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Electroplaters' Society
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Standard Terminology Relating to Electroplating¹

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INTRODUCTION

These definitions correspond to interpretations as applied to electroplating and do not necessarily correspond to the definitions used in other fields.

1. Referenced Documents

1.1 *ASTM Standards*:²

B368 Test Method for Copper-Accelerated Acetic Acid-Salt Spray (Fog) Testing (CASS Test)

2. Terminology

abrasive blasting—a process for cleaning or finishing by means of an abrasive directed at high velocity against the work piece.

activator—*in diffusion coatings*, a chemical, usually a halide salt, that enters into a reaction with the source or master alloy, depositing the source on the substrate.

activation—elimination of a passive condition on a surface.

activity (ion)—the ion concentration corrected for deviations from ideal behavior. Concentration multiplied by activity coefficient.

addition agent—a material added in small quantities to a solution to modify its characteristics. It is usually added to a plating solution for the purpose of modifying the character of a deposit.

adhesion—the attractive force that exists between an electrodeposit and its substrate that can be measured as the force required to separate an electrodeposit and its substrate.

adhesion, practical, n —the force or work required to detach or remove a coating from the underlayer or substrate; it can be measured in terms of peel, pull, or shear strength as an experimentally determined quantity.

aluminizing—forming of an aluminum or aluminum alloy coating on a metal by hot dipping, hot spraying, or diffusion.

amorphous—noncrystalline, or devoid of regular structure.

ampere—the current that will deposit silver at the rate of 0.0011180 g/s. Current flowing at the rate of 1 C/s.

angstrom unit ($\text{\AA}$)— 10^{-8} cm.

anion—a negatively-charged ion.

anode—the electrode in electrolysis, at which negative ions are discharged, positive ions are formed, or other oxidizing reactions occur.

anode corrosion—dissolution of anode metal by the electrochemical action in an electrolytic cell.

anode efficiency—current efficiency of a specified anodic process.

anode film—(1) the layer of solution in contact with the anode that differs in composition from that of the bulk of the solution. (2) The outer layer of the anode itself consisting of oxidation or reaction products of the anode metal.

anode polarization—see **polarization**.

anodic coating—a protective, decorative, or functional coating, formed by conversion of the surface of a metal in an electrolytic oxidation process.

anodizing—an electrolytic oxidation process in which the surface of a metal, when anodic, is converted to a coating having desirable protective, decorative, or functional properties.

¹ This terminology is under the jurisdiction of ASTM Committee B08 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.01 on Ancillary Activities.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

anolyte—the portion of electrolyte in the vicinity of the anode; in a divided cell, the portion of electrolyte on the anode side of the diaphragm.

anti-pitting agent—an addition agent for the specific purpose of preventing gas pits in a deposit.

autocatalytic plating—deposition of a metal coating by a controlled chemical reduction, catalyzed by the metal or alloy being deposited.

automatic machine (or conveyor)—a machine for mechanically processing parts through treatment cycles, such as cleaning, anodizing, or plating.

automatic plating: (1) *full*—plating in which the cathodes are automatically conveyed through successive cleaning and plating tanks; (2) *semi*—plating in which the cathodes are conveyed automatically through only one plating tank.

auxiliary anode—a supplementary anode employed during electrodeposition to achieve a desired thickness distribution of the deposit.

auxiliary cathode—see **thief**.

back emf (electromotive force)—the potential set up in an electrolytic cell that opposes the flow of current, caused by such factors as concentration polarization and electrode films. See **emf (electromotive force)**.

ball burnishing—see **barrel burnishing**.

barrel burnishing—the smoothing of surfaces by means of tumbling the work in rotating barrels in the presence of metallic or ceramic shot, and in the absence of abrasive. In ball burnishing, the shot consists of hardened steel balls.

barrel electroplating—an electroplating process in which electrodeposits are applied to articles in bulk in a rotating, oscillating, or otherwise moving container.

barrel finishing (or tumbling)—bulk processing in barrels, in either the presence or absence of abrasives or burnishing shot, for the purpose of improving the surface finish.

barrel plating (or cleaning)—plating or cleaning in which the work is processed in bulk in a rotating container.

barrel processing—mechanical, chemical, cleaning, or electrolytic treatment of articles in bulk or in a rotating, oscillating, or otherwise moving container.

barrier layer—in *anodizing aluminum*, the thin, pore-free, semiconducting aluminum oxide region nearest the metal surface and distinct from the main anodic oxide coating which has a pore structure.

base metal—(1) see **basis metal**; (2) in *diffusion coatings*, the metal present in the largest proportion in an alloy.

basis metal (or material)—material upon which coatings are deposited.

bipolar electrode—an electrode that is not directly connected to the power supply but is so placed in the solution between

the anode and the cathode that the part nearest the anode becomes cathodic and the part nearest the cathode becomes anodic.

black oxide—a finish on metal produced by immersing a metal in hot oxidizing salts or salt solutions.

blasting—see **sand blasting**; **grit blasting**; **wet blasting**.

blister—a dome-shaped imperfection or defect, resulting from loss of adhesion between a metallic deposit and the substrate.

bloom—a visible exudation or efflorescence on a surface.

blue dip—a solution, once widely used, containing a mercury compound used to deposit mercury upon a metal by immersion, usually prior to silver plating.

blueing—the formation of a thin oxide film on steel, either by heating in air, or by immersion in oxidizing solutions.

bright dip (nonelectrolytic)—a solution used to produce a bright surface on a metal.

bright electroplating—a process that produces an electrodeposit having a high degree of specular reflectance in the as-plated condition.

bright electroplating range—the range of current densities within which an electroplating solution produces a bright deposit under a given set of operating conditions.

bright plating—a process that produces an electrodeposit having a high degree of specular reflectance in the as-plated condition.

bright plating range—the range of current densities within which a given plating solution produces a bright plate.

brightener—an addition agent that leads to the formation of a bright plate, or that improves the brightness of the deposit.

bright-throwing power—the measure of the ability of a plating solution or a specified set of plating conditions to deposit uniformly bright electroplate upon an irregularly shaped cathode.

bronzing—the application of a chemical finish to copper or copper alloy surfaces to alter the color.

brush plating—a method of plating in which the plating solution is applied with a pad or brush, within which is an anode and which is moved over the cathode to be plated.

brush polishing (electrolytic)—a method of electropolishing (q.v.) in which the electrolyte is applied with a pad or brush in contact with the part to be polished.

buffer—a compound or mixture that, when contained in solution, causes the solution to resist change in pH. Each buffer has a characteristic limited range of pH over which it is effective.

buffing—the smoothing of a surface by means of a rotating flexible wheel to the surface of which fine, abrasive particles are applied in liquid suspension, paste, or grease stick form.