

Corrosion: effect of coating thickness

Introduction

Hot-dipped and electrogalvanised zinc coatings both protect steel in the same manner. However, hot-dipped zinc coatings are usually thicker and therefore offer a longer life under the same exposure conditions.

The protective life of a metallic zinc coating is essentially a function of the coating thickness. Figure 1 indicates the life to first maintenance for hot-dipped zinc coatings produced by a continuous galvanising process. This figure is calculated using the zinc corrosion rates from International Standard ISO 9223:2012 to estimate the life to first maintenance for a variety of different corrosivity categories. This methodology is adopted from Table 2 of International Standard ISO 14713-1:2017.

In general, for a particular environment the life of a zinc coating is directly proportional to the initial zinc coating mass. Similarly, a specific life to first maintenance necessitates increasing the zinc coating thickness as the corrosivity of the environment is increased from C1 to CX.

Referenced Standards

ISO 9223:2012 – *Corrosion of metals and alloys – Corrosivity of atmospheres – Classification, determination and estimation*

ISO 14713-1:2017 – *Zinc coatings – Guidelines and recommendations for the protection against corrosion of iron and steel in structures – Part 1: General principles of design and corrosion resistance*

Figure 1: Life to first maintenance as a function of zinc coating mass and equivalent zinc coating thickness, and corresponding corrosivity categories

