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Draft Indian Standard

GLOSSARY OF TERMS RELATED TO PAINTS

(Third revision of IS 1303)

ICS 87.040

**Paints, Varnishes and Related
Products Sectional Committee, CHD 20**

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Paints, Varnishes and Related Products Sectional Committee, CHD 20

FOREWORD

(Formal Clause will be added later)

This standard was first published in 1958 and subsequently revised in 1963, and 1983. In the second revision around 160 additional terms had been included. The necessary modifications in the definitions of some terms had been made by elaborating them. Many terms which were not used frequently had been dropped.

This revision has been taken up in order to bring out the standard in the latest style and format of the Indian Standards. It also incorporates 1 amendment issued to the last version of standard. Additionally, it was observed that IS 6667 : 1972 'Glossary of terms used in synthetic resin industry' is also available on terminology related to paints, varnish and related products under the Sectional Committee, CHD 20, in order to eliminate confusion and inconsistency in the terminology, this revision also supersedes IS 6667 : 1972. Further, the editorial corrections have been made wherever required.

This standard is intended chiefly to cover the technical definitions terms, and it may not necessarily include all the legal meanings of the terms.

Draft Indian Standard

GLOSSARY OF TERMS RELATING TO PAINTS

(Third Revision)

1 SCOPE

This standard defines technical terms widely used in paint industry, and includes terms for paints, varnishes, enamels and allied products.

A

Abietic Acid — The main acidic constituent of rosin, commercially known as resin acid.

Abrasion Resistance — Resistance of a coating to frictional rubbing. Abrasion test may be made by means of the finger alone, or with cloth or a pad with or without a mildly abrasive powder. The pressure, speed and time of rubbing as well as the character of the rubbing agent should be controlled when making comparisons of abrasion resistances of different surfaces.

Accelerated Weathering (Artificial Weathering) — Laboratory tests designed to simulate, intensify and accelerate the destructive action of natural outdoor weathering agents, such as light, heat, cold, water, water vapour, rain, etc, on paint films. There is no universally accepted test and different procedures may have to be used to suit different conditions.

Accelerator — Any substance which increases the speed of a chemical reaction and thus hastens the curing or cross linking of a system.

Acid — Alkali Resistance (for synthetic resin) — Resistance of coating system containing synthetic resin to the influence of acids or alkalis.

Acid Resistance — Resistance of paint, enamel or varnish film to acids. The term is of little value, unless it is referred to a standard of performance under, specified conditions.

Acoustic Material — A soft or aerated material lightly bound or bonded to form a soft, absorbent coating or fabricated slab for the purpose of eliminating echoes. Special care should be taken while decorating to avoid modification of acoustic properties.

Acrylic Resin — A polymer produced by addition polymerization involving monomers derived from acrylic acid (*see also* Resin).

Acrylated Alkyd — Alkyd modified with acrylic resins.

Acid Value — Number of milligrams of potassium hydroxide (KOH) required to neutralize 1 g of sample under specified test conditions.

Adhesion — The degree of attachment between a paint or varnish film and the underlying material which may be another film of paint or any substrate, such as wood, metal, plaster, etc.

After Tack — A film defect, in which the painted surface having once reached a tack-free stage, subsequently develops a sticky condition.

After Thickening — *See* ‘Thickening’.

Ageing — Change, if any, occurring in a coating on standing under defined conditions at or near ambient temperature.

Ageing (for synthetic resin)— The storage of a synthetic resin either in the solid or liquid state or in solution under stated conditions in order to study the change in properties.

Air Drying — *See* ‘Drying’.

Airless Spraying — The process of atomization of a paint by forcing it through an orifice at high pressure. This effect is often aided by the vaporization of the solvents, especially if the paint has been previously heated. The term is not generally applied to those electrostatic spraying processes, which do not use air for atomization.

Alkali Resistance — Resistance of paint, enamel or varnish film to alkalis. The term is of little value unless it is referred to some standard of performance under specified conditions.

Alkyds Resin — Polymers having a typically large molecular structure and are produced by reaction of polybasic acids with polyhydric alcohols and/or chemically interacted with natural or synthetic resins, fatty acids, oils, reactive chemicals, monomers, etc.

Alkyd Styrenated — *See* Styrenated Alkyd.

Alligatoring (Crocodiling) — *See* ‘Cracking’ .

Amino Resins — A generic term used to denote the condensation resins made by the reaction of amines with aldehydes.

Anti-Condensation Paint — A paint designed to minimize the effects of condensation of moisture under intermittently dry and humid conditions. Such a material normally has a matt textured finish and frequently contains cork or some other heat insulating materials as a filler.

Anti-Corrosive — A general term used to describe material used for preventing corrosion.

Anti-Fouling Compositions — Paints formulated for preventing growth of marine fouling organism on bottoms of ships.

Anti-Settling Agent (Suspending Agent) — A substance incorporated in paint to keep pigment in suspension, thus delaying sedimentation during storage.

Anti-Skinning Agent — Any material added to a paint with a view to preventing or retarding the process of oxidation or polymerization, which results in the formation of an insoluble skin on the surface of the paint, in a container.

A-Stage — An early stage in the reaction of certain thermosetting resins in which the material is still soluble in certain liquids and fusible. Sometimes the product of this stage is also known as ‘Resols’.

B

Baking — *See* 'Stoving'.

Baking Finish — A paint or varnish that requires stoving at temperature above 80°C for the development of desired properties.

Barrelling — *See* 'Rumbling'.

Barrier Coat — A coating used to isolate a paint system from the surface to which it is applied in order to prevent chemical or physical interaction between them, to prevent the paint solvent attacking the underlying paint or to prevent bleeding from underlying paint or material.

Binder — The non-volatile portion of the 'Vehicle' of a paint. It binds or cements the pigment particles together and the paint film as a whole to the material to which it is applied.

Bitty — The description applied to a paint or varnish containing bits of skin, gel, flocculated material or foreign particles, which project above the surface when the paint or varnish is applied in a manner appropriate to its type and purpose. The term 'Peppery' is sometimes used when the bits are small and uniformly distributed. The term 'Seedy' specifically denotes bits which have developed in a paint or varnish during storage.

Bituminous Paints — Paints based essentially on bituminous ingredients.

Bituminous Solution — Bitumen or asphalt dissolved in organic solvent.

Bituminous Varnish — Varnish essentially based on bituminous/asphalt ingredients.

Black Japan — A black material, similar to a normal oil varnish, containing a drying oil and gilsonite or other asphaltic material. It dries, by oxidation, to a hard glossy film in which the gilsonite may be regarded as replacing the copal resin in a normal varnish. A good black japan can be varnished over without bleeding of the gilsonite.

Blast Cleaning — The cleaning and roughening of a surface by the use of natural or artificial grit or fine metal shot (usually steel), which is projected on to a surface by compressed air or mechanical means.

Bleeding — The process of diffusion of a soluble coloured substance from a substratum, into and through a paint or varnish coating from beneath, thus producing an undesirable staining or discolouration.

Blistering — The formation of dome-shaped projections or blisters in paint or varnish films by local loss of adhesion and lifting of the film from the underlying surface. Such blisters may contain liquid, vapour, gas, or crystals.

Bloom — A thin whitish film which sometimes forms on glossy paint or varnish films, thereby diminishing their lustre or veiling their depth of colour.

Blown Oil — Vegetable oil which has been partially oxidized by blowing with current of air, whilst at an elevated temperature. The characteristics of oil, such as its increased viscosity and degree of oxidation can be controlled by the time, temperature and the amount of air.

Blueing — Neutralizing the yellow cast of certain white pigment of paint by adding a trace of blue, thereby increasing apparent whiteness.

Blushing — A milky opalescence which sometimes develops as a film of lacquer dries and if due to the deposition of moisture from the air or precipitation of one or more of the solid constituents of the lacquer or due to both of these conditions.

Bodied Oils — An oil of increased viscosity produced by any means.

Body — The apparent viscosity of a resin as assessed subjectively when applying an undefined shearing force, for instance, when pouring the material from a container, stirring it on brushing or otherwise spreading over a surface (*see* Consistency).

Bodying — An increase in the apparent viscosity of a paint, varnish, resin or lacquer, which occurs either deliberately during manufacture or inadvertently during storage.

Bodying Up — A term mainly used in wood polishing processes. In French polishing, it refers to building up a transparent film of shellac of substantial thickness, essentially by pad application prior to the final spiriting off.

Boiled Linseed Oil — Raw linseed oil that has been heated in the presence of metallic compounds known as ‘driers’.

Boot-Topping Composition — These are anti-corrosive and antifouling compositions, applied on a load-line area (air-water interface) of ships hulls and are usually black in colour.

Branched High Polymer — This polymer is one in which the long chain molecule is not uniformly straight like a pencil, but has branches extending from its trunk. The long chain molecule, despite these branches, remains unattached to other similar molecules surrounding it. (*see also* High Polymers).

