

Alternative Refrigerants: Hydrocarbons

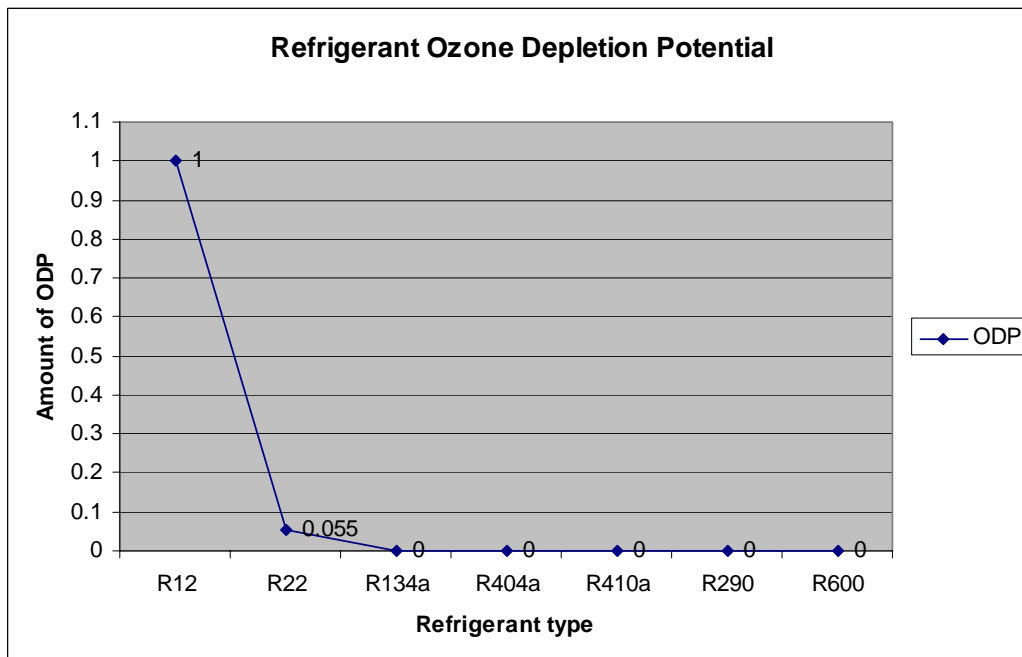
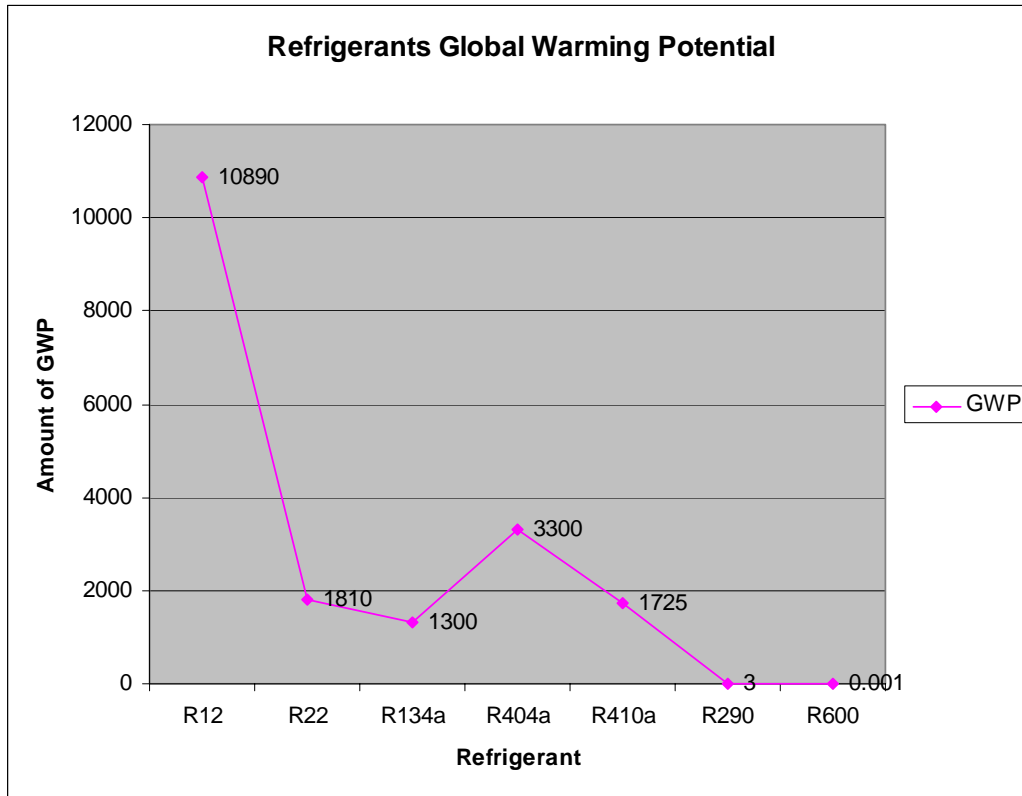
The Montreal Protocol Project eliminated the use of CFC refrigerants, namely R12, in the mid nineties and will begin the phase out of R22 on January 1, 2010 with a ban on new manufacturing with R22. As a result, Air Conditioning and Refrigeration manufacturers had to redesign their products around different refrigerants, R134a, R404a, R410a just to name a few.

