



Data centers produce high amounts of heat to keep servers cool. High temperatures and humidity levels are undesirable conditions that can have a negative impact on the performance of IT equipment and devices. This is why it is ideal to place data centers in natural cool climates like the Nordics.

However, a naturally cool climate is not enough to remove the excess heat. This is why Bulk Data Centers has initiated research into the use of refrigerant coolants and an innovation project exploring the possibilities of circular heat-reuse, where the data center becomes part of an industry cluster.

Why use refrigerants?

A refrigerant is a working fluid used in air conditioning systems. By using a cooling refrigerant, the use of electrical power needed to run an air conditioning system is minimized. The fluid undergoes a circular phase transition from liquid to gas to liquid again, in the refrigeration cycle.

There are a few different working fluids that exist as options in a cooling system. However, some gases previously used as refrigerants can be harmful to the ozone layer, these are heavily regulated both globally and within the EU. This dictates which refrigerants can be used and in what capacity.

When assessing different refrigerants, it's normal to differentiate between natural refrigerants such as ammonia and CO₂, and synthetic HFO gases.

Refrigerants also produce excess heat, however, with less potential damage to their electrical components. And if we can combine refrigerant cooling systems with circular industry heat-reuse, we are able to both protect the IT equipment and utilize the inevitable heat production in a productive way.

Assessing which refrigerant coolant to use

When assessing which refrigerant coolants to use, we assess against key requirements. At Bulk we do of course have a cost perspective in mind when looking at solutions. However, cost does not surpass requirements that follow from our sustainability framework in terms of environmental sustainability, social and governance factors such as health and safety aspects.

We also assess refrigerants in terms of sustainable costs – meaning that we take into account longevity, feasible regulation changes in the future, required maintenance and so on. If the cost-effectiveness of a solution is higher in a long-term perspective, then that outweighs a short-term cost perspective.

For that reason, we have assessed with third party consultants the two refrigerant solutions applicable for Bulk's data centers are the synthetic HFO gas R1234ze(E) and the natural refrigerant gas R717 – ammonia. Both these are significantly more environmentally and climate friendly.