Break (of Oils) — When certain raw vegetable oils are heated, a mucilaginous product separates then it is said to ‘break’. This appears as a hazy suspension which may coagulate into a spawn-like mass. The insoluble matter is also referred to as the ‘Break’ or ‘Mucilage’.

Bridging — The covering over of an unfilled gap, such as a crack or corner, with a film of paint. This introduces a weakness in the coating which may lead to an eventual cracking of the dried paint.

Bring Forward — A term used in repainting, to repair local defective areas with the appropriate paints so as to bring them in conformity with the surrounding areas before applying the finishing coat.

Brittleness — Change characterised by an appreciable reduction in the initial flexibility, cohesion and adhesion of the film.

Bronzing — A characteristic metallic lustre shown by certain highly coloured pigments in full strength, for example, certain prussian and phthalocyanine blues.

Bronzing Lacquer — Transparent lacquer for application to bright metals in order to preserve lustre and enrich colour.

Bronzing Medium or Liquid — A vehicle, either a varnish or a lacquer, which is specially formulated for use as a binder with aluminium or gold bronze powder.

Brush Mark — Ridge in a dried paint film and varnish, left by the brush.

B-Stage — An intermediate stage in the reaction of certain thermosetting resins in which the material swells when in contact with certain liquids and softens when heated, but may not entirely dissolve or fuse. The resin in an uncured thermosetting compound is usually in this stage. Sometimes the product of this stage is referred to as ‘resiol’.

Bubbling — A film defect, temporary or permanent, in which bubbles of air or solvent vapour, or both, are present in the applied film.

Build — The solidity of a paint or varnish film.

Bulking Value — Solid value of unit weight of material, usually expressed as litres per kilogram.

Burning Off — The removal of paint by a process in which the paint is softened by heat, for example, on a flame, and then scraped off while still soft.

C

Caking — The settling of pigment particles of paint into a hard compact mass, which is not easily redispersed by stirring.

Cement Paint — A paint based on portland cement, supplied as a dry powder, for mixing with water immediately before use.

Chalking — A phenomenon manifested in paint film by the presence of loose removable powder, evolved from the film itself at or just beneath the surface. Chalking may be detected by rubbing the film with the fingertip or other means.

Checking — The phenomenon manifested in paint film by slight breaks in the film that do not penetrate to the underlined surface. Different types of checking are given below.

- a) *Irregular pattern type* — Checking in which the breaks develop in the surface of the film in no definite pattern.
- b) *Line type* — Checking in which the breaks in the surface of the film are generally arranged in parallel lines, usually either horizontally or vertically over the surface of the film. These breaks often follow the line of the brush marks.
- c) *Crow-foot type* — Checking in which the breaks in the surface of the film form in definite three prong pattern with the breaks running from a centre and forming an angle of 120° between the prongs.

Cheesy — The character of a paint or varnish film which although dry is mechanically weak and rather soft.

Chilling — The subjection of paint and varnish film to low temperature which may result in a deterioration of its normal characteristics.

Clip Resistance — The resistance of a paint film to localized damage caused by impact, applied particularly to the resistance of a finished car body to stones or grit.

Chipping — It is either of the following:

- a) The removal of paint, or rust scale by mechanical means.
- b) The total or partial removal of a dried paint film in flakes by accidental damage.

Chlorinated Rubber — Rubber which has been chlorinated to increase its solubility in organic solvents. Normally used in chlorinated rubber paints.

Chroma — *See* 'Colour'.

Chromating — Treatment of light alloys by chemical solutions normally containing chromic acid or chromates or both in a suitable medium. This treatment modifies the surface to give improved protection against corrosion and to serve as a good base for subsequent paint coats.

Cissing — A defect in which a wet paint or varnish film recedes from small areas of the surface leaving them apparently uncoated.

Clouding — The development, in the clear varnish or lacquer film or liquid, of an opalescence or clouding caused by the precipitation of insoluble matter.

Coat — The paint, varnish or lacquer applied to a surface in a single application to form a homogeneously distributed film when dry. A paint system usually consists of a number of coats separately applied in a predetermined order at suitable intervals to allow for drying. It is possible with certain types of material, to build-up paint systems of adequate thickness and opacity by a more or less continuous process of application, namely wet on wet spraying. In this case no part of the system can be defined as a separate coat in the above sense. Following types are recognized.

- a) *Full coat* — As thick a coat of paint, varnish or lacquer as can be applied in one operation (brush or spray) consistent with the production of a film of uniform appearance, satisfactory hardness, etc, when dry.
- b) *Glaze coat* — A translucent or semi-transparent coating, sometimes coloured. It may be either an intermediate or the final coat of a paint system. It is frequently applied thinly with the object to modify but not obscure the ground colour.
- c) *Ground coat* — A coat of paint having good opacity which is applied before a glaze coat or stumple. The final colour effect when glazed is dependent on the mutual influence of the ground coat and the glaze coat.
- d) *Guide coat* — A very thin coat of loosely bound paint applied over a continuous coating of surfacer or filler, prior to rubbing down. It is completely removed during the rubbing operations but, as it first disappears from the higher spots and ridges, it serves as a guide to the operator in producing a smooth surface.
- e) *Mist coat* — It can be of two types:

- i. A very thin coat applied by spraying, more particularly in connection with cellulose lacquers. In some cases it may form a ‘fogged’ coat or non-continuous film.
- ii. A thin coat of volatile thinners, with or without a small amount of lacquer, which is sometimes sprayed over a dry lacquer film to improve the smoothness and lustre.
- f) *Round coat* — A full coat of a heavy bodied paint or varnish.
- g) *Sealing coat* — See ‘Sealer’.
- h) *Sharp coat* — A coat of white lead in oil thinned liberally with turpentine or white spirit. A sharp coat used for treating new plaster following the trowel is frequently referred to as ‘sharp colour’.

Coating — A liquid, liquifiable for mastic composition, that is converted to a solid protective, decorative or functional adherent film after application as a thin layer.

Cobwebbing — The production of fine filaments instead of normal ‘atomized’ particles when some solutions of certain classes of high polymers are sprayed.

Cohesion — The forces which bind the particles of paint or varnish film together into a coherent whole.

Cold Checking — The development of hair cracks in a lacquer film when it is ‘subjected to a ‘cold check’ test, for instance, when a furniture lacquer is subjected to defined cycles of alternating cold and normal temperatures.

Colloid — A stage of subdivision of a substance, when dispersed in a liquid characterized by a particle size intermediate between molecular solution and dispersion and just visible by Tyndall effect.

Cold Curing — The process of curing at normal atmospheric temperature.

Colophony — See ‘Rosin’.

Colour — The aspect of the appearance of objects which depends up-on the spectral composition of light reaching the retina of the eye and upon its temporal and spatial distribution. Mixtures of blends of these are also colours. The colours of objects have three attributes, hue, lightness and saturation.

- a) *Hue* — Colours are first divided into groups having the same hue that is, into reds, yellows, greens, blues, purples, etc. Almost all systems of colour terminology use the term hue in this sense, but in ordinary speech this quality is often called colour.
- b) *Lightness* — The lightness of a colour is determined by the proportion of light which it reflects, irrespective of hue and saturation. Corresponding terms used are ‘Value’ and ‘Reflectance Value’.
- c) *Saturation* — Colours of similar hue and lightness may differ in colourfulness or intensity of colour. This quality is termed saturation and may be defined as the intensity of any particular hue when compared with a neutral grey of similar lightness, the spectrum colours being the most intense or of highest saturation. The terms ‘chroma’ and ‘intensity’ are also used in similar sense.

Colour Floating — See 'Floating'.

Colour Match — Paints are said to match in colour if under specified conditions of illumination and viewing, no significant difference in their hue, saturation and lightness can be detected.

- a) *Spectral match* — Paints are spectral matches if at each wave-length of visible spectrum their reflectance are the same; a spectral match holds good for their illuminants and observers.
- b) *Metameric match* — Colour which match under one illuminant but have different spectral reflectance curves, are metameric matches only; the phenomenon being known as 'metamerism'. Metameric matches, in general, no longer hold good if there is a change in the illuminant, for example, from daylight to tungsten lamp light.

Colour Retention — The resistance of resin or a coating therefrom to undergo any colour change during defined exposure conditions.

Colour Value — These are specified with reference to certain standard colour scales. For resins the colour value, number or index should be expressed in terms of:

- Gardener colour scale,
- Iodine colour scale, or
- Rosin colour scale.

Colour value should be determined for 50 percent resin solution in specified solvent.

Colour Wash — Earth pigments, with or without whiting, lightly bond in glue size so as to facilitate ready removal, since frequent removal is necessary, for example, tinted lime wash or white wash.

Combing — The act of partially removing a coat of wet paint with combs to imitate the grain of wood or other pattern.

Comonomer — A monomer usually polymerized in presence of another monomer or comer.

