



## Standard Definitions of Terms Relating to ADHESIVES

**A-Stage-** an early stage in the reaction of certain thermosetting resins in which the material is fusible and still soluble in certain liquids. Sometimes referred to as Resol. (See also **B-stage** and **C-stage**)

**Abhesive-** a material which is adhesive resistant and applicable as a nonsticking surface coating; release agent

**Acceptance test-** a test, or series of tests conducted by the procuring agency, or an agent thereof, upon receipt to determine whether an individual list of materials conforms to the purchase order or contract or to determine the degree of uniformity of the materials supplied by the vendor, or both. Note: specifications usually state sampling technique, test procedures, and minimum requirements for acceptance.

**Accelerated aging-** see **aging, accelerated**.

**Adhere-** to cause two surfaces to be held together by adhesion.

**Adherend-** a body which is held to another body by an adhesive. (See also **substrate**)

**Adherend preparation-** see **surface preparation**.

**Adhesion-** the stage in which two surfaces are held together by interfacial forces which may consist of valence forces or interlocking addition, or both. (See also **adhesion, mechanical and adhesion, specific**)

**Adhesion, mechanical-** adhesion between surfaces in which the adhesive holds the parts together by interlocking action. (See also **adhesion, specific**)

**Adhesion, specific-** adhesion between surfaces which are held together by valence forces of the same type as those which give rise to cohesion. (See also **adhesion, mechanical**)

**Adhesive-** a substance capable of holding materials together by surface attachment. Note: adhesive is a general term and includes among others cement, glue, mucilage, and paste. All of these terms are loosely used interchangeably. Various descriptive adjectives are applied to the term adhesive to indicate certain characteristics as follows: (1) physical form, that is, liquid adhesive, tape adhesive, etc.; (2) chemical type, that is, silicate adhesive, resin adhesive, etc.; (3) materials bonded, that is, paper adhesive, metal-plastic adhesive, can label adhesive, etc.; (4) condition of use, that is, hot setting adhesive, room temperature setting adhesive, etc.

**Adhesive, anaerobic-** an adhesive that cures spontaneously in the absence of oxygen, the curing being inhibited by the presence of oxygen and catalyzed by metallic ions.

**Adhesive, assembly-** an adhesive that can be used for bonding parts together, such as in the manufacture of a boat, airplane, furniture, and the like. Note: The term assembly adhesive is commonly used in the wood industry to distinguish such adhesives (formerly called “joint glues”) from those used making

plywood (sometimes called “veneer glues”). It is applied to adhesives used in fabricating finished structures or goods, or subassemblies thereof, as differentiated from adhesive used in the production of sheet materials for sale as such, for example, plywood or laminates.

**Adhesive, cellular-** see **adhesive, foamed**

**Adhesive, cold setting-** an adhesive that sets at room temperatures below 68°F. (See also **adhesive, hot setting; adhesive, intermediate temperature setting; and adhesive, room temperature setting**)

**Adhesive contact-** an adhesive that is apparently dry to the touch and which will adhere to itself instantaneously upon contact; also called contact bond adhesive or dry bond adhesive.

**Adhesive, dispersion (or emulsion)-** a two phase system with one phase (the adhesive material) in a liquid suspension.

**Adhesive, encapsulated-** an adhesive in which the particles or droplets of one of the relative components are enclosed in a protective film (microcapsules) to prevent cure until the film is destroyed by suitable means.

**Adhesive, film-** an adhesive in film form, with or without a carrier, usually set by means of heat and/or pressure. The main advantage is uniformity of glueline thickness.

**Adhesive, foamed-** an adhesive, the apparent density of which has been decreased substantially by the presence of numerous gaseous cells dispersed through its mass.

**Adhesive, gap filling-** an adhesive subject to low shrinkage in setting, can be employed as a sealant.

**Adhesive, heat activated-** a dry adhesive film that is rendered tacky or fluid by application of heat or heat and pressure to the assembly.

**Adhesive, heat sealing-** a thermoplastic film adhesive which is melted between the adherend surfaces by heat application to one or both of the adjacent adherend surfaces.

**Adhesive, hot melt-** an adhesive that is applied in a molten state and forms a bond on cooling to a solid state.

**Adhesive, hot setting-** an adhesive that requires a temperature at or above 212°F to set it. (See also **adhesive, cold setting; adhesive; intermediate temperature setting; and adhesive, room temperature setting**)

**Adhesive, intermediate temperature setting-** an adhesive that sets in the temperature range from 90° to 210°F.

**Adhesive, latex-** an emulsion of rubber or thermoplastic rubber to water.

**Adhesive, multiple layer-** a film adhesive usually supported with a different adhesive composition on each side; designed to bond dissimilar materials such as the core to face bond of a sandwich composite.

