

Microbiological Influenced Corrosion

Microbiologically Influenced Corrosion or “MIC” is a corrosion process influenced by microorganisms and is a major cause of tuberculation, pitting, and failure in fire sprinkler systems, including carbon steel, copper, and galvanized piping systems.

Fire sprinkler systems provide a favorable environment for growth and development of bacteria resulting in MIC failures as recognized by members of the American Fire Sprinkler Association (AFSA), National Fire Protection Association (NFPA), National Fire Sprinkler Association (NFSA), National Association of Corrosion Engineers (NACE International), sprinkler manufacturers, end users, and fire protection service/mechanical contractors working within the industry.

MIC-related bacteria include aerobes (i.e., thrive in oxygen) and anaerobes (inhibited or die when exposed to oxygen). Aerobic microorganisms and their secretions on wetted pipe surfaces lead to the formation of biofilms, which frequently become embedded with iron, scale, oil, dirt, and other debris. This biofilm adheres to metal surfaces and forms a mass around bacterial deposits creating differential oxygen cell corrosion and other types of corrosion.

Anaerobic bacteria, acid producers, and sulfate-reducers seek out and colonize the patchy biofilms (slime layers) under debris or inside porous tubercles where the environment is deficit or devoid of oxygen. These bacteria produce acids and sulfides (the rotten egg odor of hydrogen sulfide, H₂S) causing tuberculation, restricted water flow, and severe metal loss (pitting). Taking remedial action will prevent further system damage caused by MIC.

Several manufacturers of tubing are addressing the MIC issue by applying various types of coatings to inhibit and prevent the onset of Microbiological Influenced Corrosion. One other option includes chemically treating the water contained in the sprinkler system.

For more information on MIC related issues, please contact FFCDI.

*The above information was provided by Allied Tube & Conduit - ABF II COATING™ pamphlet dated 1/05. Additional information was provided by The Wheatland Tube Company - MIC SHIELD™.

*FFCDI does not endorse individual manufacturers or procedures.