Compatible

- a) Two or more paints or varnishes which can be mixed without producing any undesirable effects, such as precipitation, coagulation, gelling, etc., in liquid state or during drying of film of the mixture, are said to be compatible.
- b) Different coats of paints which can be associated in painting system without producing undesirable effects are said to be compatible.

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 known as polycondensation.

Consistency — It is the apparent viscosity of a paint or varnish when shearing forces of varying degrees are applied to it in various ways, for instance, when it is stirred in the can or poured from one vessel to another or Brushed (or otherwise spread out) over a surface.

Convection Oven Stoving — See ‘Stoving’.

Copal — Natural resin formed from the exudation of various tropical trees. The hard fossil types are the basis of copal varnishes, the softer types frequently obtained by the tapping of live trees being mostly used for spirit varnishes. Congo copal is the main surviving member of the fossil class and manila copal that of the spirit soluble class.

Copolymer — A long chain polymeric molecule comprised of at least two different monomers.

Covering Power — See ‘Hiding power’ and ‘opacity’.

C-Stage — The final stage in the reaction of certain thermosetting resins in which the material is relatively insoluble and infusible. The resin in a fully cured thermoset is in this stage. Sometimes the product of this stage is referred to as ‘resite ’ (*see also* A-Stage and B-Stage).

Cracking — It is generally the splitting of a dry paint or varnish film usually as a result of ageing. The following terms are used to denote the nature and extent of this defect:

- a) *Hair cracking* — Fine cracks which do not penetrate the top coat; they occur erratically and at random.
- b) *Checking* — Fine cracks which do not penetrate the top coat and are distributed over the surface, giving semblance of a small pattern.
- c) *Cracking* — Specifically, a breakdown in which the cracks penetrate at least one coat and which may be expected to result ultimately in complete failure.
- d) *Crazing* — Resembles checking but the cracks are deeper and broader.
- e) *Crocodiling or alligating* — A drastic type of crack producing pattern resembling the hide of a crocodile.

Cratering — The formation of small bowl-shaped depressions in a paint or varnish film.

Crawling — A pronounced form of ‘Cissing’.

Crazing — See ‘Cracking’.

Crinkling — See ‘Wrinkling’.

Crocodiling - See ‘Cracking’.

Cross Brushing — A method of obtaining even distribution of paint by means of a brush whereby the direction of brushing each series of strokes lies at right angles to that of the previous series.

Cross Linking — The formation of three-dimensional network of bonds between similar or dissimilar linear polymers.

Cross-Linking Agent — A substance which will react chemically with the molecular chains of a thermosetting material and by linking them together will create a more rigid structure resulting in a more or less infusible product.

Cross Linked High Polymers — The polymers in which the long chain molecules, either straight or branched, have ladder rungs or cross-bridges binding them together. In the case of high polymer, all or most of the component long chain molecules are rigidly locked to each other laterally by primary linkages (*see also* High Polymers).

Crowsfooting — A type of film defect where small wrinkles occur in a pattern resembling that of a crow's foot.

Crystallizing Finish — *See* 'Finish'.

Cure — To change the physical properties of a resin by chemical action which, for example, may be condensation, polymerization or addition usually accomplished by the action of either heat or catalyst or both, and with or without pressure.

Cure Time — The time taken to achieve the desired change in physical properties of resin or coating by chemical or physico-chemical action.

Curing — The process of condensation or polymerization of a material by heat or chemical means, resulting in full development of desirable properties.

Curing Agent — An additive which promotes the curing of film (*see* also 'Cross Linking Agent').

Curtain Coating — A method of applying paint to an object by moving through a falling curtain of paint.

Curtaining — *See* 'Sagging'.

D

Degree of Polymerization (DP) — The average number of repeating units in a macromolecule.

Degradation — A condition in the polymer which detracts from its original characteristics, generally due to rupture of primary valence linkages or formation of unsaturated linkages or both.

Dehydrated Castor Oil (DCO) — Castor oil from which hydroxyl groups of fatty acids have been removed as water thereby introducing unsaturation in the chain.

Deleafing — Loss of leafing of metallic pigments in paints, giving rise to reduced metallic lustre.

Depolymerization — The process of breaking the polymer by thermal or chemical means to fragments.

Descaling (Scaling) — The removal of mill scale or caked rust from steel by mechanical means, sometimes assisted by flame cleaning.

Deterioration — A permanent change in the physical properties of a resin evidenced by impairment of these properties.

Diluent — A volatile liquid, which is not a solvent for the non-volatile constituents of a varnish or lacquer, but may yet be used in conjunction with the true solvent, without causing precipitation.

Dilution Ratio — The capacity of an active solvent for a given resin to tolerate a non-solvent or blends of non-solvents used as diluents for economic considerations, as well as to secure desirable characteristics to the resin solutions. Dilution ratio is the ratio by volume of diluent to solvent in a mixture of solvent and diluent in such proportions that the mixture just fails to be a solvent for a given resin or polymer.

Dimer Acid — Generally liquid consisting of addition product of two units of a fatty acid.

Dipping — It is:

- a) the process of applying paints, etc., by immersing therein an object to be coated and allowing it to drain during and after removal; or
- b) the description of a preparation suitable for this method of application, namely a dipping paint.

Dispersion — A two phase system in which one phase called the disperse phase, is permanently distributed as small particles through the second phase, called the continuous phase.

Distemper — Although there is a tendency to apply this term to all water paints used for house decoration, it should preferably be used solely to describe the earlier types of such products, namely, those in which the binding medium consists essentially of either glue or casein, or similar sizing material.

Distensibility — Assessment of the adhesion of a stretched paint film, whilst the film is still under stress.

Dope — A class of lacquer like materials used in the coating of textiles and leathers. In particular, aeroplane dope is used in the aircraft industry for tightening and protecting stretched linen fabric.

Drag (Brush Drag) — Resistance to the bristles, encountered when applying paint by brush. Excessive drag may be a serious fault in a paint or varnish (*see also* 'pulling').

Driers — Substances which, when incorporated in relatively small proportions in drying oils, or in paints and varnishes based on drying oils, bring about an appreciable reduction in their drying time at ordinary temperature. These substances are usually compounds of lead, manganese, cobalt, etc. They are of the following types:

- a) *Soluble driers* — Driers which are more or less readily soluble at ordinary temperature in drying oils, hydrocarbon solvents and the like. Usually they, consist essentially of metallic salts of the organic acids, such as the resinates, linoleates or naphthe-nates or octoates of lead, manganese or cobalt.
- b) *Liquid driers* — Solutions of 'Soluble driers' in volatile organic solvents, usually hydrocarbons.
- c) *Paste driers* — Driers made by grinding suitable compounds of lead or manganese with a small amount of water, linseed oil and Paris white, with or without other mineral extenders, to form a stiff paste. They are still sometimes used by painters when mixing their own linseed oil paints, but are now largely superseded by soluble and liquid driers. They are also known as patent driers.

Dry Spray — The production of a rough or slightly bitty film caused by an atomized paint, the particles being insufficiently fluid to flow together to form a uniform coating.

Drying — The process of change of a coat of paint or varnish from the liquid to the solid state, due to the evaporation of solvent, physicochemical reactions of the binding medium, or a combination of these causes. When the drying process takes place during exposure to air at normal temperature it is called ‘air drying’ ; if it is accelerated by the application of a moderate degree of heat (normally not exceeding 80°C) it is termed ‘ forced drying’ ; as distinct from ‘stoving’ . Various successive stages in the drying of a paint or a varnish film are distinguished by qualifying terms (with corresponding drying time) as follows:

- a) *Dust dry* — When dust no longer adheres to the paint surface.
- b) *Surface dry* — When the paint is dry on the surface but is soft and is tacky underneath. This condition is also commonly described as ‘sand dry’.
- c) *Tack free* — Free from stickiness even under pressure; also known as touch dry.
- d) *Hard dry* — When the drying has reached such a stage that if desired, a further coat can be satisfactorily applied by brushing, if necessary, after flattening. The term is also used to describe certain degree of film hardness when tested by specified methods.
- e) *Dry to handle* — When the paint surface is sufficiently cured to be freely handled without damage.

Drying oil — An oil, usually of vegetable origin, having the property of hardening by oxidation to a tough film when exposed in the form of a thin layer to air, for example, linseed and tung oil.

Drying Time — The time which elapses between the application of a coat of paint and the attainment of a specified dry state (*see also* Drying’).

Dual-Pack — *See* ‘Two-Pack’.

Durability — The degree to which paints and paint materials withstand the destructive effect of the conditions to which they are subjected.

Dust Dry — *See* ‘Drying.’

E

Earth Colours — A class of pigments which are usually mined directly from the earth, dried and ground. They are frequently also termed ‘Natural Pigments’ or ‘Mineral Pigments’. Most earth pigments consist of complex mixtures of iron or manganese oxides with aluminium silicates. Typical examples are red and yellow oxides of iron, yellow ochre, raw sienna, raw umber, etc.

