Creating Exceptional Material Performance

The galvanizing process has been refined and enhanced over that last 200 years. It represents the absolute best way to protect steel and ensure long-lasting, corrosion-free performance. Less costly than materials such as stainless steel and aluminum, galvanized steel delivers a significantly lower life cycle cost and requires no appreciable coating maintenance once installed.

In addition to being 100% recyclable, galvanized steel represents a sustainable material option that emits no volatile organic compounds or hazardous air pollutions in the treatment process.

The Process

Techlight's galvanizing process uses a proprietary formulation of molten metals that produces the most consistent coating thickness available while also creating an even, enduring finish. Part of a four-step, hot-dipped galvanizing process, our process meets ASTM A123, ASTM A153 and ASTM B6 requirements to deliver high quality zinc coatings on ferrous materials.

PREPARATION
Steel poles arriving at the galvanizing plant undergoe a thorough inspection to ensure drainage and venting requirements are met. Once in the staging area, careful handling ensures the material is transported efficiently and effectively through the initial cleaning process.

CLEANING
A critical part of the process is, cleaning which begins with a complete immersion in a hot alkali solution to remove organic compounds and dirt. Next acid pickling removes rust or scale and finally fluxing eliminates surface oxides to promote intermetallic development.

HOT-DIP GALVANIZING
The steel is submerged in a bath of molten zinc until it reaches 840° F (449° C). At this point, the zinc reacts with the steel to form zinc/iron intermetallic layers on all surfaces inside and out.

POST-DIP QUALITY INSPECTION
The galvanized steel is cleaned, weighed and carefully inspected. Calibrated instrumentation ensures quality standards are met and coating thickness, appearance and compliance with ASTM specifications are all reviewed before final approval.

Why galvanized poles?

The value of hot-dip galvanized steel stems from the relative corrosion resistance of zinc, which under most service conditions is considerably better than iron and steel. In addition to forming a physical barrier against corrosion, zinc, applied as a hot-dip galvanized coating, cathodically protects exposed steel. Furthermore, galvanizing for the protection of iron and steel is favored because of its low cost, the ease of application and the extended, maintenance-free service that it provides.

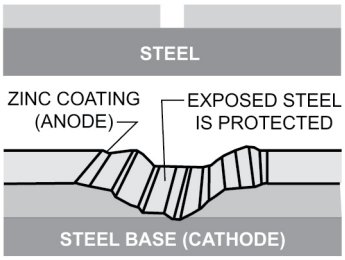
PERFORMANCE OF GALVANIZED POLES

Galvanized coatings have a proven performance under numerous environmental conditions. The corrosion resistance of zinc coatings is determined primarily by the thickness of the coating but varies with the severity of environmental conditions.

The predictability of the lifetime of a coating is important for planning and financing required maintenance. Measurements of the actual rate of consumption of the galvanized coating during the first few years of service often provide good data for projecting remaining life until first maintenance. Due to the buildup of zinc corrosion products, which in many environments are adherent and fairly insoluble, the corrosion rate may slow as time progresses. Therefore, predictions of time to first maintenance that are based on initial corrosion rates of zinc coatings are often conservative.

Environments in which galvanized steel and iron are commonly used include indoor and outdoor atmospheres, the storage of hundreds of different chemicals, in freshwater, seawater, soils and/or concrete. Because of the many years galvanizing has been used for corrosion protection, a wealth of real-world, long-term exposure data on zinc coating performance in a wide variety of environments is available.

Zinc protects base steel, even when scratched



Galvanized Steel

This is what happens at a scratch on galvanized steel. The zinc coating sacrifices itself slowly by galvanic action to protect the base steel. This sacrificial action continues as long as any zinc remains in the immediate area.

CORROSION PERFORMANCE IN FRESHWATER

Galvanizing is successfully used to protect steel in freshwater exposure. "Freshwater" refers to all forms of water except seawater. Freshwater may be classified according to its origin or application. Included are hot and cold domestic, industrial, river, lake and canal waters. Corrosion of zinc in freshwater is a complex process controlled largely by impurities in the water. Even rainwater contains oxygen, nitrogen, carbon dioxide and other dissolved gases, in addition to dust and smoke particles.

CORROSION PERFORMANCE IN SEAWATER AND SALT SPRAY

Galvanized coatings provide considerable protection to steel immersed in seawater and exposed to salt spray. The factors that influence the corrosion of zinc in freshwater also apply to seawater. However, it is the dissolved salts (primarily sulfides and chlorides) in seawater that are the principal determinants of the corrosion behavior of zinc immersed in seawater. Given the high level of chloride in seawater, a very high rate of zinc corrosion might be expected. However, the presence of magnesium and calcium ions in seawater has a strong inhibiting effect on zinc corrosion in this type of environment. Accelerated laboratory test results that sometimes use a simple sodium chloride (NaCl) solution to simulate the effects of seawater exposure on galvanized steel should be viewed skeptically. Real-world results often differ significantly from accelerated laboratory tests.