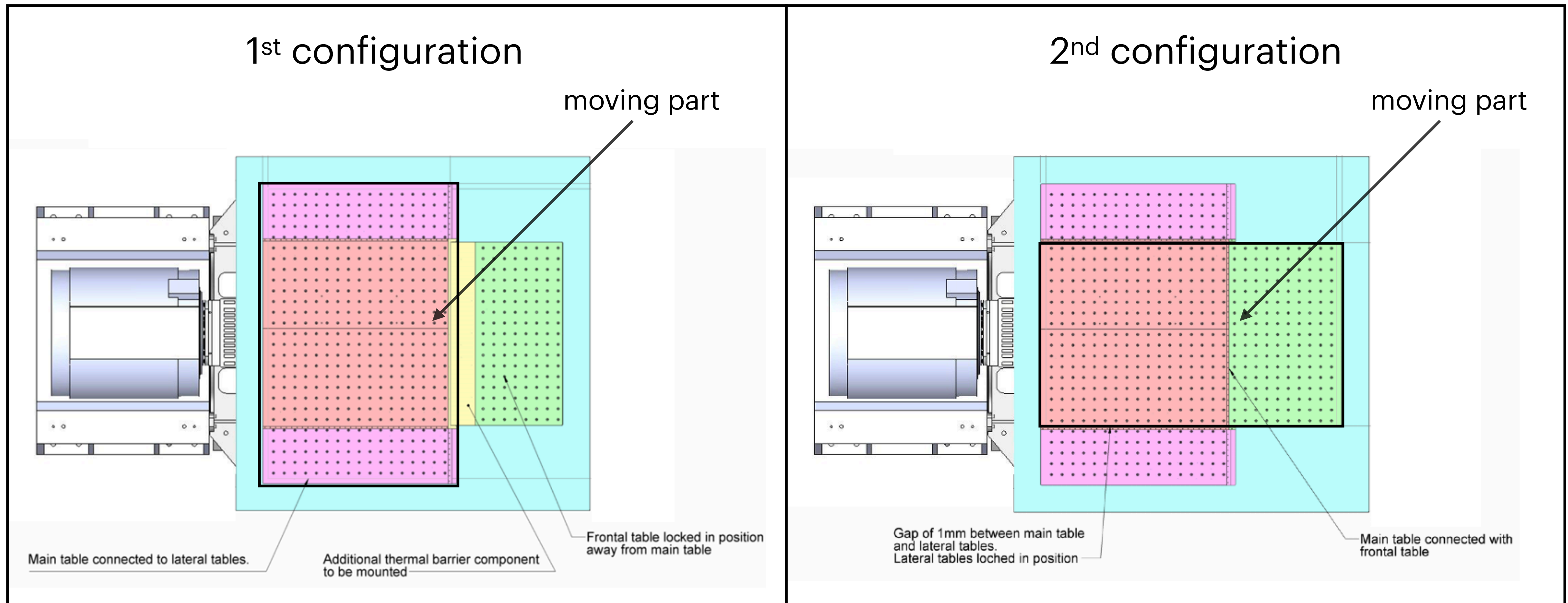
An intermediate fiberglass insulation plate creates a further separation between the upper thermal chamber volume and the lower volume where the bearings are placed.

There are no insulating textile in this solution.



BSS: THE MODULAR TABLE

The system can be used in different configurations in order to optimize the moving mass.