Efflorescence — The development of a crystalline deposit on the surface of brick, cement, etc., due to water, containing soluble salts coming to surface and evaporating, so that the salts are deposited. In some cases, the deposit may be formed on the top of any paint film present, but usually the paint film is pushed up and broken by the efflorescence under the coat.

Egg Shell — *See* ‘Gloss’.

Elastomer (or Rubber) — Elastomer is a term that refers to non-crystalline high polymers or rubber that have a three-dimensional space-network structure (vulcanization) which imparts

stability or resistance to plastic deformation. Normally, elastomers exhibit long range elasticity (rubber band effect) at ordinary room temperatures.

Electrodeposition — 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 copper. The two electrodes are connected to a source of electric current, 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.

Electrostatic Detearing — A process of removing blobs and the thick edges of paint from an article which has been coated by dipping. The process consists of passing the dipped article, after a limited period of draining over a grid at a high electrical potential. The blobs and. thick edges of paint are removed from the article by attraction to the grid.

Electrostatic Spraying — Methods of spraying in which an electro-static potential is created between the work to be coated and the atomized paint particles. The charged particles of paint are attracted to the articles being painted and are then deposited and discharged. The electrostatic potential is used in some processes to aid the atomization of the paint.

Emulsion — In scientific terminology this is an apparently homogeneous material formed by the incorporation of two liquids, which are normally immiscible. One liquid is dispersed in the other in the form of minute drops. If the droplets remain permanently dispersed, the emulsion is said to be stable and certain compounds are added as stabilizers because of their power to keep the droplets dispersed.

In paint industry, the term is frequently, if erroneously, applied to stable emulsion like dispersions of an organic binder in water, for example, polyvinyl acetate emulsions, used for making emulsion paint.

Emulsion Paint — Generally, a paint in which the medium is an ‘emulsion’ or an emulsion-like dispersion of an organic binder in water. Industrially, the name is mainly restricted to those paints in which the medium is an ‘emulsion’ of a synthetic resin. The medium may also be tailed a latex by analogy with a natural rubber latex; polyvinyl acetate emulsion paint is a typical example.

Emulsion Polymerization — Two-phase polymerization of the free radical type in which organic monomers are emulsified in a liquid medium and wherein the initiators are soluble in a continuous phase and are capable of diffusing into emulsified monomer droplets.

Enamel — One of the class of finishes obtained by melting siliceous materials. The term is also used in the paint industry to describe pigmented varnishes which simulate in appearance, the flow, smoothness and gloss of ‘Vitreous Enamels’. The same broad definition applies to ‘Enamel Paint’ and ‘Hard Gloss Paint’, although all these three may differ in degree in respect of one or more properties, such as flow, smoothness, gloss, opacity and in the retention of these properties on ageing.

Enamel Paint — *See* ‘Enamel’.

Epoxide Equivalent — This is the mass of resin in grams which contains one gram chemical equivalent of epoxy. Epoxide equivalent is determined by reacting a known quantity of resin with a known quantity of hydrochloric acid and back titrating the remaining acid to determine its consumption.

Epoxy Paint — A paint based on epoxy resin (*see also* ‘Resin’).

Epoxy Resin — Reaction product generally of epichlorohydrin and bisphenol A. Certain special types of epoxy resins are produced by addition polymerization of monomers, namely, glycidyl acrylates (*see also* Resin) .

Epoxy Esters — Fatty acid esters of epoxy resins.

Epoxy Value — This represents the fractional number of epoxy groups contained in 100 grams of resin.

Erosion — The wearing away of the top coat of a painted surface, for example, by chalking, or by abrasive action of wind borne particles of grit, which may result in exposure of the underlying surface.

Etch — Roughening of a surface by a chemical agent prior to painting in order to increase adhesion.

Etching Primer — A priming paint is usually supplied as two separate components which require to be mixed immediately prior to use, and therefore is usable for a limited period only. The mixed paint contains carefully balanced proportions of an inhibiting chromate pigment, phosphoric acid, and a synthetic resin binder in a mixed alcohol solvent solution. On clean light alloy or ferrous or non-ferrous surfaces such paint gives excellent adhesion, partly due to chemical reaction with the substrate (hence the term ‘etching primer’), and gives a corrosion inhibiting film, which is a very good base for the application of subsequent coats of paint. Although these materials are referred to as primers, the film which they give are so thin that it is better to consider them as etching solutions and to allow them with an ordinary primer if maximum protection is required.

These materials are also known as ‘Pre-treatment Primers’, ‘Wash Printers’, and ‘Self-Etch Primers’.

Etherified (Alkoxylated) Amino Resin — Etherified reaction product of methylols of amino resins and alcohols.

Extender — An inorganic material in powder form, which has a low refractive index and consequently little obliterating power; but is used as a constituent of paints to adjust the properties of the paint, notably its working and film forming properties and to avoid settlement on storage.

F

Fading — The destruction of colouring matter in a paint surface as a result of ageing, weathering or exposure to sunlight. The development of chalking gives an appearance of fading, but in this case the original colour may be substantially restored by the application of a coat of varnish.

False Body — The apparently full bodied condition of paint which undergoes a marked reduction of viscosity when agitated and returns to its former condition either immediately or subsequently, when allowed to remain at rest (*see also* ‘Thixotropy’).

Fast to Light — The description of a paint film, pigment or dyestuff which retains its original colour on exposure to light under defined conditions.

Fat Edge — An accumulation of paint in the form of a ridge at the edge of painted surface; this may arise either from faulty application by brushing or from drainage during, dipping.

Fattening — An increase in consistency of paint on storage, not necessarily to such an extent as to make it unusable.

Fatty Acid — An organic acid derived from vegetable oil.

Feather Edging — Reducing, the thickness of the edge of a dry paint film such as in the case of edge of a damaged area, prior to repainting.

Feathering — The operation of tapering off the edges of a coat of paint by laying off with a comparatively dry brush.

Feeding — An increase in consistency of paint to such an extent as to make it unusable except by undue thinning. This is generally due to chemical reaction between its constituents.

Felting Down — The operation of flattening a dry film of varnish or paint by means of a pad made of felt, or similar material, charged with very fine abrasive powder and lubricated with water or other suitable liquid.

Filiform Corrosion — A form of corrosion under paint coatings on metals characterized by a thread like form advancing by means of a growing head or paint.

Filler — A composition used for filling fine cracks or indentations to obtain a smooth, even surface preparatory to painting.

Film — A film is relatively thin skin, membrane, or pellicle less than 0.25 mm thick which usually is transparent or translucent.

Finish — The general appearance of a painted surface after drying. The various types of finishes are distinguished as follows:

- a) *Crackle finish* — The appearance of a paint system obtained by using materials so formulated that cracks develop in the last coat during drying, exposing the undercoat in a more or less regular pattern, a coat of clear lacquer being subsequently applied over the whole surface.
- b) *Crystallizing finish* — The crystalline appearance developed by certain types of paint on drying. Two main types exist:
 - i. Lacquers, which include in their composition materials which crystallize out from the medium as the solvent evaporates.

- ii. Materials in which advantage is taken of the tendency of certain drying oils, notably tung oil to 'frost' or 'crystallize' when dried under certain conditions.
- c) *Flamboyant finish* — The finish produced by application of a glossy, transparent, coloured finishing coat over a bright metallic surface. The latter may sometimes be produced by prior application of a coat of metallic paint.
- d) *Hammer finish* — A finish produced by certain coloured paints containing metal powder which on controlled spray application, dry with an appearance similar to hammered metal.
- e) *Polychromatic finish* — Apart from its literal meaning, this term is specially applied to a finish which has a metallic lusture and gives an iridescent scintillating effect when viewed from different angles. The effect is produced by application of special lacquers or paints which contain metallic powders in flake form, in addition to transparent colouring matter.
- f) *Textured finish* — A rough finish, deliberately produced, which may be achieved, for example, by the use of paints, the film of which remains in the plastic state sufficiently long to permit their being worked out into pattern of low relief, or by the incorporation in the paint of some coarse materials, such as sand or stone chippings, which automatically produce a rough surface.
- g) *Wrinkle finish* — A finish in which a paint is intentionally made to develop ridges or wrinkles on drying.

Flaking — Lifting of the paint from the underlying surface in the form of flakes or scales.

Flame Cleaning — The application of an intensely hot flame to structural steel resulting in the removal of mill scale and the dehydration of any remaining rust, leaving the surface in a condition suitable for wire brushing followed by an immediate application of paint.

Flash Dry (verb) — To allow the greater part of the more volatile solvents in a sprayed coat of lacquer or enamel to evaporate before proceeding either with application of another coat or with stoving.

Flash Off Time — The time allowed to elapse between the spray application of successive wet on wet coats or the time allowed for the evaporation of the bulk of the solvent before entering into a stoving oven.

Flash Point — Maximum temperature of a liquid at which the vapours given off are sufficient to form a flammable mixture with air, under specified conditions of the test. The flash point is an arbitrary figure and depends on the method of test. Methods commonly employed are Pensky-Martens (open and closed), Cleveland, and Abel.

