The Cold Facts

Spring 2003

Pictured above: RSC Superclean™ procedure—cleanliness does count! Note there is no smoke or sparks inside the pipe.

Pictured at left: Industry standard procedure. Note the smoke and sparks inside the pipe.

When Is Clean SUPER? According To RSC, When It's SUPERCLEAN™!

Don't allow your system to be installed using an inferior procedure. You deserve every opportunity for a well designed, reliable system that is installed using the best practices possible.

The industry has always known about the negative impact of dirt and debris on the life cycle of equipment. And, as we have traveled, visiting many plants and engine rooms around the country, it's obvious that you know the value of clean, well kept facilities and machinery rooms. There is a dramatic difference in cleanliness compared to what we saw years ago.

Within the last few years, every industrial contractor has had the opportunity to evaluate procedures to improve this situation. Industry organizations have developed committees to evaluate and improve many aspects of system design and installation, including cleanliness. Design engineers are specifying enhanced installation procedures with the specific goal of improving operations. Owners and operations people are more aware of the benefits of cleanliness and proper care of the facility and systems. Maintenance departments are universally interested in cleanliness, which confirms our industrial society's ongoing search for improved performance and safety.

As you can see from the accompanying photographs, there is a big difference in cleanliness between processes. Either weld depicted will meet the inspector's criteria and will properly contain the refrigerant. But is the industry standard acceptable for your plant?

There are several other companion procedures that result in a cleaner installation. A cleaner process will return benefits to you. Isn't it logical that less dirt and debris will enhance equipment life, reduce downtime and improve performance?

For more detailed information, please contact your RSC representative. If you're looking for a way to review the process at your leisure, we can send you an eight-minute video tape or a CD-ROM.

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Air Movement and Condensation

Condensation forming on walls and ceilings in refrigerated spaces can be anything from a nuisance to a serious problem depending on the use of the space. There are several sources of moisture that vex refrigerated spaces. It can come from the product, sanitation procedures and/or infiltration. You're familiar with the product and sanitation issue(s). You may not be familiar with infiltration, which is the topic of this article.

Infiltration is a condition that must be addressed—always. Some geographic locations, all processing plants and many other installations have more serious problems than others. Infiltration is warm, moist air that gets into the space through doors and other openings. There are primarily two reasons this happens; either there is a difference in the air pressure between the two adjacent areas, or there is a difference in the temperature, or both.

Let's talk first about a difference in temperature. This source of moisture can be likened to opening your refrigerator door. Every time you open it, cool air falls out of the box heading toward the floor. Cold air is heavier than warm air! And, naturally, the warm room temperature air replaces it. Unfortunately, the warm air can hold more moisture than cold air, so every time you open the door, a new batch of warm air and *moisture* are introduced.

The same is true for your refrigerated space. This is the reason we may see a higher rate of infiltration-related moisture during the warmer months. Then, in cooler drier weather, the problem may subside.

The other cause of infiltration is a difference in air pressure between adjacent spaces. Regardless of whether the difference is caused by an exhaust fan or inlet air, a very minor difference in air pressure can cause major infiltration problems. Now, if there is a difference in temperature also (and there typically is), the problem can be severe.

You might ask, "What are the consequences of infiltration?" The warm air and moisture require additional refrigeration capacity. So you'll need more or larger equipment and your power bill will increase.

How do we address this problem? In a well-designed refrigerated space, evaporators are selected and placed in such a way as to ensure good air movement throughout the space. If there's good air movement, moist air from all areas of the room will be pulled into the evaporator. The moisture will separate from the air and condense (or freeze) on the tubes of the evaporator. Refrigerated drier air will then be returned to the room.

Sometimes the selection and placement of evaporators is a compromise. The location of the evaporator(s) may be less than optimal due to ceiling height restrictions, location of other equipment, personnel stations or space configurations. Relatively low ceilings in spaces where people are working usually need evaporators with less discharge velocity to minimize discomfort to personnel. These compromises can sometimes lead to condensation problems.

Anytime there is poor air movement or none at all, there is a potential for condensation. The goal is to ensure that drier, cooler air is washing all of the surfaces to avoid condensation. That cooler, drier air will then pick up the moisture in the air. Without good air movement across surfaces, humid air that comes in contact with cold surfaces will cause the moisture to condense.

If evaporators cannot be placed in or are not in optimum locations, it may be possible to mitigate the problem by adding fans. The goal in this case would be to try to eliminate areas of poor air circulation. Good airflow will minimize the risk of condensation, but the best solution of all is to fix the source, if possible.

—Ron Odom, Director of Engineering

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