VAST-12-001 Virginia Air Service Tip 11/16/12

Subject: **What is " Dirty Sock Syndrome "**

Moisture allowed to accumulate on evaporator coils or ductwork, under specific conditions, can promote the growth of mold spores, mildew and other microorganisms. The smell will manifest itself most often in heat pumps that switch from cooling to heating mode or when switching into defrost mode. It rarely occurs in gas heat applications as the temperature of the heat exchanger is typically high enough to kill the bacteria. Heat pump temperatures being lower simply warm them up (in effect cooking them), creating the odor. Nationwide studies suggest the number of homes that report this condition range from less than 0.5%, in dryer climates to as high as 2% in more humid areas. The syndrome is not brand specific, with all manufactures acknowledging complaints. The problem itself is sporadic, limited to individual households and has been shown in almost every case to be application or installation related.

In a retrofit, why did the problem not exist on the first unit, but it does on the replacement unit?

- Even with an identical "size for size" change out conditions are often different: The load requirement of the house may have changed (mature trees reducing solar gain, improved windows, added insulation). This could result in a like sized unit being oversized, resulting in shorter run times and less moisture removal.
- The new unit may have a different Sensible Heat Ratio (SHR), meaning its ability to remove moisture in the same percentage as the old unit has changed. Studies show that under standard ARI rating conditions the SHR of most HVAC products has not changed to any great extent as SEER levels have risen. However the unit's installation, relative to actual CFM, has a very large impact.

- The retrofit may have included changes to the ductwork (more returns, additional supply runs, longer trunk ducts).
- The new unit may move less air which results in coil that stays wetter for a longer period of time.
- The new unit may be moving more air, meaning less moisture is removed by the coil, leaving more in the air to cling to other surfaces (ductwork).

The point here is that the unit ***cannot*** produce these microbes. However, depending on how it's set up, it can create the conditions that allow them to grow.

What can be done to eliminate it? It is very important to properly identify the problem before any action can be taken, since many odor problems are incorrectly labeled as a dirty sock problem. If the odor is present all the time, especially during heat, the problem is not a dirty sock syndrome complaint. Dirty sock complaints only smell when the indoor coil gets cool and the bacteria releases its odor into the air stream.

The conditions allowing this microbial growth must be changed. Suggestions include:

- Verify no outside sources are causing the problem by getting into the duct system, such as bathroom vents, dry sewer traps, dead rodents or animals.
- Verify the ductwork has not be damaged when the unit was replaced, perhaps allowing moisture into the ductwork that was not present before
- Verify the site has not experienced flooding or water entry issues from storms or water pipe leaks.
- Verify the unit's airflow is correct for the application.
- Verify the unit was installed properly to allow full drainage from the pan and insure the drain line is properly trapped.
- The coil and/or ductwork may have to be cleaned. However this may provide only temporary relief if the conditions that allowed the growth are not corrected as well. Cleaning will bring the system back to normal and will usually prevent a complaint for the rest of the heating season. Some systems cleaned early in the

heating season or those having more of a problem may have repeated problems during the same season, especially if the weather conditions force a system back and forth from heating to cooling.

- Avoid acid based cleaners because if not used and removed properly they can create additional problems.
- The use of properly selected, properly applied UV lights can both deter microbial growth and kill existing microbes.

If the coil cleaning does not resolve the complaint to a satisfactory level, the next suggested action would be to have the coil coated with a special process designed to continuously protect coils from fouling caused by airborne contaminates. “See attachment”

Dirty Sock Syndrome complaints are generally aimed at the equipment manufacture however the evaporator coil only collects what is being circulated throughout the home and it is released when the conditions are just right.

Regards,

The Virginia Air Technical Service Team

HUSKY COIL COAT

DIP APPLICATION - Antique Bronze

PRODUCT DESCRIPTION:

Husky Coil Coat—Dip is Bronz-Glow's top of the line coating formulation to protect fin tube and coaxial coils against the affects of severe corrosive environments. It's a rugged, abrasion resistant finish which exhibits extraordinary tensile strength and flexibility; allowing it to expand and contract with a coil as it heats and cools. Husky Coil Coat protects in the entire pH Range of (1.0 to 14.0). It will not crack, chip or flake. This unique proprietary coating formulation forms a moisture resistant barrier that prevents the intrusion of contaminated moisture which causes coil failure. Husky Coil Coat has less than ½ of 1% degradation on heat transfer efficiency. It's a "single-component" coating product that can be field repaired by equipment owners; with aerosol touch-up, should the coating become damaged or abraded. Gas Chromatography Test (FID) reveal no evidence of residual solvent vapors. **Husky Coil Coat Dip and Bronz-Glow's dipping process is exclusively applied by Bronz-Glow's Certified and Licensed Dip Applicators.**

ENVIRONMENTS WHERE COMMONLY USED:

Coastal regions, sugar refineries, petroleum refineries, paper mills, chemical plants, off shore drill platforms, waste water treatment plants, tunnel exhaust systems, veterinary clinics, swimming pool environments, food processing and storage facilities, airports, fossil fuel power plants, hospitals, restaurants, marine applications, medical facilities, saw mills, convention centers, hotels & motels, shopping malls and many other moderate to severe corrosive environments.

ATMOSPHERIC CHEMICAL RESISTANCE:

Salt air, salt water, acid rain, hydrogen sulfide, sulfuric acid, hydrofluoric acid, ammonia, chlorine, hydrogen chloride, sulfur water, uric acid and virtually any other acid or alkali.

DIP COATING VERSES SPRAY COATING:

Bronz-Glow's dip coating process ensures the coil is completely immersed guaranteeing 100% coating coverage. Spray application on 1 and 2 row coils that have plate fins and a fin density of 16 fpi or less can be effectively spray coated. Coils that are designed with 3 or more rows in depth or are constructed with plat or enhanced fins at 17 fpi or above, become much more difficult to assure 100 % coating coverage.

COLOR: Antique Bronze

Factory dip coating services are available through Bronz-Glow Technologies, Inc. and our growing family of Bronz-Glow Partners known as Certified Applicators and Manufacturer's Representatives.

Dip coatings are often specified in Gov't Specifcations such as the U.S Navy, Army Corps of Engineers, Homeland Security, and NASA. Bronz-Glow also appears in SPECSINTACT and new unified specification for various Branches of the U.S. Govenent.

Retail firms such as JC Penney, Kmart, Walgreens, CVS, and Wal-Mart to name a few, usually require dip coatings for coastal store locations.

SPECIFICATION:

Equipment or Coils as indicated, shall be corrosion protected by Bronz-Glow. Bronz-Glow shall issue a **"Certificate of Coating Compliance"** to verify that the specification has been met as part of the closing documentation. An **"Owner's Coated Coil Cleaning Maintenance Program"** shall be available for documentation close-out and upon project completion.

Condenser coils, evaporator coils, water coils, or steam coils shall be coated using Bronz-Glow's Husky Coil Coat dip application process for corrosion protection. Coil coating material and process shall have passed a minimum of 6,000 hour salt spray test in accordance with ASTM Standard B117.85. Coil film coating shall be effective in pH range of 1.0-14. Product shall be a complex chain linked polyelastomer material with properties including 4,000 PSI tensile strength and 250% flexibility. Coating shall contain a 10 year Florida UV inhibitor additive. Coating should be field repairable, and touch-up material available in aerosol form. Field coating is not acceptable. No substitutes accepted.

Acceptable Products; Husky Coil Coat - Dip