Flashing — A fault in the paint film in which patches glossier than the general finish develops especially at joints or laps in the coating.

Flat (Matt) — The description of a coated surface film which scatters or absorbs the light falling on it, so as to be substantially free from gloss or sheen (*see also* Gloss).

Flat Oil Paint — An oil paint which possesses a high pigment binder ratio such that the film dries with little or no gloss. Such paints may have relatively poor flow, in which case the production of a smooth surface depends largely on the skill of application.

Flat Varnish — Varnish made to dry with a dull surface by incorporating suitable ingredients.

Flatting Agent — A material incorporated in a paint, varnish or other coating materials to reduce the gloss of dried film.

Flatting Down — Cutting or rubbing down the surface of a paint or varnish with fine abrasives to produce a smooth dull surface.

Flexibility — The degree to which a paint film, after drying, is able to conform to movement or deformation of its supporting surface, without cracking or flaking.

Flexibilizer — An additive that makes a coating or rubber more flexible (also called as ‘ plasticizer ’).

Floating — A defect which is sometimes apparent in coloured paints containing mixtures of different pigments. During drying or storage, one or more of the pigments separates or floats apart from the others and concentrates in streaks or patches on the surface of the paint, producing a variegated effect.

Flocculation — The development of loosely coherent solid aggregates in a pigment vehicle dispersion.

Flooding — An extreme case of floating in which pigment particles float in such a manner as to produce a colour, which though uniform over the whole surface, is markedly different from that of the newly applied wet film.

Flow — The degree to which a wet paint film can flow out after application so as to eliminate brush marks or spray mottles and produce uniform smooth surface on drying (*see also* ‘Levelling’).

Flow Coating — The process of applying paint in which the paint is poured or is allowed to flow over the object to be painted, the excess, if any, being allowed to drain off.

Fluorescent Paint — *see* ‘Luminous Paint’.

Flushing — It is:

- a) a process of agitating with oil, a paste consisting of pigment dispersed in water, in order to displace the water and form a paste of pigment dispersed in oil; or
- b) a process of applying a coating material, in excess, to the inside of hollow articles by pouring or squirting, and subsequently allowing the excess to drain out.

Footing — The gradual deposition of ‘foots’ from an oil or varnish.

Forced Drying — *See* ‘Drying’ .

Ford Cup — A flow cup used for measuring the viscosity of resins and paints.

French Polish — A lacquer made essentially from shellac and methylated spirit. Other spirit-soluble gums; such as sandarach and benzoin are sometimes added to impart some special property, it is applied with cambric covered rubber or cotton or wool, lubricated with oil. The oil is afterwards removed by ‘Spiriting Off’.

Free Radical — An unsaturated electrically neutral molecular fragment formed by homolytic fission of a covalent bond in which the resulting unpaired electron takes no part in bonding.

Free Radical Polymerization — An addition polymerization induced by the presence or formation of free radicals due to a peroxide initiator or light, radiation, etc (*see also* Polymerization).

Frosting — The formation of translucent finely wrinkled surface on a film of oil or paint during drying, particularly when exposed to gas, fumes, etc. This defect is especially characteristic of paints and varnishes containing certain oils which have not received adequate heat treatment.

Full Coat — *See* 'Coat'.

Full Gloss — *See* 'Gloss'.

Functionality — Number of active group available for polymerization.

Fungicidal Paint — A paint which discourages growth of fungi on its dry applied film. The fungicidal properties are normally conferred by the addition of special additives; although certain pigments, such as, zinc oxide, commonly used in paints may themselves contribute the fungicidal properties of the paint.

Fungicidal Wash — A wash containing fungicides, used before painting and designed to kill existing spores or germinations or to prevent their inception. Many of these substances are toxic (to human beings) when used in concentrated form and therefore, need careful handling.

G

Gas Checking — The development of wrinkles, often in a well-defined pattern in the surface of a resin system during drying. This condition results from the irreversible swelling of a partially dried surface skin, and may be aggravated by impure gas fumes during stoving in a gas oven in which case it is termed gas checking (*see also* Webbing).

Gel — It generally refers to a product which has a three-dimensional cross-linked network, not soluble in solvents, but swells, and is a system consisting of a network of solid aggregates in which liquid may be held.

Gelling — Apart from its general meaning (conversion of a liquid to a jelly), this term is used specifically to denote the deterioration of a paint or varnish owing to the partial or complete changing of the medium into an insoluble jelly-like condition which is unworkable even with the addition of solvent (*see also* 'Livering').

Gel Time — The time required to convert a liquid composition into a gel under specified conditions.

Glaze Coat — *See* 'Coat'.

Glazing — The enrichment or modification of a surface by the application of a thin, translucent, coloured coating.

Gloss — The degree to which a painted surface possesses the property of reflecting light in a mirror like manner (specular reflection). The extent to which this property is developed depends mainly on the composition of the paint, surfaces ranging from dead flat to full gloss being obtainable. The following stages in increasing order of gloss are normally recognized:

- a) *Flat (matt)* — Practically free from sheen even when viewed from oblique angles; gloss value varying from 0 to 5;
- b) *Eggshell flat* — Gloss value from 6 to 15;
- c) *Eggshell gloss* — Gloss value from 16 to 30;
- d) *Semi-gloss* — Gloss value from 31 to 50; and
- e) *Full gloss* — Smooth and almost mirror like surface when viewed from all angles, gloss values 51 and above.

Glossing up is the undesirable development of gloss on a flat paint due to handling or polishing.

Gold Size — This term is used to describe the following two different types of materials.

- a) An oleo-resinous varnish which dries rapidly to a tacky condition, but which hardens slowly. It is used chiefly as an adhesive for fixing gold leaf to a surface.
- b) An oleo-resinous varnish, containing high proportion of driers, which rapidly dries hard after application. It is frequently used for the preparation of stopping and filling compositions.

Graining — A method of imitating the grains of various kinds of wood by using a semi-transparent ‘graining colour’ over a dry ground colour and manipulating it, while wet, with various appliances to produce the desired effect.

Grid Blasting — *See* ‘Blast Cleaning’.

Grinning Through — The showing through of the underlying surface due to the inadequate opacity of a paint film which has been applied to it.

Ground — A general term for any surface suitable for the reception of paint.

Ground Coat — *See* ‘Coat’.

Guide Coat — *See* ‘Coat’.

Guns Mastic — A natural resin used for picture varnish (*see also* ‘Mastic’).

Gum Resin — Resinous exudate distinguished by its solubility in water and charring on heating.

H

Hair Cracking — *See* ‘Cracking’.

Hammer Finish — *See* 'Finish'.

Hard Dry — *See* 'Drying.'

Hard Gloss Paint — *See* 'Enamel'.

Hard stopping — A material in a stiff paste form, which is usually applied by means of knife, to fill deep indentations in a surface and which dries hard throughout. It should not be confused with glazing putty which is of a different consistency and which hardens more slowly.

Hardener — It is:

- a) a crosslinking agent used to effect the hardening of resin system, or
- b) a resin added to harden a paint film.

Hardness — It is a measure of resistance the cured resin or paint film offers to deformation under stated condition. Generally it is expressed in seconds, using an oscillating technique for determining time, a film lasts without deformation.

Haze — Indefinite cloudy appearance within or on the surface of a resin or resin film.

Heat Resistance — A term used in comparative sense, as far as paints are concerned, but is of little value unless it is referred to some standard of performance under specified conditions.

Heat Resisting Paint — A paint with improved resistance to heat.

Heavy Bodied — Having a thick consistency of high viscosity. In case of paints, it is also associated with the ability to leave, after drying, a substantial coating. The term is also, sometimes, used to denote high 'Obliterating Power', but this use is deprecated.

Hiding Power — *See* 'Opacity'.

Highlighting — Emphasizing the impression of a relief by making certain parts of finished surface lighter than the general colour of that surface.

High Polymer — A macromolecule usually having molecular mass above 5 000 (*see also* Polymers).

Hold Out — The ability of a paint film to dry to its normal finish on a somewhat absorptive surface.

Holidays — Skipped or missed areas, left uncoated with paint.

Homopolymer — Polymers of which the molecule consists of only one type of structural unit repeated indefinitely (*see also* Polymer).

Hot Spraying — The spraying of hot lacquers or paints, the viscosities of which have been reduced to spraying consistency by means of heat instead of by addition of volatile solvents. By such a process, it is possible to apply materials with higher solid contents and therefore better builds.

Hot Surface — An abnormally absorbent surface.

Hue — *See* 'Colour'.

Hungry Surface — A surface, the absorptive power of which has not been fully satisfied by the coats of paint applied to it, usually resulting in a patchy film.

Hydrocarbon Resin — Resin derived from unsaturated hydrocarbons. Resins derived from petroleum sources are important subclass of this group and also known as ‘petroleum resins ’ (*see also Resin*).

I

Impact Resistance — The ability of a paint film to resist a sudden blow.

