

ACRYLIC

A resin resulting from the polymerization of derivatives of acrylic acids, including esters of acrylic acid, methacrylic acid, acrylonitrile, and their copolymers. Acrylics are also used in powder coatings in their thermoplastic form.

ACTIVE SOLVENT

A liquid which dissolves a binder.

ADDITIVES

Any substance added in small quantities to another substance, usually to improve properties. Examples of additives include plasticizers, fungicides, and dryers.

ADHESIVE

A substance capable of holding materials together by surface attachment. Various descriptive adjectives are used with the term adhesive to indicate certain characteristics: physical (liquid adhesive, tape adhesive), chemical type (silicate adhesive, resin adhesive), materials bonded (paper adhesive), and conditions of use (hot-set adhesive).

AIR-DRIED COATINGS

Coatings which are not heated above 194 °F (90 °C) for coating or drying. In the South Coast Air Quality Management District, curing also must be done below (rather than at or below) 194 °F (90 °C) to qualify as air dried. Air-dried coatings also include forced-air dried coatings.

ALIPHATIC SOLVENT

A solvent comprised primarily of straight chain hydrocarbons, including mineral spirits, kerosene, and hexane. These solvents are characterized as volatile organic compounds.

ALKALI

Any substance that neutralizes acids. Alkalis are helpful in aqueous cleaning by speeding soil removal and suspension. Alkali is synonymous with caustic.

ALKYD

A binder based on resins formed by the condensation of polyhydric alcohols with polybasic acids. They may be regarded as complex polyesters (Thermoset)

AMINO RESINS

Resins used to crosslink polyesters, epoxies, acrylics, and alkyds to enhance their durability.

AROMATIC SOLVENTS

Hydrocarbon solvents which contain an unsaturated ring of carbon atoms, including benzene, naphthalene, anthracene, and their derivatives.

Toluene (toluol) and xylene (xylol) are commonly used aromatics. These solvents are characterized as volatile organic compounds (VOCs).

AZEOTROPE

A liquid mixture that distills without change in composition and characterized by a constant minimum or maximum boiling point which is lower or higher than any of the components.

BAKED COATINGS

Coatings that are cured or dried at or above an oven air temperature of 194 °F (90 °C).

BARYTES

Colorless crystalline solids that are a form of barium sulfate (also called barite). Barytes are used as an extender pigment in primers and coatings.

BENTONITE

A type of clay derived from volcanic ash and used as a paint pigment.

BINDER

The solid (non-volatile) material in a coating that binds the pigment and additive particles together to form a film. In general, binders are resins.

BIOCID

A chemical agent capable of killing organisms responsible for microbial degradation. Biocides are sometimes added to waterborne coatings.

BITUMINOUS COATING

An asphalt or tar compound used to provide a protective finish for a surface.

BLOCKED ISOCYANATES (BLOCKING AGENT)

Isocyanates, normally extremely reactive with water, can only be used in waterborne coatings if they can be prevented from reacting before the water is baked out of the paint film. This is done by capping or blocking the isocyanate group with a thermally decomposable chemical. In a bake oven, the water evaporates, the chemical cap decomposes and the isocyanate crosslinks the paint. Blocked isocyanates are often employed for E-coat curing.

CARC

Chemical Agent Resistant Coatings. The polyurethane-based coatings are highly crosslinked to resist chemical attack. CARC is often used on military equipment that might become contaminated by nuclear, biological, or chemical substances.

CELLOSOLVE

The generic term for the solvent family of mono-alkyl ethers of ethylene glycol. For example, a widely-used solvent is butyl cellosolve, which chemically is ethylene glycol monobutyl ether.

CHLORINATED SOLVENTS

Powerful organic solvents that contain chlorine. Examples include 1,1,1-trichloroethane and methylene chloride. These solvents are characterized as volatile organic compounds. Their use is regulated and heavily restricted.

COATING

A liquid or mastic composition which is converted to a solid protective, decorative, or functional adherent film after application as a thin layer. The South Coast Air Quality Management District defines coatings as

materials which are applied to a surface and which form a continuous film in order to beautify and/or protect the surface.

COSOLVENTS

Water-miscible organic solvents. Waterborne paints frequently require cosolvents in addition to water for easier manufacture and improved application properties.

CROSSLINKING

The setting up of chemical links between the molecular chains of a resin to form a three-dimensional network polymer system. Crosslinking generally toughens and stiffens coatings.

DILUENT

Liquids which increase the capacity of a solvent for the binder. Diluents cannot dissolve the binder themselves, but rather are used to control viscosity, flash time, or cost. While true solvents can be added in unlimited amounts to lower paint viscosity, it may be more economical to lower viscosity with less-costly diluent solvents. When added to a prepared paint, a diluent will lower the viscosity just as effectively as a true solvent. However, if too much diluent is added, the resin will separate out of solution and the paint becomes unusable.

