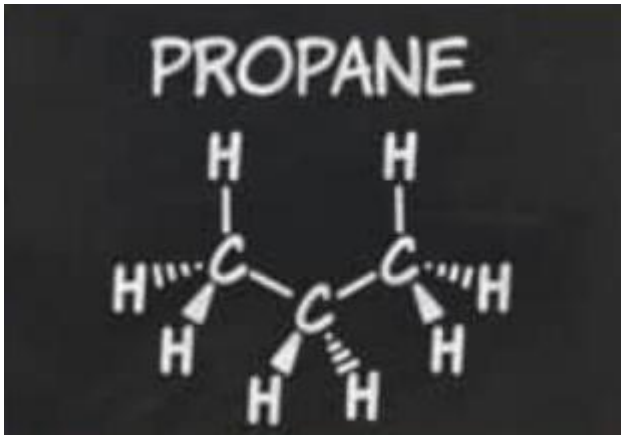
Monday, 02 Feb 2026

Newsletter:
Natural Refrigerants

Propane (R290), carbon dioxide (R744), and ammonia (R717) are natural refrigerants, each with its own strengths and constraints. They are referred to as natural refrigerants as they are substances that occur naturally in the environment.

The move toward natural refrigerants is primarily motivated by their environmental advantages. A global agreement also has mandated that 85% of HFCs should be phased down by the year 2047. This means moving to natural refrigerants is future proof and saves cost from replacing non environment friendly refrigerant systems. Natural refrigerants generally have low or zero global warming potential and do not contribute to ozone depletion. In addition, natural refrigerants often deliver comparable or superior thermodynamic performance, allowing refrigeration systems to achieve higher energy efficiency.

Propane



Propane was first used as a refrigerant over a century ago, has a made a comeback as climate friendliness is given more importance. Propane is a non-toxic, climate friendly refrigerant that combines high energy efficiency with cost effectiveness, characterised by a GWP of 3 and zero ODP. It has excellent thermodynamic properties and is more energy efficient than HFC refrigerants. It is suitable for small to medium applications but its A3 flammability classification requires the implementation of additional safety controls such as limiting the charge sizes per refrigeration circuit set by the regulation body in the place of installation, installing the machine in clear open areas.

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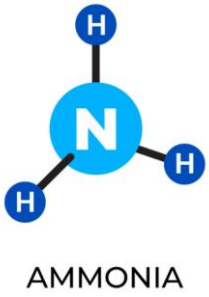
Carbon Dioxide

CO2 was used as a refrigerant since the 19th century until the 1930s before the new HFCs and CFCs replaced them. CO2 has a very low GWP of 1 and is non-flammable, making it a safe and environmentally friendly option. But it requires high-pressure systems, which can be heavy and physically large. It is more efficient in high temperature applications and less efficient in low- and medium-temperature applications. Another advantage of CO2 is that the refrigerant is inexpensive.

Ammonia



Ammonia was first used as a refrigerant in the 1850s and it has been used as a refrigerant ever since in some applications. It is used as a refrigerant in food processing and cold storage industries. Ammonia offers high thermodynamic efficiency and zero GWP, making it perfect for large-scale systems. But its toxicity, flammability pungent odour, and corrosive nature require robust construction, specialised knowledge and maintenance. Due to its corrosive nature, the material of piping and the equipment should be non-reactive with Ammonia. Stainless steel material is a safe and reliable material to work with Ammonia. Ammonia is classified as a B2L refrigerant due to its toxicity and low levels of flammability. Therefore, design and operation of the machine with safety features to mitigate these risks is essential.

Each refrigerant has pros and cons, suited to specific applications. Propane is suitable for smaller cooling systems and heat pumps while CO2 is preferrable for large, high-temperature applications, and ammonia in large industrial systems.

New Series of Propane Chillers from Novus

We present the new NOVPRG series of reversible heat pumps with natural R290 refrigerant, designed to meet the needs of residential and commercial complexes or industrial applications.

NOVPRG uses natural refrigerant R290 with a very low direct greenhouse effect (GWP = 3). The dual refrigerant circuit structure allows for an extremely low amount of refrigerant in each circuit (3.8 kg per circuit). This ensures suitability for use in all applications according to EN378-1.

Available in different sizes with a power range between 50 kW and 145 kW, it is suitable for year-round air conditioning of all environments.

The scroll compressors, optimized in tandem and trio on each circuit, and the special architecture of the refrigeration circuit with regenerative exchanger, allow for high seasonal efficiency.
In all sizes and versions, It is suitable for use in hydronic systems serving rooms with any occupancy profile thanks to the reduced refrigerant content per refrigeration circuit (<5 kg/circuit), in accordance with EN 378-1.

The high operating limits allow full load operation down to -20°C outside air temperature in winter and up to 48°C in summer, and to produce hot water up to 75°C.

The series is equipped with an electronic expansion valve, internal leak detector, double safety valves with exchange tap, and sturdy protective grilles as standard.

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Conclusion

Natural refrigerants are a no brainer future proof alternative to conventional refrigerants due to its environment friendly nature. It is essential to preserve the environment from global warming and adverse climate changes. But it is not without challenges such as flammability, high pressures and toxicity. These risks can be overcome by correct application and handling, special system design and operation with the latest advancements in engineering. This requires specialist knowledge and training. We at Novus can supply all 3 natural refrigerant chillers with robust construction and fail-safe safety design. Our machines are built with stainless steel piping depending on the requirement and built with special design to minimise refrigerant quantity, therefore minimising risk in case of a leak. Feel free to contact us for your refrigeration product requirements.

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Our Products and Services

Industrial process chillers,

Low temperature refrigeration for cold storage,

Heat pumps,

Customised and standard chillers,

Natural refrigerant chillers, HFO chillers,

Crane cabin Air conditioners,

Dehumidifiers,

Compressed Air Dryers (Refrigerant and Desiccant type),

Compressed air filtration, Aftercoolers/Moisture Separators/Pressure vessels,

OEM Spare parts,

Service and maintenance of refrigeration products.

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