

## APPENDIX 3

### GLOSSARY OF TERMS

**Absolute White**

In theory, a material that perfectly reflects all light energy at every visible wavelength. In practice, a solid white with known spectral reflectance data that is used as the "reference white" for all measurements of absolute reflectance.

**Absorb/ Absorption**

Dissipation of the energy of electromagnetic waves into other forms (e.g. heat) as a result of its interaction with matter.

**Achromatic Colour**

A neutral colour that has no hue (white, grey or black).

**Achromatic Pigments**

Pigments of low refractive index often called extenders, as they do not add significantly to the hiding powder of the coating but serve to 'bulk-out' the coating thus reducing cost. See pigments, extenders

**Acrylics**

Resins resulting from the polymerisation of derivatives of acrylic acids, including esters of acrylic acid, acrylonitrile, and their copolymers. Also known as acrylic resins, and acrylate resins.

**Adduct**

A chemical addition product that in the case of monomers and polymers will provide cross-linking and polymerise the materials to produce higher molecular weight.

**Adhesion**

State in which two surfaces are held together by interfacial forces which may consist of valence forces or interlocking action, or both see section relating to adhesion.

**Airless Nozzle Tip**

A nozzle tip made of tungsten carbide with a small hole in it in sizes from 0.0175 to 0.175 mm.

**Airless Pump**

A pump designed to create high fluid pressures that are needed in airless spraying.

**Airless Spray Gun**

A special gun designed to atomise by hydraulic pressure and thus withstand high pressure.

**Alkyds**

Synthetic resins formed by the condensation of polyhydric alcohols with polybasic acids. They may be regarded as complex esters. The most common polyhydric alcohol used is glycerol, and the most common polybasic acid is phthalic anhydride. Modified alkyds are those in which the polybasic acid is substituted in part by a monobasic acid, of which the vegetable oil fatty acids are typical.

## **Aliphatic Compounds**

A class of organic compounds which are composed of open chains of carbon atoms. These include paraffins, olefins, etc.

## **Amino. Resin**

Synthetic resin of the thermosetting type made by the reaction of urea, thiourea, melamine, or allied compounds, usually with formaldehyde. Amino resins are usually cured by baking and are blended with other resins (e.g. alkyds or epoxies). Amino resins are also cured by chemical means at normal air temperature, e.g. in wood finishes.

## **Anion**

An ion having a negative charge that will be attracted to any anode.

## **Anode**

The positive terminal of an electrical source to which electrons and negatively charged ions travel.

## **Appearance**

An object or material's manifestation through visual attributes such as size, shape, colour, texture, glossiness, transparency, opacity, etc.

## **Aromatic Compounds**

A class of organic compounds which contain an unsaturated benzene ring of carbon atoms, including benzene, naphthalene, anthracene and their derivatives.

## **Atom**

The atom can be considered as the smallest particle of matter though it is composed of electrons, neutrons, and protons.

## **Back Ionisation**

Is the phenomenon of 'pock-marking' that occurs in the powder deposited by corona charging electrostatic spray guns. It is caused by the back emission of ions from the deposited film. The film is disrupted as they leave the surface.

## **Bituminous Paints**

(1) Originally, the class of paints consisting essentially of natural bitumens dissolved in organic solvents: they may not contain softening agents, pigments, and inorganic fillers. They are usually black or dark in colour. Within recent years the term 'bituminous' has, by common usage, come to include bitumen like products such as petroleum asphalt. (2) A low-cost paint containing asphalt or coat tar, a thinner, and drying oils; used to waterproof concrete and to protect piping where bleeding of the asphalt is not a problem.

## **Cathode**

Negative terminal of an electrical source to which positive ions will travel.

**Cation**

Positive charged atom or ion which moves to the negative electrode or cathode during electrolysis.

**Chalking**

The formation of a powdery surface due to the disintegration of the polymer at the coating surface due to weathering. Many epoxy powders will chalk on outdoor exposure.