**Adhesive, one component**- an adhesive material incorporating a latent hardener or catalyst activated by heat. Usually refers to thermosetting materials, but also describes anaerobic, hot melt adhesive, or those depend on solvent loss for adherence. Thermosetting one component adhesives require heat to cure.

**Adhesive, pressure sensitive**- a viscoelastic material which in solvent free form remains permanently tacky. Such materials will adhere instantaneously to most solid surfaces with the application of very slight pressure.

**Adhesive, room temperature setting**- an adhesive that sets in the temperature range from 68° to 86°F.

**Adhesive, separate application**- a term used to describe an adhesive consisting of two parts, one part being applied to one adherend and the other part to the other adherend and the two brought together to form a joint. Also known as honeymoon adhesives.

**Adhesive, solvent**- an adhesive having a volatile organic liquid as a vehicle. Note: This term excludes water based adhesive.

**Adhesive, solvent activated**- a dry adhesive film that is rendered tacky just prior to use by application of a solvent

**Adhesive, structural**- an adhesive of proven reliability in engineering structural applications in which the bond can be stressed to a high proportion of its maximum failing load for long periods without failure.

**Adhesive, two component**- an adhesive supplied in two parts which are mixed before application. Such adhesives usually cure at room temperature.

**Adhesive, warm setting**- a term that is sometimes used as a synonym for Intermediate Temperature Setting Adhesive.

**Adsorption**- the action of a body in condensing and holding gases and other materials at its surface.

**Aging, accelerated**- a set of laboratory conditions designed to produce in a short time the results of normal aging. Usual factors include temperature, light, oxygen, water and other environments as needed.

**Aging time**- see **time, joint conditioning**.

**Aggressive tack**- see **tack, dry**.

**Ambient temperature**- see **temperature, ambient**.

**Amorphous phase**- noncrystalline; most plastics are amorphous at processing temperature. Many retain this strength under normal temperatures.

**Amylaceous**- pertaining to, or of the nature of, starch; starchy.

**Assembly**- a group of materials or parts including adhesive, which has been placed together for bonding or which has been bonded together.

**Assembly adhesive**- see **adhesive, assembly**.

**Assembly glue-** see **adhesive**, assembly.

**Assembly time-** see **time**, assembly.

**Autoclave-** a closed container that provides controlled heat and pressure conditions.

**B-stage-** an intermediate stage in the reaction of certain thermosetting resins in which the materials soften when heated and swell when in contact with certain liquids, but may not entirely fuse or dissolve. The resin in an uncured thermosetting adhesive is usually in this stage. Sometimes referred to as Resitol. (See also **A-stage and C-stage**).

**Backing-** the flexible supporting materials for an adhesive. Pressure sensitive adhesives are commonly backed with paper, plastic films, fabric, or metal foil while heat curing thermosetting adhesives are often supported on glass cloth backing.

**Batch-** the manufactured unit or a blend of two or more units of the same formulation and processing.

**Bag molding-** a method of molding or bonding involving the application of fluid pressure, usually by means of air, steam, water, or vacuum, to a flexible cover which, sometimes in conjunction with the rigid die, completely encloses the materials to be bonded.

**Bag, vacuum-** a flexible bag by which pressure may be applied to an assembly inside the bag by means of evacuation of the bag.

**Binder-** a component of an adhesive composition that is primarily responsible for the adhesive forces that hold two bodies together. (See also **extender and filler**)

**Bite-** the penetration or dissolution of adherend surfaces by an adhesive.

**Blister-** an elevation of the surface of an adherend, somewhat resembling in shape a blister on the human skin; its boundaries may be indefinitely outlined and it may have burst and become flattened. Note: A blister may be caused by insufficient adhesive; inadequate curing time, temperature, or pressure; trapped air, water, or solvent vapor.

**Blocked curing agent-** a curing agent or hardener rendered unreactive, which can be reactivated as desired by physical or chemical means.

**Blocking-** an undesired adhesion between touching layers of material, such as occurs under moderate pressure during storage or use.

**Body-** the consistency of an adhesive which is a function of viscosity, plasticity, and rheological factors.

**Bond, n-** the union of materials by adhesives.

**Bond, v-** to unite materials by means of an adhesive. (See also **adhere**)

**Bold line-** see **glue line**.

**Bond strength-** the unit load applied in tension, compression, flexure, peel, impact, cleavage, or shear, required to break an adhesive assembly with failure occurring in or near the plane of the bond. Note: The term adherence is frequently used in place of bond strength.

**Bond, structural-** see **structural bond**

**Caul-** a sheet of materials employed singly or in pairs in hot or cold pressing of assemblies being bonded. Note 1: A caul is used to protect either the faces of the assembly, of the press platens, or both, against marring and staining; to prevent sticking; to facilitate press loading; to impart a desired surface texture or finish; and to provide uniform pressure distribution. Note 2: A caul may be made of any suitable materials such as aluminum, stainless steel, hardboard, fiberboard, or plastic; the length and width dimensions being generally the same as those of the platen of the press where it is used.

