

METROPOLITAN NY CHAPTER Refrigeration Service Engineers Society

Continued Education for the HVAC/R Industry
“Better Service Through Knowledge”

December 2011

WWW.METRONYRSES.ORG



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 mi-



grate back to the compressor. Even when there is no temperature difference, some migration may occur. At 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 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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Metro NY Chapter RSES HVAC Training Courses

The Metropolitan New York Chapter RSES will offer the RSES Technical Institute Courses – 1, 2 & 3 on Tuesday & Thursday evenings, starting January 17th, 2012 in Long Island City, New York

Dates: For 11 weeks on Tuesdays & Thursdays

1/17 & 1/19	1/24 & 1/26	1/31 & 2/2
2/7 & 2/9	2/14 & 2/16	2/21 & 2/23
2/28 & 3/1	3/6 & 3/8	3/13 & 3/15
3/20 & 3/22	3/27 & 3/29	

Time: 6:00 PM – 10:00 PM

Location: Long Island City High School
14-30 Broadway
Long Island City, NY 11106

Cost for Course 1, 2 or 3:

\$849.00 for RSES members
\$949.00 non-RSES members (also includes 1 year membership in RSES)

Includes: Technical Institute course manual, course tuition, Certificate of Completion after passing final exam, 72 hours toward NATE Recertification, for those eligible.

Register by January 10th by calling, mailing or Emailing the form below

FOR ADDITIONAL INFORMATION VISIT:

<http://www.metronvrres.org>

or Email: school@metronvrres.org

or Phone Stan Hollander: 718 232-6679

by Mail: Metro NY Chapter RSES

Attn: Stan Hollander, 1837 61st Street, Brooklyn, NY 11204

–Checks and Charges Welcome –

Please make checks payable to "Metro NY RSES"



TRAINING COURSE OVERVIEWS

TECHNICAL INSTITUTE COURSE 1:

This course begins with a comprehensive introduction to refrigeration and air conditioning. Topics covered include: basic physics, major system components including hermetic, semi-hermetic and open compressors, condensers, evaporators and refrigerant metering devices. It also covers the fundamental concepts of electricity and magnetism as they pertain to resistors, resistance, conductors, power supplies, circuit protection devices and transformers. Detailed information on lessons and content for Course 1 can be found at:

<http://metronvrres.org/ti1.html>

TECHNICAL INSTITUTE COURSE 2:

Beginning with tools-of-the-trade this course covers refrigeration system accessories, desiccants and driers, defrosting methods, refrigeration system controls and piping. It also includes instruction on compressor replacement and system evacuation, electric motors in refrigeration systems, motor capacitors and protectors, thermostats, relays, contactors and starters, test equipment and troubleshooting, pressure and enthalpy diagrams, psychrometrics, heat transfer and estimating heat loads, residential air conditioning, humidification and a review of safety codes. Detailed information on lessons and content for Course 2 can be found at:

<http://metronvrres.org/ti2.html>

TECHNICAL INSTITUTE COURSE 3:

Begins with comprehensive introduction to heat pump theory, including water-source heat pumps. Topics covered include computer-room environmental control, economizers, fans and blowers, air filtration and distribution evaporative condensers and cooling towers, water treatment, multiple-rack systems, hydronics, troubleshooting, controls and controls components, pneumatic relays, typical control applications, and control maintenance. Detailed information on lessons and content for Course 3 can be found at:

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Name: _____ Company: _____

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Which course are you registering for? Technical Institute Course 1, 2 or 3: Choose ONLY ONE _____

Are you a current RSES Member. If Yes, RSES Membership Number: _____

Please register by January 10th - space is limited.

Check or Credit Card Accepted for Payment

Make check to "Metro NY RSES" and mail w/ registration to: Metro NY RSES, Attn: Stan Hollander, 1837 61st Street, Brooklyn, NY 11204

To register by Email submit this form with Credit Card information to school@metronvrres.org

METROPOLITAN NEW YORK CHAPTER, RSES

For Information Call: Stan Hollander, CMS (718) 232-6679

Annual Holiday Dinner (December Meeting)

Starting at 6:30pm

Join us for our Holiday Buffet. Bring nothing but yourselves and your appetites. Riccardo's puts out a great table for us to enjoy. Did I say "bring nothing but"? You can certainly bring a friend or colleague. They can enjoy a fine meal with us, and then partake of the educational opportunities which we have to offer, as well as our friendship and camaraderie. Who knows? They may even want to become a part of this great organization of ours.

**The Officers of The Metropolitan NY Chapter, RSES wish all our members, friends & their families
a very**

*****Happy, Healthy, and Safe Holiday & Holiday Season*****

HOLIDAY BUFFET— 6:30 pm

Wednesday December 14th, 2011 at 6:30pm

at

RICCARDO'S

21-01 24th Avenue, Astoria NY 11102

Using DataLoggers for System Diagnosis

by

Dan & Chip Clark—Gimper IV & Supco

— PLACE LABEL HERE —

**EDUCATIONAL PROGRAM
Wednesday December 14th, 2011
at 6:30pm
SEE DETAILS— THIS PAGE**

**The HVACR Training Authority
Metropolitan New York Chapter
Refrigeration Service Engineers Society
241 Halsey Street
Brooklyn, NY 11216**