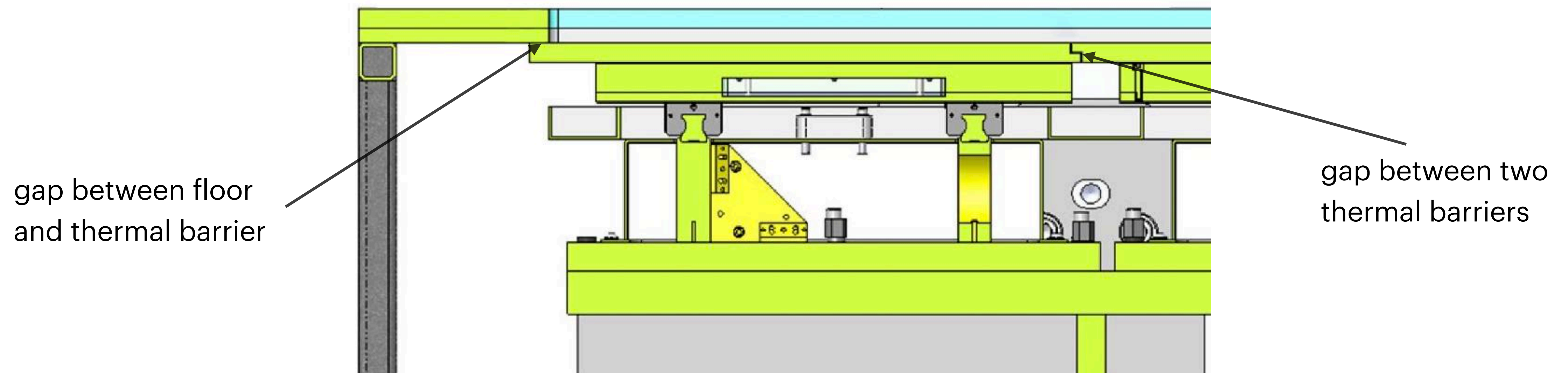


BSS: INSULATION BETWEEN CHAMBER AND BEARINGS

The insulation between the upper chamber volume and the lower bearings volume is performed by a small clearance between the fixed and the moving thermal barriers.