DISPERSION COATING

A type of coating in which the binder molecules are present as colloidal particles and spread uniformly throughout the formulation as a stable mixture.

DRIER

An additive which accelerates the drying of coatings.

EMULSION

A two-phase liquid system in which small droplets of one liquid (the internal phase) are immiscible in, and are dispersed uniformly throughout, a second continuous liquid phase (the external phase). This contrasts with a latex, which consists of solids dispersed in a liquid.

EMULSION PAINT

A coating comprised of an emulsion of a resin binder in water.

ENAMELS

Topcoats which are characterized by their ability to form a smooth surface; originally associated with a high gloss, but may also include a lower degree of gloss. Also a class of substances having similar composition to glass with the addition of stannic oxide, or other infusible substances to render the enamel opaque. Can be used to describe a coating which forms a film through chemical union of its component molecules during cure and in shop terminology can be used to describe paint which is no longer a lacquer. All paints, powder or liquid, that form crosslinking chemical bonds during curing, are considered enamels. The majority of industrial finishes fall into this category.

EPOXIES

Binders based on epoxy resins. Epoxy crosslinking is based on the reaction of the epoxide groups with other materials such as amines,

alcohols, phenols, carboxylic acids, and unsaturated compounds. Also used as a thermoset powder coating.

EXEMPT COMPOUNDS

Hydrocarbon compounds excluded from the definition of volatile organic compound, as defined by the U. S. Environmental Protection Service, on the basis that these compounds have negligible contribution to tropospheric ozone formation. Acetone is an exempt compound.

EXTENDER (PIGMENTS)

White powders used to give body to the coating.

FILM

One or more layers of coating covering an object or surface.

FLASH POINT

The lowest temperature of a liquid at which it gives off sufficient vapor to form an ignitable mixture when mixed with air and brought into contact with an open flame or spark.

FLASH-OFF TIME

The time required between application of successive wet-on-wet coatings or between application and baking to allow the bulk of the solvents in the coating to rise slowly and evaporate. In baked coatings the flash-off time helps to prevent solvent boil off and film blistering.

FLAT COATINGS

Coatings which register gloss less than 15 on an 85-degree meter or less than 5 on a 60-degree meter. This definition is usually found in architectural coating rules.

FLOCCULATION

The formation of loose clusters of dispersed pigment particles in liquid coatings.

FREE RADICAL POLYMERIZATION

Reactive electrons that chemically bond to adjacent molecules and produce a cured paint film. Certain organic compounds will form highly reactive electron configurations by the action of UV light (or other activation sources). These reactive species are called free radicals because, to an extent, 'free' electrons are available for bonding.

FUSION

The melting of a powder coating into a solid film.

HALOGENATED HYDROCARBONS (HALOGENATED SOLVENTS)

Formed by substituting one of the halogen elements (chlorine, bromine, or fluorine) into a chemical compound to change both the physical and chemical natures of the compound.

HEAT-RESISTANT COATINGS

Designed to resist degradation upon continuous or intermittent exposures to a predetermined elevated temperature. A San Diego Air Pollution Control District rule stipulates that the coating must withstand temperatures of 400 °F during normal use as determined by ASTM Method D-2485.

HIGH BOILERS

Solvents with a boiling point above 212 °F (Tail-end solvents). These solvents usually evaporate during baking.

HIGH TEMPERATURE COATINGS

Coatings certified to withstand a temperature of 1,000 °F for 24 hours.

HIGH-SOLIDS

Solvent-borne coatings that contain greater than 50 % solids by volume or greater than 62 % (69 % for baked coatings) solids by weight.

HYDROCARBON SOLVENT

An organic compound consisting exclusively of the elements carbon and hydrogen. They are principally derived from petroleum and coal tar, and include aliphatic, aromatic, and naphthenic solvent.

HYDROXIDES

The chemical opposites of acids. Also known as caustics and alkalis. Examples are sodium hydroxide and potassium hydroxide.

HYGROSCOPIC

Describes a substance that has the property of readily absorbing moisture from the air. Hygroscopic materials, such as silica gel and calcium chloride, are used as desiccants. Thinly spread deposits of hygroscopic materials can absorb enough water to completely dissolve.

INHIBITOR

A chemical additive that retards undesired chemical reaction such as corrosion, oxidation, drying, skinning, etc.

INITIATOR

A chemical added to help start a chemical reaction such as polymerization. Its action is similar to that of a catalyst, except that it is usually consumed in the reaction.

INORGANIC POLYMERS

Substances whose principal structural features are made up of homopolar interlinkages between multivalent elements other than carbon. This does not preclude the presence of carbon-containing groups in the side branches, or in interlinkages between principal structural members. Examples of such polymers are ethyl and butyl silicates, mica, clays, and talc.

