

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

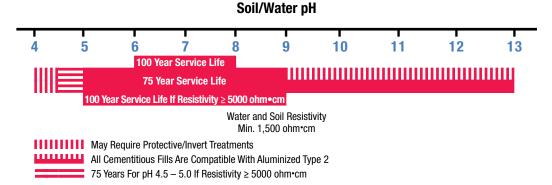
The duplex coating exhibits spontaneous, superior passive film protection in the aluminum layer. The aluminum-iron intermetallic alloy layer provides a second and major part of the coating's enhanced protection mechanism.



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 ≥ 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 ≥ 5000 ohm•cm. In the narrower pH range 6-8 with resistivity ≥ 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 ≥ 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





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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 CO₂ 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.



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Data referring to mechanical properties and chemical analyses are the result of tests performed on specimens obtained from specific locations with prescribed sampling procedures; any warranty thereof is limited to the values obtained at such locations and by such procedures. There is no warrant with respect to values of the materials at other locations.

The product, engineering and research information in this literature is applicable exclusively to AK Steel Aluminized Steel Type 2.



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