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Standard Terminology Relating to Plastics¹

This standard is issued under the fixed designation D883; 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 reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This terminology covers definitions of technical terms used in the plastics industry. Terms that are generally understood or adequately defined in other readily available sources are not included.

1.2 When a term is used in an ASTM document for which Committee D20 is responsible it is included only when judged, after review, by Subcommittee D20.92 to be a generally usable term.

1.3 Definitions that are identical to those published by another standards body are identified with the abbreviation of the name of the organization; for example, IUPAC is the International Union of Pure and Applied Chemistry.

1.4 A definition is a single sentence with additional information included in discussion notes. It is reviewed every 5 years; the year of last review is appended.

1.5 For literature related to plastics terminology, see [Appendix X1](#).

1.6 *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

[C162 Terminology of Glass and Glass Products](#)

[D638 Test Method for Tensile Properties of Plastics](#)

[D747 Test Method for Apparent Bending Modulus of Plas-](#)

[tics by Means of a Cantilever Beam \(Withdrawn 2019\)](#)³
[D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials](#)
[D882 Test Method for Tensile Properties of Thin Plastic Sheeting](#)
[D907 Terminology of Adhesives](#)
[D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics](#)
[D4703 Practice for Compression Molding Thermoplastic Materials into Test Specimens, Plaques, or Sheets](#)
[E308 Practice for Computing the Colors of Objects by Using the CIE System](#)

3. Terminology

3.1 *Definitions*:

A-stage, n—an early stage in the preparation of certain thermosetting resins in which the material is still soluble in certain liquids, and may be liquid or capable of becoming liquid upon heating.

DISCUSSION—Sometimes referred to as Resol. (See also **B-stage** and **C-stage**.) (1978)⁴

acetal plastics, n—plastics based on polymers having a predominance of acetal linkages in the main chain. (See also **polyoxymethylene**.) (1985)

acrylic plastics, n—plastics based on polymers made with acrylic acid or a structural derivative of acrylic acid. (1982)

addition polymerization—polymerization in which monomers are linked together without the splitting off of water or other simple molecules. (1983)

adiabatic extrusion—a method of extrusion in which, after the extrusion apparatus has been heated sufficiently by conventional means to plastify the material, the extrusion process can be continued with the sole source of heat being the conversion of the drive energy, through viscous resistance of the plastic mass in the extruder. (1978)

¹ This terminology is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.92 on Terminology.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Date indicates year of introduction or latest review or revision.

*A Summary of Changes section appears at the end of this standard

aging, *n*—(1) the effect on materials of exposure to an environment for an interval of time. (2) the process of exposing materials to an environment for an interval of time. (1973)

alkyd plastics, *n*—plastics based on alkyd resins. (1980)

alkyd resin, *n*—a polyester convertible into a crosslinked form; requiring a reactant of functionality higher than two, or having double bonds. (1982)

alloy, *n*—(in plastics), two or more immiscible polymers united, usually by another component, to form a plastic resin having enhanced performance properties.

allyl plastics, *n*—plastics based on allyl resins. (1978)

allyl resin, *n*—a resin made by polymerization of chemical compounds containing the allyl group. (1978)

amino plastics, *n*—plastics based on amino resins. (1978)

amino resin, *n*—a resin made by polycondensation of a compound containing amino groups, such as urea or melamine, with an aldehyde, such as formaldehyde, or an aldehyde-yielding material. (1985)

apparent density—See **density, apparent**.

aromatic polyester, *n*—a polyester derived from monomers in which all the hydroxyl and carboxyl groups are linked directly to aromatic nuclei. (1986)

artificial weathering, *n*—exposure to laboratory conditions, which may be cyclic, involving changes in temperature, relative humidity, radiant energy, and any other elements found in the atmosphere in various geographical areas.

DISCUSSION—The laboratory exposure conditions are usually intensified beyond those encountered in actual outdoor exposure in an attempt to achieve an accelerated effect. (1980)

average injection velocity, *n*—the mean value of the velocity of the molten plastic flow front within a cavity during the injection time that is calculated from the shot volume and injection time.