ISOCYANATE

A compound containing the functional group $-N=C=O$. Isocyanates are crosslinked with hydroxyls to form polyurethanes.

KICK-OUT

The portion of binder that comes out of solution as small lumps.

LACQUER

Coating composition based on synthetic thermoplastic film-forming material dissolved in organic solvent and dried primarily by solvent evaporation. Typical lacquers include those based on nitrocellulose, other cellulose derivatives, vinyl resins, acrylic resins, etc.

LATENT SOLVENT

A liquid which cannot itself dissolve a binder but which increases the tolerance of the coating for a diluent.

LATEX

Stable dispersion of polymeric solids in an aqueous medium.

NITROCELLULOSE

A binder (resin) based on polymer from cotton cellulose. Nitrocelluloses were primarily used in lacquers and were widely used from the 1920s to the 50s on automobiles.

OIL BASE

Coatings which form films through crosslinking of unsaturated plant oil (drying oils) in the presence of oxygen.

OXYGENATED SOLVENTS

Volatile organic compounds (VOCs) that contain oxygen in addition to carbon and hydrogen. VOCs include alcohols, esters, ketones, and ether-alcohols.

PHENOLIC RESINS

Resins comprised by condensation of phenols and aldehydes.

PIGMENT

Finely ground insoluble particles dispersed in coatings to influence properties such as color, corrosion resistance, mechanical strength, hardness, durability, etc. Particles may be natural or synthetic and also inorganic or organic.

POLYESTER

A polymer in which the monomer units are linked by the functional group -COO-. Polyester has been used as thermoplastic powder coating, and as the following thermosetting powder coatings: epoxy polyester hybrid powder, urethane polyester powder, and polyester TGIC powder.

POLYETHYLENES

Thermoplastic resins composed of polymers of ethylene (CH₂ CH₂). Polyethylenes are normally translucent, tough, waxy solids that are unaffected by water and a large range of chemicals. Frequently used in powder coatings.

POLYMERS

A high-molecular-weight organic compound, natural or synthetic, with a structure that can be represented by a repeated small unit, or mer.

POLYPROPYLENES

Tough, lightweight thermoplastic resins composed of polymers of propylene (CH₂ CHCH₂). They are commonly used in powder coating.

POWDER COATINGS

Any coating applied as a dry (without solvent or other carrier), finely divided solid which adheres to the substrate as a continuous film when melted and fused.

PRECURSOR

A chemical compound which is released into the atmosphere, undergoes a chemical change, and leads to a new (secondary) pollutant. VOCs are precursors to ozone.

PRIMERS

Coatings that are designed for application to a surface to provide a firm bond between the substrate and subsequent coatings.

REACTIVE DILUENT

A liquid which is a VOC during application and in which, through chemical reaction such as polymerization, 20 % or more of the VOC becomes an integral part of the finished coating.

RESIN

The polymer (plastic) component of a paint that cures to form a paint film. Also known as binder or vehicle.

RETARDERS

Solvents added to a coating to slow down a chemical or physical change, such as the rate of evaporation.

SEALERS

A liquid coat applied to porous substrates such as wood and plaster to prevent the substrate from absorbing subsequent coatings.

SHELF LIFE

The length of time a coating may normally be stored without losing any chemical/physical properties. Manufacturers typically specify the shelf life.

SILICONE RELEASE

A coating which contains silicone resins and intended to prevent food from sticking to metal surfaces such as baking pans.

SILICONES

Resins consisting of silicon-oxygen linkages, unlike organic resins, which contain carbon.

SOLUBILIZER

Compound that forms polar polymer ions when mixed with water-insoluble resins. Since water is a polar solvent and resins are usually non-polar, the resins must be treated to increase their polarity if they are to be used in waterborne paints.

SOLUTION PAINT

Resin molecules fully dissolved by solvents in the paint.

SOLVENCY

The degree to which a solvent holds a resin or other paint binder in solution.

SOLVENT

The liquid or blend of liquids used to dissolve or disperse the film-forming particles and which evaporate during drying. A true solvent is a single liquid that can dissolve the coating. Solvent is often used to describe terpenes, hydrocarbons, oxygenated, furans, nitroparaffins, and chlorinated solvents.

SOLVENT-BORNE

Coatings in which volatile organic compounds are the major solvent or dispersant.

SPECIFIC GRAVITY

Weight of a given volume of any substance compared with the weight of an equal volume of water. Relative density.

STENCIL COATING

Ink or other coating that is rolled or brushed onto a template or stamp in order to add identifying letters and/or numbers to metal parts and products.

SURFACE TENSION

The energy required to expand the surface of liquid by unit area. Liquids tend to reduce their surface area due to unequal intermolecular attractive forces in this region. A low degree of surface tension is preferred for liquid coatings to maximize adhesion and minimize edge-pull and fish-eye effects.

