

Acid Based Products on Copper

When raw Hydrochloric Acid is added to a sample of pure copper, there is essentially no reaction. Freshly formed copper is a rosy-pink color. It will graduate to a darker russet-brown color over time. Naked copper wire will inevitably change color according to its particular environment. Pure copper will not react with Hydrochloric Acid. It is above copper in the metal reactivity series which means the copper cannot replace the Hydrogen in the HCl to form CuCl_2 .¹(Socratic.org)

Copper has to be an oxide to react. $\text{CuO} + \text{HCl} = \text{CuCl}_2 + \text{H}_2\text{O}$.

When you see green color on the surface of copper, this is referred to as Patina. The Statue of Liberty is a well known visual of what the green Patina looks like. It forms over time and is totally harmless to the copper underneath. It also makes the copper underneath more water-proof and less open to further reactions.

The term tarnish on copper refers to a thin coating on the surface and is usually very uniform and will not destroy the intended purpose of the metal.²(sciencing.com)

Copper Oxidation vs. Iron Oxidation

When copper oxidizes, it provides a layer that will prevent further oxidation exposure and corrosion by solidly adhering to the metal's surface. When iron rusts or oxidizes, you see the characteristic red outer layer. This layer of oxidations doesn't securely stick to the surface of the iron. It flakes off, weakening the metal leaving it vulnerable to further rusting and structural decay. One positive effect of copper oxidation includes the formation of a protective outer layer that prevents further corrosion.³(sciencing.com)

Summary

Acid based products, like NMD 80 and OneRestore among others, contains Hydrochloric Acid; which will not harm a copper surface by simple contact and evaporation which may occur during during a wash down process. The surface tarnish color may be altered, but that does not cause the structure of the metal to be compromised.

Keep in mind, all chemicals are to be used as directed. This includes only using these products on the intended surfaces to be cleaned. Care should always be taken to protect adjacent surfaces not intended to be cleaned from the washdown liquid.

¹Socratic.org

<http://spmchemistry.onlinetuition.com.my/2014/01/position-of-hydrogen-in-reactivity.html>

²Summers, Vincent. "Why Does Copper Change Colors Over Time?" sciencing.com <https://sciencing.com/copper-change-colors-over-time-5377621.html>. 9 December 2020

³Whitezel, Joan. "The Effects of Oxidation on Copper" sciencing.com <https://sciencing.com/effects-oxidation-copper-8613905.html> 10 December 2020