**Chemical Conversion Coating**

A treatment either chemical or electro-chemical, of the metal surface to convert it to another chemical form which provides an insulating barrier of exceedingly low solubility between the metal and its environment, but which is an integral part of the metallic substrate. It provides greater corrosion resistance to the metal and increased adhesion of coatings applied to the metal. Examples are phosphate coatings on steel or zinc and chromate coatings on aluminium, zinc and zinc coated materials and anodised films on aluminium and magnesium.

**Chlorinated Rubber**

Resin formed by the reaction of rubber with chlorine. Unlike rubber, the resulting product is readily soluble and yields solutions of low viscosity. It is sold as white powder, fibres, or as blocks. Commercial products generally contain about 65% chlorine. It has good chemical resistance properties. It tends to cobweb when sprayed. Now mostly chlorinated polymers are used.

**Chroma/Chromaticity**

The intensity or saturation level of a particular hue, defined as the distance of departure of a chromatic colour from the neutral (grey) colour with the same value.

**Chromatic**

Perceived as having a hue - not white, grey, or black.

**CIELAB (or CIE L\*a\*b\*, CIE Lab)**

Mixing space in which values L \*, a\* and b\* are plotted using Cartesian co-ordinate system. Equal distances in the space approximately represent equal colour differences. Value L \* represents lightness; value a\* represents the red/green axis; and value b\* represents the yellow/blue axis. CIELAB is a popular colour space for use in measuring reflective and transmissive objects.

**Circulating System**

A system for distributing paint throughout a finishing plant having the material which is not being used returned to the source.

**Cohesion**

Propensity of a single substance to adhere to itself; the internal attraction of molecular particles toward each other: the force holding a single substance together.

**Colour**

One aspect of appearance; a stimulus based on visual response to light, consisting of the three dimensions of hue, saturation, and lightness.

**Colour Attribute**

A three-dimensional characteristic of the appearance of an object. One dimension usually defines the lightness; the other two together define the chromaticity.

**Colour Difference**

The magnitude and character of the difference between two colours under specified conditions.

**Colour Measurement**

Physical measurement of light radiated, transmitted or reflected by a specimen under specified condition and mathematically transformed into standardised colourimetric terms. These terms can be correlated with visual evaluations of colours relative to one another.

**Colour Specification**

Tristimulus values, chromaticity co-ordinates and luminance value, or other colour-scale values, used to designate a colour numerically in a specified colour system.

**Colour Temperature**

A measurement of the colour of light radiated by a black body while it is being heated. This measurement is expressed in terms of absolute scale, or degrees Kelvin. Lower Kelvin temperatures such as 2400K are red; higher temperatures such as 9300K are blue. Neutral temperature is white, at 6504K.

**Convertible Coatings**

Resin coatings which produce a solid, dry film without any chemical reaction taking place. These coatings are soluble in the solvent used in the original liquid. Non-convertible coatings produce a solid, dry film by means of irreversible chemical reactions, usually accelerated by heat. The process is regarded as curing rather than drying, although solvent evaporation takes place. The solid film formed is insoluble in the solvent used in the original liquid.

**Corrosion**

The deterioration of metal or of concrete by chemical or electrochemical reaction resulting from exposure to weathering, moisture, chemicals, or other agents in the environment in which it is placed. The term environmental degradation is often used to embrace corrosion as defined here and environmentally induced breakdown of polymeric components and coatings.

**Covalency**

A covalent bond is one where each atom donates an electron to form a shared pair of electrons in a molecular orbit

**Critical Pigment Volume Concentration (CPVC)**

That level of pigmentation, PVC value in the dry paint, where just sufficient polymer is present to fill the voids between the pigment particles. At this level a sharp break occurs in film properties such as scrub resistance, hiding, corrosion resistance, ease of stain removal, etc. Different requirements for each product would dictate different PVC or CPVC ratios. Ceiling paints, for instance, are not required to be very washable and can be formulated at or above CPVC, whereas gloss paints and many

exterior formulations are designed well below their CPVC, where CPVC has no significance; CPVC has significance only in flat paints.

