

# MODESTORE

## DELIVERABLE D6:

### SYSTEM PROTOTYPE STORAGE MODULE (AUSTRIA)



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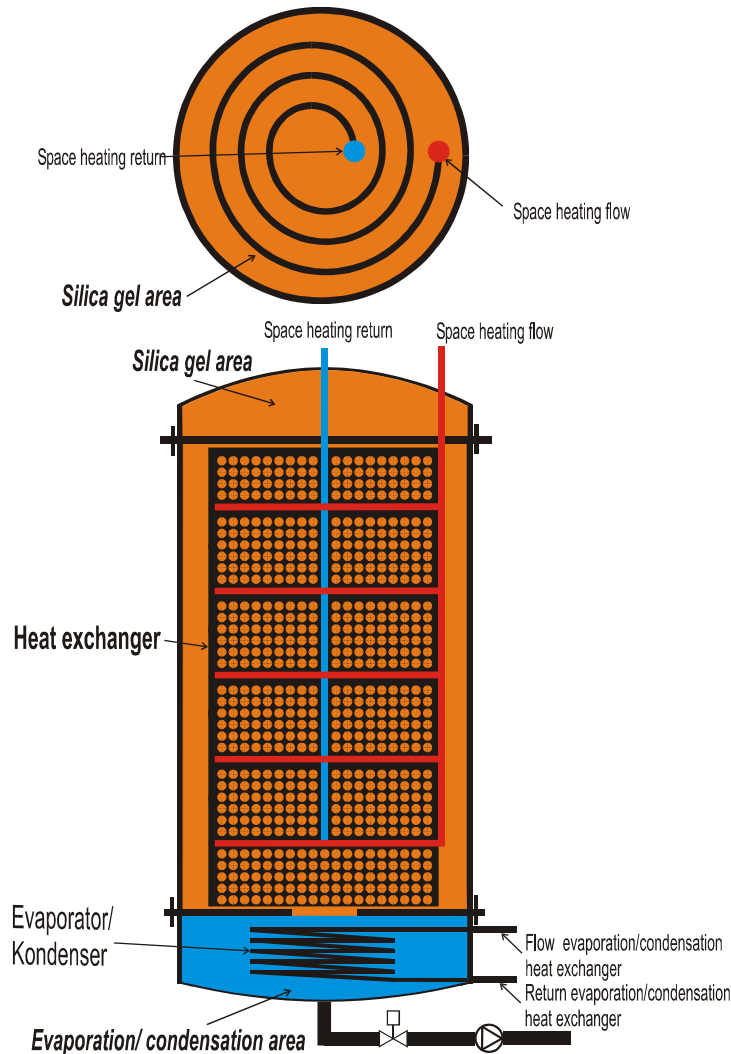
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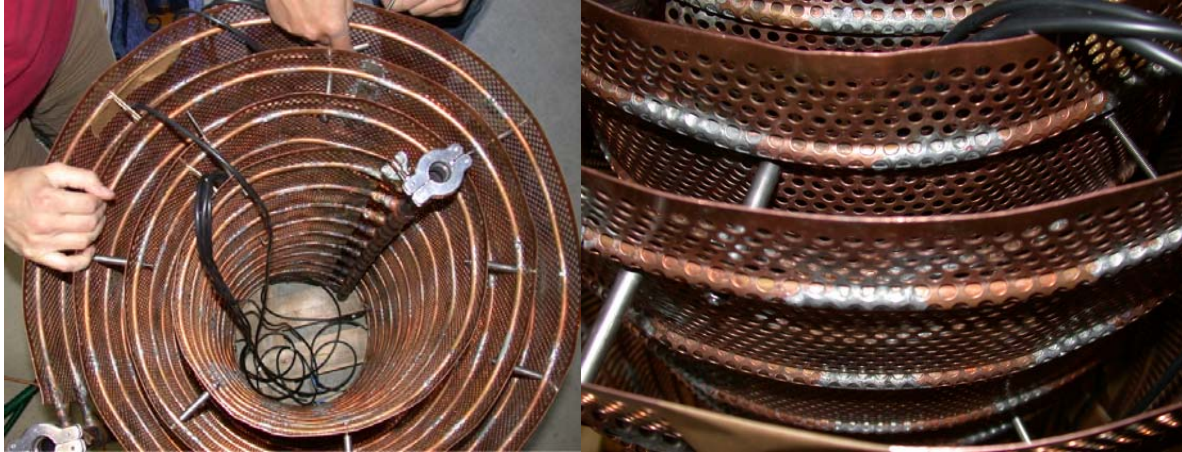
The main idea behind the design of the 2<sup>nd</sup> generation prototype system is to enclose both the adsorber and the evaporator/condenser in a single container. A scheme of the prototype is shown in Figure 1. The total size of the container is approximately 350 l.



**Figure 1: Scheme of the 2nd generation prototype**

The two parts of the system are separated by a metal slab that bears the weight of the silica gel packing. The upper part contains the heat exchanger that transfer the heat from the heat source to the silica gel in charging mode and from the silica gel to the load in discharging mode. The upper part is entirely filled with silica gel except for a vertical slot where the water vapor can freely travel within the height of the adsorption part of the container. The silica gel packing is secured with a metal mesh to prevent it from falling in the slot. This design increases the cross section area that is available for the transport of water vapor from the evaporation/condensation area to the silica gel packing and vice versa, compared to the first generation prototype system.

There are numerous temperature sensors installed at different locations in the silica gel packing. This will allow to get some information about the temperatures profile in the packing vertically, horizontally and between the heat exchanger tubes.



**Figure 2: Heat exchanger in the silica gel packing with installed temperature sensors**



**Figure 3: Mounting of temperature sensors in the silica gel packing**

The bottom part contains the heat exchanger that serves as evaporator in discharging mode and as condenser in charging mode (see Figure 4). In the new design, the condensed water is kept in a separate reservoir. In desorption mode, the water is withdrawn from the main storage container. In adsorption mode, only a small amount of water is pumped into the evaporator area when it is needed. A control strategy for the pump between the two containers will be developed during the laboratory tests of the 2<sup>nd</sup> generation system.

There are two ways to determine the amount of water currently in the evaporator/condenser area: There is a viewing glass where the water level can be read optically and there is a floating level sensor that is recorded by the data logging system (see Figure 5)



Figure 4: Lower part of the prototype module with evaporator/condenser heat exchanger



Figure 5: Water level measurement (right hand side: viewing glass, middle: water level sensor)