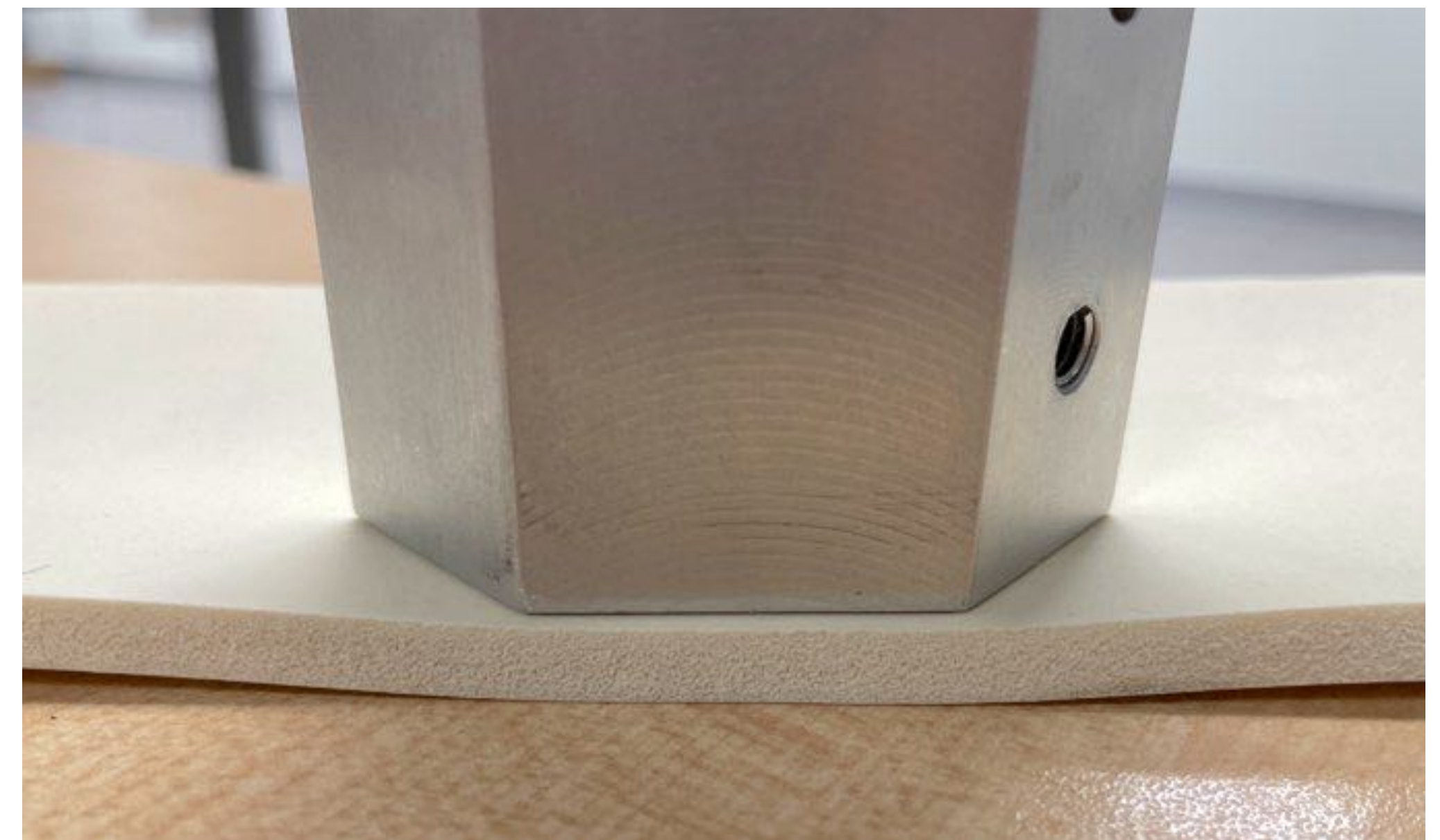
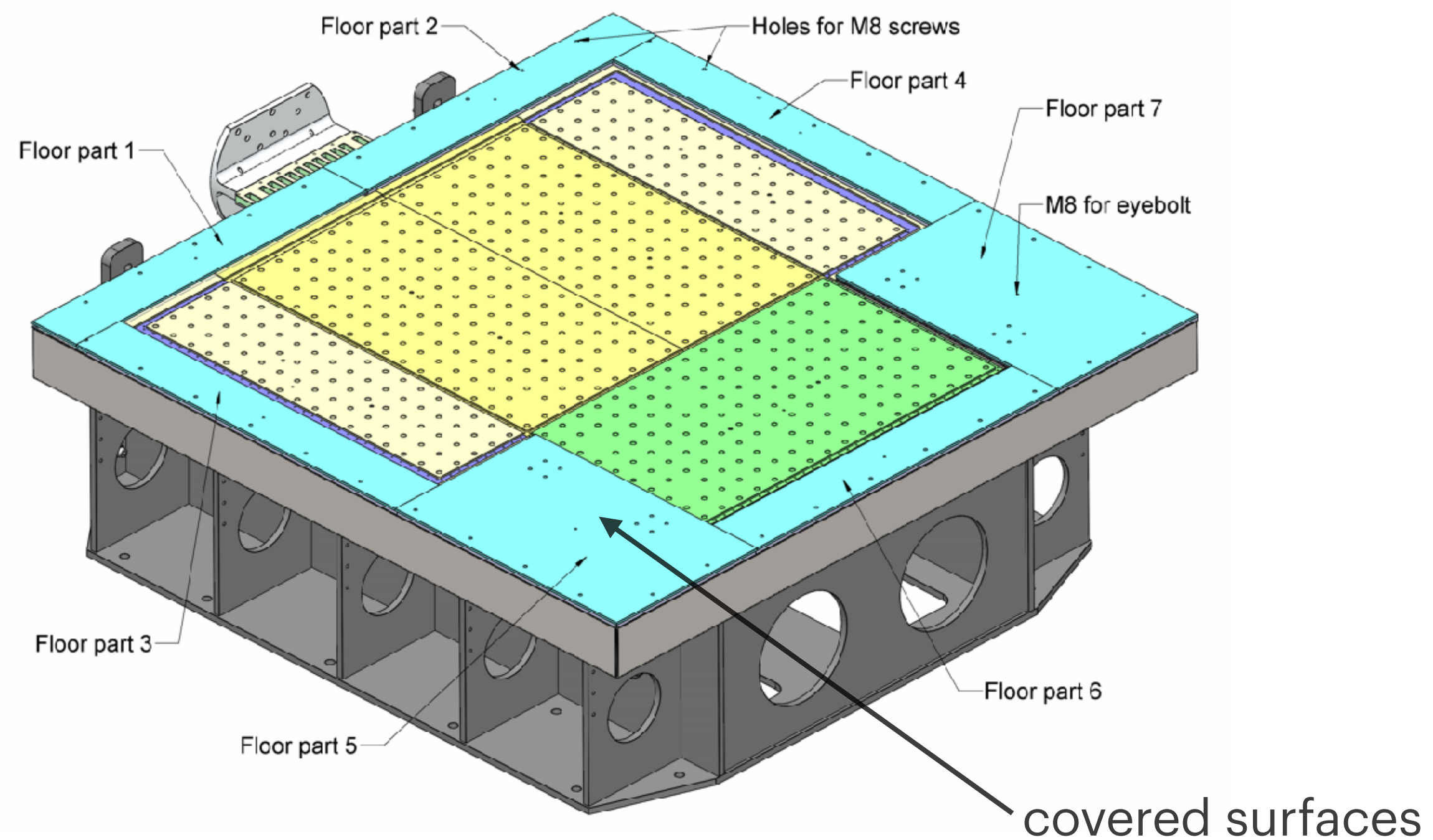
This clearance also allows the free movement of the table.

