



# Thermochemical Fluids in Greenhouse Farming

## Use of 3D printer for absorber constructions



The WATERGY absorber provides a design for an equal distribution of liquid desiccant over a larger number of cylindrical surface elements, optimised for energy- and mass transfer between the desiccant moving from top to bottom of the cylinders and air, passing the desiccant along the surface. The first prototypes were built by hand. Small pipe segments were glued by hand to the openings of a perforated distribution tray. It was shown that this solution did not provide sufficient precision in order to guarantee an equal flow over all cylinders. For that, a solution using 3D printing was chosen to reach a level of higher precision. In order to

reduce the pressure drop for the air flow and reach an optimum flow of desiccant in the distribution tray, the cylindrical elements were replaced by a hexagonal structure.

Tests in the greenhouse did show a high sensibility of the printed plastic against high temperatures. Therefore, an adequate heat resistant printing material had to be chosen. Also, the bottom of the tray required a sufficient thickness to prevent quad bends, caused by the high weight of the cylinders carrying the liquid and the increasing softness of the material along hot periods. Finally, a system of desiccant channels within the bottom of the tray was designed with openings at each hexagon, allowing to maintain an equal distribution of the liquid also at high volume flows.



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