

Adhesive Terms

absorption - The taking up of liquid adhesive film into the substrate by capillary or cellular attraction.

adherend(s) - The substance or surface to which the adhesive is applied; the surfaces bonded together.

adhesion, mechanical - The joining or bonding of surfaces by the interlocking action and actual physical penetration of the adhesive.

adhesion, specific - The joining or bonding of surfaces by valence forces resembling the types of giving rise to cohesion.

adhesive, cold-setting - (1) An adhesive that cures at temperatures at or below approximately 68°F after the addition of the catalyst or curing agent. (2) An adhesive that sets at or below room temperature without a catalyst or curing agent.

adhesive, contact - An adhesive, apparently dry to the touch, that will adhere to itself instantaneously upon contact.

adhesive, heat-seal - An adhesive that can be converted to a dry film or coating. The dried film or coating can then be rendered tacky or fluid for bonding by the application of heat.

adhesive, nonwarp - An adhesive that will produce laminations which remain flat when they are subjected to low relative humidities.

affinity - An attraction or polar similarity between adhesive and adherend.

antifoam - A material which, when included in a liquid composition, retards or inhibits the development of foam. (*Not the same as a defoamer.*)

aqueous - Water containing or water based. Refers to adhesive systems such as starch, dextrine, animal glues, polyvinyl alcohol, emulsion, latices, etc., which use water as the carrier system or solvent for the adhesive.

assembly - The completely bonded structure.

bactericide - A material used in small percentages to kill bacteria that may occur in liquid adhesives, or that may attack carbohydrate or proteinaceous adhesive films. (*See also Preservative*)

binder - An adhesive substance, usually liquid or molten, used to create adhesion between discrete particles or another substance; distinguished from adhesives in that it performs an internal adhesive function rather than a surface adhesive function.

bite - The ability of the adhesive to penetrate or dissolve the uppermost portions of the adherends.

bleed through - The migration of a component of an adhesive film into the substrate or vice versa usually results in staining of the film or substrate.

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

blocking - Unwanted adhesion between touching layers of a material; can occur under moderate pressure, temperature, or high relative humidity during storage or use.

borate - To add boron compound to an adhesive to improve adhesive tack and viscosity.

breaking - The setting or coalescing of an emulsion adhesive.

casein - White phosphoprotein precipitated from milk by heating with an acid or by the action of lactic acid.

caulk - To fill voids with plastic or semiplastic materials; to fill crevices in the adherend surface with adhesive materials; to provide a seal against moisture or solvent intrusion.

caustic - A corroding or burning substance; usually refers to strong alkalis.

clay - A natural silicate having small particle size. It is used as a filler in adhesive formulations to reduce penetration into porous substrates.

coagulate - To change into a curd-like mass.

cold flow - The deformation of an adhesive mass due to long-term stress, heat or moisture which permits the adherends to move. (*See also Creep*)

consistency - That property of a liquid adhesive enabling it to resist deformation or flow. Consistency comprises viscosity, plasticity, and other phenomena.

contact bonding - A method of assembly in which cohesive substances are deposited on both adherend surfaces which are subsequently bonded together under pressure.

cook - Polyvinyl alcohol solution after the resin has been heated and completely dissolved.

Corona Discharge Treatment - The application of high voltage to a low surface energy adherend, which allows a high-surface tension emulsion to wet the surface better.

cottoning - A phenomenon observed during the machine application of an adhesive; weblike filaments of adhesive form between machine parts or between machine parts and the adherend.

coverage - A measure of the ability of the adhesive to spread over adherend surfaces; the total amount of adhesive required per 1000 square feet of bonded assembly. (*Also called mileage.*)

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cratering - Thin or bare spots in a coating film which have the appearance of pock marks caused by inadequate wetting of the substrate.

crazing - The formation of fissures or voids in the adhesive film because of excessive shrinkage.

creaming - See Syneresis.

creep - Deformation of the bonded assembly because of the inability of the adhesive interface to withstand constant loading or a high-temperature environment. (*See also Cold Flow*)

crosslink - A crosswise connecting part that connects chains in a complex chemical molecule.

