CryoLift

CO2 free very Low Temperature Cooling

The **CryoLift** is designed to generate very low temperatures. With its thermodynamic process, it can cool to near absolute zero.

The CryoLift is a variant of the ThermoLift. It can be designed in such a way that it is not optimized for the best heating and cooling performance for buildings, but to achieve the best possible cooling performance and **very low temperatures** at the cold end. Hydrogen (H2) is fed into a heat exchanger in gaseous form at atmospheric pressure and passed around the cold chamber (green in the picture) in several coils. After all cooling steps, the hydrogen leaves the system in liquid form, here at a temperature of 17° K (=**-260°C**).

Such a device would have many possible applications, as the **cooling of medical products** or other chemical and **perishable substances**. But in the hydrogen world, the Cryolift plays an important role beyond these applications - for the liquefication of hydrogen for **transport**, especially in **vehicles**:

As a gas, hydrogen occupies 800 times the space it requires in liquefied form. To store and transport it, it must either be subjected to extremely high pressure - or it must be **liquefied by cooling**. Current hydrogen distribution operates at pressures of 700 up to 1200 bar. The technical complexity of pressure vessel storage is enormous, and tanks are limited in shape and size. This makes hydrogen storage expensive, technically extremely complex, and therefore prone to errors. If a pressurized tank is damaged in an accident, there is a great risk of explosion. In this case, it seems much more plausible to rely on **cryogenic cooling**, especially since we will have the optimal device available with a further development of the ThermoLift, the CryoLift, to achieve the required 20 degrees Kelvin (- 253 degrees Celsius), which enables the distribution of hydrogen in liquid form. The CryoLift itself will also be powered by hydrogen.