SERVICE BULLETIN

Title: Analysis of Synthetic Oils
Models Affected: 17, 19, 23 Series

Number: C9713
Date: 4/28/97

PURPOSE:

This bulletin provides information about laboratory analysis of synthetic oils.

File: Compressor, Motors, Gears

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INFORMATION:

OIL TYPE

Carrier uses two different types of synthetic oils.

1. Alkylbenzene (Zerol) oils are used in 19XL units with HCFC-22 refrigerant (See bulletin C9304 for use in older units).
2. POE oils are used in centrifugal and screw chillers with HFC-134a as the refrigerant.

These oils should not be mixed.

WEAR METALS

When analyzing synthetic oils, the laboratory reports (in PPM) the same metals as are reported for mineral oils: Iron, Copper, Zinc, Aluminum, Lead, Tin, Nickel and Chromium. They will run silicon and phosphorus if requested, as they are present in the inhibitors.

CHLORIDES & FLUORIDES

The laboratory does not look for chlorides in POE oils because there is no chlorine in HFC-134a refrigerant. Instead, they look for fluoride (reported in PPM) as an indication of refrigerant breakdown.

OIL MIXTURES

The lab can report percent of POE in alkybenzene oils if requested. Greater than 3% POE in alkybenzene with HCFC-22 can reduce the viscosity to unacceptable levels.

The lab will report the percent of mineral oil in POE oil if it is greater than 5%.

MOISTURE & ACID

Higher levels of moisture are normally seen in synthetic oils than in mineral oils, due to the hygroscopic nature of these oils but new oil typically has less than 100 PPM. Acid numbers typically range from .1-.6 mg, KOH/gm.

Oil from compressors with atmospheric oil reservoirs such as the 17DA and 17EA typically show moisture levels in the vicinity of 400 ppm. This is not detrimental to the chiller since the oil is external to the refrigerant circuit. Long term monitoring has shown no sign of oil breakdown at this moisture level in atmospheric oil systems.

As moisture levels increase, the possibility of oil breakdown increases. If levels greater than 400 ppm are found, the sump can be shielded from atmospheric moisture by injecting dry instrument air into the vapor space of the reservoir or by installing a sump heater to keep the oil temperature above the ambient dewpoint.