DISCUSSION—The average injection velocity is calculated as follows:

$$V_{av} = \frac{V_s}{t_i \times A_c \times n}$$

where:

V_{av}	=	average injection velocity, mm/s,
V_s	=	shot volume, mm ³ ,
t_i	=	injection time, s,
A_c	=	cross section of the cavity, mm ² , and
n	=	number of cavities.

This calculation is valid for molds containing a single cavity or those containing identical multi-specimen cavities only and not for family molds.

B-stage, *n*—an intermediate stage in the reaction of certain thermosetting resins in which the material swells when in contact with certain liquids and softens when heated, but may not entirely dissolve or fuse.

DISCUSSION—The resin in an uncured thermosetting molding compound is usually, in this stage, sometimes referred to as Resitol. (See also **A-stage** and **C-stage**.) (1978)

bag molding, *n*—a method of molding or laminating which involves the application of fluid pressure, usually by means of air, steam, water or vacuum, to a flexible barrier material which transmits the pressure to the material being molded or bonded.

DISCUSSION—The process is usually employed for forming shapes from preformed laminates comprising a fibrous sheet impregnated with an A-stage or a B-stage thermosetting resin. (1986)

binder, *n*—in a reinforced plastic, the continuous phase which holds together the reinforcement.

DISCUSSION—During fabrication, the binder, which may be either thermoplastic or thermoset, usually undergoes a change in state. (1978)

biodegradable plastic, *n*—See **degradable plastic**.

blister, *n*—an imperfection, a rounded elevation of the surface of a plastic, with boundaries that may be more or less sharply defined, somewhat resembling in shape a blister on the human skin. (1983)

block copolymer, *n*—an essentially linear copolymer in which there are repeated sequences of polymeric segments of different chemical structure. (1982)

blocking, *n*—unintentional adhesion between plastic films or between a film and another surface. (1983)

bloom, *n*—a visible exudation or efflorescence on the surface of a material. (1972)

blowing agent, *n*—a compounding ingredient used to produce gas by chemical or thermal action, or both, in manufacture of hollow or cellular articles. (1983)

blow molding, *n*—a method of fabrication in which a heated parison is forced into the shape of a mold cavity by internal gas pressure. (1985)

branched polyethylene plastics, *n*—those containing significant amounts of both short-chain and long-chain branching and having densities in the 0.910 to 0.940 g/cm³ range.

DISCUSSION—These plastics, usually produced commercially by free radical polymerization, are subcategorized by density level; low density polyethylene plastic and medium density polyethylene plastic.

bulk density, *n*—the weight per unit volume of a loosely packed material, such as a molding powder or pellets.

DISCUSSION—This term should not be used synonymously with apparent density.

bulk factor, *n*—the ratio of the volume of a given mass of molding material to its volume in the molded form.

DISCUSSION—The bulk factor is also equal to the ratio of the density of the material to its apparent density in the unmolded form. (ISO) (1982)

bulk molding compound (BMC), *n*—a putty-like mixture of any thermosetting resin containing fillers, fiber reinforcements, catalysts and thickening agents, or thermoplastic polymers, often extruded into logs or ropes.

DISCUSSION—BMC is suitable for molding by any one of three matched-metal-mold processes—compression molding, transfer molding, or injection molding. (1983)