## **Cross-linking**

As applied to polymer systems cross-linking is the setting up of a chemical link between the molecular chains to form more three-dimensional polymers and, of course, much higher molecular weight polymers. Thermosetting coating materials cross-link under the influence of heat.

## **Diluent**

A volatile liquid which, while not a solvent for the non-volatile constituents of a coating, may be used with a true solvent without causing precipitation. They are often used to increase the amount of liquid at lower cost.

## **D.O.P. Di Octyl Phthalate**

An inert plasticiser which should be used to keep pumps wet especially if they are handling plural components.

## **Daylight Illuminants (CIE)**

Series of illuminant spectral power distribution curves based on measurements of natural daylight and recommended by the CIE in 1965. Values are defined for the wavelength region 300 to 830 nm. They are described in terms of the correlated colour temperature. The most important is D65 because of the closeness of its correlated colour temperature to that of illuminant C, 6774K. D75 bluer than D65 and D55 yellower than D65 are also used.

## **Density**

The mass per volume of a material normally expressed as g/ml.

## **Displacement Pump**

A reciprocating pump which displaces a volume of fluid equal to the volume of the piston or plunger.

## **Dye**

A soluble colorant - as opposed to pigment, which is insoluble.

## **Edge Type Filter**

A filter made of a series of fine metal plates with grooves cut in one set of plates. In some of these filters, one set of plates are made to move to facilitate cleaning.

## **Electrodeposition (Electrocoating)**

A method of paint application in which an article to be coated which is an electrical conductor, is made one of the electrodes in a tank of water-thinned paint. The other electrode is generally a metal such as stainless steel. The two electrodes are connected to a source of electric power, the polarity of the article to be coated being of the opposite sign to that on the particles in the liquid paint in the tank. The charged particles move towards the articles under the influence of the electric field, and when they give up their charge at the electrode (article) they are deposited and ultimately form a continuous film of paint.

**Electrolyte**

An electrically conducting solution that contains ions.

**Electromagnetic Spectrum**

The massive band of electromagnetic waves that pass through the air in different sizes, as measured by wavelength. Different wavelengths have different properties, but most are invisible - and some completely undetectable - to human beings. Only wavelengths that are between 380 and 720 nanometers are visible, producing light. Waves outside the visible spectrum include gamma rays, x-rays, microwaves, and radio waves.

**Epoxy Resins**

Cross-linking resins based on the reactivity of the epoxide group. One common type is the resin made from epichlorohydrin and bisphenol A. Aliphatic polyols such as glycerol may be used instead of the aromatic bisphenol A or bisphenol F.

**Extender**

A specific group of achromatic pigments of low refractive index (between 1.45 and 1.70) incorporated into a vehicle system whose refractive index is in a range of 1.5 to 1.6. Consequently they do not contribute significantly to the hiding power of paint. They are used in paint to, reduce cost, achieve durability, alter appearance (e.g. decrease in gloss), control rheology, and influence other desirable properties. If used at sufficiently high concentration, an extender may contribute dry hiding and increase reflectance. See pigment.

**External Mix Air Nozzle**

Accomplishes atomisation by mixing compressed air and fluid outside the air nozzle by the action of air jets from holes which are drilled into the air nozzle. This method is normally used when fine finishes are required.

**Faraday Cage Effect**

Is caused by the natural phenomena of charged particles being attracted to the nearest earth and therefore a resistance to being attracted into enclosed areas such as the corners of a box.

**Fluid Regulator**

A control designed to reduce the amount of fluid pressure.

**Fluorocarbons**

Group of compounds containing fluorine atoms such as fluoroplastics, and some solvents of the halogenated type.

