

Alternative Refrigerant Terminology

Alkyl Benzene Oil:

A synthetic refrigeration oil used as a higher performing replacement for mineral oil. A common trade name is Zerol.

Alternative Refrigerant:

Any of a number of refrigerants or refrigerant mixtures designed to replace CFC or HCFC refrigerants.

Azeotrope:

A mixture made up of two or more refrigerants that act as a single fluid. The components of azeotropic mixtures will not separate under normal operating conditions and they can be charged as a vapor or liquid.

CFC Refrigerant:

CFC refers to the chemical composition of the refrigerant. Chlorofluorocarbon indicates that the refrigerant is comprised of Chlorine, Fluorine, and Carbon. Common CFC refrigerants are R-11, R-12, R-13, R-113, R-114, and R-115.

Drop-In Replacement:

Alternative refrigerants that can be installed directly into an existing system, with relatively minor equipment changes necessary.

Polyolester Lubricant (POE):

Sometimes called ester oil, they are a family of synthetic refrigeration lubricants, generally used with non-chlorine containing refrigerants. These lubricants have an oxygen-containing chemical group called an ester. POEs are generally compatible with existing mineral oils, and system components. Ester oils are slightly hygroscopic and should be stored in well-sealed, non-porous containers. The base components of ester oil are organic acid and alcohol. When exposed to high levels of moisture and heat (as typically exist in automotive engines), ester oil can hydrolyze. Hydrolysis causes a reverse reaction, causing the ester oil to revert back to its original organic acid and alcohol components.

Fractionation:

The change in composition in the liquid phase of a refrigerant blend that results from more of the higher pressure component(s) moving into the vapor. If the vapor is lost during leakage, the remaining refrigerant will run at lower pressure and have lower capacity than the original charge.

Global Warming Potential:

Global warming occurs when solar energy penetrates the atmosphere and the resultant infrared energy from the earth's surface is absorbed by certain gases and not allowed to leave. This process is commonly known as the greenhouse effect. Refrigerant GWPs are normally reported as a multiple of the effect of Carbon Dioxide for a 100 year time period, which is set to a value of 1. The GWP for R-134a is 1300, or 1300 times as much as CO₂.

HCFC Refrigerant:

HCFC refers to the chemical composition of the refrigerant. HydroChloroFluoroCarbon indicates that the refrigerant is comprised of Hydrogen, Chlorine, Fluorine, and Carbon. Common HCFC refrigerants are R-22, R-123, R-124, and R-142b.

HFC Refrigerant:

HFC refers to the chemical composition of the refrigerant. HydroFluoroCarbon indicates that the refrigerant is comprised of Hydrogen, Fluorine, and Carbon. Common HFC refrigerants are R-32, R-125, R134a, R-143a, and R-152a.

High Pressure Refrigerants (HP):

A term used for some alternative refrigerants designed to operate in the low temperature (-35° F to 0° F) range.

Hygroscopic:

A tendency for refrigeration oils to absorb moisture from the atmosphere.

Interim Replacements (SHORT TERM):

Refrigerants intended to serve as an intermediate solution during the transition from CFC to HFC refrigerants. Most interim replacements contain HCFC refrigerants like R-22.

Long Term Replacements:

Alternative refrigerants are considered to have no adverse effect on the stratospheric ozone layer. Most long term replacements are HFC compounds.

Medium Pressure Refrigerant (MP):

A term used for some alternative refrigerants designed to operate in the medium temperature (0° F to 40° F) range.

Mineral Oil:

Refrigeration oil obtained from refining crude oil, normally used with CFC and HCFC refrigerants, but is not compatible with most of the HFC based refrigerants. Refrigerant conversions often require a procedure for the removal of existing mineral oil because of the incompatibility with alternative refrigerants.

Near Azeotrope:

A zeotropic mixture with a low enough temperature glide (see below) that the effects of temperature glide and fractionation are not a factor in system operation or on blend composition. Blends with temperature glides below 5° F will fall into this category.

Ozone Depletion Potential (ODP):

This is a relative indication of the effect of the substance on breaking down the ozone layer. Products are measured by comparing their effect on the ozone layer in relation to R-11, which is set to 1.0. The ODP for R-22 is 0.05, which is 20 times less than R-11.

P.A.G. Lubricant:

A family of synthetic oils based on the chemistry of Polyalkylene Glycols. These lubricants have an oxygen containing group called ether. They are generally not compatible with mineral oils. The primary application of PAG lubricants are automotive air conditioning since they are not readily compatible with hermetic electric motors in sealed systems.

Temperature Glide:

The temperature difference that occurs between the vapor state and liquid state during evaporation or condensation at constant pressure, i.e. the temperature in the evaporator and condenser is not constant. Temperature glide occurs in near-azeotropic and zeotropic mixtures.

Zeotrope:

A mixture made up of two or more refrigerants with different boiling points. As a zeotropic mixture boils, the liquid will fractionate (see above) as more of the volatile component(s) boil, and the change in liquid composition will result in an increasing boiling point temperature. The total change in temperature from the beginning of boiling to the end is considered the temperature glide. (The process is reversed during condensing, giving a similar glide.) Zeotropic mixtures should be charged by removing liquid from the cylinder.