In the fabrication of corrugated metal pipe, some mechanical effects of the manufacturing process on the metallic coatings can be expected. The resultant potential impact on corrosion of the substrate must be addressed by the metallic coating. In the case of the Aluminized Steel Type 2 coating, the steel substrate is protected in service over the long term due to the electrochemical behavior of the bi-layer, duplex coating. The aluminum layer of the coating provides low-level galvanic protection that directly retards long-term substrate corrosion. This also modifies the corrosion process to produce a partially protective corrosion-product scale that hinders the advance of corrosion. Additionally, substrate corrosion is further retarded due to insulating films that form naturally on the Al and Al-Fe coating layers and suppress the electrochemical action that powers substrate corrosion. All of these electrochemical mechanisms combine to protect against corrosion problems.
The effectiveness of electrochemical corrosion protection for exposed steel substrate was demonstrated in field exposures. Weld seams exhibit good protection by the coating in extended field tests.

During pipe manufacturing, re-rolled ends show a few small spots of spalled coating around the pipe circumference. This is due to reverse double bending of pipe material at these spots. Coating electrochemical behavior provides corrosion protection at re-rolled ends, as it does at weld seams. Actually, there is further protection in that the spots retain a skin of protective intermetallic alloy layer. Re-rolled ends can be painted for cosmetic purposes. The full extent of substrate protection was demonstrated by the minimal corrosion at original cut edges on riveted pipe exposed in the field for times up to 50 years.

The effectiveness of the fissure-plugging tendency was demonstrated in 30 and 43-year field investigations of riveted pipe. Plugging is an added benefit of the tendency of the Aluminized Type 2 steel substrate to form protective corrosion product scales under the influence of galvanic interaction.

Voids in the corrosion product in fissure cavities are still present after 30 years exposure in the field. This shows that initial substrate corrosion at a fissure base is stifled very early by corrosion product that plugs the fissure, even before the cavity is totally filled. Eventual reactivation of corrosion at a fissure base occurs, as illustrated by the development of detectable substrate corrosion and cavity filling at one of the fissures in the photo.

The information and data in this product data sheet are accurate to the best of our knowledge and belief, but are intended for general information only. Applications suggested for the materials are described only to help readers make their own evaluations and decisions, and are neither guarantees nor to be construed as express or implied warranties of suitability for these or other applications.

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 warranty 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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