**Follower Plate**

A metal plate placed on a drum of material to prevent air from cavitating through the material which forces the fluid down to the bottom of the tank and thus into the pump foot valve.

**Free Radical**

A free radical or, put more simply, a radical is a fragment of a molecule which has at least one unpaired electron. Interaction between polymer radicals during curing pairs up the unpaired electrons electrically, neutralising the radicals to produce stable, larger molecules. This process is the basis of cross-linking.

## **Gloss**

An additional parameter to consider when determining a colour standard, along with hue, value, chroma, the texture of a material, and whether the material has metallic or pearlescent qualities. The general rule for evaluating the gloss of a colour sample is the higher the gloss unit, the darker the colour sample will appear. Conversely, the lower the gloss unit, the lighter a sample will appear.

Gloss is measured in gloss units, which use the angle of measurement and the gloss value (e.g. 60° gloss = 29.8). A 60° geometry is recommended by the American Society for Testing and Materials (ASTM) D523 standard for the general evaluation of gloss.

**Halogenated Solvents** The solvents containing halogens (usually chlorine) have improved solvency compared with the hydrocarbons from which they are derived and, in addition, flammability is reduced. Some of these are highly toxic, and precautions must be taken to avoid inhalation of their vapours.

## **Holdout**

This term is used to describe the quality of a surfacer or other undercoat that resists any degradation of the gloss and sharpness of image (Definition of Image - DOI) of the over coating topcoat. Poor hold out is attributed to porosity which absorbs binder from the topcoat (also known as sinkage), though it is also a function of the surface roughness profile, and any shrinkage that takes place on ageing. Holdout is strongly influenced by the choice of extender.

## **Hue**

The first element in the colour-order system, defined as the attribute by which we distinguish red from green, blue from yellow, etc.

## **Hydroxyl Group**

- OH. The chemical group characteristic of hydroxides and alcohols

## **Illuminant**

Mathematical description of the relative spectral power distribution of a real or imaginary light source - i.e., the relative energy emitted by a source at each wavelength in its emission spectrum. Often used synonymously with "light source" or "lamp", though such usage is not recommended.

## **Infra-Red Heating**

This form of heat is used to cure coatings by radiation being emitted from electric or gas heaters at a wavelength of between 1 and 100 microns.

## **Inorganic Compound**

Designation of compounds that generally do not contain carbon. Source: matter other than vegetable or animal. Examples: sulphuric acid and salt. Exceptions are carbon monoxide and carbon dioxide and their derivatives.

## **Inorganic Paint Coatings**

Coatings based on silicates or phosphates and usually pigmented with metallic zinc, copper, nickel, aluminium or silver.

**Ionic Bond**

Ionic bonds are held together by the attraction of opposite electric charges. A metal will lose electrons to form positive ions, a non-metal will gain electrons to form negative ions, and thus there will be ionic attraction.

**Isocyanate Resins**

These resins are based upon the reaction of isocyanates ( $-N=C=O$ ) and alcohols ( $-OH$ ) to form a urethane linkage. See *polyurethanes*.

**Isomerism**

The existence of two or more chemical compounds with the same molecular formula but having different properties, owing to different arrangement of atoms within the molecule, e.g. ammonium cyanate  $NH_4CNO$  and urea,  $CO(NH_2)_2$  are isomers.

**Kelvin (K)**

Unit of measurement for temperature. The Kelvin scale starts from absolute zero, which is  $-273^\circ$  Celsius.

**Lacquer**

A coating composition that is based on synthetic thermoplastic film-forming material dissolved in organic solvent that dries primarily by solvent evaporation to produce a clear or slightly tinted solid film.

**Light**

Electromagnetic radiation of which a human observer is aware through the visual sensations that arise from the stimulation of the retina of the eye. This portion of the spectrum includes wavelengths from about 380 to 770 nm. Thus, to speak of ultraviolet light is incorrect because the human observer cannot see radiant energy in the ultraviolet region.

