www.vtechonline.com

VTech e-news

#12

Time Saving and Quality Issue

Price Industries Begins In-house Coil Manufacturing

Price Industries, of Auburn, GA, recently decided to manufacture their own water coils for their air handling units, investing in a state-of-the-art VTech 50 Pressure Decay Leak Detection System. The VTech machine is part of a major investment that includes fin press, expander and hairpin bender.

More information about Price can be found on their website: http://www.price-hvac.com/

"It wasn't that we weren't happy with our current coil supplier," says Kevin Hoskins, Design Engineer at Price. "We just decided to cut down on transportation and handling costs by making our coils in-house. We contacted VTech and after a detailed technical review, including sending them sample coils for testing trials, we chose the VTech 50 Pressure Decay Leak Test System for our needs."

The high-pressure testing of the coils (up to 450 psig) require a safety enclosure, which we integrated into a section of roller conveyor, so the coils can easily be slid in from one side and out the other side. A dedicated dry air supply system was installed next to the VTech 50; as an alternative to bottled nitrogen and the expense and time-consuming task of having to frequently change supply tanks, the unit supplies the required pressure for the test.

Installation and training only required one day; The VTech system arrives fully assembled, is designed to be simple to set up, and is intuitive and easy to use, all

(Continued on page 2)

Keep it dry: POE Oil

Older refrigerants such as R22 used mineral oils to lubricate the compressors, which were not as adversely affected by water vapor. The newer refrigerants such as R404a use a form of POE (Polyester) oil that is similar to the brake fluid in automobiles. It is an anhydrous material, containing no water, but is therefore very hygroscopic and readily absorbs any available moisture. If water vapor is present in the refrigeration circuit when the unit is charged with POE oil, the oil absorbs the moisture and while failures aren't immediately noticeable, in approximately six months, the compressors fail.

Moisture can also break up the chemical bond of the oil itself in a process called hydrolysis, which results in the decomposition of the oil. The alcohol and acid components of the oil separate and if a large amount of acid is formed, creates corrosion and shortens the material life of the system.

So, all the necessary steps to keep the POE Oil dry should be taken: if the compressors arrive pre-filled from the supplier, only removing the compressor caps a short time before assembling onto the unit is recommended. Other tips include keeping the oil containers "covered" with a nitrogen blan-

(Continued on page 2)

"Time is free, but it's priceless. You can't own it, but you can use it. You can't keep it, but you can spend it. Once you've lost it you can never get it back."

--Harvey MacKay

Coil Testing at Price continued from page 1

while providing the most comprehensive testing equipment design. Several layers of programming logic help utilize the full power of the PLC, creating a knowledge-depth or "information value" of the test while automating it at the same time.

For instance, if the high pressure set point of the coil isn't reached within a preset (adjustable) time, an error is displayed and the test is aborted, indicating a massive leak. Time isn't wasted trying to pressurize a coil that cannot maintain the pressure. That coil is removed immediately for repair. Additionally, a compare feature measures two identical coils side by side for another rate of change comparison; while each coil may be behaving within preset parameters, one that deviates considerably more than the other indicates some type of problem. The amount of acceptable deviation is of course adjustable and can be turned off.

Perhaps most importantly, the results aren't left up to an operator and the naked eye, but to some fundamental science and straightforward technology.

Ultimately, whether you manufacture coils to sell to your customers or you manufacture them for your own use, the goal is first-time quality. No one has the time or money to waste fixing the problem afterwards. If you've given any thought about manufacturing more of what you buy in-house, or want to improve the quality of the components you sell, contact Gordon Purkis to inquire about what VTech can do to help at (678) 691-4935 x.100 or g.purkis@vtechonline.com

POE Oil continued from page 1

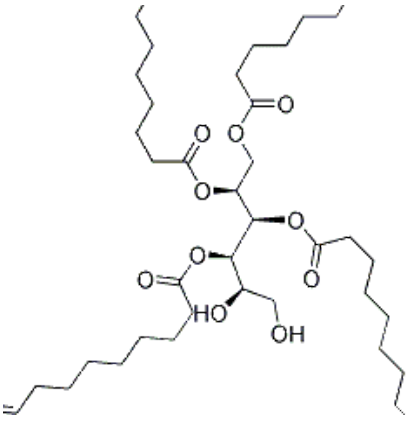
ket, and even being kept under vacuum.

Moisture (i.e. water vapor) isn't the only issue. The POE Oil also absorbs gases, called non-condensables, which include oxygen, helium and nitrogen. Interestingly, nitrogen is often used to keep the inside of the compressors dry during shipment, so while it serves a purpose, it also creates another issue. If not removed, these gases can remain absorbed within the oil and occupy the space intended for refrigerant vapors, diminishing the heat transfer properties of the system.

No matter how careful you are, the oil will absorb some moisture, depending on the working environment, the time of year, etc. So pre-evacuation, removing residual water and non-condensable gases from the system, is more important than ever, just as important as leak detection and the accuracy of the refrigerant charge.