Inert Pigment — A pigment which remains relatively inactive or chemically unchanged in paints under stated conditions. The term has little significance unless the conditions are stated.

Infra-Red Drying — A method of stoving paint or varnish films employing radiant energy from the sources, such as gas heated panels, filament lamps or low temperature electrical radiant.

Inhibitive Pigments — A pigment which retards or prevents the corrosion of metals by chemical and/or electrochemical means, as opposed to a purely barrier action. Red lead and zinc chromate are examples of inhibitive pigments as opposed to red iron oxide which has little or no inhibitive action.

Inhibitor — A material used normally in small proportions to inhibit a chemical reaction, for example, use of arsenic or antimony compounds as inhibitors in acid pickling solution and the use of small proportions of antioxidants to reduce the skinning of paints or varnishes in partially filled containers or to stabilize paint in dipping tanks.

Initiator — Generally a reactive that can give rise to a free radical polymerization.

Insulating Varnish — A varnish often used to provide electrical insulation for electrical equipment.

Intensity — *See* ‘Colour’.

Iodine Value — The number of grams of iodine absorbed per 100 g of the oil or the resin, which is the percent iodine absorbed. The iodine number or value of the oil or the resin gives an indication of the degree of unsaturation of the constituent fatty glyceride or the resin in its form of delivery. It is customary to give the method employed for its determination. Wijs method is applicable to all normal oils and fats not containing conjugated systems. For conjugated oils, Woburn’s method is used.

K

Keeping Property — The ability of paint to retain its original characteristics in general when stored under prescribed conditions.

Ketone Resin — A product of reaction between a ketone and formaldehyde and/or other aldehydes (*see also Resin*).

Key — Any special quality of the surface or of a previous coat of paint, which assists adhesion of subsequent coat. One example is that of rough or abraded surface which provides a mechanical key for the applied film.

Knifing Filler — A filling composition suitable for application with a filling knife as distinct from one made for brush application.

Knotting — A quick drying composition used in the prevention of joinery for painting, to form a local impervious covering for knots and other resinous areas liable to stain or soften a superimposed coat of paint.

L

Lacquer — A term usually applied to coating compositions which dry solely by evaporation of the solvent for example, cellulose lacquers and spirit lacquers. The term is also used with reference to gold stoving finishes for tin plate which are not formulated on spirit or cellulose basis and do not dry solely by solvent evaporation.

Lake — A special type of pigment consisting essentially of an organic soluble colouring matter combined more or less definitely with an inorganic base or carrier. It is characterised generally by a bright colour and a more or less pronounced translucency.

Lap (noun) — The region where a coat extends over an adjacent fresh coat (The object of the painter is usually to effect a joint between the two coats without showing the lap).

Lab (verb) — To place one coat of finishing material alongside another partly extending over it, causing increased thickness where the two coats are present.

Lapping Time — *See* 'Wet Edge Time'.

Latex — Originally a natural rubber emulsion. Now also applied to emulsions of various synthetic resins.

Latex Paint — A paint based on pigment emulsion of synthetic resin.

Laying Off — The final light strokes of the brush during a painting operation.

Lead Free — Paints or varnishes for special purposes where the presence of lead constitutes a danger, for example, in certain explosives factories and in food packing. In these cases, the quantities of lead permitted are very low, much lower than the limits permitted for lead restricted paints, and are normally specified for particular purpose by the users.

Lead Paint — The term applies to any paint, paste, stopping, filling or other material used in painting, which contains more than 5 percent lead as lead oxide (PbO), in its pigment when determined by a certain defined method (*see also* 'Lead Restriction').

Lead Restriction — Normally a paint having a lead content below a given limit.

Leafing — The action involving the floating and slight overlapping of certain metallic and other pigment particles, in the form of thin flakes, on the surface of a paint film. Leafing may occur when such pigments are mixed with a suitable vehicle and applied as a paint film

Levelling — The ability of a coat of wet paint to flow out to a level surface (*see also* ‘Flow’ and ‘Pulling Over’).

Life — The period of time during which a paint film continues to serve the purpose for which it was designed.

Lifting — The softening of a dry film of paint or varnish when another coat is applied over it, manifested by wrinkling of the first coat.

Lightness — *See* ‘Colour’.

Lime Washing — Coating with lime-wash made from hydrated lime or by slaking quick lime.

Linseed Oil — A drying oil extracted from the seeds of the flax plant (*Linum usitatissimum*). The oil is refined by treatments which remove water and mucilaginous material and is then described as acid or alkali refined oil according to the method of treatment. Further processing gives boiled oil, blown oil or stand oil.

Liquid Driers — *See* ‘Driers’.

Livering — A progressive thickening in the consistency of a paint or varnish due to gelation, to a stage where it is unsuitable for application (*see also* ‘Gelling’).

Long Oil — A high ratio of oil to polyester part in resin in a varnish medium (*see* ‘Oil Length’ and ‘Short Oil’).

Luminous Paint — A paint which exhibits fluorescence or phosphorescence.

- a) *Fluorescent paint* — It contains pigments which are capable of absorbing energy from the blue or ultraviolet end of spectrum and re-emitting it in the form of light in the visible wavelengths. A fluorescent paint ceases to glow if activating source is removed.
- b) *Phosphorescent paint* — It contains pigments (phosphorus) which absorb energy at one wavelength and emit it over a period, in the form of light at a longer wavelength in the visible spectrum. It differs from a fluorescent paint in that it continues to glow even after the stimulant is removed.
- c) *Radioactive (or self-luminous paint)* — Normally this is a phosphorescent paint, containing a portion of radioactive compounds and in such paint, the phosphorous is permanently activated by absorbing energy from the bombardment by the radioactive rays and emits light in the visible spectrum.

M

Malamine Resin — *See* Amino Resins.

Mar-Resistance — The property of a paint or varnish film which enables the film to remain unimpaired by light abrasion, impact or pressure.

Marbling — Imitating with finishing materials, the figure and texture of polished marble or other decorative stones.

Masking — Covering that part of a continuous surface to which it is not desired to apply paint. Mask may be made by sheets of brown paper stuck in position by adhesive tape or plastics or metal shields for long runs of masked jobs.

Mass Tone — The colour, by reflected light, of a bulk of undiluted pigment.

Mastic — An adhesive composition. Loosely used to describe a plastic filler, stopper, putty or adhesive (Not to be confused with gum mastic which is natural resin used for picture varnish).

Match — *See* 'Colour'.

Matt — *See* 'Gloss'.

Maturing (of Varnishes) — The process by which clarity, brightness, working properties, etc, are improved by stoving the varnish in the tank.

Medium (In Paints or Enamels) — The continuous phase in which the pigment is dispersed; thus in the liquid paint it is synonymous with 'Vehicle' and in dry film, it is synonymous with 'Binder'.

Metallic Paint — A paint which on application gives a film with a metallic appearance. This effect is normally produced by incorporation of fine flakes of such metals as copper, bronze or aluminium.

Metameric Match — *See* 'Colour Match'.

Mildew Collection — A phenomenon of a coating manifested by the presence of mould or fungus growth of a type familiarly known as mildew. A microscope is necessary to differentiate mildew from dirt collect. Two types are common, namely:

- a) The spore type, which resembles caviare in appearance; and
- b) The mycelium or filament type.

Milkiness — A whitish or translucent appearance in a varnish film which should normally be transparent.

Mill-scale — The layer of black oxide of iron produced during the hot rolling of steel.

Mist Coat — *See* 'Coat'.

Monomer — The term is used both specifically and generically. Generically, it is a term applied to any of the various types of reactants, namely, true monomers, comers, etc, in the sense that they are the original reactants.

Mop Polishing — Polishing by friction with a rotary mop.

Mottling — The picking out of highlights and other markings in the operation of graining in imitation of wood or other materials by a supplementary process of glazing.

Mucilage — *See* 'Break'.

N

Natural Pigments — *See* 'Earth Colours'.

Natural Resin — *See* Resin, Natural.

Nibs — Small pieces of foreign material, pieces of skin, coagulated mediums, etc., which project above the surface of an applied film, usually a varnish (*see also* 'Bitty').

Non-drying Oil — An oil which undergoes little or no oxidation when exposed to air and therefore has no film forming properties.

Non-volatile Matter — The ingredients of a coating composition which after drying, are left behind on the material to which it has been applied, and which constitute the dry film.

Non-yellowing — Resistance to the development of yellowing tinge during exposure for a period of time under stated conditions.

O

Obliterating Power — *See* 'Opacity'.

Off White — A colour which is obviously not white, but is also not sufficiently far away from white to enable it to be called by a definite colour name.

Oil Absorption (Value) — The number of millilitres or grams of oil, used to bind together 100 g of pigment under specified conditions of test. The unit used should be stated. The figure is not absolute, but depends on the method of determination.

Oil Bound — The description of water paint; the medium of which contains a proportion of drying oil in the binder.

