



HVAC Training Center  
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# The Comfort Zone

## DIRTY SOCK SYNDROME

We've had a number of questions the last couple months on unpleasant odors associated with start-ups of heating systems this season. So we thought we would share some background on an odor issue generally associated with heat pumps referred to as "Dirty Sock Syndrome," because that name approximates the smell involved.

Dirty Sock Syndrome is caused by the growth of bacteria and/or mold on the indoor coil. As the surface area of the coil becomes more compact, as it does with higher efficiency coils, the coil fin spacing is going to be tighter (more fins per inch of coil). The depth of the coil may increase as well because manufacturers want to expose a greater amount of coil surface to the air stream in order to improve coil heat exchange and in the process improve system efficiency. So as the coils grow in size, depth, and fin density, the coil is even more likely to trap bacteria and mold on its surfaces.

Heat pump environments are the most likely systems to be associated with Dirty Sock Syndrome. The reason is pretty simple. When the heat pump is in the heating mode, the heat pump heating cycle for most heat pumps is not hot enough to kill the microbes that grow on wet coils in the cooling mode. So, when the unit goes into defrost (cooling mode), the likelihood that the indoor coil is wet or moist goes up, which causes any microorganisms or bacteria that were dormant to become active again. When the heat pump goes back into the heating cycle, it only warms the microbes to a level where they off-gas their odors. And that's where the odor associated with this phenomenon come from.

When the outdoor temperature drops below the thermal balance point for the heat pump, supplemental heat for the heat pump will be energized. At that point, the discharge temperature of the system is likely hot enough to kill the microorganisms or bacteria as they move from air handler or furnace. That is why many customers will note that the odor seems to go away when they put the heat pump system in emergency heat mode.

Controlling indoor relative humidity is key to maintaining a healthy indoor environment that is less susceptible to this type of phenomenon. Anytime relative humidity gets much beyond 40% to 45% during the heating season, conditions are right for bacteria and other microorganisms to begin forming on the indoor coil. Helping your customer understand the importance of indoor relative humidity is key to solving the problem for them. Don't forget to investigate other potential sources of excessive moisture. The indoor coil drain pan can also be a source of mold and bacteria, particularly if there is a problem with the drainage and disposal of condensate from the pan.

For purposes of indoor air quality control, ultraviolet lighting is a good addition to most any HVAC system. However, because there are so many choices within this area of IAQ technology, caution must be used when selecting and installing any UV system. All UV systems are sensitive to installation location and air stream CFM. Efficiency for some UV

systems changes with air temperature. UV output levels vary widely from one manufacturer to the next as does air stream exposure efficiency. UV light wave length can also impact UV performance. The UVC spectrum destroys the DNA of microbial contaminants while the UVV spectrum is primarily used for oxidation, which is most often associated with neutralizing odors in the air.

The fact that a customer has a UV light system doesn't necessarily mean that particular UV system will be effective in controlling odors for their home. Some manufacturers of UV equipment make UV lights specifically designed for coil and drain pan and odor applications. Take the time to investigate several manufacturers to ensure the right choice for your customer.

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### **Training Program Schedule For 2006**

Don't forget to check the website [www.hvacsystemtraining.com](http://www.hvacsystemtraining.com) for the new 2006 training schedule. We are also offering a wider selection of evening programs this year for technicians in the local area. If you have any questions, e-mail us at [information@hvactng.com](mailto:information@hvactng.com) or call locally at 402-829-5606 or call us toll free at 1-877-758-5500. Best wishes to all of you for 2006.

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