

Designation: NACE/ASTM G193 – 20



Standard Terminology and Acronyms Relating to Corrosion¹

This standard is issued under the fixed designation NACE/ASTM G193; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This terminology and acronyms standard covers and defines commonly used terms and acronyms in the field of corrosion. Related terms may be found in Terminologies [D16](#), [D4538](#), [G40](#), or other ASTM terminology standards.

1.2 This terminology and acronyms standard is a result of an agreement between NACE International and ASTM International Committee G01 on Corrosion of Metals and may not reflect the opinions of other ASTM committees.

1.3 In this terminology and acronyms standard, brackets are used for directives that follow a definition and are obviously not part of it, such as, “[see XXX]” and “[also known as XXX].” Brackets can also indicate the field of application or context of the definition or acronym.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

- 2.1 *ASTM Standards:*²
- [D16 Terminology for Paint, Related Coatings, Materials, and Applications](#)
 - [D2583 Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor](#)
 - [D4538 Terminology Relating to Protective Coating and Lining Work for Power Generation Facilities](#)
 - [E10 Test Method for Brinell Hardness of Metallic Materials](#)
 - [E18 Test Methods for Rockwell Hardness of Metallic Materials](#)

¹ This terminology and acronyms standard is under the jurisdiction of NACE/ASTM Committee J01, Joint Committee on Corrosion, and is the direct responsibility of Subcommittee J01.02, Working Group on Terminology.

Current edition approved Jan. 1, 2020. Published April 2020. Originally approved in 2009. Last previous edition approved in 2012 as G193–12d. DOI: 10.1520/G0193–20.

² For referenced ASTM standards, visit the ASTM Web site, 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 Web site. For NACE standards, visit the NACE International website, www.nace.org, or contact NACE First Service at firstservice@nace.org.

[E92 Test Methods for Vickers Hardness and Knoop Hardness of Metallic Materials](#)

[G40 Terminology Relating to Wear and Erosion](#)

2.2 *NACE Standards:*²

[NACE No. 1/SSPC-SP 5 White Metal Blast Cleaning](#)

[NACE No. 2/SSPC-SP 10 Near-White Metal Blast Cleaning](#)

[NACE No. 3/SSPC-SP 6 Commercial Blast Cleaning](#)

[NACE No. 4/SSPC-SP 7 Brush-Off Blast Cleaning](#)

2.3 *SSPC Surface Preparation Standards:*³

[SSPC-SP 1 Solvent Cleaning](#)

[SSPC-SP 2 Hand Tool Cleaning](#)

[SSPC-SP 3 Power Tool Cleaning](#)

[SSPC-SP 8 Pickling](#)

2.4 *ISO Standards:*⁴

[ISO 6506-1 Metallic materials -- Brinell hardness test -- Part 1: Test method](#)

[ISO 6507-1 Metallic materials -- Vickers hardness test -- Part 1: Test method](#)

[ISO 6508-1 Metallic materials -- Rockwell hardness test -- Part 1: Test method \(scales A, B, C, D, E, F, G, H, K, N, T\)](#)

3. Terminology

3.1 *Definitions:*

abrasion resistance—the ability of a material to resist being worn away and to maintain its original appearance and structure when subjected to rubbing, scraping, or wear.

abrasive—a solid substance that, owing to its hardness, toughness, size, shape, consistency, or other properties, is suitable for grinding, cutting, roughening, polishing, or cleaning a surface by friction or high-velocity impact.

abrasive blast cleaning—cleaning and roughening of a surface produced by the high-velocity impact of an abrasive that is propelled by the discharge of pressurized fluid from a blast nozzle or by a mechanical device such as a centrifugal blasting wheel. [also referred to as **abrasive blasting**]

abrasive blasting—see **abrasive blast cleaning**.

³ Available from The Society for Protective Coatings (SSPC), 800 Trumbull Drive Pittsburgh, PA 15205, <http://www.sspc.org>.

⁴ Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

accelerator—a chemical substance that increases the rate at which a chemical reaction (for example, curing) would otherwise occur.

