



# Harbour

INDUSTRIES  
High Performance Wire & Cable

## **Red Plague Commentary (Cuprous Oxide Corrosion)**

Harbour Industries is the preeminent manufacturer of PTFE insulated lead wire in the world. Since 1965, Harbour has never had a return or rejection for red plague on PTFE insulated lead wire. To put this statement in perspective, Harbour has shipped more than one billion feet of PTFE insulated lead wire in the past five years.

Red plague (cuprous oxide) is the result of galvanic corrosion occurring at the silver/copper interface of silver plated copper. In theory, cuprous oxide can only occur if the silver/copper interface is exposed to the atmosphere where moisture and oxygen are present. Additional, as yet unidentified, agents may also play a role. If left unchecked, cuprous oxide will advance to cupric oxide which is black in color.

Red plague has been observed in the industry since 1957. The occurrence rate has been described as an "occasional but persistent phenomenon". Mechanical damage exposing copper to water has been thought to be the primary cause of red plague. There have been numerous papers and studies issued by various standards groups and agencies attempting to get to the root cause of red plague. All too often words like "may, possible, probably and should" have been used in the conclusion of the reports. The root cause continues to elude both the wire and cable industry and the scientific community. To explain the sporadic nature of red plague occurrences, unfounded charges of complacency have been leveled against the wire and cable industry.

With respect to handling and storage of silver plated copper wire, Harbour Industries uses industry leading and best practices. The absence of red plague issues with Harbour's wire and cable is a testament to both handling and quality control practices. That said, no guarantees can be made that red plague will not occur given variables that are beyond our company's control. If there are critical application-specific requirements, steps can be taken to further reduce the probability of experiencing red plague. 40 $\mu$ in (0.00040"), the industry standard for silver plating thickness on copper strands, is typical of MIL-DTL-17, AS22759 and NEMA specifications. Additional plating can reduce, but not necessarily eliminate, the possibility of red plague. At the time of quotation, average plating thicknesses of 80 $\mu$ in (0.00080"), 120 $\mu$ in (0.00120") and even 160 $\mu$ in (0.00160") can be offered.

Harbour Industries consistently manufactures a quality product to the highest industry standards. Rigid material handling, improving storage and packaging, and controlling shelf life might reduce the risk of red plague. However, since the root cause has never been adequately defined, these controls can only be considered risk mitigation measures, not preventatives.

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