

TYPES OF CORROSION

GALVANIC SERIES

Corrosion is a process of deterioration of a metal in which the metal combines chemically with substances in its environment.

1. UNIFORM CORROSION:

Called rust in iron or steel. This is slow oxidation of the parent metal.

2. GALVANIC CORROSION:

Caused by the coupling of unlike metals in an electrolyte that causes an electrical transfer of particles from one metal to another. Metals grouped together in the Galvanic Series are fairly safe with each other. When metals from different groups are coupled they corrode by galvanic action. The farther apart they are in the series the more will be the corrosion.

3. PITTING:

A localized breakdown in a metal that becomes the

anode and loses metal locally to the cathodic surrounding areas. The result is pitting.

4. STRESS CORROSION:

Internal or external stresses in a fastener will create paths within the grain of the metal. Corrosion is accelerated along these paths.

5. CORROSION FATIGUE:

Similar to stress corrosion but with cyclic stresses. Usually occurs faster than stress corrosion.

6. STRAY CURRENTS:

Corrosion started by outside stray electric currents or from being in contact with solutions.

CORRODED END-ANODE (Last Noble)

Magnesium	Nickel (active)
Magnesium alloys	Inconel (active)
Zinc	Brasses
Aluminum 2 S	Copper
Cadmium	Bronzes
Aluminum 21S-T4	Copper-nickel alloys
Steel or Iron	Monel
Cast Iron	Silver solder
Chromium-iron (active)	Nickel (passive)
Ni-Resist	Inconel (passive)
Type 304 Stainless (active)	Chromium-iron (passive)
Type 316 Stainless (active)	Type 304 Stainless (passive)
Lead-tin solders	Type 316 Stainless (passive)
Lead	Silver
Tin	Graphite
	Gold
	Platinum

PROTECTED END-CATHODE (Most Noble)

PLATINGS AND FINISHES

FINISH	COLOR	ANTI-CORROSION PROPERTIES	USED WITH	CHARACTERISTICS AND USES
BLACK ZINC	Black	Excellent	All metals	Rich and lustrous. With or without lacquering.
CADMIUM	Bright Silver-gray Dull or burnished	Very good	Most metals	Non-porous metallic plating. Rich appearance, good rust resistance, low cost, good electrical conductivity. Bright silver gray, dull gray, or black electroplated finish.
CHROMIUM	Bright blue-white	Excellent	All metals	Used wherever a beautiful finish is desired. Bright blue-white lustrous appearance. Electroplated.
DICHROMATE DIP	Rainbow	Excellent	All metals	A yellow, brown, green or iridescent colored coating. This dipping process greatly increases rust resistance. Add to Zinc or Cadmium plating.
IRIDITE	Green Olive drab Bronze	Excellent	All metals	A coloring dip which also adds rust resistance. Usually applied on Zinc or Cadmium.
NICKEL	Blue Red Black	Very good	All metals	A hard, stable, dull white or bright burnished finish. Used for appliances and hardware.
PARKERIZING	Silver	Excellent	Ferrous metals	A chemical process of rust-proofing steel.
PASSIVATING	Dull gray or black	Excellent	Stainless steels	For stainless steels. A nitric acid dip to remove foreign material and brighten finish.
ZINC ELECTROGALVANIZED	Gray	Very good	All metals	A commonly used finish with good rust resistance, appearance and low cost.

Also available for fasteners are the following finishes:

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|--------------|-------------|------------------|--------------|--------------|-------------------------------|----------------|
| ANODIZING | BLUING | BRASS PLATE | BRONZE | COPPER | GOLD | LEAD |
| BLACK NICKEL | BONDERIZING | BRIGHT POLISHING | CARBON BLACK | EBONIZING | GRAPHITE LUBRICANT LACQUERING | SILVER TINNING |
| | | | | HOT DIP ZINC | | |

PLATING INFORMATION

FINISH	THICKNESS	SALT SPRAY	FINISH	THICKNESS	SALT SPRAY
Cadmium	.0001	50 Hours	Zinc	.0001	25 Hours
Cadmium	.0002	100 Hours	Zinc	.0002	36 Hours
Cadmium	.0003	150 Hours	Zinc	.0003	48 Hours
Cadmium	.0004	200 Hours	Zinc (Mechanical)	.0004	24 Hours
Cadmium (Mechanical)	.0004	48 Hours	Clear Chromate	—	Adds 24 Hours to Cad or Zinc
Chromium	.0002	16 Hours	Dichromate Dip	—	Adds 72 Hours to Cad or Zinc
Chromium	.0003	25 Hours	Olive Drap Iridite	—	Adds 100 Hours to Cad or Zinc
Nickel	.0001	12 Hours			
Nickel (Black)	.0002	25 Hours			
Parkerize & Oil	.0001	48 Hours			
Phosphate & Oil	.0001	48 Hours			



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