



Designation: **C 904 – 9801**

Standard Terminology Relating to Chemical-Resistant Nonmetallic Materials¹

This standard is issued under the fixed designation C 904; 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.

acid etch, v —to clean or alter a surface by the application of acid.

adhesion—the physical attraction of two substances, especially the macroscopically observable attraction of dissimilar substances.

aggregate—any inert material such as sand, gravel, slag, carbon, etc., usually consisting of various-sized particles and used with chemical-resistant binders to form chemical-resistant mortars.

back joint—a vertical mortar joint, parallel to the vertical substrate, between a chemical-resistant construction unit and a substrate or another chemical-resistant construction unit.

bearing area—for chemical-resistant polymer machinery grout, the portion of the grout surface in contact with the underside of a supported surface.

bed joint—a horizontal mortar joint between a chemical-resistant construction unit and a substrate or another chemical-resistant construction unit.

bend angle— 180° minus the internal angle created by applying a load on the weld joining two sheets of plastic.

binder—a substance used to bond aggregates or fillers, or both, into a solid mass.

broadcast resin monolithic floor surfacing—a flooring system whereby a film of catalyzed resin binder is applied on a prepared concrete substrate followed immediately by the seeding to excess, into this wet film, of a dry inert filler. Upon hardening, any unbonded filler is removed. The application may be repeated once or several times to yield a greater thickness of surfacing. A top coat may be applied.

butt welding (machine)—the fusing together of two pieces of plastic which are aligned in the same plane, with the same mating thickness, by application of heat and pressure. Also called *hot-plate welding*.

castable, n —a combination of filler and suitable binder that is generally poured or compacted into place and which hardens.

catalyst—a substance whose presence initiates or changes the rate of a chemical reaction, but does not itself enter into the reaction.

DISCUSSION—Occasionally used in the vernacular to describe a setting agent, hardener, curing agent, or promoter, etc.

chemical-resistant—the ability of a material to resist degradation by reaction with, dissolution by, or reduction of physical continuity from contact with a chemical agent or agents, thereby retaining its capacity to perform as a structural or aesthetic entity.

chemical-resistant carbon brick—a brick comprised of carbon (including graphite) that is carbon bonded and fired to a minimum temperature of 1850°F (1010°C). This brick exhibits good resistance to thermal shock and resists exposure to a wide range of alkalis and acids, particularly hydrofluoric acid. When used in oxidizing conditions, temperature exposure should be less than 600°F (315°C).

chemical-resistant construction unit—a modular nonmetallic material, either vitreous or nonvitreous, used in industrial processes primarily for applications where chemical, thermal, and mechanical resistance is required.

chemical-resistant fireclay or shale brick—a kiln fired brick from clay, shale, or mixtures thereof that exhibits low absorption and high resistance to a wide range of chemical environments. This brick should not be used in hot caustic or where hydrofluoric acid or other fluoride chemical compounds are found. Commonly referred to as acid-resistant brick or acid-proof brick.

chemical-resistant polymer concrete—a construction material composed of a continuous phase (binder) of a polymer and a discontinuous phase (aggregate) generally used in applications where chemical resistance is required.

chemical-resistant resin grout—a mixture of liquid resin, filler and setting agent. The components form a mixture that subsequently hardens by chemical reaction. The setting agent may be separate or incorporated in the filler.

chemical-resistant polymer machinery grout—an intimate mixture of liquid resinous material, selected filler materials, and setting agent, which harden by chemical reaction to provide support for machine bases.

chemical-resistant resin monolithic surfacing—an intimate mixture of liquid resinous materials, selected filler materials, and

¹ This terminology is under the jurisdiction of ASTM Committee C-3 C03 on Chemical-Resistant Nonmetallic Materials and is the direct responsibility of Subcommittee C03.05 on Terminology.

