

# Pump stations for CO<sub>2</sub>

## CO<sub>2</sub> - pump stations for many installations



Following the debate about the climate change, old natural refrigerants are gaining new interest. One of these refrigerants is CO<sub>2</sub>, which has many advantages and few draw backs. Most people do not realise that CO<sub>2</sub> is as important to human life as oxygen.

The use of CO<sub>2</sub> as a refrigerant raises the question is it not a potential greenhouse gas? The answer to this is no. Actually, we do the environment a favour by using CO<sub>2</sub> in refrigeration system, instead of just releasing it to nature. Most of the CO<sub>2</sub> used enters the market as a useful waste product deriving from other processes, such as, the production of ammonia and beer. In some countries it is also available from natural wells.

Other benefits of CO<sub>2</sub> include:

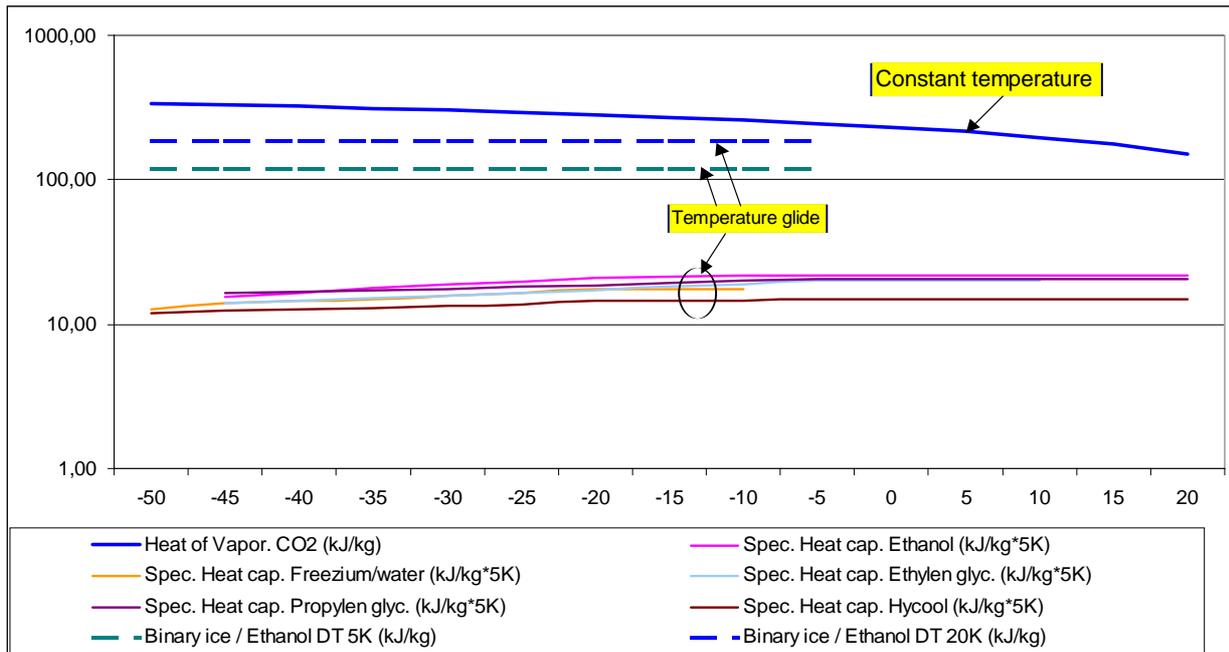
- Good thermophysical capabilities
- Good heat transfer
- High volumetric efficiency
- Relatively inexpensive natural products
- Offers a very uniform temperature in the coil

Johnson Controls has vast experience in the design and instal of CO<sub>2</sub> systems, from commercial hydro-carbon based systems for supermarkets to very large industrial plants for the food industry.

The pump stations have been used in supermarkets, and many other installations throughout the years. In fact, the first installation took place in 1996 in Helsingborg, and the system still running successfully until today.

The advantage of using CO<sub>2</sub> as a secondary volatile refrigerant, is the high viscosity and the low pressure drop. The capacity of each volume of circulated CO<sub>2</sub> is many times higher than the normally used one-phase refrigerants, e.g. propylene glycol.

Figure 1



The figure shows the capacity of one kg CO<sub>2</sub> evaporated, and the capacity of popular one-phase liquids. The temperature in one phase systems is increasing throughout the coil where the temperature in the CO<sub>2</sub> coil is constant. In ice slurry systems, the temperature change in the coil can be as high as 20K.

Our experience ensures that we can offer the customer, a very energy efficient system.

Our pump stations can be supplied either as a stand-alone unit ready to be connected to an existing refrigeration system, or as part of a package comprising the primary refrigeration system and the pump station.

We are proud that we are able to supply primary side system, utilising natural refrigerants, including ammonia and energy efficient hydrocarbons, such as propylene and propane.

Standard systems come equipped with:

- One 300 litre tank
- One pump
- Safety valves
- Controls

Upon request, further options are available:

- Inverter drive for the pump
- Insulation
- Additional pump alternating with the first pump
- Shut off valves around the pump for easy service
- Evaporator/cascade heat exchanger for HFC, NH<sub>3</sub> or HC solutions

- High temperature stage in one or two circuits
- Plant in container
- Complete housed plant including high temperature system with condenser ready to connect to system

The standard CO<sub>2</sub> pump station measures are:  
800 wide x 2100 long x 2200 high mm  
SRM CO<sub>2</sub> Pump Station

Type:

- SRM CO<sub>2</sub> 2 x 10 kW
- SRM CO<sub>2</sub> 2 x 20 kW
- SRM CO<sub>2</sub> 2 x 30 kW
- SRM CO<sub>2</sub> 2 x 40 kW
- SRM CO<sub>2</sub> 2 x 50 kW
- SRM CO<sub>2</sub> 20 kW
- SRM CO<sub>2</sub> 40 kW
- SRM CO<sub>2</sub> 60 kW
- SRM CO<sub>2</sub> 80 kW
- SRM CO<sub>2</sub> 100 kW

Other types on request.



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