Adjective meaning high reflectance, transmittance, or level of illumination as contrasted to dark, or low level of intensity.

**Light source**

An object that emits light or radiant energy to which the human eye is sensitive. The emission of a light source can be described by the relative amount of energy emitted at each wavelength in the visible spectrum, thus defining the source as an illuminant. The emission also may be described in terms of its correlated colour temperature.

**Lightness**

Perception by which white objects are distinguished from grey, and light-coloured objects from dark-coloured.

**Melting Point**

This is the transition temperature at which a powder changes from a solid to a liquid. In powder coating this will occur over a temperature range except in the case when fairly pure polymers are used, i.e. Nylon 11 will melt at  $1840^\circ C$ .

**Metamerism**

A phenomenon exhibited by a pair of colours that match under one or more sets of illuminants (be they real or calculated), but not under all illuminants.



## **Molecules**

Molecules are compounds made up of specific combinations of atoms. Familiar substances may theoretically be divided into single molecules but no further. Like a strict recipe in which atoms are the ingredients, each molecule has a chemical formula. If any ingredients are subtracted or changed, the molecule becomes something completely different.

## **Newtonian Liquid**

One in which the rate of shear is proportional to the shearing stress. The constant ratio of the shearing stress to the rate of shear is the viscosity of the liquid. If the ratio is not constant, the liquid is non-Newtonian.

**Non-Convertible Coatings** See Convertible Coatings

## **Nylon Resins**

Polyamide resins made from the interaction of diamines and dicarboxylic acids. Hexamethylene diamine and adipic acid are typical reactants. These resins are composed principally of a long chain synthetic polymeric amide that has recurring amide groups as an integral part of the main polymer chain.

## **Organic Compound**

Designation of any chemical compound containing carbon, usually combined with elements such as hydrogen, oxygen and nitrogen. (Some of the simple compounds of carbon such as carbon dioxide, are frequently classified as inorganic compounds.) Over eight million synthetic and naturally-occurring organic compounds are known. (There are approximately 100,000 known inorganic compounds.) Organic compounds are not usually ionised in water and frequently show the phenomenon of isomerism. The molecules of organic compounds used for coatings are usually very complex, containing large numbers of atoms.

## **Paint**

Any pigmented liquid, liquefiable, or mastic composition designed for application to a substrate in a thin layer which is converted to an opaque solid after application.

## **Phenolic Resins**

Resins made by the condensation of phenols and aldehydes. Known also as Phenol-formaldehyde or PF Resins.

## **Pigment**

Finely ground, natural or synthetic, inorganic or organic, insoluble dispersed powder particles which, when dispersed in a liquid vehicle to make paint, may provide, in addition to colour, many essential properties of the paint such as opacity, hardness, durability, and corrosion resistance. See *extender*.

## **Piston Pump**

A pump using a piston to displace material.

## **Plastic Flow**

A liquid displays plastic flow when a yield stress must be overcome or exceeded before flow will take place. Plastic viscosity,  $U$ , is expressed as:

$$U = \frac{\text{Shear stress} - \text{yield stress}}{\text{Shear rate}}$$

Liquids which display plastic flow are called Bingham liquids.

## **Plastisol**

A suspension of a finely divided resin in a plasticiser that can be converted to a continuous film by the application of heat. Distinct from baking enamels, etc, in that substantially all the original mixture becomes a part of the film; there is no significant evaporation of solvent. The films are usually much thicker than those obtainable from paint coatings which depend on the evaporation of a volatile solvent

## **Polyamide Resins**

Condensation resins of an amine and an acid, the repeated structural unit in the chain being of the amide type.

## **Polyester Resins**

Group of synthetic resins which are polycondensation products of dicarboxylic acids with dihydroxy alcohols. They are therefore a special type of alkyd resin. Oil-free alkyds are a class by themselves. Often these resins are dispersed in a suitable monomer.

