CORROSION & MIC TESTING SERVICES

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WHY TEST FOR CORROSION & MIC?

Corrosion occurs in all fire protection sprinkler systems. Corrosion damage/products and mineral deposits can restrict water flow and impair mechanical operation, leaving facilities vulnerable.

For these reasons, NFPA 13 requires the evaluation of water supplies for conditions that contribute to unusual corrosive properties, including the existence of microbiologically influenced corrosion (MIC).

NFPA 25 also requires an assessment of the internal condition of the piping at a minimum of every 5 years. As part of this assessment, if tubercules or slime are found, they shall be tested for indications of MIC.

LAB TESTING

Our laboratory analyzes the parameters mentioned in **FM Global's Research Technical Report from 2014,** ***Corrosion and Corrosion Mitigation in Fire Protection Systems:***

"The corrosivity of sprinkler water [in a fire protection system] is significantly influenced by water quality and chemistry parameters, such as concentration of dissolved gases (O_2), dissolved anions (chloride, sulfate, etc.), pH, alkalinity (HCO_3^- and CO_3^{2-}), solids (hardness and deposits), and microorganisms."

WHY TEST WITH DYNE?

- Test reports in 5-business days or less (rush 24 hour turn-around available)
- Free Corrosion & MIC sample kits
- Free shipping within the contiguous United States (limited free 1-way shipping to Alaska, Hawaii, Puerto Rico, and Canada, inquire for details)
- Comprehensive reports and tank tags
- Online access to results and return forms
- Immediate communication with our quality technician or customer service staff

RELEVANT STANDARDS

- **NFPA 25** Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
  - **2026 Edition Section 14.2.1.3**
- **NFPA 13** Standard for the Installation of Sprinkler Systems
  - **2025 Edition Sections 5.1.4.1 and 5.1.4.2**

SAMPLE TEST KITS

- Each kit contains one 500 mL sample container, 1 luer lock syringe, 1 luer lock filter assembly, 1 preservation buffer, 1 vial of nuclease free water, 1 set of gloves, 1 scoop, 1 whirl-pak bag, 1 forceps, 1 absorbent pad, paperwork, and a marker. Kits have an expiration date (typically 1 year). Check the date on the kit box before submitting samples.
- UPS Ground shipping to you is included as well as return labels (UPS/USPS) that can be used within the contiguous United States (limited 1-way free shipping to Alaska, Hawaii, and Canada, inquire for details)

NFPA GLOBAL SOLUTIONS | FIRE PROTECTION LABS DYNE™

Contact Us!

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TEST	EXPLANATION
CHEMICAL	
Disolved Oxygen	Dissolved oxygen (DO) concentration in sprinkler water is one of the biggest factors when determining corrosivity in sprinkler systems. Corrosion is fundamentally a chemical reaction, involving metal, water, and oxygen. The higher the concentration of dissolved oxygen in the water, the higher the corrosion rate for steel sprinkler pipe.
Disolved Anions	Chloride (Cl^-) and sulfate (SO_4^{2-}) are two particularly aggressive anions, increasing metal corrosion. They can adsorb onto the metal surface, interfere with passive film formations, and lower solution pH in pits/crevices/tubercules.
pH	pH is a measure of how acidic or basic (alkaline) a solution is. The pH of water in most sprinkler systems varies from a weak acid (pH 5-7) to a mild basic solution (pH 7-10) according to FM Global. According to Corrosion Inspection and Monitoring by Pierre R. Roberge (2007), the corrosivity of steel significantly increases at pHs below 5. Corrosivity of steel decreases above pH 10 given "the deposition of insoluble ferric hydroxide tends to stifle the corrosion attack".
Alkalinity	Alkalinity, that is the measure of bicarbonate (HCO_3^-) and carbonate (CO_3^{2-}), can act as a buffer, resisting changes in pH and stable water chemistry. It can also help to form a protective film (scale), inhibiting corrosion.
Hardness	Dissolved calcium and magnesium in sprinkler systems (if hard water is used) can react with bicarbonate to form a film (scale) of calcium carbonate or magnesium carbonate in neutral or alkaline environments. This scale forms a protective barrier between the metal piping and the dissolved oxygen.
BIOLOGICAL	
Sulfate-reducing bacteria (SRB)	Anaerobic (do not need oxygen) bacteria that consume sulfate as part of their metabolism, producing hydrogen sulfide (H_2S). These bacteria are widely recognized as primary contributors to MIC, particularly through sulfide production, iron sulfide formation, and pitting corrosion mechanisms.
Sulfur-oxidizing bacteria (SOB)	Aerobic (need oxygen) bacteria that consume sulfur compounds (e.g. the H_2S produced by SRB) as part of their metabolism, converting reduced sulfur compounds into sulfuric acid (H_2SO_4). These organisms typically act as part of a two-stage corrosion mechanism, where SRB generate H_2S under anaerobic conditions and SOB subsequently oxidize these compounds under aerobic conditions, resulting in localized acidification and accelerated corrosion.
Iron-reducing bacteria (IRB)	Anaerobic bacteria that consume iron as part of their metabolism, specifically converting protective (scale), insoluble ferric iron (FE_3^+) to a more soluble ferrous iron (FE_2^+). This process destabilizes protective oxide layers, increasing susceptibility to corrosion.
Corrosive Methanogens (micH)	Most methanogens corrode indirectly by removing protective hydrogen layers, exposing iron to further oxidation. Some, those with the micH (hydrogenase) gene that our analysis looks for, can directly transfer electrons from iron, resulting in accelerated electrochemical corrosion and representing a high-confidence MIC mechanism.