Oil Length — The ratio of oil to resin in a medium (*see* 'Long Oil' and 'Short Oil'). For an oleo-resinous varnish, the oil length may be expressed in terms of parts by mass of oil to one part by mass of resin. For an alkyd resin, the oil length is expressed as a percentage of oil by mass in the resin.

Oils (Fatty) — Triglyceride of fatty acid(s).

Oil Stain — *See* 'Stain'.

Oleo-Resinous — Varnishes composed of drying oils in conjunction with resins, which may be either natural and or synthetic.

Oligomer — The chain consisting of only a few monomer units and a low molecular mass product.

Opacity (Hiding Power) — Qualitatively it is the ability of a coat of paint (or a paint system) to obliterate the colour of a surface to which it is applied, and quantitatively it is the extent to which the paint obliterates a colour of an underlying surface of a different colour when a film of it is applied by some standard method. It is of following types:

- a) *Wet opacity* — It is the maximum number of square metres of a smooth, non-absorbent surface which can be obscured by 10 liters of material viewed immediately after application.
- b) *Dry opacity* — It is the maximum number of square metres of a smooth, non-absorbent surface which can be obscured by 10 liters of material, viewed after the film is hard dry.

Orange Peel — The pock-marked appearance, in particular of a sprayed film, resembling the skin of an orange, resulting due to the failure of the film to flow out to a level surface.

Organosol — A dispersion of finely divided resin particles in an organic liquid which may be wholly or partly volatile. After application the coating is heated and the resin particles with any non-volatile portions of the carrier are fused to a continuous film.

Over-Spray — Sprayed paint which misses the surface to be coated. Although often unavoidable, much can be done towards reducing overspray by skillful manipulation of the spray gun trigger.

P

Paint — A pigmented material, which when applied in a liquid form to, a surface, forms after a time a dry adherent film. The following main types are recognized:

- a) *Oil paint* — A paint that contains drying oil or oil varnish as the basic vehicle ingredient.
- b) *Water paint (emulsion paint)* — A paint that contains a water emulsion or dispersion as the vehicle.
- c) *Paste paint* — A paint in which the pigment is sufficiently concentrated to permit a substantial reduction with vehicle before use.

Paint Filler — *See* 'Filler'.

Paint Remover — A material which when applied to a dry paint, varnish or lacquer film, softens it, so that it can be easily removed, say by scraping.

Paint System — *See* 'Coat'.

Peeling — The spontaneous removal in ribbons or sheets of a paint, varnish or lacquer film from a surface due to loss of adhesion

Petrifying Liquid — Usually a dilute emulsion of drying oil and/or resin in water, used as a sealing coat before applying an oil bound water paint to a porous surface. It may also be used in place of water to thin the first coat of water paint before application to a porous surface.

Phenolic Resin — A generic term to denote a class of synthetic resins obtained by the reaction of phenol, alkyl and aryl phenols, with aldehydes, namely, formaldehyde, acetaldehyde, etc.

Phosphating — The treatment of steel or certain other metal surfaces by chemical solutions containing metal phosphates and phosphoric acid as the main ingredients, to form an adherent corrosion inhibiting lacquer which serves as a good base for subsequent paint coats.

Phosphorescent Paint — *See* 'Luminous Paint'.

Pickling — A treatment for the removal of rust and mill scale from steel by immersion in an acid solution containing an inhibitor. Pickling shall be followed by thorough washing and drying before painting.

Pigment — Material, usually a fine powder, which is insoluble in paint media and which is used because of its optical, protective and decorative properties. In modern uses the term is often used to include extenders, as well as the white or coloured pigments.

Pigment-Binder Ratio — The ratio of total pigment to binder in a paint, preferably expressed as a ratio by volume.

Pigment Volume Concentration — Ratio of the volume of the pigments in a product to the corresponding total volume of the non-volatile matter.

Pin-Holding — The formation of minute holes in film during application and drying. Sometimes due to air or gas bubbles which in wet film burst, forming small craters that fail to flow out before the film has set (*see also* ‘Blistering’ and ‘Bubbling’).

Pink Primer — Traditionally a wood primer, pink in colour.

Pitting — The formation of holes or pits in a metal surface, by localized corrosion.

Plaster Primer — Primers, with a degree of resistance to alkali, which are used for priming plasters and cements of varying degrees of alkalinity. The primer shall not only resist saponification, but insulate succeeding coats of paint from attack.

Plastic Emulsion Paint — *See* ‘Paint’.

Plasticizer — A non-volatile substance, incorporated with the film forming materials in the paint, varnish or lacquer, to improve the flexibility of a dried film.

Plastisol — A suspension of finely divided resin in plasticizer.

Pock-Marking — A film defect in the shape of irregular and unsightly depressions formed during the drying of the paint or varnish film.

Polyamide Resin — A product of reaction generally between a diamine and a dibasic acid. Also a polymer derived by ring chain polymerization, for example, caprolactum (*see also* Resin).

Polychromatic Finish — *See* ‘Finish’.

Polyester Resin — Polycondensation product of polybasic acid with polyol.

a) *Saturated* — Product of saturated polybasic acids with polyols.

b) *Unsaturated* — Product of unsaturated polybasic acids with polyols.

Polymer — A substance composed of molecules characterised by regular or irregular repetition (end, branch, functions and other minor irregularities being neglected) of one or more types of chemical units.

a) *Homopolymer* — Polymer in which the molecules consist of one kind of chemical unit repeated any number of times.

- b) *Copolymer* — Polymer in which the molecule consists of more than one kind of chemical units, derived from more than one monomer.

Polymerization — Polymerization refers to the process of formation of large molecules, in the form of either linear chains or three-dimensional network, from smaller molecules with or without the simultaneous formation of other products.

Polymerization, Emulsion — *See* Emulsion Polymerization.

Polymerization, Free Radical — *See* Free Radical Polymerization.

Polymerization, Solution — *See* Solution Polymerization.

Polyol — A chemical compound having two or more of hydroxyl groups bonded to carbon atoms in the molecule.

Polyurethane Resins — Synthetic resin obtained by the reaction of polyisocyanates with polyhydroxy compounds, such as polyesters, castor oil or glycols.

Popping — Eruptions in a film of paint or varnish after it has become partially set, so that craters remain in the film.

Pot Life — The period after mixing the two packs of a two-pack paint during which the paint remains usable.

Pot Life (for synthetic resin) — A maximum time for which a resin composition when prepared can be stored in usable conditions under specified conditions.

Precondensate — An intermediate stage in the process of condensation of suitable reactants which will permit of further reaction under stated conditions to achieve a practically useful resinous compound.

Pre-fabrication Primer — A quick drying material applied as a thin film to a metal surface after cleaning, for example, by a blast cleaning process to give protection during the period before and during fabrication.

Pre-fabrication primers should not interfere seriously with conventional welding operations or give off toxic fumes during such operations.

Pre-treatment — Usually restricted to mean the chemical treatment of metal surfaces, before painting, with various surface-active preparations and may comprise cleaning/removal of grease, contaminants, dust, rust, etc., followed by the formation of a rust inhibiting layer of phosphate or chromate.

Pre-treatment Primer — *See* 'Etch Primer'.

Primer — The first complete coat of paint of painting system applied to a surface. The type of primer varies with the surface, its conditions and painting system to be used.

Primer Surfacer — *See* 'Surfacer'.

Print Resistance — The ability of a coating of paint, varnish or lacquer to resist taking on the imprint of another surface placed on it, under normal conditions of practical use or under defined conditions of experiment.

Pulling — The resistance to the movement of brush, during the application of a material, due to the viscous nature of the medium. Such a material is sometimes referred to as being sticky under the brush (*see also* ‘Drag’).

Pulling Over — A process of levelling a cellulose lacquer film, usually on wood, lay rubbing it with soft cloth pad soaked in a mixture or organic solvent, which is only a partial solvent for the lacquer film.

Pulling-Up — The action of a coat of paint or varnish which softens a previous coat to such an extent as to make brush application difficult, and in extreme cases, causes an objectionable intermingling of the two coats.

Putty — A highly pigmented stiff plastic material which is applied by a knife and which normally hardens on air-drying chemical curing or stoving.

R

Radiant Heat Drying — *See* ‘Infra-Red Drying’.

Rain Spotting — The particular case of water spotting caused by rain (*see* ‘Water Spotting’).

Raised Grain

- a) A condition of wood surface where fibres from the wood structure become unduly prominent due to wetting with water or materials containing water.
- b) Prominence of the harder portions of the grain of wood when the softer portions have suffered shrinkage.

Reactive Diluent — A compound, usually a monoepoxide, when added to liquid epoxy resins reduces the initial viscosity of the resin system without impairing the desirable properties of the cured resin.

Reducing Power — The strength of the white pigment, that is, the degree to which it is able to produce a very pale tint when mixed with a defined proportion of coloured pigment. The paler the tint produced, the greater the reducing power.

Reflectance Value — *See* ‘Colour’.

