

Upscaling sustainable cooling

About natural refrigerants

“Natural refrigerants are non-synthetic substances that occur in nature’s biochemical process in contrast to the ‘synthetic’ fluorinated refrigerants, which are man-made chemicals”*

* The Natural Voice Magazine, 2016. Demystifying Natural Refrigerants



Why use natural refrigerants?



Environmentally friendly

Natural refrigerants' properties and resulting products are well known



Zero/very low GWP

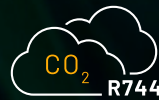
Direct emissions from natural refrigerants do not contribute to global warming



Zero ODP

Natural refrigerants do not contain chlorine or other halogens that cause ozone layer depletion

Natural refrigerants include:



Carbon dioxide

Advantages

- Non-flammable
- Non-toxic
- Good efficiency at specific use cases (see main use areas)

Main use areas

- Supermarket refrigeration: State of the art in many regions

Special considerations

- High system pressures require specific components



Hydrocarbons

(propane, butane, etc.)

- High efficiency at all ambient conditions
- Non-toxic

- Stand-alone refrigeration: state of the art in many developed countries
- AC: single split units and small to medium-sized compact chillers

- Requires specific measures and care due to flammability



Ammonia

- Very high efficiency due to its chemical properties

- Central chillers in commercial refrigeration, AC and process cooling

- Requires special measures and care due to flammability and toxicity



Air & Water

- Non-flammable
- Non-toxic
- Low-cost

- Limited use to date

- Water properties' limitations: minimum chilled water temperatures between 16 and 22 °C
- No special safety concerns