Current edition approved Sept. 10, 1998; 2001. Published March 1999; July 2001. Originally published as C 904 – 79. Last previous edition C 904 – 978.

setting agent. These components are mixed together, placed to a minimum thickness of 60 mils (1.5 mm), then hardened to form a bonded overlay.

chemical-resistant resin mortar—an intimate mixture of liquid resinous material, selected filler materials, and setting agent. These components form a trowelable mortar that subsequently hardens by chemical reaction.

chemical-resistant tile grout—an intimate mixture of liquid resinous material, selected filler materials, and setting agent. These components form a flowable mixture that subsequently hardens by chemical reaction.

DISCUSSION—This grout is applied to fill open joints between chemical-resistant brick or tile.

chemical setting silicate and silica chemical-resistant mortar—an intimate mixture of a silicate or silica binder, a chemically inert solid filler, and a setting agent. The binder may be a liquid silicate or silica, or a powder to which water is added. These components are subsequently hardened by the chemical reaction between the setting agent and the binder.

cohesion—the mutual attraction by which elements of a substance are held together.

compressive strength—the maximum stress that a specimen or material will support when subjected to a crushing force applied at a specified rate.

creep—time dependent deformation of a material under load.

deflection—deformation or displacement from the original contour or shape.

degradation—a deleterious change in the physical or chemical properties, or both, of a material.

density—the weight per unit volume in air, expressed in pounds per cubic foot of a product.

DISCUSSION—Density may be expressed in other common units, when desired, by using appropriate conversion factors.

epoxy resin—a viscous liquid or brittle solid containing epoxide groups that can be crosslinked into final form by means of a chemical reaction with a variety of setting agents used with or without heat.

extrusion welding—a process in which heated plastic is forced through a shaping orifice (or die) and applied with pressure to suitably prepared, locally preheated plastic pieces of the same resin base, to join them.

face surface bend—procedure whereby load is applied perpendicular to the weld axis of the joint, at the weld, such that the weld face is subject to tension.

furan resin—a thermosetting catalyzed condensation reaction product from furfuryl alcohol, furfural or combination thereof.

fusion welding—a joining process in which the mating surfaces of two thermoplastic parts are melted by induced heat and rapidly pressed together while still molten to form a homogeneous bond.

head joint—the mortar joint perpendicular to the substrate and perpendicular to the direction of the course being laid. On a floor it may be called a cross joint.

hot-gas welding—a technique for joining thermoplastics (usually sheets) in which the materials are first softened by a jet of hot gas from a welding gun. A rod of the same plastic is used to fill the heated gap and join the sheets at the same time pressure is applied by either the rod or the tip of the gun. Sometimes referred to as string bead welding.

hot-plate welding—see *butt welding (machine)*.

hydraulic mortar—a mortar that is capable of setting and hardening due to the interaction of water and the constituents of the mortar.

initial setting time—the time interval from the start of mixing the component parts at a specified temperature, (a) to that time when a Gillmore needle weighing 1 lb (454 g) and having a tip $\frac{1}{24}$ in. (1 mm) in diameter by $\frac{3}{16}$ in. (5 mm) long will penetrate mortar $\frac{5}{8}$ in. (16 mm) thick to a depth of $\frac{3}{16}$ in. (5 mm) in 1 min, or, (b) to that time at which a $\frac{1}{4}$ in. (6.4 mm) wide joint of the mortar between bricks is indented less than $\frac{1}{24}$ in. (1 mm) by a Vicat needle during a 10-min period.

monolithic, n—a material of uniform composition applied as a continuous surface or structure.

phenolic resin—a thermosetting condensation product obtained by reacting phenol with an aldehyde.

polyester resin—a condensation product resulting from a chemical reaction between a dicarboxylic acid and a dihydroxy alcohol or by the polymerization of a hydroxy carboxylic acid.

resinous—containing a polymer as a binder that is either hardened by chemical action (thermosetting), by the evaporation of a solvent, or by melting for application (thermoplastic).

root bend—procedure whereby a loading nose is applied along the weld face such that the weld root is subject to tension.

secant modulus—the slope of a line drawn from the origin to any specified point on the stress-strain curve.

service strength setting time—the time interval, after the initial mixing of the composition, at a specific temperature, at which time the product has acquired 90 % of its specified strength.

setting agent—the component of a mixture that catalyzes or reacts with the resin component to cause hardening by polymerization.

