Oil Return Issues

A colleague of mine was having trouble with their condensing unit on a medium temperature walk-in cooler. The unit started to trip on low oil pressure. When they came in to check on it in the morning the unit was not running and the oil pressure control was tripping during the night. When the reset button was pressed the unit ran fine with no issues. After a couple of no cooling calls another technician came in and replaced the switch but now, a few days later, it is doing it again.

For background, this issue had started happening during the fall and from what information the technician could gather, it had not happened the previous year and the condensing unit had been replaced during the summer with a brand-new unit. So, you have a fairly new condensing unit that has had its oil switch already replaced in a matter of a few weeks.

Often it is very easy to blame the oil pressure switches for problems like the one described here, but that is not necessarily the case. Most of the time there are other issues that are causing the low oil pressure problem. It is well worth remembering that during seasonal changes in temperature, especially when night temperatures begin to drop but yet it is warm during the day there is an uptick of call such as this one.

What could be happening here is that during the night under low load and low outdoor temperature conditions the oil is basically getting stuck somewhere in the system and not returning to the crankcase as it does under “normal” conditions. There could be a number of factors that could cause this. If the unit is low on refrigerant the expansion valve will not feed the evaporator which will increase superheat and lower the gas velocity allowing the oil to stay in the evaporator and not return to the compressor causing a low oil trip.

Low head pressure, especially on cold nights could also starve the expansion valve causing the same problems as described above high superheat and low gas velocities. Therefore, some sort of head pressure control device should be installed in order maintain proper pressures during low ambient conditions.

Another one could be improperly sized lines which if coupled with any of the other possible causes describe will only make matters worse. If the line is too large, especially the suction line, there is not enough velocity to carry the oil back to the compressor. Always follow the condensing unit manufacturer’s guidelines when selecting line sizes. This also applies if, due to the location of the unit, there needs to be a suction riser or p-traps in the system. Always follow manufacturer’s recommendations.

Question and answer from Agustin Cardona, HVACR Consultant and Contributing Member of the MSAC Hotline.