DXair is a GREEN MACHINE

w/Fluid Cooler/Dry Cooler Technology

DXair's RRS (Reduced Refrigeration Systems) Separates Manufacturers, Engineers & Contractors from the Competition and is used in "green"/Leed applications.

- *DXair introduced RRS in their indoor swimming pool dehumidification systems in 1988 under the DRY-AIR name, and we continue to distance ourselves from the competition. We have offered RRS for over 25 years. Instead of the very large refrigerant charge needed with air-cooled condensers, glycol/fluid cooled heat exchangers are used for heat rejection*

- *Since the Kyoto Protocol global environmental treaty in 1997 when chlorofluorocarbon (CFC) refrigerants, such as R-12 and R-11, were slated for phase-out, refrigerant is still considered an unpopular term among environmentally-conscious people. DXair was the first to introduce Green technology using Secondary Coolant Refrigeration Technology (SCRT) better known as RRS in 1989 and has always been standard components on our line of DXAIR reclaim dehumidification systems. The use of RRS has substantiated many green benefits including higher system efficiencies, lower installation costs, lower maintenance costs plus annual energy cost savings in all of our dehumidifiers.*

LOWER INSTALLED COSTS

Compared to the traditional DX systems, substantial savings are achieved in material reduction and installation labor. Specifically:

- *The refrigerant circuit of a dehumidifier that uses glycol as a heat rejection transfer fluid is compact and factory-charged and sealed, which eliminates onsite refrigeration work by a certified technician.*
- *Glycol is 95 percent less expensive than refrigerants. With refrigerant prices and management costs perpetually rising, a system with hundreds of pounds of refrigerant carries considerably more risk management liability than a glycol-based system.*
- *Glycol systems can be piped to nearly infinite lengths and height levels that are only dependent on proper pump horsepower sizing and hydraulic design considerations.*
- *Refrigerant grade copper isn't needed. A 20 to 40% reduction in cost can be achieved using plastic or water grade piping.*
- *No special pipe requirements are needed for risers, or traps for oil returns.*
- *No nitrogen flow is required for cleaning or welding.*
- *Vacuum isn't required in the condenser loop.*
- *No electric defrost is required.*
- *No TXV valve adjustments are needed. The only TXV is in the compressor section.*
- *No high-pressure test requirement.*

All of the above add up to material, labor and time savings that help move the project forward.

HIGHER MOISTURE REMOVAL capacity and efficiency:

RRS Have Higher Efficiencies

- *The concerns that many engineers and contractors have is whether a reduced refrigerant charge is a trade-off for efficiency. When designed properly, reduced refrigerant systems are overall more efficient. They are equally as efficient as their DX counterparts in the high cooling demand on summer design days and as much as 6% more efficient than conventional DX dehumidifiers throughout the rest of the year.*

ADDRESSES ENVIRONMENTAL ISSUES:

The effect of refrigerant on the Total Equivalent Warming Impact (TEWIC) index is a major concern. Recent independent studies confirm that secondary coolant systems are environment-friendly. The secondary coolant fluid, propylene glycol, is 100% environment friendly with no impact on the ozone layer or on global warming plus, it is considerably less expensive than refrigerants. The potential for refrigerant leaks that affect the ozone layer is greatly reduced. The primary refrigerant charge is reduced by 75 to 85 percent, which yields a significant cost savings.

DO NOT BE MISLED BY CLAIMS BY OTHER MANUFACTURERS' CLAIMS OF 80-90% REDUCTION OF REFRIGERANT!

For example, let's compare a nominal 8 ton system with another competitor's nominal 8 ton system. In this case we'll use NE008 Series. Our DXAIR 096 8 ton without a DX Condenser carries a refrigerant charge of 9.25 lbs. of R410A. With the condenser we add 4.80 lbs. of refrigerant for a TOTAL INSTALLED SYSTEM of 14.05 lbs. /refrigerant. With a fluid cooler, it remains at 9.25 lbs. of refrigerant.

The SERESCO™ NE Series 8 Ton carries 44 lbs. and another 10 lbs. of refrigerant for the condenser. That is a total of 54 lbs. of refrigerant vs. our 14.05! Use a fluid cooler & you still have 44 lbs. of R410A. When manufacturers state a reduction of refrigerant up to 85%, it may mean very little in the scope of total refrigeration. Every little bit helps… but do not be misled by these claims. Do your own research; ask what each piece of equipment carries in charge because eventually everything inevitably comes at a cost.

UNIFORM FIRE CODE COMPLIANCE

The Uniform Fire Code requires has specific requirements for the amount of refrigerant per 1,000 cubic feet of space. Should that limit be exceeded, audible and visible alarms tied to the fire monitoring system are required. Should there be a refrigerant leak, the fire department is called and the building evacuated. With SCT, only a mixture of water and antifreeze is circulating, hence automatic code compliance. With some DX systems, local code compliance can cost thousands of dollars due to the installation of necessary leak detection devices and fire monitoring systems. Considering the current state of public opinion on refrigerants, consulting engineers or contractors who specify a reduced refrigerant natatorium dehumidifier for a new construction or retrofit project not only have an edge over their competitors' conventional specifications, but they also portray a cutting-edge mindset.

Instead of the large refrigerant charge/heavy outdoor air-cooled condenser approach, glycol/fluid cooled heat exchangers (also called dry-coolers) are used to reject heat.

