

GLOSSARY

- adsorption - taking up one substance at the surface of another; tendency of all solids to condense on their surfaces a layer of any gas or solute that contacts such solids.
- aeration cell (oxygen cell) - electrolytic cell in which a difference in oxygen concentration at the electrodes exists, producing corrosion.
- amphoterics - materials subject to attack by both acid and alkaline environments; include aluminum, zinc, and lead (commonly used in construction).
- anaerobic - free of air or uncombined oxygen; anaerobic bacteria are those that do not use oxygen in their life cycle.
- anion - a negatively charged ion that migrates toward the anode under influence of a potential gradient.
- *anode - electrode at which oxidation of its surface or some component of the solution is occurring (opposite: cathode).
- *bell hole - excavation to expose a buried structure.
- cathode - electrode at which reduction of its surface or some component of the solution is occurring (opposite: anode).
- cathodic corrosion - corrosion resulting from a structure's cathodic condition, usually caused by the reaction of alkaline products of electrolysis with an amphoteric metal.
- *cathodic protection - technique to prevent metal surface corrosion by making that surface the cathode of an electrochemical cell.
- cation - positively charged ion of an electrolyte that migrates toward the cathode under the influence of a potential gradient.
- concentration cell - electrolytic cell in which a difference in electrolyte concentration exists between anode and cathode, producing corrosion.
- *continuity bond - metallic connection that provides electrical continuity.
- *corrosion - deterioration of a material, usually a metal, because of a reaction with its environment.
- * current density - current per unit area.
- *electrical isolation - condition of being electrically separated from other metallic structures or the environment.
- *electrosmotic effect - passage of a charged particle through a membrane under the influence of a voltage; soil can act as the membrane.
- *electrode potential - potential of an electrode as measured against a reference electrode. The electrode potential includes no loss of potential in the solution due to current passing to or from the electrodes (that is, it represents the reversible work required to move a unit charged from the electrode surface through the solution to the reference electrode).
- electrolyte - chemical substance or mixture, usually liquid, containing ions that migrate in an electric field; examples are soil and seawater.
- electromotive force series (EMF series) - list of elements arranged according to their standard electrode potentials; the sign is positive for elements with potentials cathodic to hydrogen and negative for those elements with potentials anodic to hydrogen.
- *foreign structure - any structure not intended to be part of the system of interest.
- *galvanic anode - metal that, because of its relative position in the galvanic series, provides sacrificial protection in the galvanic series when coupled in an electrolyte. These anodes are the current source in one type of cathodic protection.
- galvanic cell - corrosion cell in which anode and cathode are dissimilar conductors, producing corrosion because of their innate difference in potential.
- *galvanic series - list of metals and alloys arranged according to their relative potentials in a given environment.
- *holiday - coating discontinuity that exposes the metal surface to the environment.
- hydrogen overvoltage - voltage characteristic for each metal-environmental combination above which hydrogen gas is liberated.

*Definition is from NACE Standard RP-01.

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- impressed current - direct current supplied by a power source external to the electrode system.
- *insulating coating system - all components that comprise the protective coating, the sum of which provides effective electrical insulation of the coated structure.
 - *interference bond - metallic connection designed to control electrical interchange between metallic systems.
 - ion - electrically charged atom or molecule.
 - *IR drop - voltage across a resistance according to Ohm's Law.
 - *line current - direct current flowing on a pipeline.
 - local action - corrosion caused by local cells on a metal surface.
 - mill scale - heavy oxide layer formed during hot fabrication or heat-treatment of metals. Applied chiefly to iron and steel.
 - Molality - concentration of a solution expressed as the number of gram molecules of the dissolved substance per 1000 grams of solvent.
 - PH - measure of hydrogen ion activity defined by $\text{pH} = \log_{10} (1/a_{\text{H}^+})$, where a_{H^+} = hydrogen ion activity = molal concentration of hydrogen ions multiplied by ion activity coefficient ($a = 1$ for simplified calculations).
 - polarization - deviation from the open circuit potential of an electrode resulting from the passage of current.
 - *reference electrode - device for which the open circuit potential is constant under similar conditions of measurement.
 - * reverse-current switch - device that prevents the reversal of direct current through a metallic conductor.
 - *stray current - current flowing through paths other than the intended circuit.
 - *stray current corrosion - corrosion resulting from direct current flow through paths other than the intended circuit.
 - *structure-to-electrolyte voltage (also structure-to-soil potential or pipe-to-soil potential) - voltage difference between a buried metallic structure and the electrolyte, measured with a reference electrode in contact with the electrolyte.
 - *structure-to-structure voltage (also structure-to-structure potential) - difference in voltage between metallic structures in a common electrolyte.
 - *voltage - electromotive force, or a difference in electrode potentials, expressed in volts.

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