Also emerging in the North American market is the demand for products that use other alternative refrigerants, “natural” substitutes such as R290 (Propane) and R600 (Isobutane). These refrigerants have been used in Europe and in Asia since the early nineties, but are just now catching the interest of North American markets.

This demand, unlike that of the Montreal Protocol, is created almost totally by end-users. Powerful companies such as Coca-Cola, McDonald’s and GE are perceiving the “going green” movement as an opportunity to establish an “Environmentally Conscious” image with consumers. Alternative refrigerants are in their eyes a long-lasting solution to ozone depleting gases that also have a low Global Warming Potential.

The proposal of moving toward an HFC-Free Domestic Refrigerator is being considered under the Significant New Alternatives Policy (SNAP) (link <http://www.epa.gov/Ozone/snap/refrigerants/qa.html>), an EPA program that assesses substitutes to substances being phased out under the Clean Air Act for the protection of the Earth’s ozone layer (source *Appliance Design* article October 31, 2008). Link: http://www.appliancedesign.com/CDA/Articles/Breaking_News/BNP_GUID_9-5-2006_A_1000000000000458025

When compared to even the most environmentally friendly HFCs these natural refrigerants are a valid alternative. The following tables show a comparison of the impact of hydrocarbon refrigerants vs. HCFC’s and HFC’s on Ozone Depletion Potential (ODP) and Global Warming.



Data source EPA Website: Link

<http://www.epa.gov/Ozone/science/ods/index.html>

HCFCs such as the soon to be phased out R22 have an ODP of 0.01 to 0.1 and are categorized as "Class II" Substances by the EPA. All HFCs have 0 ODP while they have higher GWP.

Definitions

What do these numbers mean? Obviously in both cases lower is better. Ozone Depletion Potential is the ratio of the impact on ozone of a chemical compared to the impact of a similar mass of CFC-11. HFC's do not contain chlorine and therefore have 0 ODP. The Global Warming Potential is the ratio of the warming caused by a substance to the warming caused by a similar mass of carbon dioxide (CO₂). Thus, the GWP of CO₂ is defined to be 1.0. Data source EPA website: Link

<http://www.epa.gov/Ozone/defns.html#ods>

From a manufacturing standpoint, the use of Hydrocarbon refrigerants pose some new challenges as these gases are flammable and potentially explosive. Therefore the manufacturing area requires a safety zone and specialized equipment specifically designed for this use. Fortunately, manufacturers can piggy back on the experience of European and Asian companies that pioneered this technology many years ago. Therefore, there is nothing to worry about as long as you are dealing with equipment manufacturers who have previous experience in handling hydrocarbon refrigerants.

VTECH is on the forefront of this emerging technology offering both production and R&D charging equipment suitable for hydrocarbons. Please visit the Products section of our web site (www.vtechonline.com) for more information on this equipment and other VTECH products.