



ICE BUILDUP REVISITED

By Bill Lape, SCS Engineers

With winter right around the corner, and the fact that those of us that live in, or close to, the Great White North (shout out to Bob and Doug McKenzie) have already experienced a buildup of snow and ice on the ground, it is apropos to revisit the subject of excessive ice buildup on our ammonia refrigeration systems. As I stated in the last article on this subject, this is a topic that is frequently discussed (some would say argued). Regulatory officials have often been concerned with a thin layer of frost on a product tank surge drum or a valve train, such as shown in the photo below. However, operators of ammonia refrigeration systems recognize that this is a normal level of frost buildup, and because it does not impede operation of the valves, and does not negatively affect the physical integrity of the valves and their supports, it is not grounds for concern.



But what about a more significant amount of ice buildup on a valve train? Say, perhaps what is evident in the picture on the top right?

Now we have an issue. Because the ice buildup has progressed to the point where we are unable to physically operate the valve's manual stem, we must first defrost the valve.

Is this out of compliance? Well, it depends on the situation. IIAR6 states in Section 5.6.8.1 that, "Ice buildup shall not interfere with the operation of emergency shut-off valves."

While some may argue that the manual stem is not an emergency shutoff valve, if it is ever intended to be operated during an emergency shutdown of its associated equipment, then it becomes part of the emergency shutdown procedure for that equipment and, as such, it is now out of compliance with Section 5.6.8.1. So, be mindful of your emergency shutdown procedures. Review them and evaluate any maintenance requirements that may arise based on the valves that are identified in the emergency shutdown procedure.

IIAR6 goes on to state in Section 5.6.8.2 that, "Ice accumulation shall not be permitted to deflect or bend pipes, displace components, or negatively impact the system's structural integrity."

Here are some more examples of possible "excessive" ice buildup:



Insulation is a component of the refrigeration system. If it is displaced by ice, then it is not compliant with IIAR6, Section 5.6.8.2.

Remember that IIAR 6 does state in the informative appendix that, "The owner is permitted to develop and incorporate defrost operational procedures, ice removal procedures using mechanical tools, or both, with determined frequencies to safely remove ice often enough to avoid excess accumulation."

Always be mindful of the potential consequences of ice buildup, particularly if it is allowed to continue for an extended period of time. When developing inspection procedures for your system's mechanical integrity program, be sure to include criteria that defines what is considered excessive ice buildup for each piece of equipment. Then be sure to develop procedures for controlling ice buildup on each piece of equipment.

If you have photos of an Epic Fail please pass them on to nh3isB2L@gmail.com.

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