**C-stage-** the final stage in the reaction of certain thermosetting resins in which the material is relatively insoluble and infusible. Certain thermosetting resins in a fully cured adhesive layer are in this stage. Sometimes referred to as Resite. (See also **A-stage and B-stage**)

**Catalyst-** a substance that markedly speeds up the cure of an adhesive when added in minor quantity as compared to the amounts of the primary reactants. (See also **hardener and inhibitor**)

**Cement, n-** see **adhesive**.

**Cement, v-** see **bond, v**.

**Closed assembly time-** see **time, assembly**.

**Cohesion-** the state in which the particles of a single substance are held together by primary or secondary valence forces. As used in the adhesive field, the state in which the particles of the adhesive (or the adherend) are held together.

**Cold flow-** see **creep**.

**Cold pressing-** a bonding operation in which an assembly is subjected to pressure without the application of heat.

**Cold setting adhesive-** see **adhesive, cold setting**.

**Collagen-** the protein derived from bone and skin used to prepare animal glue and gelatin

**Colophony-** the resin obtained from various species of pine trees.

**Condensation-** a chemical reaction in which two or more molecules combine with the separation of water or some other simple substance. If a polymer is formed, the process is called poly condensation. (See also **polymerization**).

**Conditioning time-** see **time, joint conditioning**.

**Consistency-** that property of a liquid adhesive by virtue of which it tends to resist deformation. Note: Consistency is not a fundamental property but is comprised of viscosity, plasticity, and other phenomena. (See also **viscosity and viscosity coefficient**)

**Contact bonding-** the deposition of cohesive materials on both adherend surfaces and their assembly under pressure.

**Copolymer-** see **polymer**.

**Copolymerization-** see **polymerization**.

**Core-** the honeycomb structure used in sandwich panel construction.

**Corrosion-** the chemical reaction between the adhesive or contamination and the adherend surfaces, due to reactive compounds in the adhesive film, leading to deterioration of the bond strength.

**Coverage-** the spreading power of an adhesive over the surface area of the adherend.

**Crazing-** fine cracks that may extend in a network on or under the surface of or through a layer of adhesive.

**Creep-** the dimensional change with time of a material under load, following the initial instantaneous elastic or rapid deformation. Creep at room temperature is sometimes called cold flow.

**Cross laminated-** see **laminated, cross**.

**Crosslinking-** the union of adjacent molecules of uncured adhesive (often existing as long polymer chains) by catalytic or curing agents.

**Crystallinity-** a state of molecular structure in some polymers denoting uniformity and compactness of the molecular chains.

**Cure-** to change the physical properties of an adhesive by chemical reaction, which may be condensation, polymerization, or vulcanization; usually accomplished by the action of heat and catalyst, alone or in combination with or without pressure.

**Curing agent-** see **hardener**.

**Curing temperature-** see **temperature, curing**.

**Curing time-** see **time, curing**.

**Degrease-** to remove oil and grease from adherend surfaces.

**Delamination-** the separation of layers in a laminate because of failure of the adhesive, either in the adhesive itself or at the interface between the adhesive and the adherend.

**Dextrin-** a water based product derived from the acidification and/or roasting of starch.

**Dielectric curing-** the use of a high frequency electric field through a joint to cure a synthetic thermosetting adhesive. A curing process for wood and other nonconductive joint materials.

**Diluent-** an ingredient usually added to an adhesive to reduce the concentration of bonding materials. (See also **extender and thinner**)

**Doctor-bar or blade-** a scraper mechanism that regulates the amount of adhesive on the spreader rolls or on the surface being coated.

**Doctor roll-** a roller mechanism that is revolving at different surface speed, or in opposite directions, resulting in a wiping action for regulating the adhesive supplied to the spreader roll.

**Double spread-** see **spread**.

**Dry-** to change the physical state of an adhesive or an adherend by the loss of solvent constituents by evaporation or absorption, or both. (See also **cure and set**)

**Dry strength-** see **strength, dry**.

**Dry tack-** see **tack, dry**.

**Drying temperature-** see **temperature, drying**.

**Drying time-** see **time, drying**.

**Elasticity, modulus of-** the ratio of stress to strain in elastically deformed materials.

**Elastomer-** a macromolecular material which, at room temperature, is capable of recovering substantially in size and shape after removal of a deforming force.

**Epoxy-** a resin formed by combining epichlorohydrin and bisphenols. Requires a curing agent for conversion to a plastic-like solid. Has outstanding adhesion and excellent chemical resistance.