## **Polymer**

A substance, the molecules of which consist of one or more structural units repeated any number of times. The name often applies to large molecules produced by any chemical process.

## **Polyurethanes**

Type 1, one-package, pre-reacted urethane coatings characterised by the absence of any significant quantity of free Isocyanate groups. They are usually the reaction product of a polyisocyanate and a polyhydric alcohol ester of vegetable oil acids and are hardened with the aid of metallic soap driers.

Type 2, one-package, moisture-cured urethane coatings characterised by the presence of free Isocyanate groups and capable of conversion to useful films by the reaction of these Isocyanate groups with ambient moisture.

Type 3, one-package, heat cured urethane coatings that dry or cure by thermal release of blocking agents and regeneration of active Isocyanate groups.

Type 4 two-package catalyst-urethane coatings that comprise systems wherein one package contains a pre-polymer or adduct having free Isocyanate groups capable of forming useful films by combining with a relatively small quantity of catalyst, accelerator or cross linking agent such as a monomeric polyol or polyamine contained in a second package. This type has limited pot life after the two components are mixed.

Type 5 two-package polyol-urethane coatings that comprise systems wherein one package contains a pre-polymer or adduct or other polyisocyanate capable of forming useful films by combining with a substantial quantity of a second package containing a resin having active hydrogen groups, with or without the benefit of catalyst.

Type 6 one-package, non-reactive lacquer-urethane solution coatings characterised by the absence of any significant quantity of free Isocyanate or other functional groups. Such coatings convert to solid films primarily by solvent evaporation. See Urethane Coatings and Isocyanate Resins.

## **Polyvinyl Acetate**

A colourless thermoplastic, water-insoluble, resinous high polymer derived from the polymerisation of vinyl acetate with a catalyst; used as a latex polymer in certain paints. Abbreviation: PVA and PVAc.

## **Polyvinyl Chloride**

A hard and tough plastic solid. Stabilisers are necessary to prevent discoloration from exposure to light and heat. Used for plastics and coatings. Commonly known as vinyl. Abbreviation: PVC.

## **Polyvinyl Fluoride (PVF) (-H<sub>2</sub>CCHF-)**

Polymer of vinyl fluoride, in the film form has low permeability to air and water as well as oil, chemical solvents and stain resistant.

## **Polyvinylidene Chloride (PVDC)**

A polymer of vinylidene chloride.

## **Polyvinylidene Fluoride (PVDF) (-H<sub>2</sub>CCF<sub>2</sub>- )**

Thermoplastic fluorocarbon polymer derived from vinylidene fluoride. In film form it is characterised by superior weather and UV resistance.

## **Powder Coating**

A 100% solids coating applied as a dry powder and subsequently formed into a film with heat.

## **Pre-polymer**

This is a material at an intermediate stage of polymerisation between that of the monomer and the final polymer.

## **Pressure Feed**

Term used to describe the process of force feeding material to the spray gun using a pressure cup, tank or material pump used for large volume spraying or when the material is too heavy to siphon.

## **Pressure Tank**

A sealed container where material is placed and air pressure is used to force the material to the spray gun.

## **Pseudoplastic Flow**

Type of flow characterised by a consistency curve which shows no yield value (starts at the origin), where the rate of flow increases faster than linearly with the shearing stress.

## **Pump**

A piece of equipment designed to force fluid to flow. May be operated by air, electric or hydraulic force.

## **Ratio of a Pump**

The effective area of the air motor piston over the effective area of the fluid piston. A multiplier that relates to the stalling pressure of the pump for example a 10:1 ratio pump has a stalling fluid pressure approximately ten times the input air pressure (e.g., 100 psi input air pressure has a stalling fluid pressure of 1,000 psi).

## **Refractive Index**

The ratio of the angle incidence to that of the angle of refraction of light passing through a material. A good use of this measurement is seen in the difference between the use of a pigment and an extender.

