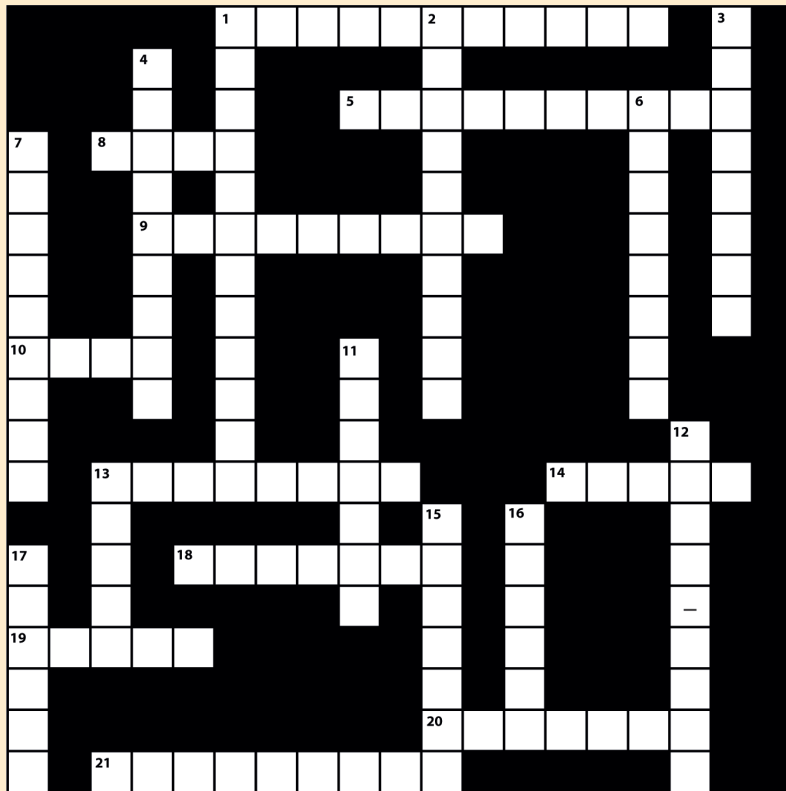


Take the HVAC CHALLENGE™

BY STEVEN G. LIESCHEIDT, P.E., CSI-CCS, CCPR

▶ Lubricants In Refrigerant Systems



ACROSS

- These gases are fully miscible with most compressor lubricating oils and are absorbed by the lubricant.
- This range is so broad in totally immiscible lubricant/refrigerant solutions that mutual solubility effects can be ignored.
- This point is determined by exposing a lubricant to a low temperature for a short time.
- These are used to enhance certain lubricant properties or impart new characteristics and generally fall into three groups: polar compounds, polymers, and compounds containing active elements.
- This point is the highest temperature at which wax-like materials or other solid substances precipitate when a mixture of 10% lubricant and 90% R-12 is cooled under specific conditions.
- The primary function of a lubricant in a refrigerant system is to reduce this and to minimize wear.
- The pressure at which the vapor phase of a substance is in equilibrium with the liquid phase at a specified temperature.

- This point can predict a mineral oil's effect on elastomer seal material and is more soluble in oils containing a greater quantity of similar compounds.
- This fluid film or quasi-hydrodynamic regime of lubrication is defined when occasional or random surface contact occurs.
- This instability is the tendency of a lubricant to carbonize.
- These types of miscible refrigerants and lubricants are mutually soluble to a limited extent; however, above the critical solution temperature or consolute temperature, many of these are completely miscible.

DOWN

- This full fluid film regime of lubrication is defined by the mating surfaces that are completely separated by the lubricant film.
- These types of miscible refrigerants and lubricants are mutually soluble in all proportions at any temperature encountered in a refrigeration or A/C system.

- Refrigerant lubricants must have this excellent stability of this type.
- These refrigeration oils of mineral origin are unsaturated cyclic hydrocarbons containing one or more rings characterized by alternate double bonds.
- This regime of lubrication is defined when the gross surface-to-surface contact occurs because the bulk lubricant film is too thin to separate the mating surfaces.
- These refrigeration oils of mineral origin consist of all straight chain and branch-chained saturated hydrocarbons.
- This refrigerant along with carbon dioxide is usually regarded as poorly soluble in mineral oil.
- In this extreme-pressure method of testing of lubricants, the anti-wear property is determined from the average scar diameter on the stationary balls and is stated in terms of a load-wear index.
- The method of testing of lubricants allows wear measurement during the test itself and scar width on the V-blocks and/or mass loss of the pin is used to measure anti-wear properties.
- This indicates the composition of a lubricant for a given viscosity.
- This organization publishes Standard 86 - Methods of Testing the Floc Point of Refrigeration Grade Oils.
- This test method of lubricants determines the load at which rupture of the lubricant film occurs.

To brush up on the facts behind this month's clues, refer to Chapter 7 ("Lubricants in Refrigeration Systems") in the **2002 ASHRAE Handbook - Refrigeration**.



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