**Exothermic-** a chemical reaction that gives off heat.

**Extender-** a substance, generally having some adhesive action, added to an adhesive to reduce the amount of the primary binder required per unit area. (See also **binder, diluent, filler, and thinner**)

**Failure, adherend-** joint failure by cohesive failure of the adherend.

**Failure, adhesive-** rupture of an adhesive bond, such that the separation appears to be at the adhesive-adherend interface. Note: Sometimes termed failure in adhesion.

**Failure, cohesive-** rupture of an adhesive bond, such that the separation appears to be within the adhesive.

**Failure, contact-** the failure of an adhesive joint as a result of incomplete contact during assembly, between adherend and adhesive surfaces or between adhesive surfaces.

**Faying surface-** the surface of an adherend which makes contact with another adherend.

**Feathering-** the tapering of an adherend on one side to form a wedge section, as used in a scarf joint.

**Filler-** a relatively nonadhesive substance added to an adhesive to improve its working properties, permanence, strength, or other qualities. (See also **binder and extender**)

**Filler sheet-** a sheet of deformable or resilient materials that when placed between the assembly to be bonded and the pressure applicator, or when distributed within a stack of assemblies, aids in providing uniform application of pressure over the area to be bonded.

**Fillet**- that portion of an adhesive which fills the corner or angle formed where two adherends are joined.

**Flow**- movement of an adhesive during the bonding process, before the adhesive is set.

**Gel**- a semisolid system consisting of a network of solid aggregates in which liquid is held.

**Gelation**- formation of a gel.

**Glue, n**- originally, a hard gelatin obtained from hides, tendons, cartilage, bones, etc. of animals. Also, an adhesive prepared from this substance by heating with water. Through general use the term is synonymous with the term adhesive. (See also **adhesive, mucilage, paste, and sizing**)

**Glue, v**- see **bond, v**.

**Glue line (bond line)**-the layer of adhesive, which attaches two adherends.

**Green strength**- the ability of an adhesive to hold two surfaces together when brought into contact and before the adhesive develops its ultimate bond properties when fully cured.

**Gum**- any class of colloidal substances exuded by or prepared from plants, sticky when moist, composed of complex carbohydrates and organic acids, which are soluble or swell in water (See also adhesive, glue, resin). Note: The term gum is sometimes used loosely to denote various materials that exhibit gummy characteristics under certain conditions, for example, gum balata, gum benzoin, and gum asphaltum. Gums are included by some in the category of natural resins.

**Hardener**- a substance or mixture of substances added to an adhesive to promote or control the curing reaction by taking part in it. The term is also used to designate a substance added to control the degree of hardness of the cured film. (See also **catalyst**)

**Heat reactivation**- the use of heat to effect adhesive activity, e.g., hot melt adhesive; completion of the curing process of a B-staged resin.

**Honey comb core**- a sheet of material, which may be metal, formed into cells (usually hexagonal) and used for sandwich construction in structural assemblies, especially in aircraft construction.

**Hot setting adhesive**- see adhesive, hot setting.

**Hydrolysis**- decomposition of a substrate or adhesive by a reaction with water.

**Inhibitor**- a substance that slows down a chemical reaction. Inhibitors are sometimes used in certain types of adhesives to prolong storage or working life.

**Interface**- the contact area between adherend and adhesive surfaces.

**Intermediate temperature setting adhesive**- see **adhesive, intermediate temperature setting**.

**Jig**- an apparatus used to hold a bonded assembly until the adhesive has cured.

**Joint**- the location at which two adherends are held together with a layer of adhesive. (See also **bond, n**)

**Joint aging time**- see **time, joint conditioning**.



**Joint conditioning time-** see **time, joint conditioning.**

**Joint, lap-** a joint made by placing one adherend partly over another and bonding together the overlapped portions. (See also **joint, scarf**)

**Joint, scarf-** a joint made by cutting away similar angular segments of two adherends and bonding the adherends with the cut areas fitted together. (See also **joint, lap**)

**Joint, starved-** a joint that has an insufficient amount of adhesive to produce a satisfactory bond. Note: This condition may result from too thin a spread to fill the gap between the adherend, excessive penetration of the adhesive into the adherend, too short an assembly time, or the use of excessive pressure.

**Laminate, n-** a product made by bonding together two or more layers of material or materials. (see also **laminated, cross and laminated, parallel**)

**Laminate,v-** to unite layers of materials with adhesive.

**Lamination-** the process of preparing a laminate. Also, layer in a laminate.

**Laminated, cross-** a laminate in which some of the layers of materials are oriented at right angles to the remaining layers with respect to the grain or strongest direction in tension. (See also **laminated, parallel**) Note: Balanced construction of the laminations about the center line of the thickness of the laminate is normally assumed.

