Ali Group North America
Refrigeration Division

BEVERAGE-AIR VICTORY

# R290

## The Natural Refrigerant

GROUP

*As an industry leader in commercial refrigeration, Beverage-Air is committed to making valuable contributions to the protection of our environment through the responsible use of natural resources and the development of clean technologies that replace harmful substances with more eco-friendly alternatives.*

# The world is changing and so is the market demand.

With growing concerns about global warming and the atmosphere taking on more and more hazardous emissions, industries are looking to alternative refrigerants as part of the solution.
Hydrocarbon refrigerant is the next step towards better refrigeration and environmental responsibility.

- Over 1.5 billion HC refrigerators and freezers are used in homes worldwide.
- 20+ years of HC adoption in Europe with over 2 million commercial units in use.
- More and more companies are choosing HC in the US and around the world as they look to meet corporate sustainability objectives.

## What is hydrocarbon refrigerant?

**Hydrocarbon (HC)** refrigerants are natural, non-toxic refrigerants that have no ozone depleting properties and low global warming potential. Hydrocarbons are one of the most climate-friendly and cost-effective refrigerants to cool and freeze.

**R-290 (HC)** refrigerant is highly refined propane that is a safe, environmentally friendly alternative for the hydrofluorocarbon (HFC) refrigerants R134a in refrigerator applications and R404a in freezer applications. It is, and can continue to be domestically produced. (90% of today's supply) R-290 propane is not harmful upon exposure to skin or inhalation. Minimal risk to toxicity when inhaled as it can displace oxygen only in high concentrations.

## Why use R-290 Refrigerant?

- Natural, non-toxic, and sustainable
- ODP = 0
- GWP < 0
- Reduces energy consumption

| Refrigerant | ODP | GWP |
|---|---|---|
| R404A | 0 | 3,300 |
| R134A | 0 | 1,300 |

The R-290 refrigerant chosen to replace HFCs is simply a highly-refined blend of propane, an abundant, non-toxic, and naturally-occurring compound that most people associate as a fossil fuel. As a matter of fact, propane has properties similar to popular, man-made refrigerants.

The substance has long been used as a refrigerant in industrial and commercial applications, but as foodservice equipment companies including Beverage-Air, sought an alternative to synthetic refrigerants, whether R-290 was a viable alternative to HFCs was a question that received much debate.

Numerous studies, including one published in the International Journal of Current Engineering and Technology showed R-290 and HFCs have very similar thermodynamic properties, meaning that they absorb and transfer heat in much the same way. A white paper, based on the actual production experience of a major compressor company names R-290 as the best alternative to traditional refrigerants.

# Hydrocarbon Refrigerant Equals More Efficient Equipment.

As it happens, R-290 refrigerant isn't just an environmentally-sound replacement to HFCs, its use also results in energy savings. Several studies have confirmed an increase in efficiencies of approximately 28%. Several studies have confirmed that units manufactured with R-290 are on average 28% more energy efficient.

## Mitigating the Fears that Propane Refrigerant Poses a Risk of Explosion

The fact that propane is combustible and is widely used as a fuel has raised concerns of whether it's safe to use as a refrigerant. Many have wondered if leaks in the system could pose an explosion risk, especially in kitchens that cook with open gas flames. Studies have measured the risk of a fire caused by R-290 to have a chance of ignition less than 0.001%.

More than 1.5 billion Hydrocarbon refrigerators and freezers are already being used in homes worldwide, and they've been used in Europe for more than 20 years. The Environmental Protection Agency approved its use in the US in 2011, and there are UL and ANSI/ASHRAE standards in place to regulate its use in commercial foodservice equipment. The adoption of hydrocarbon refrigerant also helps companies prepare for tightening energy-efficiency requirements that will soon be phased in by the Department of Energy.

## Beverage-Air Coolers Contain Less Propane Than Many Everyday Products

| HR1HC-1HS<br>*3.17 ounces R-290 Propane* | Large BIC Lighter<br>*3.5 ounces Fluid Propane* | Glade Super Fresh<br>*3.9 ounces Propane* | Spray Paint<br>*4.5 ounces Flammable Gas* |
|---|---|---|---|
|  |  |  |  |

Beverage-Air spent many years engineering their HC models before releasing them for sale, ensuring that each one is built to safely and efficiently use the new refrigerant. The redesigned models will feature faster pull-down times due to propane's quick heat absorption. Smaller charge volumes and flow rates are needed to produce the same amount of work thus reducing motor sizes in compressors.

# Hydrocarbon Frequently Asked Questions

1. **Do you need any specialized training to service R-290?**
   - No, the EPA has ruled specialized training is not required, but it is recommended.
2. **Where do I go for training?**
   - Beverage-Air suggests contacting Refrigeration Service Engineers Society to inquire about their training program. The website address for this is www.rses.org.
3. **What tools are needed to service HC cabinets?**
   - There are only 2 specialized tools that are required for servicing Hydrocarbon equipment, a combustible gas meter/R-290 leak detector and a safety place card.

# R-290 Frequently Asked Questions

1. **Is there maximum charge amount for commercial applications with R-290?**
   - Yes, you can only have a maximum charge amount of 150 grams (5.3 ounces) in each refrigeration system.
2. **Are there special markings on a cabinet built using R-290? How will I be able to tell if the system I'm working on is built with R-290?**
   - The serial number tag will indicate the type of refrigerant.
   - The unit will have multiple labels built with an HC/R-290 refrigerant.
3. **Will I need different gauges to use with an R-290 system?**
   - No. The 134a manifold set can be used. Due to the small system charge amounts we suggest the use of the shortest hoses possible. 12 inch hoses are included in our service kit.
4. **Does the R-290 refrigerant have to be recovered?**
   - No. The EPA has ruled that an R-290 system can be vented into the atmosphere.
5. **How do we leak check an R-290 system?**
   - You would follow the same service procedure to locate a leak on a system using R-290 as you would a 134a or 404a system. You would however have to make sure you were using a R-290 leak detector. Use a nitrogen charge of 200 psi with a trace gas. Then use the electronic leak detector to locate the leak. You can also use a bubble solution or an ultra-sonic leak detector.
6. **Where can I get R-290 refrigerant?**
   - We would suggest trying your local HVAC supply house or a company that sells gases and welding supplies.
7. **What is the difference between R-290 and standard propane that you can purchase from a hardware store?**
   - R-290 has a much higher purity level. This level is greater than 97.5%. R-290 has a low moisture content. Moisture will damage the refrigeration system and components. Also there is no scent added to R-290 which is added to standard propane.
8. **Can I retrofit older cabinet to R-290?**
   - NO, The E.P.A has ruled that R-290 can only be used on "New equipment"

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