



Natural choice – ecological refrigerant R290

Application of chillers brand COOL
serie AQUACOOOL GREEN

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Cool®

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Application of the refrigerant R290 commonly known as propane in chillers so far arouses surprise and doubts among investors. Completely unnecessary! Why? We explain below.

History of R290 use by PPH COOL

PPH COOL is a Polish manufacturing and trading company existing since 1981, dealing in the manufacture of equipment refrigeration and air-conditioning, which specializes in the production of chillers. In 2012, watching global trends in the industry, the company became interested in the ecological refrigerant R290 as a replacement for popular freons and is currently the most experienced manufacturer and sales leader of refrigeration equipment in the country using propane. The first propane chillers were designed and manufactured for a customer from Great Britain, with whom the cooperation continues to this day. Our offer of dedicated R290 devices is also interesting for companies from Germany, Norway and Denmark, which are currently our clients. On the basis of the experience gained, PPH COOL has developed a full line of AQUACOOOL GREEN chillers, aimed at both the foreign and domestic market, and systematically finds more and more customers. The propane devices offered by COOL include models cataloged with cooling capacities from 10 kW to 390 kW and models from outside the catalog produced for individual inquiries and customer requirements. Standard construction of the AQUACOOOL GREEN chiller with R290 is an open frame structure with a separate compressor-hydraulic section on the lower level, a condensing section made of aluminum microchannel exchangers in the V-shape located above, and a power supply and control cabinet. The components used for production come from reputable suppliers. The customer can choose from a number of options and accessories depending on individual needs. PPH COOL Service Department provides professional service of the delivered devices, undergoes systematic training and has the necessary qualifications.

Where can AQUACOOOL GREEN chillers be used?

R290 water chillers are ideal for indirect cooling projects with a wide range of applications, i.e. able to cool a liquid, e.g. glycol solution, to temperatures ranging from -25°C to + 10°C. AQUACOOOL GREEN chiller is a device ideally suited for a user from the industrial sector, regardless of the profile, e.g. processing plants, machine production, food, etc. For trouble-free and safe operation, the best location for such a device is it outside the building with access only to authorized persons. These chillers are especially a beneficial proposition for customers who focus on ecology and are aware of related regulations with environmental protection. In accordance with the EU Directive and Regulation No. 517/2014, R290 meets all the requirements resulting from the GWP value limits (global warming potential index).

R290 refrigerant (propane) – what is it really?

Propane as a homogeneous refrigerant with thermodynamic parameters similar or even better than the current refrigerants of the HFC group (eg R134A), it is perfectly applicable in refrigeration and very well replaces classic fluorinated gases. The only significant difference is its flammability.

Advantages of using devices with R290

- Ecological values: R290 has a very low GWP = 3, which means that in the event of a leak it has almost zero negative impact on the environment and the user does not pay any emission charges.
- No need to register equipment or report gas emissions to the atmosphere with local governmental control institutions established pursuant to regulation No. 517/2014 Articles 19 and 20.
- No obligation to perform periodic tightness tests – cheaper maintenance.
- The R290 factor is one of the long-term solutions not covered by further tightening resulting from the so-called the F-Gas regulation.
- Low factor price.

Propane (R290) in the chiller: the most common unjustified fears

FLAMMABLE – RISK OF FIRE

R290 is a flammable gas (flammability class A3), however probability of refrigerant ignition and the explosion in our chiller is extremely low. An explosion occurs it requires the existence of both an ignition source and an explosive atmosphere i.e. a dangerous concentration of propane in the air.

The reasons which practically exclude the occurrence of such a situation are:

- The location of the chiller with R290 content is an open space outside buildings.
- Such a location provides free ventilation of the device and prevents it build up of a dangerous concentration in case of leakage.
- The design of the device is open type, it is easy to ventilate natural and does not create closed spaces that could cause accumulation up R290.
- The refrigerant amounts in the device are small (depending on the model size, the most popular models contain from 2.5 to 10 kg per one refrigerant system).
- Components that could potentially be a source of ignition are in our chillers eliminated or closed in the electrical cabinet, which the location and construction exclude the occurrence of an explosive atmosphere there.

Before the interested person starts to worry about R290 in the chiller, he should think about or the risk of using 11 kg propane butane cylinders in millions of households is not definitely bigger? Are LPG installations in cars not a greater threat?

REFRIGERATION DEVICES WITH R290 MUST BE MADE IN ACCORDANCE WITH ATEX DIRECTIVE STANDARDS?

They do not have to. According to the regulations, the ATEX standard applies only to these devices, which are intended to work in an explosive atmosphere (e.g. mines or petrochemical plants). In standard use our chillers do not work in such an atmosphere. Some of the components with which the propane chiller is equipped conform to the ATEX directive, but only those which are in contact with the medium R290 (e.g. compressors).

How to safely operate?

Basic conditions that must be met to ensure safety use are:

- The device should be installed outside the building, far from sewage and technical sumps as well as ventilation intakes; this kind location is optimal requiring no additional treatments compared to for typical devices with HFC refrigerants. It is allowed other locations following assessment and additional measures safety.
- Hydraulic circuit safety valve and main air vent must be installed on the outgoing pipeline outside the building.
- Ensuring the visibility of factory markings (labels) on the chiller warning about the flammable refrigerant content.
- Keep away from the device with open fire.
- Read the instructions before use.
- The chiller must be served only by persons / companies with appropriate qualifications.
- For large chillers – restricting access by third parties (such as the requirement is met by locations within the production plants); devices with a capacity of up to 5 kg R290 can be installed in places on general access (access category A), provided that it is met requirements described above.



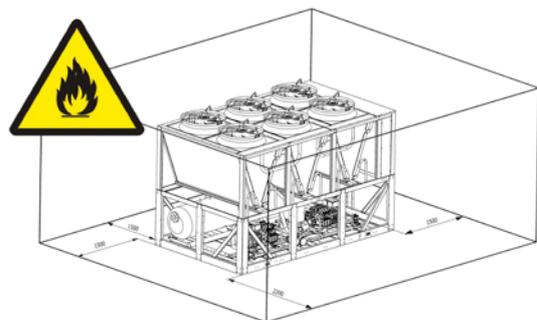
An example of a typical location out of building preferred for R290 chillers.



R290 – propane for refrigeration applications is a 99.5% pure gas supplied by professional distributors.



The construction of the chiller is an open frame with separated electrical part preventing R290 cumulation in the event of a leak.



Device marking and ensuring the safety zone during service are the basic elements of usage risk reduction to a minimum.

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