**Laminated, parallel-** a laminate in which all the layers of materials are oriented approximately parallel with respect to the grain or strongest direction in tension (See also **laminated, cross**)

**Lap joint-** see **joint, lap**

**Legging-** the drawing of filaments or strings when adhesive bonded substrates are separated.

**Manufactured unit-** a quantity of finished adhesive or finished adhesive component, processed at one time. Note: The manufactured unit may be a batch or a part thereof.

**Matrix-** the part of an adhesive that surrounds or engulfs embedded filler or reinforcing particles and filaments.

**Mechanical adhesion-** see **adhesion, mechanical and adhesion, specific.**

**Modifier-** any chemically inert ingredient added to an adhesive formulation that changes its properties. (See also **filler, plasticizer, and extender**)

**Modulus-** see **elasticity, modulus of.**

**Monomer-** a relatively simple compound which can react to form a polymer. (See also **polymer**)

**Mucilage-** an adhesive prepared from a gum and water. Also, in a more general sense, a liquid adhesive which has a low order of bonding strength. (See also **adhesive, glue, paste, and sizing**)

**Newtonian fluid**- a fluid in which the shearing rate is directly proportional to the applied torque.

**Novalak**- a phenolic-aldehydic resin that, unless a source of methylene groups is added, remains permanently thermoplastic. (See also **retinoid and thermoplastic**)

**Open assembly time**- see **time, assembly**.

**Parallel laminated**- see **laminated, parallel**.

**Paste**- an adhesive composition having a characteristic plastic type consistency, that is, a high order of yield value, such as that of a paste prepared by heating a mixture of starch and water and subsequently cooling the hydrolyzed product. (See also **adhesive, glue, mucilage, and sizing**)

**Penetration**- the entering of an adhesive into an adherend. Note: This property of a system is measured by the depth of penetration of the adhesive into the adherend.

**Permanence**- the resistance of an adhesive bond to deteriorating influences.

**Pick-up roll**- a spreading device where the roll for picking up the adhesive runs in a reservoir of adhesive.

**Plasticity**- a property of adhesives that allows the materials to be deformed continuously and permanently without rupture upon the application of a force that exceeds the yield value of the material.

**Plasticizer**- a material incorporated in an adhesive to increase its flexibility, workability, or distensibility. The addition of the plasticizer may cause a reduction in melt viscosity, lower the temperature of the second order transition, or lower the elastic modulus of the solidified adhesive.

**Plywood**- a cross-bonded assembly made of layers of veneer or veneer in combination with a lumber core or plies joined with an adhesive. Two types of plywood are recognized, namely (1) veneer plywood and (2) lumber core plywood. Note: Generally the grain of one or more plies is approximately at right angles to the other plies, and almost always an odd number of plies are used.

**Polycondensation**- see **condensation**.

**Polymer**- a compound formed by the reaction of simple molecules having functional groups which permit their combination to proceed to high molecular weights under suitable conditions. Polymers may be formed by polymerization (addition polymer) or polycondensation (condensation polymer). When two or more monomers are involved, the product is called a copolymer.

**Polymerization**- a chemical reaction in which the molecules of a monomer are linked together to form large molecules whose molecular weight is a multiple of that of the original substance. When two or more monomers are involved, the process is called copolymerization or heteropolymerization. (See also **condensation**)

**Porosity**- the ability of adherend to absorb and adhere.

**Post cure, n**- a treatment (normally involving heat) applied to an adhesives assembly following the initial cure, to modify specific properties.

**Post cure, v-** to expose an adhesive assembly to an additional cure, following the initial cure, for the purpose of modifying specific properties.

**Post vulcanization bonding-** conventional adhesive bonding of previously vulcanized elastomeric adherends.

**Pot life-** see **working life**.

**Prebond treatment-** see **surface preparation**.

**Preproduction test-** a test or series of tests conducted by (1) an adhesive manufacturer to determine conformity of an adhesive batch to established production standards, (2) a fabricator to determine the quality of an adhesive before parts are produced, or (3) an adhesive specification custodian to determine conformance of an adhesive to the requirements of a specification not requiring qualification tests.

**Pressure sensitive adhesive-** see **adhesive, pressure sensitive**.

**Primer-** a coating applied to a surface, prior to the application of an adhesive, to improve the performance of the bond.

**Qualification test-** a series of tests conducted by the procuring activity, or an agent thereof, to determine conformance of materials, or materials system, to the requirements of a specification which normally results in a qualified products list under the specification.

**Release agent-** an adhesive material which prevents bond formation.

**Release paper-** a sheet, serving as a protectant or carrier, or both, for an adhesive film or mass, which is easily removed from the film or mass prior to use.

