**Metal Protection Methods**

**Corrosion Inhibitors:**  
Corrosion inhibitors are chemicals that react with the metal's surface or the environmental gases causing corrosion, thereby, interrupting the chemical reaction that causes corrosion.

Inhibitors can work by adsorbing themselves on the metal's surface and forming a protective film. These chemicals can be applied as a solution or as a protective coating via dispersion techniques.

The inhibitors process of slowing corrosion depends upon:

* Changing the anodic or cathodic polarization behavior
* Decreasing the diffusion of ions to the metal's surface
* Increasing the electrical resistance of the metal's surface

Major end-use industries for corrosion inhibitors are petroleum refining, oil and gas exploration, chemical production and water treatment facilities.

The benefit of corrosion inhibitors is that they can be applied in-situ to metals as a corrective action to counter unexpected corrosion.

**Coatings:**  
Paints and other organic coatings are used to protect metals from the degradative effect of environmental gases.

Coatings are grouped by the type of polymer employed. Common organic coatings include:

* Alykd and epoxy ester coatings that, when air dried, promote cross-link oxidation
* Two-part urethane coatings
* Both acrylic and epoxy polymer radiation curable coatings
* Vinyl, acrylic or styrene polymer combination latex coatings
* Water soluble coatings
* High-solid coatings
* Powder coatings

**Plating:**  
Metallic coatings, or plating, can be applied to inhibit corrosion as well as provide aesthetic, decorative finishes.

There are four common types of metallic coatings:

1. Electroplating: A thin layer of metal - often nickel, [tin](http://metals.about.com/od/properties/a/Metal-Profile-Tin.htm) or [chromium](http://metals.about.com/od/properties/a/Metal-Profile-Chromium.htm) - is deposited on the substrate metal (generally steel) in an electrolytic bath. The electrolyte usually consists of a water solution containing salts of the metal to be deposited.
2. Mechanical plating: Metal powder can be cold welded to a substrate metal by tumbling the part, along with the powder and glass beads, in a treated [aqueous solution](http://chemistry.about.com/od/chemistryglossary/a/aqueoussoldef.htm). Mechanical plating is often used to apply zinc or cadmium to small metal parts
3. Electroless: A coating metal, such as [cobalt](http://metals.about.com/od/properties/a/Metal-Profile-Cobalt.htm) or nickel, is deposited on the substrate metal using a [chemical reaction](http://chemistry.about.com/od/chemicalreactions/f/What-Is-A-Chemical-Reaction.htm) in this non-electric plating method.
4. Hot dipping: When immersed in a molten bath of the protective, coating metal a thin layer adheres to the substrate metal.

**Sources:**  
Corrosionist.com. Corrosion Control Methods.  
Source: [www.corrosionist.com](http://www.corrosionist.com/corrosion_control_methods.htm)