A thorough evacuation can't be rushed by simply employing large pumps; achieving a low micron level immediately with an oversized pump doesn't remove the trapped moisture and gases in the oil. These must be removed slowly, over the course of about 10 minutes depending on the size of the circuit. Conductance, among other factors, limits the speed in which these unwanted materials can be evacuated. Multiple pumps are employed based on productivity to mitigate the time.

In previous issues we've talked about sizing vacuum pumps. Another useful tool for computing the correct vacuum pump size is a nomogram (see page 3).



POE Oil: Diglyceryl Monostearate

Takt Your Time

Takt is the German word for the baton that an orchestra conductor uses to regulate the speed, beat or timing of the musicians they are conducting. The term *takt time* has been adopted by Lean Manufacturing practitioners to signify the rate in which a product must be completed in order to meet customer demand. A takt time of two minutes, for instance, means that every two minutes a finished product must be produced.

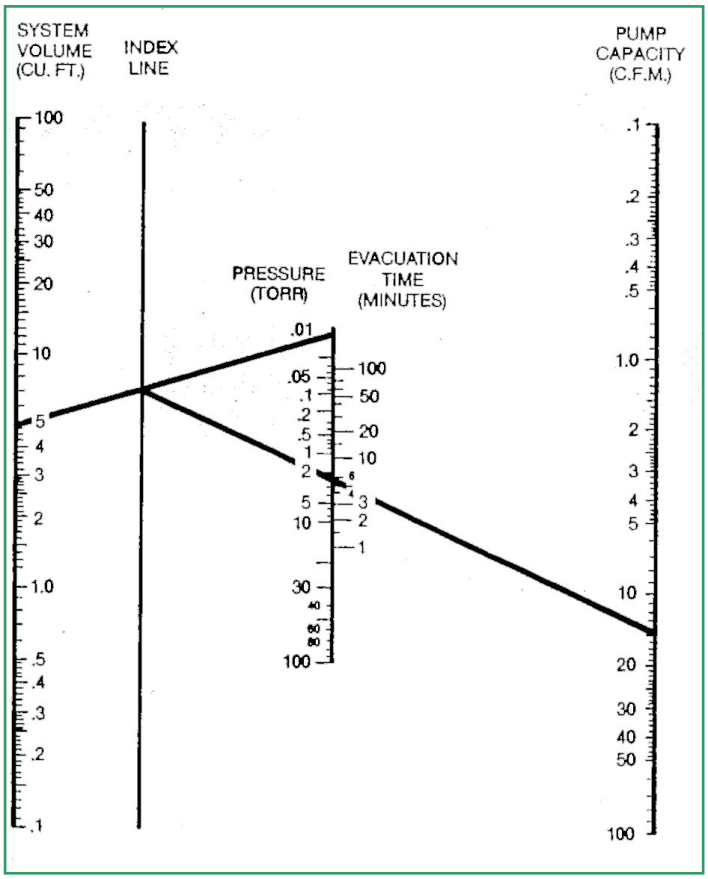
Takt time is determined directly by customer demand, whether or not a manufacturer keeps an inventory or follows the "just in time" (JIT) methodology of Lean Production, which views carrying inventory as a wasteful means of compensating for manufacturing inconsistencies, resulting from mismanaged or lost time, regardless of cause.

Takt time behaves inversely to demand, meaning when demand increases, takt time decreases, and when demand decreases, takt time increases. Producing to meet the desired takt time with optimal staffing is the target, where the right amount of people and equipment are used to produce your product within your established takt time.

Imbalances in takt time create a need for precautionary inventories and "buffer" space. Due to documented supply issues in the past and assumable problems in the future, an inventory is maintained to meet demand in the event production is slowed or stopped.

Even if keeping some inventory is considered a wise precaution, at least until true lean practices can become a reality, the first step is to monitor an aggregate takt time in order to move toward preventive, as opposed to reactive, quality measures. That is, if you can detect, contain, and correct a problem within the ideal takt + buffer time, then you have begun to the process of Error-Proofing. The first step toward achieving desired takt time is to improve in eliminating errors, or any factors that exist or occur "outside of the normal condition." That is the idea of "continuous improvement."

Supplier quality is an important consideration in improving your quality. You require equipment that is dependable and capable of performing to your takt time. When we approach a project, your takt time is the first thing we ask. This allows us to offer the appropriate equipment for your particular needs. Generally we're given a range, a low to high, which also allows us to factor an average. A range is helpful since demand isn't static. Many manufacturers create production goals in stages, allowing for increases in demand later, especially when redesigning line flow and adding new or replacing old equipment.



Pump Size Selection Nomogram

Example: take the known volume of the circuit, in this example 5 cubic feet, and extend a line through the index line to the desired ultimate pressure of 0.1 torr. From the intercept of the index line, extend a line through the evacuation time allowed (5 minutes) to the pump capacity line. In this example, a 15 cfm pump is the appropriate choice.