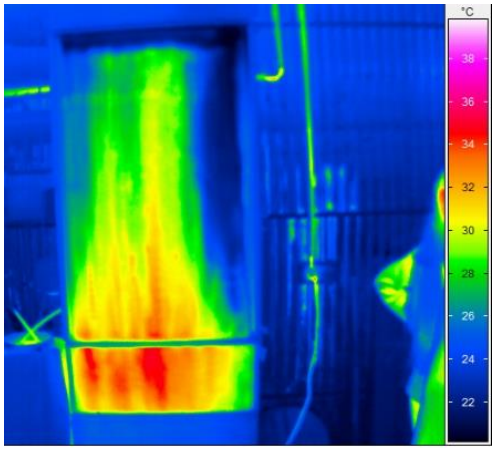
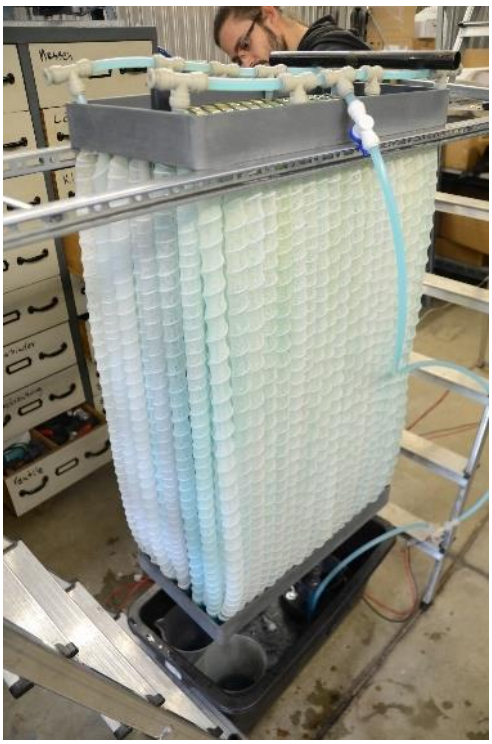
Thermochemical Fluids in Greenhouse Farming

Evolution of the design for the absorber

The absorber is the interface for energy and mass transfer between air and a liquid desiccant. There are two different objectives:

- **Dehumidification of air:** The absorber is optimised for a low volume flow of the desiccant. Most process heat, generated by the phase change from vapor (in the air) to liquid (in the desiccant) will be released to the air side, due to the low-volume flow. This is especially advantageous for air dehumidification in the heating period. The WATERGY absorber was originally designed for this application. A low flow is generated by a short transport against gravity using capillary forces provided by the suction properties of a textile material, mounted on a cylindrical distribution surface. The advantage is a very low pumping energy demand, combined with a low ventilation energy demand compared to the estate of art (random packing absorber). The disadvantage is a larger volume for the same drying capacity.
- **Combined cooling and dehumidification:** The absorber must be designed for high volume flow of the desiccant in order to withdraw the phase change energy with the flow of the desiccant (instead of the flow of air). Still the energy costs for pumping are lower compared to random packing, as the desiccant is not circulated over the structure, but only passes once. However, the high-volume flow required a solution for an equal distribution over all textile elements. This was finally reached by a distribution scheme with desiccant entries between each element.





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