

Types of Corrosion

Corrosion is a gradual eating or wearing away of metals by such conditions and substances as moisture, chemicals, stresses, contact with other metals, temperature changes, and atmospheric conditions. There are six major types of corrosion.

1. UNIFORM CORROSION

Slow, uniform oxidation of a metal. In iron or steel it is commonly called rusting and is characterized by a brown scale.

2. GALVANIC CORROSION

Occurs when some unlike metals are together in an electrolyte, and electrical transfer of particles takes place between them.

3. STRESS CORROSION

Occurs when the grain of a metal is affected by internal or external stresses, setting up corrosion paths along the grain.

4. CORROSION FATIGUE

Usually occurs faster than Stress Corrosion although they are similar. This form of corrosion is produced by cyclic stresses.

5. STRAY CURRENTS CORROSION

A deterioration resulting from metal in contact with solutions or stray electrical currents.

6. PITTING

Pits will occur on a metal that becomes an anode and loses metal to a cathode.

GALVANIC SERIES

CORRODED END— ANODE (Least Noble)

Magnesium
Magnesium alloys
Zinc
Aluminum 2S
Cadmium
Aluminum 21S-T4

Steel or Iron
Cast Iron
Chromium-iron (active)
Ni-Resist
Type 304 Stainless (active)
Type 316 Stainless (active)

Lead-tin solders
Lead
Tin
Nickel (active)
Inconel (active)
Brasses
Copper
Bronzes

Copper-nickel alloys
Monel
Silver solder
Nickel (passive)
Inconel (passive)
Chromium-iron (passive)
Type 304 Stainless (passive)

Type 316 Stainless (passive)
Silver
Graphite
Gold
Platinum

**PROTECTED END
CATHODE (Most Noble)**

PLATINGS AND FINISHES

Special finishes are applied to screw products for one of three reasons . . . To render them resistant to rust and corrosion, to improve appearance; or to match them in color with the part on which they are to be used. These finishes are applied by one of the following methods: (1) coating the parts with dissimilar metals as in cadmium plating, electroplating, galvanizing, or tinning; (2) application of an organic or mineral substance as in enameling,

varnishing or lacquering; (3) chemically converting the surface of iron or steel into basic iron phosphates as in Parkerizing; (4) subjecting parts to high temperatures as in bluing.

Finishes can be broadly classified as commercially Rust Resistant and Decorative. In some cases the Rust Resistant finish furnishes the desired appearance in itself; and conversely, a number of the Decorative finishes are somewhat rust resistant.

COMMON FINISHES	Color	Anti-Corrosion Properties	Suitability	Characteristics and Uses	Following Finishes Are Also Available:
BONDERIZING	Dull Grey	Excellent	Ferrous Metals	Chemical process for rustproofing steel. Ideal base for paint or enamel. Also for galvanized, zinc alloy, cadmium surfaces.	
BRASS	Brass	Good	Usually Steel	Generally for matching brass parts. Available in dull or bright.	
BRONZE	Bright to dull black copper	Fair	All Metals	Usually as decorative finishes for close matching of fine wood finishes.	
CADMIUM	Silver Grey — dull or bright	Excellent	All Metals	Widely used for exceptional rust resistance, fine appearance, and low cost. Good electrical conductivity.	
COPPER	Copper	Fair	All Metals	Popular for decorative purposes. Also as an undercoating for nickel.	
NICKEL	Silver	Excellent	All Metals	Hard, durable finish, excellent for fasteners, Available dull or bright.	
PASSIVATING	— — —	Excellent	Stainless Steels	Nitric acid dip cleans and brightens stainless steels, removes foreign matter.	
ZINC (Electro Galvanizing)	Silver Grey	Good	All Metals	Economical finish, widely used. Good rust resistance, good appearance.	

Following Finishes Are Also Available:

- ANODIZING
- BLACK NICKEL
- BLUING
- CHROME
- DICHROMATE DIP
- EBONIZING
- HOT DIP ZINC
- GRAPHITE LUBRICANT
- LACQUERING



electronic fasteners inc.

305 Winter Street • Waltham, Massachusetts 02254