



## Sentry – Guard Coil Design

**April 2001**

As many of you know by seeing various ads in trade magazines, USA had developed a new product that we call our Sentry – Guard coil series. At present, this coil design is patented by USA Coil & Air and USA is the only company that offers this design in the HVAC industry. Below is a brief explanation of why we developed this coil and how it works.

### **Coil Freezing**

Any steam, hot water, or chilled water coil will freeze given the proper set of circumstances. Maintenance problems like open dampers, non-operating freeze-stats, boiler breakdown, and bad controls all contribute to freezing coils. This freezing process is not just limited to heating coils. Chilled water coils should be drained for winter operation in many parts of the country, but of course, they rarely are drained or maintained properly. There is very little you can do to *absolutely* prevent freezing of coils. Even when you do all the maintenance things that you should do, coils still freeze and there is no way to repair the damage that is caused during most freeze-ups. Generally, the coil must be replaced.

### **What Does Sentry – Guard Do?**

Coils freeze randomly. You can never pinpoint where a coil is going to freeze. It's *not* the actual "change of state" from water to ice that causes the damage. Pressures up to 2,000 PSIG are built up between freeze points, and this pressure build-up is actually what causes the damage. Sentry – Guard places freeze relief plugs at every place you can get a pressure build-up, and releases this pressure when it exceeds a preset limit. Inserts located inside the plugs burst and release the pressure to the atmosphere, thus preventing damage to the coil. It seems simple, doesn't it? The trick is to place the plugs properly on the coil and design the plugs so they burst above the test pressures of the coil, but below the pressures that cause damage to the coil. Actually, it's not simple at all!

### **How Much Does It Cost To Replace A Bank of Coils?**

Well, you obviously have the cost to replace the coil. In addition you have labor, piping, valves, cranes and other assorted costs. The number that USA likes to use is 3 times the cost of the coil. It could be more or less by 20%, but if you calculate the cost of the coil and multiply by 3, then you will come pretty close to the total cost of the job. For example, a bank of 3 chilled water coils might be \$10,000 for 3 coils, but the total cost to

do the entire job will be pretty close to \$30,000. And, of course, this doesn't calculate any downtime for the loss of heating and/or cooling to the building or plant.

### **How Much Does Sentry – Guard Cost?**

There are percentage adds based on what kind of coil you want to protect. Hot water and steam coils don't require as much Sentry – Guard protection so the add may be only 15% to 20%. Chilled water coils require much more protecting because of the number of rows and return bends, so the add may be 30% to 35%. In any case, it's a small price to avoid freezing at a later time.

### **Who Buys These Coils?**

Everybody, but particularly owners of hospitals, schools, universities, industrial plants, commercial buildings, etc. They obviously have a real stake in the operation of the HVAC system, and the addition to make coils Sentry – Guard are minimal to avoid replacement costs and downtime. Contractors can be less excited, because they view these coils as taking away future replacement business. And do you know what? They're probably right!

Sentry – Guard is not limited to replacement coils or new coils installed in built-up systems. We can build Central Station Units with Sentry – Guard coils or just about any coil that you would require. We think that you should seriously consider the Sentry – Guard design when you are involved in any service/replacement job or any negotiated or design/build work. This is a great product with a tremendous amount of value for the money that you spend. To get more information on Sentry-Guard, go to the product section of the USA website and click on "HVAC Coils", scroll down to find Sentry-Guard.



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