

# ALUMINIZED STEEL TYPE 2

## DURABILITY STANDARDS

Technical Bulletin

### INCREASED SERVICE LIFE FOR CORRUGATED STEEL PIPE

Aluminized Type 2 meets durability requirements for most pipe applications in settings where the performance of other metallic pipe is limited.

### ALUMINIZED TYPE 2 COATING

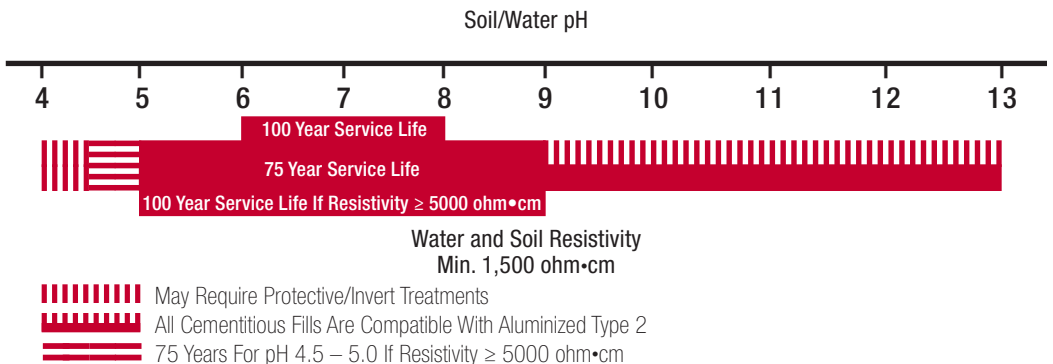
The duplex coating exhibits spontaneous, superior passive film protection in the aluminum layer. The aluminum-iron intermetallic alloy layer provides a second and major part of the coating's enhanced protection mechanism.

### Meeting New Durability Standards and Expanding Environmental Limits with Corrugated Steel Pipe

The use of Aluminized Steel Type 2 with its bi-layer Al/Al-Fe protective metallic coating in drainage pipe service increases the range of environmental conditions and the Corrugated Steel Pipe (CSP) service life attained within those conditions. The application of Type 2 within the recommended 5 – 9 pH range and the  $\geq 1500$  ohm•cm resistivity range, indicated below, covers most pipe environments. Based on field studies of 43 years, 16 gauge Type 2 service life in these ranges is estimated at 75 years. Based on the 50 year durability assessment, 16 gauge Type 2 has a service life of 100 years for pH 5 – 9 and resistivity  $\geq 5000$  ohm•cm. In the narrower pH range 6 – 8 with resistivity  $\geq 1500$  ohm•cm a 100 year service life is also expected. Estimated service life of 75 years for pH between 4.5 – 5.0 if resistivity  $\geq 5000$  ohm•cm. The duplex Type 2 coating exhibits spontaneous passive film corrosion protection in the aluminum layer and inherent corrosion/abrasion protection in the Al-Fe intermetallic alloy layer. The Al-Fe alloy layer provides a major portion of coating protection.



### ALUMINIZED STEEL TYPE 2 APPLICATION GUIDELINES



## Product Description

Each of the layers of the duplex Type 2 coating contributes unique protective features. The protection of the two layers combined affords several advantages.

### ADVANTAGES

- Performance of either coating layer independent of water scaling; immunity of both layers to the effects of soft water.
- Enhanced resistance of both coating layers to CO<sub>2</sub> corrosive effects.
- Enhanced resistance of both coating layers to erosion corrosion.
- Enhanced resistance of the Al-Fe layer to more common mild-to-moderate abrasive effects.
- Resistance to chloride/sulfate salts down to at least 1500 ohm•cm, oftentimes lower. Additional water/soil testing is advisable to determine suitability at resistivities below 1500 ohm•cm.
- Resistance to dry climate soils down to at least 1000 ohm•cm.
- Although 5 – 9 pH is the recommended environmental guideline, there actually is no upper pH limit for Type 2, as there is with aluminum, for the Al-Fe layer and the steel substrate are fully resistant to high pH.
- Type 2 is fully compatible with concrete headwalls and with cementitious backfills such as flowable fill and cement stabilized sand since the Al-Fe alloy layer alone is adequately resistant to high-pH cement alkalinity and to corrosive soil effects.
- Can be used where pH is between 4.5 – 5.0 if resistivity is over 5000 ohm•cm.

### APPLICATION LIMITS

- Severe corrosive environments such as seawater, acid minewater or sanitary sewage are incompatible with Type 2.
- Gray, olive or blue clay soil portions of a highly acidic nature (pH = 2.5 – 3.5, typically) found in some heterogeneous soils of certain small geographical regions necessitate precautionary measures for various pipe materials. In these regions, an asphalt coating or a select granular fill is sometimes required to prevent direct contact with the highly acidic clay portions.
- Severe abrasive conditions necessitate use of supplemental invert pavement.
- De-icing salts are normally not a problem. Under certain conditions salt concentration can build up and cause problems for various pipe materials. If water/soil testing indicates a problem, protective measures are available.