

WASTEWATER CORROSION THREATENS LONGEVITY OF DUCTILE IRON PIPE

For decades, ductile iron pipe has been used in the transportation of raw and potable water, sewage, digester gas, slurries, process chemicals, as well as for plant process piping in wastewater treatment plants. The Ductile Iron Pipe Research Association (DIPRA) has reported that when properly designed and installed, ductile iron pipe systems offer a life expectancy of 100 years or more. “As long as ductile iron pipe is not subjected to loadings and pressures in excess of its original capabilities, the only factor that could shorten its life is corrosion,” the DIPRA explained.



Typically, ductile iron pipe and fittings are finished with an internal cement-mortar lining that conforms to the ANSI/AWWA C104/A21.4 standard. While this lining system provides protection in water treatment applications, this technology was not designed to resist the biological and chemical components found in today's wastewater streams. According to the DIPRA, “Microbiologically-induced corrosion (MIC), which is sometimes referred to as hydrogen sulfide (H₂S) corrosion, can occur in gravity sewers. It occurs when bacteria in the anaerobic slime layer reduces existing sulfates to hydrogen sulfide. The H₂S is liberated into the crown area of the pipe above the flow where Thiobacillus bacteria further metabolize the H₂S into very low pH sulfuric acid. The sulfuric acid is corrosive to cement-mortar and iron.”

Given the limitations of cement-mortar linings under aggressive wastewater conditions, the DIPRA noted, “Special linings are often recommended for ductile iron pipe used to transport septic sewage where hydrogen sulfides create a corrosion-related problem.”

Among the special linings specifically designed for wastewater immersion and fume environments is Series 431 Perma-Shield® PL, a 100 percent solids, ceramic-modified polyamine epoxy, which was developed to protect carbon steel and ductile iron pipe in severe wastewater environments. “When properly applied at 40 to 50 mils dry film thickness, Perma-Shield PL provides excellent resistance to abrasion and MIC corrosion found in wastewater streams,” explained Vaughn O’Dea, director of Sales, Water & Wastewater Treatment for Tnemec. “This lining is strictly for use in sewerage pipe by specialty applicators who understand the unique surface preparation required prior to shop application.”

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In accelerated wastewater corrosion testing, Perma-Shield PL demonstrated performance superior to older coating technology and even newer lining products. When tested in accordance with NACE TM-0174 *Laboratory Methods for the Evaluation of Protective Coatings and Lining Materials in Immersion Service*, Perma-Shield PL exhibited no blistering, cracking, checking, erosion or delamination of film after six months continuous immersion in an acidic and gaseous solution.



The ceramic modified epoxy lining offers exceptional abrasion resistance and a low permeation rate for an impenetrable barrier to H₂S and other sewer gases. And its high-build application ensures fast and efficient throughput of pipe and fittings during the manufacturing process.

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Tnemec Company Incorporated 6800 Corporate Drive Kansas City, Missouri 64120-1372 1-800-TNEMEC1 Fax: 1-816-483-3969 www.tnemec.com

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