defoamer - An additive which, when added to a liquid, breaks foam. Sometimes erroneously used as a synonym for antifoam.

dextrin - Any of various gummy substrates obtained from starch by the action of heat, acids, or enzymes.

dielectric curing - The curing of a synthetic thermosetting resin by the passage of an electric charge, produced by a high-frequency generator, through the adhesive joint. Dielectric curing is usually employed with nonconductive materials such as wood. A high-frequency current passing through the liquid adhesive interface creates rapid molecular motion and setting of the adhesive film.

drying time - The time interval between the application of the liquid adhesive to the adherend and the time at which the coalescence of the adhesive particles occurs.

elongation - The distance a bond will stretch lengthwise before breaking, expressed as a percentage of original length.

emulsify - To produce an intimate mixture (*emulsion*) from two insoluble liquids which will not separate upon standing.

etch - The corrosive action of an acid on a smooth surface such as metal or glass.

extender - (1) A substance, such as wood flour or a pigment, that is added to an adhesive to increase the bulk in relation to the active or primary ingredient. (2) A substance, with or without some adhesive action, that is added to an adhesive to reduce the amount of the primary binder required per unit area.

fiber tear - The dislocation and rupture of paper cloth or wood fibers during the separation of the adhesive-adherend interface. Used to evaluate the effectiveness of an adhesive bond by rating the total percentage of area exhibiting fiber rupture after cleavage of the assembly.

filler - A material - clay, diatomaceous earth, walnut-shell flour, etc., - used to extend an adhesive system or to provide increased bulk to a dried adhesive film.

fish eyes - Gel particles forming locally during the preparation of adhesives, or partially dissolved bits of material. The term fish eyes can also refer to the crawling of a wet film into a pattern resembling small dimples.

flexibility - The property of a material that will permit its being bent or twisted without breaking; the state of being nonrigid. Pliability.

foil - Unsupported thin metal membrane less than 0.006 of an inch thick.

foil, aluminum, dead soft - Fully annealed, tensile strength 10,000 p.s.i., soft, good ductility.

foil, aluminum, full hard, as rolled - Surface has a film of rolling oil. Normally called *H-18 temper*, tensile strength 24,000 p.s.i., strong, low ductility.

fungicide - A chemical used to destroy or prevent the growth of mold, mildew, or similar fungi. (*See also Preservative*)

fusion temperature - The temperature at which a film made of an emulsion coalesces to form a continuous film.

glass transition temperature (T_g) - The temperature at which an amorphous material changes from a brittle state to a flexible plastic state.

glue, animal - A proteinaceous adhesive obtained by hydrolyzing the collagen found in animal tissue.

gum - A generic term, referring to a broad class of natural adhesive materials obtained from the exudations of plants. Gums have good flow and tack characteristics.

hardener - A catalyst or crosslinking agent added to accelerate the curing of an adhesive, or a substance added to give durability and impact resistance to adhesive films.

heat-sealing temperature - The temperature at which a dry adhesive film is sufficiently activated to bond two surfaces at a given pressure and dwell time.

humectant - A material used to attract moisture and/or to retard the loss of moisture.

hydrolysis - Chemical decomposition of a substance involving the addition of water.

hydrophilic - Readily wet by water

hydrophobic - Water-repellent adhesive coating or sealer.

hygroscopic - A hygroscopic substance is capable of absorbing and retaining atmospheric moisture. Hygroscopic adhesive films can be moistened by extreme conditions of atmospheric humidity.

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Impact shock - A stress, resulting from the sudden jarring or vibration of the bonded assembly, transmitted to the adhesive interface.

Interface - The adherend surfaces in contact with the adhesive layer; the area of contact between the adhesive and adherend surfaces.