AC impedance—see **electrochemical impedance**.

acrylic—type of resin polymerized from acrylic acid, methacrylic acid, esters of these acids, or acrylonitrile.

activator—a chemical substance that initiates a chemical reaction (for example, curing). Heat and radiation may also serve as activators for some chemical reactions.

active—(1) a state of a metal surface that is corroding without significant influence of reaction product. (2) the negative direction of electrode potential.

active-passive cell—an electrochemical cell in which the anode is a metal in the active state and the cathode is the same metal in the passive state.

adduct curing agent—a material that is formed by prereacting the curing agent with a portion of the resin component of the coating.

adhesion—the state in which two surfaces are held together by chemical interfacial forces, mechanical interlocking forces, or both.

aeration cell—see **differential aeration cell**.

aging—(1) the process of exposing materials to an environment for an interval of time. (2) change in metallurgical properties that generally occurs slowly at room temperature (natural aging) and more rapidly at higher temperature (artificial aging).

air drying—process by which an applied wet coat converts to a dry coating film by evaporation of solvent or reaction with oxygen as a result of simple exposure to air without intentional addition of heat or a curing agent.

airless spraying—process of spraying coating liquids using hydraulic pressure, not air pressure, to atomize.

alkyd—type of resin formed by the reaction of polyhydric alcohols and polybasic acids, part of which is derived from saturated or unsaturated oils or fats.

alligatoring—pronounced wide cracking over the surface of a coating, which has the appearance of alligator hide.

alloy steel—an iron-based alloy containing carbon (usually less than 2.5 mass percent), manganese (usually greater than 0.25 mass percent), and specified minimum quantities of one or more alloying elements other than manganese, silicon, and copper, but does not contain 10.5 mass percent or greater chromium.

alternate immersion—exposure to environmental cycles, each involving immersion in a fluid for a period of time followed by removal from that fluid for another period of time.

amphoteric metal—a metal that is susceptible to corrosion in both acidic and alkaline environments.

anaerobic—absence of air or free (molecular) oxygen.

anchor pattern—see **surface profile**.

anion—a negatively charged ion.

anneal—heat to and hold at a temperature appropriate for the specific material and then cool at a suitable rate, for such purposes as reducing hardness, improving machinability, or obtaining desired properties.

anode—the electrode of an electrochemical cell at which oxidation occurs. (Electrons flow away from the anode in the external circuit. It is usually the electrode where corrosion occurs and metal ions enter solution.)

anode cap—an electrical insulating material placed over the end of the anode at the lead wire connection.

anode corrosion efficiency—the ratio of the actual corrosion (mass loss) of an anode to the theoretical corrosion (mass loss) calculated from the quantity of electricity that has passed between the anode and cathode using Faraday's law.

anodic inhibitor—a corrosion inhibitor whose primary action is to reduce the rate of the anodic reaction, producing a positive shift in corrosion potential.

anodic polarization—(1) the change of electrode potential caused by an anodic current flowing across the electrode/electrolyte interface. (2) a forced noble (positive) shift in electrode potential. [See **polarization**.]

anodic protection—a technique to reduce the corrosion rate of a metal surface by polarizing that surface to a more oxidizing potential.

anodizing—an electrochemical oxidation process that converts the surface of a metal (such as aluminum or titanium) to an oxide coating.

anolyte—the electrolyte adjacent to the anode of an electrochemical cell.

antifouling—preventing fouling. [See **fouling**.]

atmospheric zone—the portion of a marine structure that extends upward from the splash zone and is exposed to sun, wind, water spray, and rain.

attenuation—electrical losses in a conductor caused by current flow in the conductor.

Auger electron spectroscopy—analytical technique in which the sample surface is irradiated with low-energy electrons and the energy spectrum of electrons emitted from the surface is measured.

austenite—the face-centered cubic crystalline phase of iron or iron-based alloys.

austenitic/ferritic stainless steel—see **duplex stainless steel**.

austenitizing—forming austenite by heating iron or iron-based alloys to a temperature in the transformation range (partial austenitizing) or above the transformation range (complete austenitizing).

auxiliary electrode—see **counter electrode**.

backfill—material placed in a hole to fill the space around the anodes, vent pipe, and buried components of a cathodic protection system.