SURFACER

Easily sanded coating used to fill surface irregularities.

TERPENE SOLVENTS

Terpene solvents are VOCs obtained from pine tress and are the oldest solvents used in coatings. Includes turpentine, dipentene, and pine oil.

TGIC (Triglycidyl isocyanurate)

A complex chemical used to crosslink paint, especially polyester powders, to increase exterior durability.

THERMOPLASTIC

Resin capable of being repeatedly softened by heat and hardened by cooling. These materials, when heated, undergo a substantially physical rather than chemical change. Thermoplastic resins can be completely dissolved with appropriate solvents.

THERMOSET

Resin that, when cured by application of heat or chemical means, changes into a substantially infusible and insoluble material. Thermosetting resins will soften but will not dissolve in any solvents.

THINNING

The process of adding volatile liquid to a coating to reduce its viscosity. This liquid may be solvent, diluent, or mixtures of both. Also may be called reducing or "adding make-up solvent."

THIXOTROPE

Substances that cause temporarily high paint viscosities by forming loosely-held, three-dimensional particle networks within paint fluids. Agitation of the paint by stirring, pumping, spraying, etc., quickly destroys the networks and viscosity drops sharply. When agitation is halted, the networks reform rapidly and paint viscosity again rises.

THIXOTROPY

The tendency for the viscosity of a liquid to be shear-rate dependent. When a liquid is rapidly shaken, brushed, or otherwise mechanically disturbed the viscosity decreases rapidly.

THROWING POWER

The ability of electro-deposited coatings to cover interior surfaces.

TOPCOAT

The final coating film or multiple layers of the same coating film applied to the surface.

UNDERCOATERS

Coatings formulated and applied to substrates to provide a smooth surface for subsequent coats.

URETHANES

Materials based on resins made by the condensation of organic isocyanates with compounds or resins containing hydroxyl groups. Categories of polyurethane coatings include: single component prereacted-urethane coatings; single component moisture-cured urethane coatings; single component heat-cured urethane coatings; two-component catalyst-urethane coatings, two-component polyurethane coatings; and one-component nonreactive lacquer-urethane solution coatings.

VACUUM METALLIZING

Process in which surfaces are thinly coated by exposing them to metal vapor under vacuum.

VARNISH

Clear or pigmented coatings formulated with various resins and designed to dry by chemical reaction on exposure to air. These coatings are intended to provide a durable transparent or translucent solid protective film.

VEHICLE

The liquid portion of a coating in which the pigment is dispersed; it is composed of binder, solvent and diluent.

VINYL CHLORIDE POLYMERS

Polymers comprised by the polymerization of vinyl chloride or copolymerization of vinyl chloride with other unsaturated compounds, the vinyl chloride being in greatest amount by weight. Can be used in thermoplastic powder coatings.

VINYL RESINS

Resins which involve the unsaturated vinyl group ($\text{CH}_2 = \text{CH}-$), including polyvinyl acetate, polyvinyl chloride, copolymers of these, the acrylic and methacrylic resins, the polystyrene resins, etc.

VISCOSITY

The property of a fluid whereby it tends to resist relative motion within itself. A thick liquid such as syrup has a high viscosity. Viscosity is often measured using an efflux-type cup, which gives the time required for a given quantity of paint to flow through a hole in the bottom of the metal cup at a given temperature (See Zahn Cup).

VOLATILE ORGANIC COMPOUND (VOC)

Any organic compound not specifically exempted by the U.S. EPA that participates in atmospheric photochemical reactions. VOCs may be emitted during the application and/or drying of coatings. In calculating the VOC content of the coating, exempt compounds and water are excluded and are not considered to be part of the coating. Exempt compounds are acetone, ethane, methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates, ammonium carbonate, methylene chloride, 1,1,1 trichloroethane (methyl chloroform), 1,1,2-

trichlorotrifluoroethane (CFC-113), trichlorofluoromethane (CFC-11), dichlorodifluoromethane (CFC-12), dichlorotetrafluoroethane (CFC-114), chloropentafluoroethane (CFC-115), trifluoromethane (CFC-23), and chlorodifluoromethane (CFC-22). Many of these exempt compounds may contribute to upper-atmosphere ozone destruction. Carbon dioxide is considered to be a "greenhouse gas," which may contribute to global warming, and carbon monoxide is a primary pollutant.

VOLATILITY

The tendency of a liquid to evaporate. Liquids with high boiling points have low volatility and vice versa.

WATER-REDUCIBLE COATINGS

see WATERBORNE COATINGS.

WATERBORNE COATINGS

Coatings in which water is the major solvent or dispersant. Solvents or dispersants include water-soluble polymers (water reducible), water-soluble colloidal dispersions, and emulsions (including latex).