

METROPOLITAN NY CHAPTER
Refrigeration Service Engineers Society

Continuing Education for the HVAC/R Industry

“Better Service Through Knowledge”

February 2024



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Metro NY RSES



EDUCATIONAL
MEETING

February 14th, 2024 @ 7:30pm

Dinner at 6:00pm

At *TAVERNA KOS* 41-19 23rd Ave., Astoria

UNDERSTANDING & USING “MANUAL J”

- ⇒ What is “MANUAL J”??
- ⇒ Understanding HEAT LOSS & HEAT GAIN
- ⇒ Free SOFTWARE that is available for your use in using Manual J

Presented by: Rich Bruno

PRESIDENT'S MESSAGE

If current EPA rules remain in effect, you will not be able to install a R410A split systems starting January 1,2026. Units manufactured after January 1,2024 will not be allowed for use in COMPLETE system installations. They will be permitted to be used to replace existing **COMPONENTS**, not **SYSTEMS**. Over the coming year, manufacturers will be transitioning to units containing A2L refrigerants. The EPA website www.epa.gov has a question and answer section.

Our in person meetings have given attending members the opportunity to learn, while being able to network with industry experts and other members. Join us on February 14th for dinner at 6:00 or the educational portion of the meeting at 7:30. The cost of the optional dinner is \$20.00 with the chapter paying the balance. Of course, there is no charge for the educational presentation. SEE YOU THEN!

Drew Garda, President

Metropolitan NY Chapter, RSES

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REFRIGERANT MIGRATION

A common cause of premature compressor failure is excessive migration of refrigerant vapor to the crankcase of the compressor during the off cycle. The problem with this is that the refrigerant vapor can condense back into a liquid, mix with the oil and dilute its lubricating properties. On start-up the oil/liquid refrigerant mixture is then used to lubricate the bearing surfaces within the compressor. This mixture—being a poor lubricant—causes wearing of the bearing surfaces within the compressor. Depending on the percentage of liquid refrigerant to oil, the bearing wear could be mild to severe. If a sufficient amount of refrigerant has returned to the compressor, it may be possible *on start up* for liquid to enter the cylinder(s) of the compressor and cause further damage to the compressor, as it attempts to compress a liquid.

Refrigerant migration occurs as a result of a difference in vapor pressure between the oil in the crankcase of the compressor and the refrigerant vapor in another part of the system. Normally, the refrigerant vapor migrates back from the system's evaporator through the suction line during the off cycle. The greater the pressure difference between the refrigerant vapor in the evaporator and the oil vapor in the compressor, the more likely migration will occur. Migration will continue until there is no pressure difference between the refrigerant vapor in the evaporator and the vapor pressure of the now refrigerant/oil mixture in the crankcase of the compressor.

Normally, refrigerant migration is associated with a temperature difference between the refrigerant in the evaporator and the oil in the compressor. This is true because as the temperature of a liquid decreases so does its vapor pressure. If the oil is cooler than the refrigerant in the evaporator, there will be a sufficient enough difference in the vapor pressures to cause the refrigerant to migrate

back to the compressor. Even when there is no

temperature difference, some migration may occur. At the same temperature, refrigeration oil tends to have a lower vapor pressure than refrigerant.

To prevent migration from occurring, it is common practice to keep the oil at a higher temperature than the refrigerant in the rest of the system during the off cycle. This is usually done with some type of resistive crankcase heater. There are several types of crankcase heaters commonly used: a heater can be strapped around the belly of the compressor (commonly referred to as a "bellyband heater"), or a heater can be directly immersed in the oil of the compressor. Another method commonly used is to allow a small **controlled** current to flow through the start winding and run capacitor of single-phase compressor during the off cycle. Whichever type or method is employed, it is important not to overheat the oil—always contact the compressor manufacturer for their recommendations.

Crankcase heaters may not work effectively in applications where the crankcase of the compressor is exposed to extreme cold outdoor temperatures. The extreme cold temperatures may overpower the crankcase heater. On these systems a positive way to prevent migration is to incorporate a pump down cycle into the design of the system. This will pump most of the refrigerant out of the evaporator during the off cycle.

Severe refrigerant migration can lead to certain compressor failure — but it is preventable. When deciding how to best to prevent refrigerant migration, it is usually best to follow the guidelines published by the compressor and system manufacturers. <<

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COMING TOPICS

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Handling Customers Who are
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High Quality Compressor
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