

Heating and cooling applications with hydrocarbons

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euramm^on Symposium, DATE

SECON GMBH

- Since 2010 on the DACH market
- Exclusively using natural refrigerants since the beginning
- DACH hydrocarbons chiller market leader
- 20 employees in Gondelsheim, Germany
- 50 indirect employees in Zagreb, Croatia
- 16.000.000 € turnover in 2022



HYDROCARBONS

- Typical applications
 - R290 (propane)
 - HVAC, domestic and industrial heat pumps
 - MT applications like cold brine for food processing
 - HT applications like data centers
 - R1270 (propylene)
 - LT applications like cold brine for environmental simulation
 - R600a (isobutane)
 - high temperature heat pumps
 - decarbonisation by re-use of waste heat

HYDROCARBONS

- Special applications
 - R170 (ethane)
 - ultra LT applications, as for pharmaceutical lyophilisation
 - R600 (n-butane)
 - ultra high temperature heat pumps, as for steam generation

SAFETY

- main criteria to deal with flammability of hydrocarbons
 - low refrigerant charge by compact unit design
 - confined compartment containing non-hermetic joints
 - ventilated housing according to EN 378
 - monitored by gas sensor, except for small units
 - outside of compartment only hermetic joints
 - alarm and ventilation of housing above 20% of LEL
 - shut down of all potential ignition sources inside of compartment above 40% of LEL



SAFETY

- unit placement criteria
 - no EX-zone around closed unit in normal working mode
 - temporary EX-zone around open unit (e.g. for service)
 - 2 m area around the unit on all sides should be kept free of potential ignition sources
 - rainwater drains shouldn't be located within 2 m area
 - 10 m minimum distance to fresh air inlet of rooftops

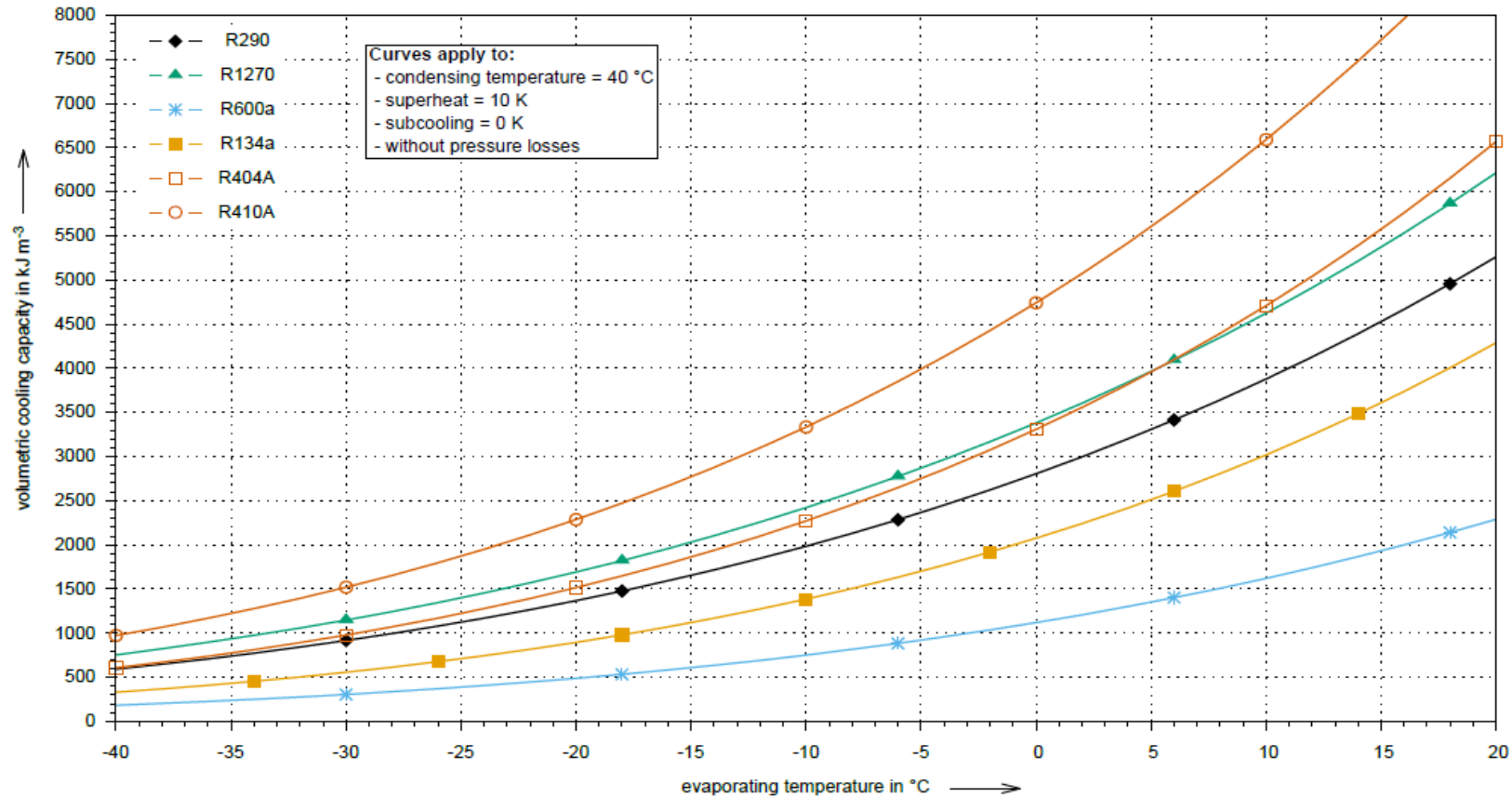


APPLICATIONS

Refrigerant	R290	R1270	R600a	R170
Evaporating temperature at atmospheric pressure	-42,1°C	-47,6°C	-11,8°C	-88,6°C
Critical temperature	+96,7°C	+91,1°C	+134,7°C	+32,2°C
Usable temperatures on hydraulic side (cold)	-15 to +25°C	-40 to 0°C	+10 to +40°C	-80°C to -40°C
Usable temperatures on hydraulic side (hot)	+10 to 60°C	+10 to +50°C	+60°C to +100°C	-30 to 0°C
Typical applications	HVAC / space heating Process cooling	MT and LT chillers	High temperature heat pumps	Ultra-low-temperature

APPLICATIONS

Volumetric cooling capacity



EXAMPLES

Process cooling for paper factory

- 3 air cooled chillers with R290
- 1.700 kW
- leaving temperature 14 °C
- ambient temperature 38 °C
- combined free cooling modules



EXAMPLES

MT brine for food logistics

- 3 air cooled chillers with R290
- 900 kW
- leaving temperature $-2\text{ }^{\circ}\text{C}$
- ambient temperature $38\text{ }^{\circ}\text{C}$
- combined hydraulic module



EXAMPLES

Ground water heat pumps for hotel

- 2 water/water heat pumps with R290
- seasonal cooling and heating
- simultaneous cooling and heating
- separated R600a units for tap water
- safety concept for indoor installation



eurammon e. V. is always available as a sparring partner for questions on refrigeration with natural refrigerants.

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