Barcol hardness—a hardness value obtained by measuring the resistance of rubbers, plastics, or coatings to indentation by a steel impressor under spring load in accordance with Test Method **D2583**.

barrier coating—(1) a coating that has a high resistance to permeation of liquids and/or gases. (2) a coating that is applied over a previously coated surface to prevent damage to the underlying coating during subsequent handling.

barrier pigment—a pigment that impedes permeation through an organic coating solely by its physical presence [contrast with **corrosion-inhibitive pigment** and **sacrificial pigment**].

beach marks—the characteristic markings on the fracture surfaces produced by fatigue crack propagation. [also known as *arrest marks*, *clamshell marks*, and *conchoidal marks*]

beta curve—a plot of dynamic (fluctuating) interference current or related proportional voltage (ordinate) versus the corresponding structure-to-electrolyte potentials at a selected location on the affected structure (abscissa).

binder—the nonvolatile portion of the vehicle of a formulated coating material.

bituminous coating—an asphalt or coal-tar compound used to provide a protective coating for a surface.

blast angle—(1) the angle of the blast nozzle with reference to the surface during abrasive blast cleaning. (2) the angle of the abrasive particles propelled from a centrifugal blasting wheel with reference to the surface being abrasive blast cleaned.

blister—a dome-shaped projection on the surface of a coating resulting from the local loss of adhesion and lifting of the film from an underlying coat or from the base substrate.

blooming—see **blushing**.

blowdown—(1) the injection of air or water under high pressure through a tube to the anode area for the purpose of purging the annular space and possibly correcting high resistance caused by gas blockage. [cathodic protection use] (2) the process of discharging a significant portion of the aqueous solution in order to remove accumulated salts, deposits, and other impurities. [boiler or cooling water tower use]

blushing—whitening and loss of gloss of a coating, usually organic, caused by moisture. [also known as **blooming**]

bracelet anode—a galvanic anode with geometry suitable for direct attachment around the circumference of a pipeline. This may be a half-shell bracelet consisting of two semicircular sections or a segmented bracelet consisting of a large number of individual sections.

braze—(1) a bond produced as the result of heating an assembly to the brazing temperature greater than 450 °C [840 °F] and less than the solidus temperature of the base metal using a brazing filler metal distributed and retained between the closely fitted faying surfaces of the joint by capillary action. (2) the act of creating a braze.

breakdown potential—the least noble potential at which pitting or crevice corrosion, or both, will initiate and propagate in a specific environment.

Brinell hardness—hardness value, measured in accordance with ISO 6506-1 or Test Method **E10**, using a 1 mm to 10 mm diameter tungsten carbide ball and a force of approximately 9.807 N to 29.420 N (1 kgf to 3000 kgf).

brittle fracture—fracture that occurs with little or no plastic deformation of the material. [contrast with **ductile fracture**]

brush-off blast cleaned surface—an abrasive blast cleaned steel surface that is free of all visible contaminants and foreign matter but may have some tightly adherent mill scale, rust, or coating. [See NACE No. 4/SSPC-SP 7 for detailed specification.]

burnish—process of smoothing surfaces using frictional contact between the material and some other hard pieces of hard material (for example, hardened steel balls).

calcareous coating—a layer consisting of calcium carbonate and other salts deposited on the surface. When the surface is cathodically polarized as in cathodic protection, this layer is the result of the increased pH adjacent to the protected surface.

calcareous deposit—see **calcareous coating**.

carbon steel—alloy of carbon and iron containing up to 2 mass percent carbon and up to 1.65 mass percent manganese and residual quantities of other elements, except those intentionally added in specific quantities for deoxidation (usually silicon and/or aluminum).

carburizing—the absorption and diffusion of carbon in iron or an iron-based alloy in contact with a suitable carbonaceous environment at elevated temperature.

case hardening—hardening a ferrous alloy so that the outer portion, or case, is made substantially harder than the inner portion, or core. Typical processes are carburizing, cyaniding, carbonitriding, nitriding, induction hardening, and flame hardening.

casein paint—water-thinned paint with vehicle derived from milk.

cast iron—a generic term for a large family of cast ferrous alloys in which the carbon content exceeds the solubility of carbon in austenite at the eutectic temperature, or about 2 mass percent. Most cast irons also contain silicon, and may contain other alloying elements and impurities.

casting—(1) a component formed at or near its finished shape by the solidification of liquid material in a mold; (2) the creation of such a component.