**Resin-** a solid, semisolid, or pseudosolid organic material that has an indefinite and often high molecular weight, exhibits a tendency to flow when subjected to stress, usually has a softening or melting range, and usually fractures conchoidally. Note: A “liquid resin” is an organic polymeric liquid which when converted to its final state becomes a resin.

**Resinoid-** any of the class of thermosetting synthetic resins, either in their initial temporary fusible state or in their final infusible state. (See also **novolak and thermosetting**)

**Resite-** an alternative term for C-stage. (See also **C-stage**)

**Resitol-** an alternative term for B-stage (See also **B-stage**)

**Resol-** an alternative term for A-stage (See also **A-stage**)

**Retarder-** see **inhibitor**.

**Retrogradation-** a change of starch pastes from low to high consistency on aging.

**Room temperature setting adhesive-** see **adhesive, room temperature setting**.

**Rosin-** a resin obtained as a residue in the distillation of crude turpentine from the sap of the pine tree (gum rosin) or from an extract of the stumps and other parts of the tree (wood resin)

**Sagging**- run or flow-off of adhesive from an adherend surface due to application of excess or low viscosity material.

**Sandwich panel**- an assembly composed of metal skins (facings) bonded to both sides of a lightweight core.

**Sealant**- a gap filling material to prevent excessive absorption of adhesive, or penetration of liquid or gaseous substances.

**Scarf joint**- see **joint, scarf**.

**Self-curing**- see **self-vulcanizing**.

**Self-vulcanizing**- pertaining to an adhesive that undergoes vulcanization without the application of heat.

**Separate application adhesives**- see **adhesive, separate application**.

**Service conditions**- the environmental conditions to which a bonded structure is exposed., e.g., heat, cold, humidity, radiation, vibration, etc.

**Set**- to convert an adhesive into a fixed or hardened state by chemical or physical action, such as condensation, polymerization, oxidation, vulcanization, gelation, hydration, or evaporation of volatile constituents. (See also **cure and dry**)

**Setting temperature**- see **temperature, setting**.

**Setting time**- see **time, setting**.

**Shear, tensile**- the apparent stress applied to an adhesive in a lap joint.

**Shelf life**- see storage life

**Shortness**- a qualitative term that describes an adhesive that does not string on cotton, or otherwise form filaments or threads during application.

**Shrinkage**- the volume reduction occurring during adhesive curing, sometimes expressed as percentage volume or linear shrinkage; size reduction of adhesive layer due to solvent loss or catalytic reaction.

**Single spread**- see **spread**.

**Size**- see **sizing**.

**Sizing**- the process of applying a material on a surface in order to fill pores and thus reduce the absorption of the subsequently applied adhesive or coating or to otherwise modify the surface properties of the substrate to improve the adhesion. Also, the materials used for this purpose. The latter is sometimes called size.

**Slippage**- the movement of the adherends with respect to each other during the bonding process.

**Solids content**- the percentage of weight of the nonvolatile matter in an adhesive. Note: The actual percentage of the nonvolatile matter in an adhesive will vary considerably according to the analytical procedure that is used. A standard test method must be used to obtain consistent results.

**Solvent bonding**- see **solvent welding**.

**Solvent cement**- an adhesive utilizing an organic solvent as the means of depositing the adhesive constituent.

**Solvent cementing**- see **solvent welding**.

**Solvent reactivating**- the application of solvent to a dry adhesive layer to regenerate its wetting properties.

**Solvent welding**- the process of joining articles made of thermoplastic resins by applying a solvent capable of softening the surfaces to be joined and pressing the softened surfaces together. Adhesion is attained by means of evaporation of the solvent, absorption of the solvent into the adjacent materials and/or polymerization of the solvent cement.

**Specific adhesion**- see **adhesion, specific and adhesion, mechanical**.

**Spread**- the quantity of adhesives per unit joint area applied to an adherend, usually expressed in points of adhesive per thousand square feet of joint area. (1) Single spread refers to application of adhesive to only one adherend of a joint. (2) Double spread refers to application of adhesive to both adherends of a joint.

**Squeeze-out**- excess adhesive pressed out at the bond line due to pressure applied in the adherends.

**Stabilizer**-an adhesive additive which prevents or minimizes change in properties, e.g., by adherend absorption, demulsification, or rapid chemical reaction.

**Storage life**- the period of time during which a packaged adhesive can be stored under specified temperature conditions and remain suitable for use. Sometimes called Shelf Life. (See also **working life**)

**Starved joint**- see **joint, starved**.

**Strength, cleavage**- the tensile load expressed in force per unit of width of bond required to cause cleavage separation of a test specimen of unit length.

**Strength, dry**- the strength of an adhesive joint determined immediately after drying under specified conditions or after a period of conditioning in the standard laboratory atmosphere.

**Strength, fatigue**- the maximum load expressed in force per unit of width of bond required to cause cleavage separation of a test specimen of unit length.