This clearance also allows the water, generated from the condensation or from safety water spray, to be drained in the lower volume and finally drained out through proper fittings and pipes.

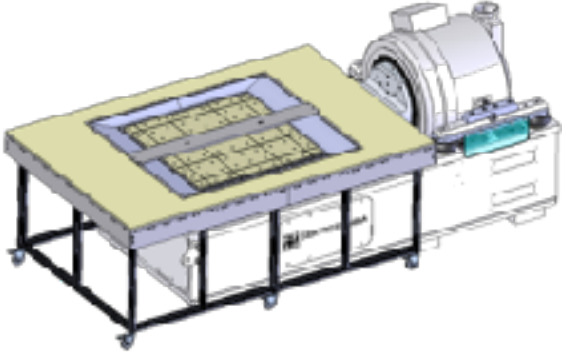
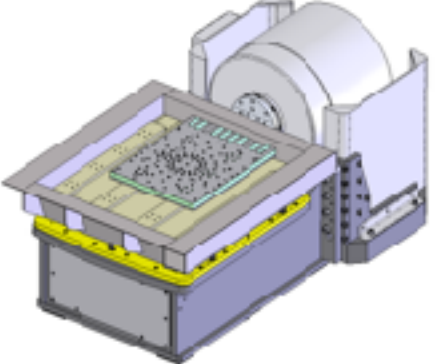
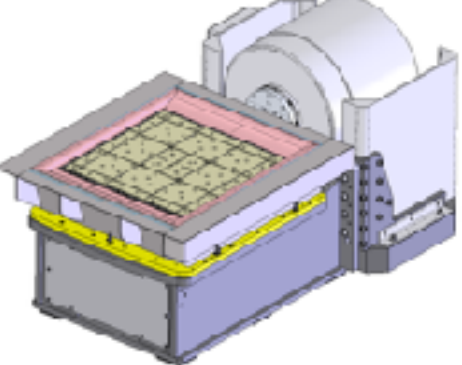
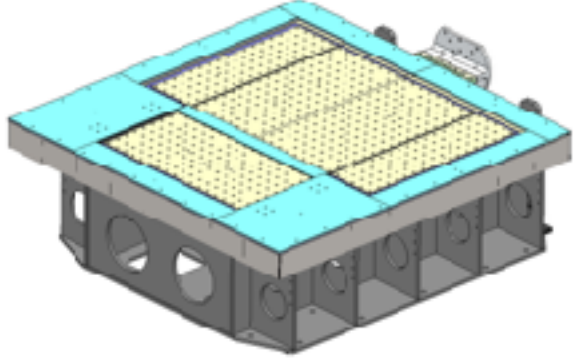


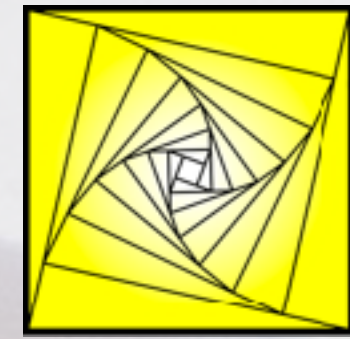
BSS: THE INSULATION OF THE DIRECT COUPLING FRAME

The top surface and internal surfaces of the frame is covered by closed cells silicone foam that provides a strong thermal insulation. The silicone foam membrane is strong enough to provide a perfect coupling surface with thermal chamber sealings.



DIFFERENT DIRECT COUPLING, DIFFERENT SOLUTIONS

DIRECT COUPLING SOLUTIONS	SLIP TABLE TYPE	TEMPERATURE RANGE °C	HUMIDITY CAPABILITY	INTERCHANGEABLE TABLES
<p>STS STANDARD SOLUTION</p> 	any on the market	-70 / +220	OK	<p>YES thermal barrier + textile</p>
<p>HFS HIGH FLEXIBILITY SOLUTION</p> 	RT	-40 / +160	dew point related to the temperature of the slip table	<p>YES</p>
<p>HFS + TB HFS WITH THERMAL BARRIER</p> 	RT	-70 / +220	OK	<p>YES thermal barrier + textile</p>
<p>BSS BATTERY TEST</p> 	RT	-40 / +220	limited range	<p>predefined number of table configurations</p>



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