



REFRIGERATION REVIEW

Air Changes in Refrigerated Spaces

As has been previously discussed, in calculating heat gain for refrigerated rooms, the big challenge is how much infiltration will be required to have water vapor removed. Upwards of 1,000 BTU/lb to remove water vapor from air is the ultimate challenge.

So often experience is the only benchmark you have to use to determine how many air changes per day must be accounted. Some of the old ASHRAE guidelines and data books had charts for single rooms to determine the air changes expected per day. While this, of course, varies by the size of the room in its application, there are some benchmarks you could use to develop a comfort level with what air change is applied. I have included a graph below which I have developed over the years which can serve as a benchmark for rooms and freezers of various sizes. As the room gets smaller, which normally won't be refrigerated room applications, it is obvious that the air changes greatly increase. For instance, the air changes for home refrigerators could easily be 25 air changes per day. The same would apply to reach-in cooler cases in a convenience store where you get cold drinks or sodas. The graph is intended for stationary, refrigerated freezers with typical use for storage of refrigerated, palletized product.

As you can see, the air changes greatly diminish as the room size increases. This is why you can get 16,000 to 20,000 cubic feet/TR in large freezers, whereas low-ceilinged rooms might be 8,000 to 10,000 cubic feet/TR. Some benchmarks using square footage are used, but care must be taken that the cube is a more indicative benchmark for air changes in storage rooms.

Dock areas do not apply to this chart, and air changes on docks can be vastly different. The benchmark for docks is typically 5 TR per door opening, although depending on the dock width, size, and length, that can vary.

Air changes in process areas are a totally different scenario and have to consider such things as wash down/cleanup and wet floors, and is a topic for future discussion.