**Strength, fatigue**- the maximum load that a joint will sustain when subjected to repeated stress application after drying, or after a conditioning period under specified conditions.

**Strength, impact**- the ability of an adhesive material to resist shock by a sudden physical blow direct against it. Impact shock is the transmission of stress to an adhesive interface by sudden vibration or jarring blow of the assembly, measured in work units per unit area.

**Strength, lap joint-** the force necessary to rupture an adhesive joint by means of stress applied parallel to the plane of the bond. Also referred to as tensile-shear strength.

**Strength, peel-** the force per unit width necessary to bring an adhesive to the point of failure and/or to maintain a specified rate of failure by means of a stress applied in a peeling mode.

**Strength, shear-** the resistance of an adhesive joint to shearing stresses; the force per unit areas sheared, at failure.

**Strength, tensile-** the resistance of an adhesive joint to tensile stress; the force per unit area under tension, at failure.

**Strength, wet-** the strength of an adhesive joint determined immediately after removal from a liquid in which it has been immersed under specified conditions of time, temperature, and pressure. Note: The term is commonly used also to designate strength after immersion in water. In the latex adhesive, the term is also used to describe the joint strength when the adherends are brought together with the adhesive still in the wet state.

**Stringiness-** the property of an adhesive that results in the formation of filaments or threads when adhesive transfer surfaces are separated. (See also **webbing**) Note: Transfer surfaces may be rolls, picker plates, stencils, etc.

**Structural adhesive-** see **adhesive, structural**.

**Structural bond-** a bond, which stresses the adherend to the yield point, thereby taking full advantage of the strength of the adherend. On the basis of this definition, a dextrin adhesive used with paper (e.g., postage stamps, envelopes, etc.) and which cause failure of the paper, forms a structural bond. The stronger the adherend, the greater the demands placed on the adhesive. Thus, few adhesives qualify as “structural” for metals. A further requirement for a structural adhesive is that it be able to stress the adherend to its yield point after exposure in its intended environment.

**Substrate-** a material upon the surface of which an adhesive containing substance is spread for any purpose, such as bonding or coating. A broader term than adherend. (See also **adherend**)

**Surface preparation-** a physical or chemical preparation, or both, of an adherend to render it suitable for adhesive joining.

**Synersis-** the exudation of small amounts of liquid by gels on standing.

**Tack-** the property of an adhesive that enables it to form a bond of measurable strength immediately after adhesive and adherend are brought into contact under low pressure.

**Tack,dry-** the property of certain adhesives, particularly nonvulcanizing rubber adhesives, to adhere on contact to themselves at a stage in the evaporation of volatile constituents, even though they seem dry to the touch. Sometimes called Aggressive Tack.

**Tack range-**the period of time in which an adhesive will remain in the tacky dry condition after application to an adherend, under specified conditions of temperature and humidity.

**Tacky-dry-** pertaining to the condition of an adhesive when the volatile constituents have evaporated or been absorbed sufficiently to leave it in a desired tacky state.

**Tackifier**- an additive intended to improve the stickiness of a cast adhesive film; usually a constituent of rubber based and synthetic resin adhesives.

**Tape**- a film form of adhesive which may be supported on carrier material.

**Teeth**- the resultant surface irregularities or projections formed by the beading of filaments or strings which may form when adhesive bonded substrates are separated.

**Telegraphing**- a condition in a laminate or other type of composite construction in which irregularities, imperfections, or patterns of an inner layer are visibly transmitted to the surface.

**Temperature, ambient** - temperature of the air surrounding the object under construction or test.

**Temperature, curing**- the temperature to which an adhesive or an assembly is subjected to cure the adhesive (See also **temperature, drying and temperature, setting**) Note: The temperature attained by the adhesive in the process of curing it (adhesive curing temperature) may differ from the temperature of the atmosphere surrounding the assembly (assembly curing temperature).

**Temperature, drying**- the temperature to which an adhesive on an adherend or in an assembly or the assembly itself is subjected to dry the adhesive. (See also **temperature, curing, and temperature, drying**)

**Temperature, maturing**- the temperature, as a function of time and bonding condition, that produces desired characteristics in bonded components.

**Temperature, setting**- the temperature to which an adhesive or an assembly is subjected to set the adhesive (See also **temperature, curing and temperature, drying**)

**Test, destructive**- tests involving the destruction of assemblies in order to evaluate the maximum performance of the adhesive bond.

**Test, nondestructive**- inspection tests for the evaluation of bond quality without damaging the assembly, e.g., ultrasonic, visual inspection, etc.

