



REFHYB

Frost-free, energy-efficient cold production

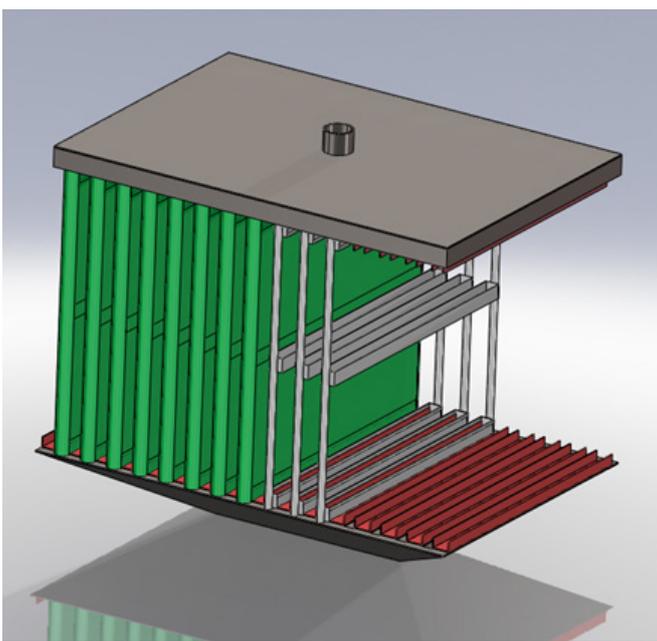
Vapour-compression air-conditioning systems can effectively manage temperature but have certain drawbacks when it comes to controlling indoor humidity. Hybrid systems based on liquid desiccants are energy-efficient refrigeration systems. Dessiccation can be used for dehumidification before the air supply is cooled, thus separating humidity control from temperature control.

Carnot M.I.N.E.S Institute

Scientific / technological breakthrough

Controlling combined heat and mass transfer is a major challenge for hybrid systems, significantly enhancing their compactness, simplicity and availability. Membrane exchangers that harness liquid absorption or desorption phenomena, provide a technological response to these challenges.

Research partnered by Carnot M.I.N.E.S has made it possible to design a membrane exchanger prototype that helped prove the technology's feasibility and provide the data used to validate the design models. A patent has already been filed to protect the technology developed.



Competitive advantage for the economic stakeholders

After a prototype was designed in the lab, a partnership between two major players - Bonduelle and Dalkia Froid Solutions - was instrumental in developing an industrial-scale prototype. The latter is a future user of the technology.

It will allow Bonduelle to control humidity in their factories and keep their energy costs down. Dalkia is a technology integrator and future installer of the new system. This new technology will enable them to offer customers a highly energy-efficient solution. A start-up (STEM) is currently being created and will benefit from the MINES ParisTech Spin Off label. This future partnership will help pave the way for mass production and continue with project development and maturation in partnership with the MINES ParisTech Centre for Systems Energy efficiency (CES).

The partners

- **BONDUELLE** is a French, family-owned business - world leader in ready-to-eat vegetables.
- **DALKIA FROID SOLUTIONS**, is Dalkia's specialty subsidiary and energy services leader within EDF group. It provides energy solutions for industrial and service processes.