## **Rheology**

The science of deformation and flow of materials. It is more than viscosity and deals with the effects of energy applied to materials.

## **Roller Coating**

- (1) Process by which a film is applied mechanically to sheet material. The machine consists of a series of horizontal cylindrical rollers. The coating is picked up by one of the first rollers rotating in a trough containing the coating, transferred to subsequent rollers until evenly distributed over the last roller, and thence to the flat surface of mild steel, tinned iron or other suitable sheets
- (2) Application of paint by means of a hand-operated roller to wall surfaces, etc.

## **Saturation**

The attribute of colour perception that expresses the amount of departure from a grey of the same lightness. All greys have zero saturation (ASTM).

## **Silicone Resins**

Group of resins containing a substantial amount of silicon, distinguished by their outstanding heat resistance, high water repellence, and chemical resistance. They are made by preparing dialkyl dichlorosilanes from silicon tetrachloride and the corresponding alkyl magnesium bromide. The disilanes are converted to silanediols, which are polymerised into resinous products. Mixtures of silanediols and triols are copolymerised to yield thermosetting resins.

## **Siphon Spraying**

When material is fed into a spray gun by atmospheric pressure due to a partial vacuum created by the design of the air and fluid nozzle.

## **Solids (Total Solids)**

Non-volatile matter in a coating composition, i.e. the ingredients of a coating composition which, after drying, are left behind and constitute the dry film. Also called non-volatile matter.

## **Solids by Volume**

The volume of the non-volatile portion of a composition divided by the total volume expressed as a per cent.

## **Solvent**

A liquid, usually volatile, which is used to dissolve or disperse the film-forming

constituents of a coating and which evaporates during drying and therefore does not become part of the dried film.

## **Specific Gravity**

Weight of a given volume of any substance compared with the weight of an equal volume of water. See *Density*. Note: In SI units the term "relative density" is preferred.

## **Specular Gloss**

Relative luminous fractional reflectance from a surface in the mirror or specular direction. It is sometimes measured at 60° relative to a perfect mirror.

## **Subtractive Primaries**

Cyan, magenta, and yellow. Theoretically, when all three subtractive primaries are combined at 100% on white paper, black is produced. When these are combined at varying intensities, a gamut of different colours is produced. Combining two primaries at 100% produces an additive primary, either red, green or blue:

100% cyan + 100% magenta = blue

100% cyan + 100% yellow = green

100% magenta + 100% yellow = red

## **Surface Tension**

Property arising from molecular forces of the surface film of all liquids which tends to alter the contained volume of liquid into a form of minimum surface area. Note: Surface tension is numerically equal to the force acting normal to an imaginary line of unit length in a surface. It is also numerically equal to the work required to enlarge the surface by unit area. The usual unit of measurement is Newtons per cm. The older unit is dynes per cm

## **Siphon Nozzle External Link**

Designed to create a vacuum in front of the fluid nozzle and draw material from a cup by atmospheric pressure. This nozzle can usually be identified by the fluid nozzle protruding beyond the air nozzle.

## **T.C.P. - Tricresyl Phosphate**

A synthetic lubricant or inert plasticiser which can be used to keep pumps lubricated or wet.

## **Tell-Tale Filter**

A strainer which gives an indication when the filtering element is becoming obstructed with impurities.

## **Tempera**

(1) a rapidly drying paint consisting of egg white ( or egg yolk, or a mixture of egg white and yolk), gum, pigment, and water; especially used in painting murals.

(2) A method of painting using tempera.

## **Thermoplastic**

Capable of being repeatedly softened by heat and hardened by cooling.

**Thermosetting**

Having the property of undergoing a chemical reaction by the action of heat, catalysts, ultraviolet light, etc., leading to a relatively infusible state.

