Corrosion Glossary

deactivation.
The process of prior removal of the active corrosive constituents usually oxygen, from a corrosive liquid by controlled corrosion of expendable metal or by other chemical means, thereby making the liquid less corrosive.

dealloying.
The selective corrosion of one or more components of a solid solution alloy, usually in the form of ions. Also called parting or selective leaching. See also *decarburization, decobaltification, denickelification, dezincification, and graphitic corrosion.*

dealuminization
The selective leaching or corrosion of a specific constituent (Al, Ni, Mo, Ni) from an alloy.

decarburization.
Loss of carbon from the surface layer of a carbon-containing alloy due to reaction with one or more chemical substances in a medium that contacts the surface. See also *dealloying.*

decobaltification.
Corrosion in which cobalt is selectively leached from cobalt-base alloys, such as Stellite®, or from cemented carbides. See also *dealloying and selective leaching.*

decomposition potential (or voltage).
The *potential* of a metal surface necessary to decompose the electrolyte of a cell or a component/substance thereof.

deep groundbed.
One or more *anodes* installed vertically at a nominal depth of 15 m (50 ft) or more below the earth's surface in a drilled hole for the purpose of supplying *cathodic protection* for an underground or submerged metallic structure. See also *groundbed.*

delta ferrite.
See *ferrite.*

demineralization
Removal of dissolved mineral matter, generally from water.

dendrite.
A crystal that has a treelike branching pattern, being most evident in cast metals, slowly cooled through the solidification range.

denickelification.
Corrosion in which nickel is selectively leached from nickel-containing alloys. Most commonly observed in copper-nickel alloys after extended service in fresh water. See also *dealloying,* and

diffusion.
(I) Spreading of a constituent in a gas, liquid, or solid, tending to make the composition of all parts uniform. (2) The spontaneous movement of atoms or molecules to new sites within a material.

diffusion coating.
Any process whereby a base metal or alloy is either (1) coated with another metal or alloy and heated to a sufficient temperature in a suitable environment or (2) exposed to a gaseous or liquid medium containing the other metal or alloy, thus causing *diffusion* of the coating or of the other metal or alloy into the base metal with resultant changes in the composition and properties of its surface.

diffusion coefficient.
A factor of proportionality representing the amount of substance diffusing across a unit area through a unit concentration gradient in unit time.

diffusion-limited current density.
The current density, often referred to as *limiting* current density, that corresponds to the maximum transfer rate that a particular species can sustain because of the limitation of diffusion.

dimple rupture.
A fractographic term describing ductile fracture that occurs through the formation and coalescence of microvoids along the fracture path. The fracture surface of such a ductile fracture appears dimpled when observed at high magnification and usually is most clearly resolved when viewed in a scanning electron microscope.

disbandment.
The destruction of adhesion between a coating and the surface coated.

discontinuity.
Any interruption in the normal physical structure or configuration of a part, such as cracks, laps, seams, inclusions, or porosity. A discontinuity may or may not affect the usefulness of the part.

dislocation.
A linear imperfection in a crystalline array of atoms. Two basic types are recognized: (1) an edge dislocation corresponds to the row of mismatched atoms along the edge formed by an extra, partial plane of atoms within the body of a crystal; (2) a screw dislocation corresponds to the axis of a spiral structure in a crystal, characterized by a distortion that joins normally parallel planes

selective leaching.

density (of gases).
The mass of a unit volume of a gas at a stated temperature and pressure.

density (of solids and liquids).
The mass of unit volume of a material at a specified temperature.

deoxidizing.
(1) The removal of oxygen from molten metals by use of suitable deoxidixers. (2) Sometimes refers to the removal of undesirable elements other than oxygen by the introduction of elements or compounds that readily react with them. (3) In metal finishing, the removal of oxide films from metal surfaces by chemical or electrochemical reaction.

depolarization.
A decrease in the *polarization* of an electrode; the elimination or reduction of polarization by physical or chemical means; depolarization results in increased corrosion.

depolarizer.
A substance that produces *depolarization.*

deposit
Foreign substance which comes from the environment, adhering to a surface of a material

deposit attack
Pitting corrosion resulting from deposits on a metal surface which cause concentration cells.

deposit corrosion.
Corrosion occurring under or around a discontinuous deposit on a metallic surface. Also called poultice corrosion.

descaling.
Removing the thick layer of oxides formed on some metals at elevated temperatures.

dezincification.
Corrosion in which zinc is selectively leached from zinc-containing alloys. Most commonly found in copper-zinc alloys containing less than 83% copper after extended service in water containing dissolved oxygen; the parting of zinc from an alloy (in some brasses, zinc is lost leaving a weak, brittle, porous, copper rich residue behind) See also *dealloying* and *selective leaching.*

dichromate treatment.
A chromate *conversion coating* produced on magnesium alloys in a boiling solution of sodium dichromate.

dielectric shield.
In a *cathodic protection* system, in electrically nonconductive material, such as a coating, plastic sheet or pipe that is placed between an *anode* and an adjacent *cathode* to avoid current wastage and to improve current distribution, usually on the cathode.

differential aeration cell.
An *electrolytic cell,* the *electromotive force* of which is due

together to form a continuous helical ramp (with a pitch of one interplanar distance) winding about the dislocation. Most prevalent is the so-called mixed dislocation, which is any combination of an edge dislocation and a screw dislocation.

double layer
The interface between an *eletrode* or a suspended particle and an *electrolyte* created by charge-charge interaction (charge separation) leading to an alignment of oppositely charged ions at the surface of the electrode or particle. The simplest model is represented by a parallel plate condenser of 2 x 10^{-8} cm in thickness. In general the electrode will be positively charged with respect to the solution..

drainage.
Conduction of electric current from an underground metallic structure by means of a metallic conductor. Forced drainage is that applied to underground metallic structures by means of an applied electromotive force or sacrificial anode. Natural drainage is that from an underground structure to a more negative (more anodic) structure, such as the negative bus of a trolley substation.

dry corrosion.
See *gaseous corrosion.*

drying oil.
An oil capable of conversion from a liquid to a solid by slow reaction with oxygen in the air.

ductile fracture.
Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation and expenditure of considerable energy. Contrast with *brittle fracture.*

ductility.
The ability of a material to deform plastically without fracturing, measured by elongation or reduction of area in a tensile test, by height of cupping in an Erichsen test, or by other means.

dummy cathode.
(1) A *cathode,* usually corrugated to give variable current densities, that is plated at low current densities to preferentially remove impurities from a plating solution. (2) A substitute cathode that is used during adjustment of operating conditions.

dummying.
Plating with *dummy cathodes.*

dynamic equilibrium
The condition of an electrode when the rate of anodic dissolution just balances the rate of cathodic plating.

to a difference in air (oxygen) concentration at one electrode as compared with that at another electrode of the same material; an oxygen concentration cell (a cell resulting from a potential difference caused by different amounts of oxygen dissolved at two locations). See also *concentration cell.*