



ALUMINIZED STEEL TYPE 2

PERFORMANCE

Technical Bulletin

PERFORMANCE OF ALUMINIZED TYPE 2 DRAINAGE PIPE IN CONTACT WITH CEMENTITIOUS MATERIALS

Aluminized Steel Type 2 superior durability is not impacted by concrete headwalls or cementitious backfills. The coating aluminum layer is subject to attack by cement alkalinity. However, the coating intermetallic Al-Fe alloy layer is resistant to cement alkalinity and also provides good protection against soilside corrosion. As is well known, the corrosion behavior of a steel substrate is enhanced by cement alkalinity due to passivation.








By 1984, 30 year field tests had shown that concrete headwalls had no significant adverse effect on Aluminized Type 2. There is some chemical attack of the free aluminum coating layer during the concrete curing period, but this is arrested at the Al-Fe alloy layer which is fully resistant to cement alkalinity due to its iron content.

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The results of the 1984 studies on Aluminized Type 2 behavior at concrete headwalls led to studies on behavior in the increasingly important cementitious backfills. Field evaluations in the wetter climate of Houston, Texas showed that cement-stabilized sand backfill had no significant adverse effect beyond attack of the free Al layer of the coating. The Al layer was removed in places during the curing stage but the Al-Fe

alloy layer was fully protective against cement alkalinity and soilside corrosion. Such results show that there is no need for any supplemental coating protection on Aluminized Steel Type 2 pipe in cementitious backfill. The results are not surprising in view of the known high resistance of the coating Al-Fe alloy layer to alkalinity and soilside corrosion.

FIGURE 1 – SOILSIDE CONDITION OF METAL CORINGS FROM 4 SUBJECT PIPE SITES WITH CEMENT STABILIZED SAND BACKFILL

	Site A	Site B	Site C	Site D
	<p>On these three-year-old specimens, most of the coating's free Aluminum layer is gone but the intermetallic layer is completely intact. There is an adherent black film overlying the intermetallic layer on portions of specimens.</p>		<p>There are only small discontinuities in the free Aluminum layer on this 3 year old specimen.</p>	<p>Most of the coating's free Aluminum layer is gone from this 5 year old specimen but the coating intermetallic layer is intact.</p>
Coating #2				
Coating #1				

Soilside surfaces on 2 in. diameter pipe metal corings.



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About Cleveland-Cliffs Inc.

Cleveland-Cliffs is the largest flat-rolled steel producer in North America. Founded in 1847 as a mine operator, Cliffs also is the largest manufacturer of iron ore pellets in North America. The Company is vertically integrated from mined raw materials, direct reduced iron, and ferrous scrap to primary steelmaking and downstream finishing, stamping, tooling, and tubing. The Company serves a diverse range of markets due to its comprehensive offering of flat-rolled steel products and is the largest supplier of steel to the automotive industry in North America. The Company is headquartered in Cleveland, Ohio with mining, steel and downstream manufacturing operations located across the United States and in Canada. For more information, visit www.clevelandcliffs.com.



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