

Analyze chiller oil to maintain your building's refrigeration/AC system

Analyzing compressor lubricant is an important part of maintaining and restoring a refrigeration/air-conditioning system's health. A refrigeration oil's viscosity, color, acidity, moisture and elemental content are parameters that may signal potential problems when they deviate from their normal state. As lubricating oil circulates throughout a refrigeration/AC system, it tends to pick up indicators of a machine's internal conditions. Thus, a properly performed oil analysis can reveal developing problems within a chiller or refrigeration/AC system. Spectrochemical Analysis, Water Analysis, Total Acid Number, and Viscosity are the tests most commonly performed in a laboratory analysis of refrigeration oil.

- **Spectrochemical Analysis** identifies the type and concentration of wear metals such as iron, aluminum, lead, copper, tin, zinc, etc. within the oil. When the concentrations of the various metals used in the construction of the refrigeration machine is known, any increase in these concentrations is an indicator of wear or corrosion of an internal machine component.
- **Water Analysis** determines the amount of water present in the oil. Taken by itself, the presence of water in the oil may/may not indicate a problem as most new hermetic compressor oils contain a measurable quantity of water before being installed into the compressor. Changes in water content over time also may/may not indicate a problem as the water may migrate to different areas of the machine during varying load conditions.
- **Total Acid Number (TAN)** measures of the acidity of the oil. A high TAN value indicates moisture contamination or an abnormally high operating temperature in the refrigeration system. TAN results may not be meaningful on some older paraffin based oils with rust and oxidation inhibitor and extreme pressure packages used in hermetic centrifugal chillers with R-11 and R-12 and with internal gears.
- **Viscosity** determination verifies that the correct oil is being used in the refrigerant system and that the oil is still serviceable.

What you can do

Visually inspect the oil on small reciprocating compressors for contamination and analyze the oil on-site with an oil acidity test kit to determine its usability. On centrifugal, screw, and large reciprocating water chillers, perform a laboratory oil sample analysis to determine that the oil is still serviceable and if critical problems such as wear, corrosion, water leaks, or abnormal operating temperatures require further investigation and action. A typical hermetic centrifugal chiller (in good condition, used for normal comfort cooling) may operate with the same oil charge for two or three operating seasons before any of the analysis parameters are found to be outside the acceptable operating range.

Because of budget constraints, laboratory oil analysis is usually performed only after the oil has been in use for at least one operating season. A common assumption is that oil, when new, has specific initial values for analysis parameters. A frequent misconception is that these initial values are zero. In reality, the analysis parameters of new oil can be higher than many samples of used oil. To avoid misleading results, when performing the oil change take a new oil sample as a benchmark against future analyses. Deviation from established trends would then indicate a possible chiller operational or conditional problem.

Prevent poor oil conditions by using proper oil and filters for equipment and frequently inspecting the refrigeration system to ensure that there are no operational/conditional problems that would contribute to oil degradation. Frequent oil analyses will confirm the absence of such

problems. The size and type of equipment, operating hours and conditions, known problems, and economic considerations will determine the frequency of oil sampling and analysis.

Basically, it's a good idea to analyze your compressor lubricant at least annually—you can even have it done in conjunction with your routine maintenance service calls. For more information on analyzing your chiller oil in order to maintain your equipment's health, contact your local Siemens Building Technologies representative.

Reference : This article from Internet

<http://www.us.sbt.siemens.com/customerlounge/whatsnew/press.209.asp> on 30 April 2007