**Thermoplastic, adj**-capable of being repeatedly softened by heat and hardened by cooling.

**Thermoplastic, n**- a material that will repeatedly soften when heated and harden when cooled.

**Thermoset, adj**- pertaining to the state of a resin in which it is relatively infusible.

**Thermoset, n**- a material that will undergo or has undergone a chemical reaction by the action of heat, catalyst, ultraviolet light, etc., leading to a relatively infusible state.

**Thermosetting, adj**- having the property of undergoing a chemical reaction by the action of heat, catalysts, ultraviolet light, etc., leading to a relatively infusible state.

**Thinner**- a volatile liquid added to an adhesive to modify the consistency or other properties. (See also diluent and extender)

**Thixotropy**- the property of adhesives systems to thin upon isothermal agitation and to thicken upon subsequent rest.

**Time, assembly**- the time interval between the spreading of the adhesive on the adherend and the application of pressure or heat, or both, to the assembly. (1) Open assembly time is the time interval between the spreading of the adhesive on the adherend and the completion of the assembly of the parts for bonding. (2) Closed assembly time is the interval between completion of assembly of the parts for bonding and the application of pressure or heat, or both, to the assembly.

**Time, curing**- the period of time during which an assembly is subjected to heat or pressure, or both, to cure the adhesive. (See also time, joint conditioning and time, setting)

**Time, drying**- the period of time during which an adhesive on an adherend or an assembly is allowed to dry with or without the application of heat or pressure, or both. (See also time, curing; time, joint conditioning; and time, setting)

**Time, joint conditioning**- the time interval between the removal of the joint from the conditions of heat or pressure, or both, used to accomplish bonding and the attainment of approximately maximum bond strength. Sometimes called joint aging time.

**Time, setting**- the period of time during which an assembly is subjected to heat or pressure, or both, to set the adhesive. (See also time, curing; time, joint conditioning; and time, drying)

**Vehicle**- the carrier medium (liquid) for an adhesive material which improves its ease of application to adherends; solvent component of an adhesive.

**Viscosity**- the ratio of the shear stress existing between laminae of moving fluid and the rate of shear between these laminae. Note: A fluid is said to exhibit Newtonian behavior when the rate of shear is proportional to the shear stress. A fluid is said to exhibit non-Newtonian behavior when an increase or decrease in the rate of shear is not accompanied by proportional increase or decrease in the shear stress.

**Viscosity coefficient**- the shearing stress tangentially applied that will induce a velocity gradient. A material has a viscosity of one poise when a shearing stress of one dyne per square centimeter produces a velocity gradient of (1 cm/s)/cm. (See also **viscosity**)

**Vulcanization**- a chemical reaction in which the physical properties of a rubber are changed in the direction of decreased plastic flow, less surface tackiness, and increased tensile strength by reaction it with sulfur or other suitable agents. (See also **self-vulcanizing**)

**Vulcanize**- to subject to vulcanization.

**Warm setting adhesives**- see **adhesive, warm setting**.

**Warp**- a significant variation from the original, true, or plane surface.

**Webbing**- filaments or threads that may form when adhesive transfer surfaces are separated. (See also **stringiness**)

**Weld bonding**- a process in which a joint is formed by spot welding through an uncured adhesive bond line, or by flowing an adhesive into a spot-welded joint.



**Wet strength-** see **strength, wet**.

**Wetting-** a surface is said to be completely wet by a liquid if the contact angle is zero, and incompletely wet if it is a finite angle. Surfaces are commonly regarded as unwettable if the angle exceeds 90 degrees.

**Wood build-up, laminated-** an assembly made by bonding layers of veneer or lumber with an adhesive so that the grain of all laminations is essentially parallel.

**Wood failure-** the rupturing of wood fibers in strength tests on bonded specimens, usually expressed as the percentage of the total area involved which shows such failure.

**Wood veneer-** a thin sheet of wood, generally within the thickness range from 0.01 to 0.25 in. to be used in a laminate.

**Working life-** the period of time during which an adhesive, after mixing with catalyst, solvent or other compounding ingredients, remains suitable for use. (See also **storage life**)

**Yield value-** the stress (either normal or shear) at which a marked increase in deformation occurs without an increase in load.

The following sources were used in compiling this Appendix:

ASTM D 907, "Standard Definitions of Terms Relating to Adhesives," American Society for testing and Materials, Conshohocken, PA.

ASTM C717, "Terminology of building Seals and Sealants," American Society for Testing and Materials, Conshohocken, PA.

MIL-HDBK-691B, Military Standardization Handbook, *Adhesive Bonding*, Department of Defense, Washington, DC.

Panek, J.R. and Cook, J.P., *Construction Sealants and Adhesives*, John Wiley & Sons, New York, 1991.

Sharpe, L.H., "Fundamentals of Adhesives and Sealants Technology," *Adhesives and Sealants*, vol. 3, Engineered Materials Handbook Series, ASM International, 1990.