CORROSION INTERCEPT

Technical Bulletin 25 Corrosion Intercept Silver Protection

Intercept developed by Bell Labs to protect against the ravages of corrosion and tarnish.
Used by Lucent, The Royal Mint of England, The Guggenheim Museum, The Getty Museum, Raytheon, Intel, Delco and others to protect against their corrosion and tarnish problems.

Non Ferrous metals (such as Silver, Copper and Brass) tarnish by reacting with corrosive gases such as COS, SO_2, HCl and H_2S. These corrosive gases are formed by such forces as decaying vegetation, industrial smokestack output, burning fossil fuels (such as from cars, wood fires, burning leaves, etc.), from oil refining and pulp mills, from ocean surfaces, as well as many other natural sources. These gases are in every environment, even inside clean Lucent facilities.

Silver and Copper, and all of their alloys (Brass, Bronze, etc.) are very susceptible to tarnish and corrosion. Tarnish, the dulling of the luster of the metal, is the first visible sign of corrosion caused by Sulfidation. In nature, atmospheric Hydrogen Sulfide attacks the surface of Silver leaving Silver Sulfide (AG_2S) and Copper leaving Copper Sulfide (Cu_2S). This is done with the 5 parts per million of Hydrogen Sulfide that is the minimum amount present in any environment.

These microscopic vandals unceasingly attack the surface of all Silver and Copper objects left unprotected. Because of their ultra fine molecular size, Sulfur gases are able to penetrate all but a vacuum sealed barrier bag and attack the metal surface. Even when Silver or Copper is protected inside a VCI bag, or Polyethylene bag, or blue anti-tarnish bag, or Silver chests, or coin collection books and sleeves, etc., the metals are being attacked by the atmospheric gases.

This should not be surprising. Ore forms of Copper and Silver found in nature are, more often than not, Sulfates, Silicates, or Carbonates of the original metals. Take as an example the famous Comstock Lode found beneath Virginia City, Nevada. The Silver deposited in this "the richest" vein of Silver in the world is almost entirely Archentite, a natural form of Silver Sulfide. Living proof that nature has been corroding Silver and Copper with Sulfur since time began.

Until now, the only method that could be used to eliminate this unsightly tarnish has been its physical removal by manual or chemical means. It is important to note that all of these means are destructive to the surface of the metal object being polished because what is happening is the removal of the thin layer of Silver Sulfide - the surface of the Silver that reacted with the Sulfur. You actually wear away the object that you are trying to preserve in the continual maintenance of polished Silver and Copper objects. However, unchecked and unpolished the Sulfur will continue to go deeper into the metal, eventually pitting out Silver plate for instance, or requiring more layers of Silver to be removed to properly clean the object.

This tarnish becomes annoying in the case of functional equipment such as Silver flatware and serving items where the user might need to polish the Silver prior to using it for dinner. The Silver is then polished again after use and stored away. After 6 months of storage the user finds that, in spite of a closed Silver chest, the Silverware is again tarnished and must be polished again. This is tedious and destructive to the Silver, and now it is also unnecessary.

Unnecessary because now we have Corrosion Intercept, using a revolutionary new technology that will usher in a new age of archival and ornamental storage of Silver and Copper materials. Corrosion Intercept is a reactive polymer created by Bell Labs. The technology reacts activated Copper into the plastic matrix -- forming a whole new plastic. This reactive Copper then forms a tortuous path for these corrosive gases -- it is impossible for these gases to migrate through the Intercept material without hitting a piece of highly active Copper where the gases react and are permanently neutralized and stopped, thus protecting the metals stored inside. Likewise the material cleanses the air trapped inside of the package with your metal part - the surface area of the Copper on the surface of the bag is far greater than the metal being protected, so the gases will go to where it is easiest to react, the surface of the bag, protecting your valuables.

The system also reacts with and neutralizes Chlorine (important in environments near oceans), Ozone (for protecting items with rubber parts, or protecting paper, books, and other items affected by Ozone), Acetic Acid (generated from acetate paper and cellulose film), and Ammonia. However the most remarkable aspect of Intercept is that it protects against galvanic corrosion -- the corrosion that happens when two or more metals are joined together. Intercept sacrifices itself, by becoming a sacrificial anode, to protect these multiple metal combinations.

So, by simply placing your clean metals (Intercept will not reverse the effects of corrosion, it will just stop any additional corrosion from occurring) inside Corrosion Intercept it will be protected for 10 years per mil of Intercept material. Intercept does this without the use of any oils or any harmful chemicals. Intercept will not coat your products, but will sacrifice itself in protecting them. Intercept is also fully recyclable and has accelerated landfill breakdown time.

The design of the protection is limited only by your imagination. Intercept can come in the form of bags, zipper bags, film, thermoformable sheet, plastic corrugate, and bubble material. With these materials we routinely design boxes, shrouds, totes and trays to protect your metals and artifacts.

What if I have a Silver flute or a brass trumpet that has been lacquered. Doesn't the lacquer protect the instrument from corrosion? Lacquers and varnished provide minimum protection from corrosion in that they form a barrier over the

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surface itself. However, the barrier is only as good as the film that it forms. In the case of best metal lacquers on the market, methyl methacrolate and its family, the film produced is still porous and Hydrogen Sulfide makes its way through the pores to tarnish the surface of the metal beneath the lacquer. This is called undercoat corrosion, and is particularly noticeable in plated objects -- such as Silver or Gold plate. The Vatican Museum of Art is using Intercept to protect Gold plated chalices from this undercoat corrosion (Gold is very porous allowing gases to pass through and tarnish the metal underneath resulting in black spots). So simply place your plated or lacquered metals inside Intercept.

So, to protect the shine on your Silver jewelry, Silver plates, trays and silverware, Copper and costume jewelry as well as protecting your tools, fishing tackle and guns from rust and corrosion and to extend the life of your cameras and camera equipment, as well as your film and negatives all you need to remember is to store them in Corrosion Intercept. Corrosion Intercept for maximum protection from the harmful affects of tarnish and corrosion.