Obtaining Oil Samples

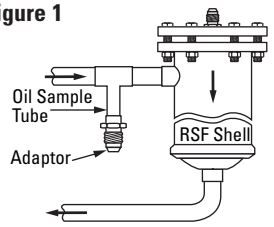
Form 40-141
September 2009

Monitoring the acid level in a refrigeration or air conditioning system is of the utmost importance. Contaminants such as water and air are important factors in the formation of acids in the system.

Also, high discharge temperatures caused by dirty condensers, high compression ratio, high superheat of suction gases returned to the compressor, fan failure, and other factors can cause oil to exceed its thermal stability and create oil breakdown.

In addition to high discharge temperatures, there are certain catalytic materials that contribute to the oil-refrigerant mixture breakdown. The most noted of these in a refrigeration system is iron. In adverse conditions, materials like iron provide a location (surface) for acid generating reactions to occur.

Figure 1



Sufficient acid within a refrigeration system is detrimental to system materials and may cause a compressor to fail. Therefore, monitoring acid levels within a system alerts the user of potential problems caused by acidic conditions.

Various methods exist for obtaining an oil sample from a refrigeration or air conditioning system. Since less than one ounce is required for the Sporlan TA-1 Acid Test Kit, any of the following methods are satisfactory. Or, if a detailed laboratory analysis of the lubricant is desired, the Virginia OA-1 Oil Analysis Kit is recommended.

Refrigeration rack systems typically have compressors with oil drain ports. Oil analysis can be accomplished by draining an oil sample into the oil vial of the acid test kit.

Often, a technician encounters a refrigeration system where oil sampling from the compressor can not be accomplished easily.

Usually, the compressor would have to be disassembled and a small amount of oil drained from the suction port of the compressor. Since this is a labor intensive procedure, systems of this type are rarely checked for acid concentration until it is too late.

For these systems, the technician may want to use the following suggestions to make oil sampling more accessible.

Method one is ideal for a technician who is installing a new split system, or installation of a new compressor after a compressor burnout, and would like to obtain an oil sample after some run time.

Method two is for a technician who needs an oil sample from an operating system.

Method #1 (Figure 1)
The method shown in Figure 1 involves installing a small oil trap in the suction line of the refrigeration system. The oil trap is designed to have an oil sample tube long enough to hold approximately 1 ounce of oil and an adaptor installed in the suction line, ahead of the shell. The adaptor should be a Schrader fitting with a cap.

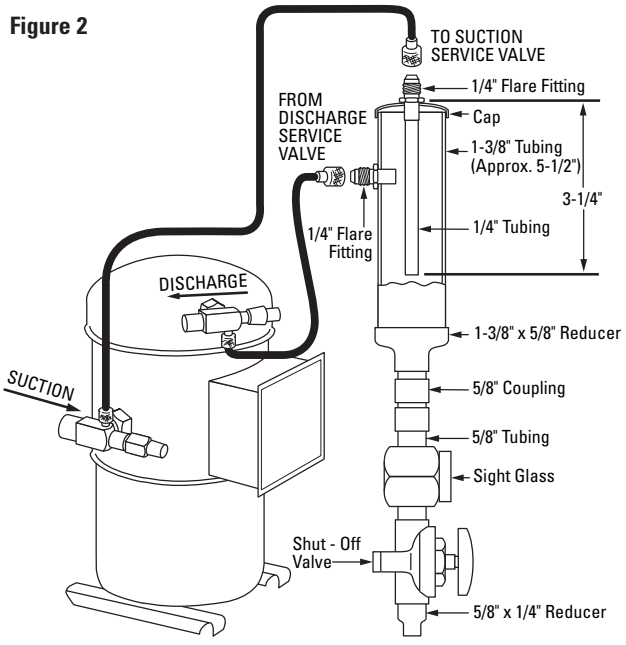
Note: Be sure to purge the remaining amount of oil in the trap so the next oil sample is representative of the oil circulating in the system.

Method #2 (Figure 2)
This method is ideal for a technician who needs to obtain an oil sample without opening the system. This method is applicable for systems with service valves.

Construct the trap as shown in Figure 2 and connect it to the service valves with flexible refrigeration hoses. The trap should be connected to each access port and held upright to ensure the oil sample tube is collecting oil. The side connection is the inlet fitting and is connected to the discharge service valve. The suction service valve is connected to the top or outlet connection. When the oil level is visible in the sightglass, isolate and relieve pressure from the trap, then drain the oil sample from the device.

Note: This trap should be constructed in advance so it is ready to be used when the need arises. Also, the device can be reused. Flush the trap thoroughly with a readily available flushing solvent, drain, and evaporate solvent residues by evacuating the trap with a vacuum pump. Following these steps will ensure the trap is ready for the next sampling.

Figure 2



Sporlan Division
Parker Hannifin Corporation
206 Lange Drive
Washington, MO 63090 USA

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