



TECHNICAL BULLETIN:

CAST GRAY & DUCTILE IRON MATERIAL PROPERTIES

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CAST GRAY AND DUCTILE IRON CORROSION

- Cast iron (both ductile and gray) do not corrode the same as steel. Cast iron has a higher carbon and silicon content that aids in creating a long-lasting patina layer. This patina layer inhibits further corrosion.
- Cast iron infrastructure castings nearly always outlast the infrastructure they are placed in.
- Since corrosion is naturally inhibited, coating cast iron manhole covers is unnecessary and discouraged.

OXIDATION PROCESS OVER TIME



New casting - no moisture contact. Graphite in the surface remains uncorroded and is trapped in the surface network and causes corrosion to reduce over time.



Initial contact with moisture. Oxidation of iron begins on the surface.



Full surface oxidation. The orange color is attributed to hydrated iron oxide. The hydrated iron oxide is loosely bonded to the casting and soluble in water.



Final weathering begins. Iron oxide and silicate subscale is forming. This, combined with the graphite and trapped corrosion, forms a protective barrier.



Final state. The iron turns dark brown to black. The only way to remove the surface scale is through mechanical means such as grinding.



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