- butylene plastics**, *n*—plastics based on resins made by the polymerization of butene or copolymerization of butene with one or more unsaturated compounds, the butene being in greatest amount by weight. (1975)
- C-stage**, *n*—the final stage in the reaction of certain thermo-setting materials in which they have become practically insoluble and infusible.
DISCUSSION—The resin in a fully cured thermoset molding is, in this stage, sometimes referred to as Resite. (See also **A-stage** and **B-stage**.) (1986)
- cast film**, *n*—a film made by depositing a layer of plastic, either molten, in solution, or in a dispersion, onto a surface, solidifying and removing the film from the surface. (1982)
- cavity**, *n*—in specimen preparation, the part of the hollow space of a mold that forms one specimen.
- cell**, *n*—a small cavity surrounded partially or completely by walls. (1983)
- cell, closed**, *n*—a cell totally enclosed by its walls and hence not interconnecting with other cells. (ISO) (See **cell** and **cell, open**.) (1983)
- cell, open**, *n*—a cell not totally enclosed by its walls and hence interconnecting with other cells. (See **cell** and **cell, closed**.) (1983)
- cellular plastic**, *n*—a plastic containing numerous cells, intentionally introduced, interconnecting or not, distributed throughout the mass. (See also **syntactic cellular plastics**.) (1983)
- cellular striation**, *n*—a condition characterized by a layer within a cellular material that differs greatly from the characteristic cell structure.
- cellulosic plastics**, *n*—plastics based on cellulose compounds, such as esters (cellulose acetate) and ethers (ethyl cellulose). (1985)
- chalking**, *n*—(*plastics*), a powdery residue on the surface of a material resulting from degradation or migration of an ingredient, or both.
DISCUSSION—Chalking may be designed-in characteristic. (1980)
- chemically foamed polymeric material**, *n*—a cellular material in which the cells are formed by gases generated from thermal decomposition or other chemical reaction. (1982)
- chlorinated poly(vinyl chloride)**, *n*—a poly(vinyl chloride) (PVC) polymer modified by additional chlorination. (2000)
- chlorinated poly(vinyl chloride) plastics**, *n*—plastics based on chlorinated poly(vinyl chloride) in which the chlorinated poly(vinyl chloride) is in the greatest amount by weight. (1978)
- chlorofluorocarbon plastics**, *n*—plastics based on polymers made with monomers composed of chlorine, fluorine, and carbon only. (ISO) (1983)
- chlorofluorohydrocarbon plastics**, *n*—plastics based on polymers made with monomers composed of chlorine, fluorine, hydrogen, and carbon only. (ISO) (1982)
- circuit**, *n*—*in filament winding*, the winding produced by a single revolution of mandrel or form. (1978)
- closed-cell cellular plastics**, *n*—cellular plastics in which almost all the cells are noninterconnecting. (1983)
- cold flow**, *n*—See **creep**. (1983)
- cold molding**, *n*—a special process of compression molding in which the molding is formed at room temperature and subsequently baked at elevated temperatures. (1982)
- collapse**, *n*—inadvertent densification of cellular material during manufacture resulting from breakdown of cell structure. (1982)
- composite**, *n*—a solid product consisting of two or more distinct phases, including a binding material (matrix) and a particulate or fibrous material.
DISCUSSION—Examples are moulding material containing reinforcing fibers, particulate fillers, or hollow spheres. (1991)
- compost**, *n*—the product of composting.
- compostable plastic**, *n*—a plastic that undergoes biological degradation during composting to yield carbon dioxide, water, inorganic compounds, and biomass at a rate consistent with other known compostable materials and leaves no visually distinguishable or toxic residues. (1996)
- compound**, *n*—an intimate admixture of (a) polymer(s) with all the materials necessary for the finished product. (1983)
- compression molding**, *n*—the method of molding a material already in a confined cavity by applying pressure and usually heat. (1986)
- condensation polymer**, *n*—a polymer made by condensation polymerization. (1983)
- condensation polymerization**, *n*—polymerization in which monomers are linked together with the splitting off of water or other simple molecules. (1983)
- contact pressure molding**, *n*—a method of molding or laminating in which the pressure, usually less than 70 kPa (10 psi), is only slightly more than necessary to hold the materials together during the molding operation. (1985)
- cooling time**, *n*—in molding, the time interval from the start of forward screw movement until the mold starts to open.
- copolymer**, *n*—See **polymer**. (1983)
- copolymerization**, *n*—See **polymerization**. (1983)
- crater**, *n*—a small, shallow surface imperfection. (1978)
- crazing**, *n*—apparent fine cracks at or under the surface of a plastic.
DISCUSSION—The crazed areas are composed of polymeric material of lower density than the surrounding matrix. (1978)
- creep**, *n*—the time-dependent part of strain resulting from stress. (1983)
- cross laminate**, *n*—a laminate in which some of the layers of material are oriented approximately at right angles to the remaining layers with respect to the grain or strongest direction in tension. (See also **parallel laminate**.) (1982)