Internal stress - Stress created within the adhesive layer either by the movement of the adherends at differential rates or by the contraction or expansion of the adhesive layer.

kiss applicator - An applicator roll that leaves an adhesive film of closely controlled thickness on the paper by a single light touch; also known as a kiss coater.

laminate - A structure containing two or more components that has been joined by an adhesive; to join by an adhesive method.

latex - A milky, aqueous dispersion of a natural or synthetic rubber or resin.

lay-flat - A lay-flat laminating adhesive has good noncuring and nondistorting characteristics. A lay-flat laminating adhesive will not warp.

machinability - The physical behavior of an adhesive in a given machine operation, from its introduction into the glue pot to its application to the adherend.

mastic - Any heavy bodied adhesive used as a protective coating or a cement.

migration - The movement of one or more of the components of an adhesive to either a substrate or face material.

mileage - (See *Coverage*)

miscible - Capable of being mixed in any ratio without separation of two phases.

molecular weight - The weight of a molecule, calculated as a sum of the atomic weights of its constituent atoms. High molecular weight indicates high adhesives strength.

open assembly time - The maximum time lapse between applying the adhesive and bringing the substrates together, within which a satisfactory bond can be obtained.

overlap - A single adhesive joint in which the surface of one adherend extends past the leading edge of another.

paste-back - An increase in viscosity; a retrogradation of a vegetable adhesive form.

peel adhesion - The force required to remove a bonded strip from a standard test panel at a specified angle and speed.

plasticizer - Softener; substance added to materials to impart flexibility, workability, and elongation.

preservative - A substance that will prevent microbial growth. (See also *Fungicide and Bactericide*)

protective colloid - A surface-active substance that prevents the dispersed phase of an emulsion from coalescing by forming a thin layer around each particle.

quick stick - (See *Tack, Dry*)

rate of set (set time) - The time required to produce fiber tear after the application of an adhesive to a paper substrate.

rheology - The transformation of an adhesive into a hard or hardened state by chemical or physical action, such as condensation, polymerization, oxidation, vulcanization, gelation, hydration, or the evaporation of volatile constituents.

shear strength - The relative resistance of an adhesive film to a stress applied in such a manner that the adherend surfaces slide in a plane parallel to their plane of contact.

shelf-life - The period of time during which a packaged adhesive can be used. Sometimes called storage life.

solvent - A chemical substance capable of dissolving another material.

starch - A white, odorless granular or powdery complex carbohydrate used in adhesives.

starved joint - A joint that has been deprived of the proper amount of adhesive because of insufficient adhesive, excessive penetration into the substrate, or the application of excessive pressure during the bonding process.

striations - A pattern of lines or streaks caused by the uneven application of adhesive.

stringiness - That property of an adhesive giving rise to the formation of filaments or threads when adhesive transfer surfaces are separated. (See also *Webbing*) The transfer surfaces may be rolls, picker plates, stencils, etc.

substrate - (See *Adherend*)

syneresis - The creaming action caused by separation of solids from the continuous phase of an adhesive solution.

tack, dry - The property of certain adhesives to adhere on contact to themselves even through they seem dry to the touch.

tack, wet - The property of an adhesive enabling it to form a bond of measurable strength immediately after the adherends are brought together under low pressure.

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tackifier - A material added to synthetic resins or to elastomeric adhesives to improve initial and extended tack range of the deposited adhesive film.

temper - To allow an open assembly time sufficient to enable the adhesive and substrate to reach conditions favorable for bond formation.

tensile strength - The greatest longitudinal stress a substance can bear without tearing apart.

thixotrophy - A property of adhesive systems to thin upon isothermal agitation and to thicken upon subsequent rest.

throwing - A characteristic of some adhesives that is most apparent when they are transferred from rollers or rotary stencil mechanisms having a high peripheral speed. Small droplets of adhesive are thrown from the roller or stencil.

viscoelastic - Having appreciable conjoint viscous and elastic properties.

viscosity - The property of a fluid, enabling it to maintain shearing stress, and offer continued resistance to flow.

water-resistance - A degree of resistance to permeation and damage by liquid water. Many materials called *waterproof* should correctly be called *water-resistant*.

webbing - The formation of filaments or threads when adhesive transfer surfaces are separated. (*See also stringiness*)

wettability - The ability of the substrate to attract a liquid adhesive. This usually depends on molecular structure of the substrate relative to the adhesive on its surface. *Wettability* is usually measured by the contact angle of a droplet of water. Generally, the lower the surface energy of the adhesive relative to the substrate, the more complete the wetting.