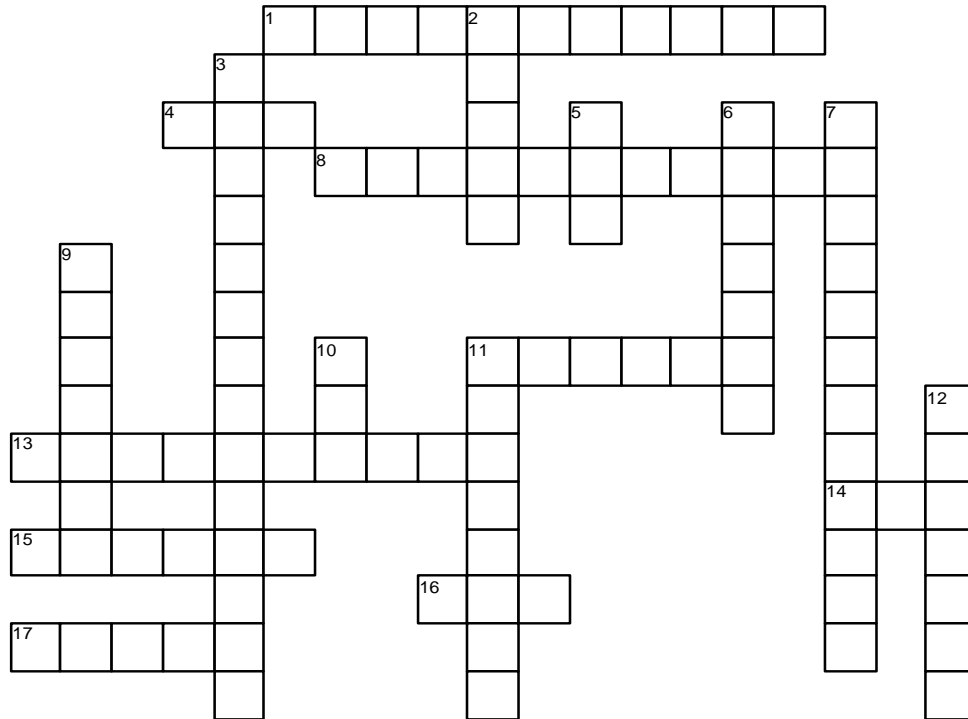


# Refrigerants and Refrigerant Oils

## Chapter 64



<http://jameshalderman.com>

### ACROSS

- 1 PAG or ester oil is very \_\_\_\_\_, which means that it can absorb moisture directly from the air up to about 2% to 6%.
- 4 \_\_\_ (polyol ester) (ester) oils are used in a few R-134a systems, and either ester or PAG oils are used in R-12 systems that have been retrofitted to R-134a.
- 8 Section 612 of the 1990 Clean Air Act established the \_\_\_\_\_ New Alternatives Policy (SNAP) program to determine acceptable replacements for Class I and Class II chemicals.
- 11 \_\_\_\_\_ dioxide (CO<sub>2</sub>) is a colorless and odorless gas which is a naturally occurring chemical compound.
- 13 Another area of concern is a layer of gases that is causing a \_\_\_\_\_ effect. This gas layer traps heat at the Earth's surface and lower atmosphere, and it is increasing the temperature of our living area.
- 14 Starting in the early 1990s, most vehicle manufacturers used \_\_\_-134a (R-134a)—a refrigerant that is less harmful to the atmosphere.
- 15 Another area of concern is a layer of gases that is causing a greenhouse effect. This gas layer traps heat at the Earth's surface and lower atmosphere, and it is increasing the temperature of our living area. This is called \_\_\_\_\_ warming.
- 16 \_\_\_ (polyalkylene glycol) oils are used in most R-134a systems.
- 17 The \_\_\_\_\_ Environmental Warming Impact (TEWI)

index was developed, which rates the impact of various refrigerants along with the energy required to perform the cooling operation.

### DOWN

- 2 CFCs do the most damage and have an \_\_\_\_\_ depletion potential (ODP) of 1.
- 3 Any gas that does not condense (change from vapor to liquid) under the normal compression refrigeration conditions is called a \_\_\_\_\_-\_\_\_\_\_ gas (NCG).
- 5 The chemical name for \_\_\_-12 is dichlorodifluoromethane.
- 6 Global \_\_\_\_\_ potential (GWP) compares the ability of different gases to trap heat, and this is based on the heat-absorbing ability of each gas.
- 7 The upper layer of the atmosphere is called the \_\_\_\_\_, and it begins about 7 miles to 10 miles (11 km to 16 km) up and extends to the outer limits.
- 9 \_\_\_\_\_ oil is used in R-12 systems.
- 10 Starting in the mid-2010s and required by 2021 \_\_\_-1234yf refrigerant was used in all recent vehicles. It has a lower impact on climate change (global warming).
- 11 In 1990, President Bush (senior) signed the \_\_\_\_\_ Act.
- 12 \_\_\_\_\_ 609 is a portion of the Clean Air Act that places certain requirements on the mobile vehicle air conditioning (MVAC) service field.