

VAST-13-001

Virginia Air Service Tip

06/27/13

Subject: Poor House Ground causing white Flakes and Possible Formicary Corrosion

As we all know formicary corrosion of copper tube, aluminum fin evaporator coils is a serious concern for consumers, contractors and manufacturers throughout the industry. Owing to how the impacted copper appears under a microscope it is sometimes referred to as “ants nest corrosion or tunneling”. See figure 1

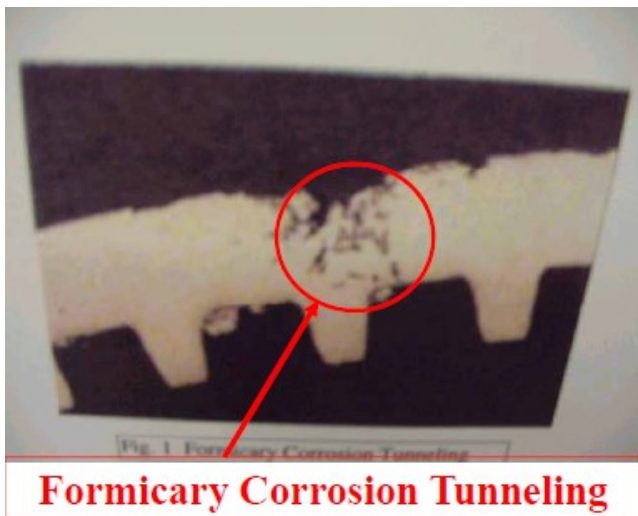


Figure 1 - Ant's Nest Tunneling

Formicary corrosion is caused by a chemical reaction requiring three parts: oxygen, water, and an organic acid. If any of the three parts are removed further corrosion can be prevented. The most baffling aspect is of this phenomenon is that it does not appear to occur uniformly throughout the country but is found in high numbers in some parts of the country. Studies are ongoing in an effort to identify the cause(s).

The industry also gets reports from time to time of consumers claiming white flakes are found in the home and preliminary studies have shown these flakes to be aluminum oxides from the evaporator coil. The cause has been found to be a poor ground house ground. A bad ground can allow a very small

amount of voltage and current to flow through materials that conduct electricity. Where water and dissimilar metals are found, such as on an evaporator coil, an anode/cathode effect can result, creating a battery where a very small amount of DC current can flow through the coil. In homes where the white flakes have been found I have measured .15 to .65 micro-amps. When a solid, complete earth ground has been installed, the current flow is virtually eliminated and the white flakes, which form as the aluminum fins on the coil degrade, are eliminated as well.

There have been no studies that I'm aware of that suggest formicary corrosion is also tied to a bad house ground. However we believe that until all the causes of formicary are identified performing a simple current flow test on homes where coils have failed is well worth the effort.

To perform this test, set a digital meter to the lowest DC micro-amp setting it allows. Place the black (negative) lead on the ground wire (or an unpainted surface of the cabinet) on the furnace or air handler, then place the positive (red) lead on the suction or liquid line copper near the evaporator, making sure you have a good connection. If a value greater than .05 micro-amps is found, it indicates a poor ground.

I recommend this test be made with a good quality TRUE RMS meter to assure accuracy. Please forward test results to your VA Air TSM and include the model/serial number of the coil. We will compile a database with the hoped end result of confirming or disproving whether this battery effect caused by a poor ground can be contributing to failed evaporator coils. Please call your local TSM if you have any questions.