The Advantages of RRS

The contractor's and engineers competitive advantages with a reduced refrigerant system consist of many factors:

1. *The refrigerant circuit of a dehumidifier that uses glycol as a heat rejection transfer fluid is compact and factory-charged and sealed, which eliminates onsite refrigeration work by a certified technician. In multiple compressor units, the fluid-cooled circuits are combined into a single manifold set of PVC pipes to the fluid cooler (dry-cooler).*
2. *Glycol is 95 percent less expensive than refrigerants. With refrigerant prices and management costs perpetually rising, a system with hundreds of pounds of refrigerant carries considerably more risk management liability than a glycol-based system.*
3. *Glycol systems can be piped to nearly infinite lengths and height levels that are only dependent on proper pump horsepower sizing and hydraulic design considerations.*

Conversely, onsite placement of a conventional DX system's condenser and dehumidifier is extremely limited before refrigerant and oil management issues are encountered.

4. *Glycol system installation labor and material costs are considerably less since the required copper line sets needed for each DX circuit can be substituted with a single PVC or CPVC piping set on glycol systems.*
5. *Glycol is an environmentally-preferred heat transfer liquid.*
6. *Eliminating exterior copper minimizes exposure to the recent trend of copper theft.*
7. *Longer piping runs and more field-brazed joints increase the chance of refrigerant leaks. Today's refrigerants, such as R-410A, are blends of refrigerants. Blend refrigerants with different molecular structures tend to leak out at different rates — thus skewing the original formula ratios — which is commonly called fractionation. This inadvertently creates a modified refrigerant blend for which the system was not designed. The resulting system performance degradation is often costly to diagnose in service labor and the replacement of hundreds of pounds of refrigerant is very expensive at an approximate price of $20/pound. Reducing refrigerant systems to help save the environment is a proven technology that has come of age. It's now the contractors' and engineers' responsibility to think outside the box and introduce the technology to the end-user.*

Since their introduction in the 1970s, DX dehumidifiers have dominated new construction indoor pool HVAC designs. Many of those installations from the 1970s, 1980s, and even the 1990s are reaching the end of their lifecycle and need retrofits. An RRS design potentially gives a design/build contractor or consulting engineer a tremendous advantage over the competition on a retrofit project, especially when combined with today's technological advances that offer efficiency far surpassing the original equipment.

The Perfect Balance of Water and Air

DXair Dehumidifiers are designed exclusively for use in all indoor swimming pool applications: from lap pools, schools, large hotel/resort indoor swimming pools, where humidity needs to be controlled with dehumidification to prevent deterioration of the pool enclosure.

Bulletin # 8 coil myths

DEHUMIDIFICATION COIL MYTH

If you are looking for an engineering myth that has whiskers on it, you need to look no further than, "If you need to dehumidify, you must specify a 6, 8, or 10 row coils. The more rows the better."

The preceding statement is obviously false if you just think about it for a minute. The very first heat-transfer equation everyone learns is: q = U A Dt. The "A" stands for surface area. A coil's surface area can be increased by adding rows, increasing face area and adding fins. To prove that a 4-row coil can dehumidify just as well as a 6-row coil, I ran a series of selections through a major coil manufacture's coil selection program. I began with a 6-row, 4-pas, 8 fins-per-in. (FPI) coil that would reduce the moisture content of 5000 CFM of air at sea level from 123 gr per lb. to 74 gr per lb. The program gave me a coil with a face area of 11.46 sq. ft. I then changed to a 4-row, 4-pass, 8 FPI coil and began increasing the face area until I achieved the same leaving-air conditions as the 6-row coil. My chosen 4-row coil had a face area of 19.79 sq. ft., and increase of almost 73 percent, but it dehumidified the air just as well as the 6-row coil.

In order to eliminate the possibility that this was a fluke, I ran similar selections with the same entering and leaving conditions at 10,000 CFM, 15,000 CFM and 20,000 CFM. The results are summarized in the table below. In each case I was able to select a 4-row coil that would do the same duty as the 6-row coil.

One of the arguments for multi-row coils is the increase in the dwell time, the amount of time that the air is in contract with the coil surface. The longer the dwell time, the more dehumidification. As you can see by the comparative face velocities between the 6-row and the 4-row coils, increasing the face area not only increases the surface area, it also increases the dwell time by decreasing the face velocity. I maintained the same 8-FPI for both the 6-rwo and the 4-row coils. I could have decreased the face area of the 4-row coil and still increased the surface area by increasing the FPI. This course of action, however, has its trade-offs. By increasing the FPI, you increase the airside pressure drop and increase the fan hp. Not only that you make the coils harder to clean, it doesn't take long for a wet coil with 14 FPI to become a filter. NOTE THE COMPLETE ARTICLE IS FOUND ON OUR WEBSITE UNDER RESOURCES. (Joseph Tinely PE)

4-row and 6-row coil comparison

5000 CFM	5000 CFM	10000 CFM		10000 CFM	15000 CFM	15000 CFM	20000 CFM	20000 CFM
ROWS/FPI/PASSES	ROWS/FPI/PASSES	ROWS/FPI/PASSES		ROWS/FPI/PASSES	ROWS/FPI/PASSES	ROWS/FPI/PASSES	ROWS/FPI/PASSES	ROWS/FPI/PASSES
6/8/4.	4/8/4.	6/8/4.		4/8/4.	6/8/4.	4/8/4.	6/8/4.	4/8/4.
11.46	19.79	19.79	Face area (sq ft)	35	30	50	40	75
436.4	252.6	505.3	Face velocity (fpm)	285.7	500	300	500	266.7
286.8	283.2	556.4	Total capacity (MBH)	576	867	890.2	1208	1187
111.8	110.2	217.1	Sensible (MBH)	223.9	337.6	345.8	469.7	461.3
0.55	0.14	0.71	APD (in. w.g.)	0.18	0.7	0.19	0.7	0.16
2.31	2.21	3.27	WPD (ft)	5.54	4.9	14.56	10.51	5.82