short term weld factor—a dimensionless number that provides a relative measure of the tensile strength of a welded thermoplastic test specimen to the tensile strength of the manufactured sheet.

shrinkage—a reduction in size of a composition which occurs during its hardening process, curing process, or both.

shrinkage, linear—a reduction in the length of a cast bar of a composition during its hardening process, curing process, or both.

shrinkage, unrestrained—a reduction in size of a composition which occurs during its hardening process, curing process, or both, with no external forces applied that can inhibit such reduction.

shrinkage, volume—a reduction in occupied space of a composition during its hardening process, curing process, or both.

side surface bend—procedure whereby a load is applied on the weld in line with the weld axis.

slurry-broadcast resin monolithic surfacing—a flooring system whereby a dry inert filler is added to a catalyzed resin binder to yield a semi-flowable consistency. This mixture is then poured onto the substrate and spread to desired thickness, followed immediately by seeding the fresh surface to excess with a dry inert filler. Upon hardening, any unbonded filler is removed. The application may be repeated once or several times to yield a greater thickness of surfacing. A top coat may be applied.

socket welding (machine)—a joining technique for thermoplastic pipe whereby the joining surfaces of the pipe and the fitting are inserted into a heating mandrel that is equipped with appropriate sized male and female heater bushings. The surfaces are heated to the melt point, removed, and held together under pressure until fused.

spin welding (machine)—a joining technique used for bonding thermoplastic parts by frictional heat caused by differential rotation of one or both pieces. Rotation is then stopped and pressure held until heat is dissipated. Also known as frictional welding.

strain, linear—the change in length of a specimen due to an applied stress relative to the original length of the specimen before the stress was applied. Linear strain is often shown as:

$$\frac{L_2 - L_1}{L_1}$$

where:

L_1 = original length of specimen, and

L_2 = length of the specimen when subjected to an applied stress.

strain rate—the rate of relative length deformation with time due to an applied stress. Strain rate is often shown as:

$$\frac{L_2 - L_1}{L_1(T_2 - T_1)}$$

where:

L_1 = original length of specimen,

L_2 = length of the specimen when subjected to an applied stress,

T_1 = time when stress is applied, and

T_2 = time when L_2 is measured.

sulfur concrete—see **sulfur polymer cement concrete**.

sulfur modifier—the concentrated product produced by reacting sulfur with a hydrocarbon material, used with additional elemental sulfur to produce a binder for sulfur polymer cement concrete.

sulfur mortar—a product consisting of fillers, such as carbon or silica flour, dispersed in sulfur. Small amounts of modifying additives may be included.

sulfur polymer cement—the product obtained by reacting sulfur with chemical modifiers to produce a binder for sulfur polymer cement concrete.

sulfur polymer cement concrete—a thermoplastic chemical-resistant construction material composed of sulfur polymer cement binder or a binder composed of elemental sulfur and sulfur modifier, hot-mixed with appropriate types and amounts of aggregate and mineral filler. Commonly referred to as sulfur concrete or sulfur polymer concrete.

sulfur polymer concrete—see **sulfur polymer cement concrete**.

symmetrical weld—a fused joint joining two sheets in which the joint and weld configuration on either side of the sheets is identical.

tangent modulus—the slope of a tangent line drawn at the steepest initial portion of the stress-strain curve.

thermoplastic—any one of a group of materials capable of being repeatedly softened or melted by increases in temperature followed by subsequent solidification on cooling.

thermoplastic weld—the joining together of two plastic surfaces by a combination of heat and pressure, with or without filler material.

thixotropy—the property of a material to thin upon isothermal agitation and to thicken upon subsequent rest.

vinyl ester resin—a thermosetting reaction product of epoxy resin with a polymerizable unsaturated acid usually methacrylic acid, which is then diluted with a reactive monomer—usually styrene.

working time (chemical-resistant mortars)—the time interval in minutes after initial mixing of the component parts, at a specific temperature and in the absence of direct sunlight, in which the mortar may be applied to a brick or tile surface without curling behind the trowel.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).