METROPOLITAN NY CHAPTER

Refrigeration Service Engineers Society

Continued Education for the HVAC/R Industry

"Better Service Through Knowledge"

****

September 2012

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Metropolitan New York Chapter

EMPIRE KEYSTONE ASSOCIATION
BETTER SERVICE THROUGH KNOWLEDGE

Commercial Ice Machine Capacities

A common complaint associated with commercial ice machines is that the machine is not producing enough ice for the customer. Each day the customer runs short of ice needed to operate his business. This can be the result of several different problems—not all necessarily being related to a defect with the machine itself.

One possible cause could be its location. The capacity of an ice machine is based on the temperature of the air surrounding it. The warmer the air temperature, the less ice will be produced. Most manufacturers will state a maximum air temperature to which a machine should be exposed. A machine exposed to temperatures higher than this maximum temperature can exhibit problems with its operation.

At times, this could present a tricky situation for a technician. If the ice machine is installed in a kitchen, the air temperature there may be acceptable during mild outdoor ambient conditions (such as in the spring and fall). However, during the summer months, the kitchen temperature may rise well above its maximum operating temperature and cause a problem with the ice machine's capacity at a time when the customer's demand for the ice is greatest.

Most ice machine manufacturers will also specify a minimum ambient temperature to which an ice machine can be exposed. If a machine is exposed to temperature lower than specified, it can also cause problems with the ice machine's production.

A technician should look for these situations when servicing any ice machine. Many times machines are installed in a very hot kitchen or a very cold basement, and a technician is faced with a problem he/she cannot solve without relocating the ice machine.

Another scenario a technician may encounter is an ice machine with a capacity that is simply too small for the needs of the customer. The ice machine may have been sized properly when the customer's business first started, but now their business has grown and so has their need for ice. When this occurs it is often beneficial for a technician to determine the ice production from a machine. This can be done by recording the cycle time and weight of the ice produced from one cycle, and then using the following formula to determine the machine capacity:

$$\text{Ice Production in 24 hours} = \left(\frac{1440}{\text{Cycle Time}}\right) \times \text{weight of ice produced in one cycle}$$

This will yield the production of ice in a 24-hour period, which is how most ice machines are rated. For example, let's say we measure a cycle time of 20 minutes and weight of ice produced from one cycle of 6 lbs.

$$\text{Ice Production} = \left(\frac{1440}{20\text{ minutes}}\right) \times 6\text{ lbs} = 432\text{ pounds of ice produced in 24 hours}$$

This machine will produce 432 pounds of ice in a 24-hour period. If this is relatively close to the stated capacity of the machine, it is working normally and the problem lies with the current needs of the customer and not the actual operation of the ice machine. These types of problems are not typically found when servicing ice machines; most of the time there is an actual system defect. However a technician should be alert to these possibilities while servicing these machines.

Low Pressure Controls and Refrigerant Blends

Low pressure controls are used on many medium temperature refrigeration systems to control case temperature. In order for this type of control to work properly both its cut-in and differential (or cut-out) pressure settings must be set correctly. The control's cut-in setting must be set to cycle the compressor back on: 1) at a pressure that will ensure adequate defrosting of the evaporator, and 2) at a case temperature that is not too high for the product being refrigerated. For some applications this may be at a saturation pressure corresponding to a 38°F saturation temperature. Since refrigerant blends have a varying saturation temperature corresponding to a specific saturation pressure, a service technician must choose which saturation pressure/temperature relationship to use. When setting the cut-in pressure of a low pressure control the ***dew point temperature*** of a refrigerant blend should be used. This will cycle the compressor on at an appropriate coil/case temperature.

Once the cut-in pressure has been set, the control's differential setting must be set. The differential setting is used to cycle the compressor off at the lowest designed case temperature. The differential setting represents the difference between the cut-in and the cut-out pressure of the pressure control. For example if the cut-in is set at 34 psig and you want the compressor to cycle off at 24 psig, the differential setting would need to be set at 10 psig (34 psig - 24 psig = 10 psig). The appropriate cut-out pressure when working with a refrigerant blend must reflect the average saturation temperature within the evaporator minus any pressure drop through the suction line. For example, if an average coil temperature of 25°F is desired and the refrigerant blend enters the evaporator at a saturation temperature of 21°F and is at 29°F before the refrigerant becomes superheat, the cut-out pressure would then be set corresponding to the ***dew point temperature*** of the higher saturation temperature, which in this example would be 29°F minus any pressure drop through the suction line. For example, if R-401A were the refrigerant used in our example and a pressure drop of 2 psig was assumed across the suction line, then the actually cut-out pressure would be 26 psig minus the 2 psig, which would equal a cut-out of 24 psig. If the cut-in value were set at 34 psig, then the differential would need to be set at 10 psig.

Calculating the average saturation temperature required and the pressure drop across a suction line may be difficult at times. Here's an alternate method which can be used to set the cut-in and differential pressure setting of a low pressure control:

- First, set the cut-in value of the low pressure control to the appropriate value for the refrigerant to be used.
- Then, initially set the differential of the low pressure control to an extremely high value (a value the suction pressure should never reach under normal operating conditions—30 psig should suffice).
- Allow the system to run while monitoring the box temperature.
- Once the box reaches its lowest desirable temperature, slowly adjust the differential counter-clockwise until the compressor cycles off.

Using this procedure will ensure the differential settings have been properly set and the system will cycle properly. >>

SIGNS OF THE TIMES

On a taxidermist's window:
"We really know our stuff."

In a podiatrist's office:
"Time wounds all heels."

On a fence:
"Salesmen welcome! Dog food is expensive."

At a car dealership:
"The best way to get back on your feet - miss a car payment."

Outside a muffler shop:
"No appointment necessary. We hear you coming."

In a veterinarian's waiting room:
"Be back in 5 minutes. Sit! Stay!"

At the electric company:
"We would be de-lighted if you pay your bill. However, if you don't, you will be."

In a restaurant window:
"Don't stand there and be hungry… Come on in and get fed up."

In the front yard of a funeral home:
"Drive carefully. We'll wait."

At a propane filling station:
"Tank heaven for little grills."

At a radiator shop:
"Best place in town to take a leak."

COMING EVENTS

Air Filtration Basics
(You Thought You Knew It All)

Dan Holohan (Who??)

Ice Machines

Gas Heating

Chillers

Tankless Water Heaters

If you have any suggestions or requests for Future programs, please let us know!

Our congratulations to all the students who successfully completed the RSES Technical Institute Educational Program. The Certificates will be presented at the September meeting. PLEASE ATTEND.

Wednesday September 12th, 2012 at 7:30pm

at

RICCARDO'S
21-01 24th Avenue, Astoria NY 11102

Air Filtration Basics (You Thought You Knew It All)

by

Bill Ferguson - Hall Components

PLACE LABEL HERE

EDUCATIONAL PROGRAM
Wednesday September 12th, 2012
at 7:30pm
SEE DETAILS—THIS PAGE

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