**Thinner**

- (1) The portion of a paint, varnish, or lacquer, or related product that volatilises during the drying process.
- (2) Any volatile liquid used for reducing the viscosity of coating composition or components; may consist of a simple solvent, or diluent or a mixture of solvents and diluents.

**Thixotropic**

Adjective, which describes full-bodied material which undergoes a reduction in viscosity when shaken, stirred or otherwise mechanically disturbed and which readily recovers the original full-bodied condition on standing. Non-drip paints are thixotropic.

**Total Reflectance**

Reflectance of radiant flux reflected at all angles from the surface, thus including both diffuse and specular reflectance.

**Transfer Efficiency**

The application transfer efficiency of materials is important to reduce waste. The higher the transfer efficiency the better. It is calculated in powder coating by measuring the amount sprayed compared to the amount applied to the work.

**Transparent**

Describes a material that transmits light without diffusion or scattering.

**Tribo-electricity**

This is a phenomenon of producing static electricity by friction, rather like the spark one can create by rubbing one material against another.

**Tristimulus**

Of, or consisting of, three stimuli; generally used to describe components of additive mixture required to evoke a particular colour sensation.

**Tumbling**

- (1) Process by which paint is applied to small articles, such as hairpins, childrens' building bricks, etc., which are unsuitable for coating by any of the normal methods. The articles are placed in a drum, together with a little more paint than will be sufficient to cover the total surface of all the articles, and the drum is rotated until the paint is evenly distributed. The articles are then emptied from the drum, generally onto wire trays and the coating air-dried or baked. Also called Barrelling.
- (2) Process used in some paint storehouses whereby containers are repeatedly up-ended to re-disperse pigments which may have settled or caked during storage of the paint.

**Turbine Electric Pump**

A high-volume paint pump used to fill large circulating systems. Uses turbine blades (many small individually enclosed propellers connect to one shaft). To pump paint, the output relates to the speed of the motor.

## **Urethane Coatings**

Coating vehicles containing a polyisocyanate monomer reacted in such a manner as to yield polymers containing any ratio, proportion, or combination of urethane linkages, active isocyanate groups, or polyisocyanate monomer. The reaction products may contain excess isocyanate groups available for further reaction at time of application or may contain essentially no free isocyanate as supplied. See Polyurethanes.

## **Varnish**

A liquid composition which is converted to a transparent solid film after application as a thin layer.

## **Vehicle**

The portion of a paint in which the solids are dispersed.

## **Venturi**

A venturi is a device that creates a forced airflow within a chamber and therefore suction. A pumping device uses this method of siphoning material from a container and then propelling it towards the application device.

## **Vinyl Acetate Plastics**

Plastics based on resins made by the polymerisation of vinyl acetate or copolymerisation of vinyl acetate with other unsaturated compounds, the vinyl acetate being in greatest amount by mass. See Polyvinyl Acetate.

## **Viscosity**

(1) State or quality of being viscous.

(2) The property of a fluid whereby it tends to resist relative motion within itself. If different layers of fluid are moving with different velocities, viscous forces come into play, tending to slow down the faster moving layers and to increase the velocity of the slower moving layers. The constant of proportionality is called the coefficient of viscosity of the fluid. Measured in Newton seconds per square metre (SI units) or poise (c.g.s.units). 1 centipoise =  $10^{-3}$ Ns/m<sup>2</sup>.

## **Viscometer**

An instrument for measuring flow properties. The chief types of viscometers are: capillary, rotational, outflow or efflux (Ford cup or Zahn, usually called orifice type), falling ball, bubble tube.

## **Volatile Organic Compounds - VOCs**

Solvents, thinners, and diluents based upon organic liquids that rapidly evaporate.

## **Zinc-rich Primer**

Anti-corrosive primer for iron and steel incorporating zinc dust in a concentration sufficient to give electrical conductivity in the dried film, thus enabling the zinc metal to corrode preferentially to the substrate, i.e. to give cathodic protection.