Registered /approved sample - Sample supplied in advance by a prospective supplier and tested by the approved testing authorities to establish its conformity to all the requirements of specified product standard. A complete record of its performance shall be kept in respect of all tests for a specified period as agreed by supplier, manufacturer and purchaser.

Residual Tack — Tackiness remains in the film which although set, does not reach the really tack-free stage.

Resin — Non-crystalline organic substance of varying molecular mass convertible or non-convertible type, having a softening range, possessing distinct clarity, normally soluble in organic solvents and having a characteristic to form, a continuous film in a suitable form.

Resin Natural — It is an amorphous thermoplastic solid organic substance obtained from the secretion of certain plants and insects or dug up from the ground (fossil resin), where it has lain since the trees from which it was formed decayed in prehistoric times. These resins, as distinct from gums, are not soluble in water, but may be dissolved in organic solvents or vegetable oils, if necessary, after heat treatment to form varnishes.

Resin, Synthetic — A group of synthetic substances of relatively high molecular mass, produced by polycondensation, polyaddition, polymerization reaction from one or more of simpler/lower molecular mass materials. These are designed to achieve superior performance compared to natural resin. Chemically modified natural resin/polymers, such as cellulose acetate or nitrate, hardened casein, ester gum and chlorinated rubber are not considered to be synthetic resins. Synthetic resins are of the following type:

- a) *Acrylic resin* — Synthetic resin resulting from the polymerization of derivatives of acrylic acid or methacrylic acid, for example, esters, nitriles, amides, etc.
- b) *Alkyd resin* — Synthetic resin resulting from the interaction of, primarily polyhydric alcohols, such as pentaerythritol, glycerol, glycols; polybasic acids or anhydrides, such as phthalic anhydride, isophthalic acid, maleic acid/anhydride, fumaric acid, adipic acid; and fatty acids or vegetable oils with or without natural/synthetic monobasic acids and other modifying chemicals or resins, such as rosin, ester gum, acrylates/methacrylates, styrene, vinyl, toluene, isocyanates, silicones, phenolics. The alkyd resins may be dissolved/diluted in mixtures of organic solvents, water, etc. Normally alkyd resins are classified as:
 - i. *Long oil alkyd* — containing more than 60 percent oil as a modifying agent, and
 - ii. *Short oil alkyd* — containing less than 40 percent oil as modifying agent.
- c) *Amino resin* — Synthetic resin made by the interaction of amide or amino compounds, such as urea, thiourea, melamine or allied chemicals with aldehyde in presence of solvents. Certain alcoholic solvents may also take part in the reaction.
- d) *Epoxy resin* — A synthetic resin containing epoxide groups and in which a final polymer is formed as a result of reaction taking place substantially at the epoxide groups. A common type is the resin made from epichlorohydrin and bisphenol A.
- e) *Hydrocarbon resin* — Resin derived from unsaturated hydrocarbons. Resins derived from petroleum sources are important sub-class of this group and known as petroleum resins.
- f) *Ketonic resin* - A product of reaction between a ketone and formaldehyde and/or other aldehydes.

- g) *Maleic resin* — Synthetic resin manufactured by reacting maleic anhydride, maleic acid or fumaric acid with polyhydric alcohols and rosin or ester gum and/or terpenes and/or unsaturated hydrocarbons and may be modified with other chemicals.
- h) *Melamine resin* — An amino resin made by condensation reaction between melamine and aldehydes in presence of solvents.
- j) *Phenolic resin* — Synthetic resin, normally of thermosetting type, produced by the reaction of a phenol with formaldehyde or a compound which is capable of providing methylene bridges. Phenol, cresol, xylenol and resorcinol are commonly used. The term includes both the simple condensation products (pure or 100 percent phenolics), and those modified with resin or rosin esters.
- k) *Polyamide resin* — A product of reaction between polyamine and polybasic acid. Also, a polymer derived from cyclic compound like caprolactam.
- m) *Polyester resin* — It is of following types:
 - i. *Unsaturated* — An unsaturated polyester made by condensation between polyhydric alcohol and a polybasic acid or anhydride which must include an unsaturated acid or anhydride and may also contain some monobasic acid. In practice, such polyester is dissolved in an unsaturated monomer such as a styrene and immediately before use an activator and an accelerator are added. The composition reacts to form a hard tough film, no loss of solvent by evaporation being necessary.
 - ii. *Saturated* — A condensation product of saturated polybasic acids or anhydrides with polyols and may also contain monobasic acid.
- n) *Polyurethane resin* — A synthetic resin produced by the reaction of a polyhydroxy reactant, normally of polyester or polyether type, with polyisocyanate.
- p) *Silicon resin* — These are organo siloxane polymers containing siliconoxygen linkages in the polymer chain and are characterised by excellent heat resistance.
- q) *Styrenated resin* — A resin modified with styrene.
- r) *Terpene resin* — A resin derived by polymerization of terpenes.
- s) *Urea formaldehyde resin* — An amino resin made by reaction between urea and aldehyde in presence of solvents. Certain alcoholic solvents may also take part in the reaction.
- t) *Vinyl resin* — A synthetic resin of thermoplastic type obtained by the polymerization of monomers containing the vinyl groups. In strict chemical terminology the description covers not only the polymerized vinyl ester, for example, polyvinyl acetate, but also polystyrene and polyacrylates. Vinyl resins may be applied as solutions in organic solvents, for example, as plastisols, as organosols, or in aqueous dispersion, or latex form.

Retarder — Generally a component added to a composition to slow down a chemical or physical change. A slowly evaporating solvent may be added to a paint, varnish or lacquer to delay the set

of the film after application and so improves the application properties or to give a better film, for example, one with improved flow.

Rivelling — *See* ‘Wrinkling’.

Roller Coating — It is:

- a) a process by which a film is applied mechanically to sheet material; the sheet is passed between horizontal rollers, one of which is kept coated with a film of liquid varnish, enamel or lacquer.
- b) the application of a paint by means of a hand operated roller, wall surfaces, etc.

Ropey Finish — A finish in which the brush marks have not flowed out, this being the normal appearance of a paint or varnish having poor levelling properties. A similar appearance may also be produced in a paint, which normally has good levelling properties, by continuing to brush the paint after the film has begun to set.

Rosin — The solid resin-like material obtained as the residue from the preparation of turpentine from the crude oleo-resin of pine trees. Also known as ‘Colophony’ or ‘Gum Rosin’.

Rubbing (Rubbing Down) — The process of levelling a dried paint film by rubbing it, either wet or dry, with such abrasives as cuttle fish bone, pumice, abrasive paper or rubbing compound.

Rubbing (adj) — The description of a coating material, which after application and drying is suitable for rubbing or flattening down, for example, rubbing varnish.

Rumbling — A process by which paint is applied to small articles, such as hairpins, children’s 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 on the wire trays and the coating air-dried or stoved. It is also called as ‘Tumbling’ or ‘Barrelling’.

Runs — Narrow downward movements of a paint or varnish film; may be caused by the collection of excess quantities of paint at irregularities in the surface, for example, cracks, holes, etc., the excess material continuing to flow after the surrounding surface has set. Small characteristically shaped runs are known as ‘Tears’.

Rust — The coating of red or yellow oxides of iron produced when iron and steel is exposed to a humid atmosphere. Not to be confused with ‘White Rust’ which is a term loosely used to describe corrosion products of certain non-ferrous metals.

S

Sagging — A downward movement of a paint film between the time of application and setting, resulting in an uneven coating having a thick lower edge. The resulting sag is usually restricted to a local area of a vertical surface and may have the characteristic appearance of a draped curtain, hence the synonymous term ‘Curtaining’.

Sags — *See* ‘Sagging’.

Sand Blasting — The removal of rust and scale from steel and certain metal surfaces by a blast of sand-laden air.

Sanding — An abrasive process used to level a coated surface, prior to application of a further coat (*see* ‘Rubbing’ or ‘Rubbing Down’).

Sanding Sealer — A specially hard first coat which has the property of sealing or filling, but not obscuring, the grain of wood. The surface is then suitable for sanding.

Saponification — In general, the formation of a soap by the reaction between a fatty acid/ester and an alkali. In painting practice saponification refers to the decomposition of the medium of the paint or varnish film by alkali and moisture in a substrate, for example, concrete or rendering based on cement, sand and lime. Saponified paint or varnish films may become sticky and discoloured. In very severe cases the film may be completely liquified by saponification.

Saturated Fatty Acids — Principal component of non-drying oils characterized by carbon-to-carbon linkage without any ethylenic or methalinic group interspersed.

Saturated Polyester — *See* Polyester.

Scaling — *See* ‘Flaking’

Screen Painting — *See* ‘Silk Screen Painting’.

Scuffing — Very light rubbing down of a paint surface prior to varnishing, graining or other finishing processes either with very fine (or worn) sand paper, cuttle fish bone or powder pumice on a felt rubbing block.

Stumble Glaze — A transparent preparation used in the stumbling process.

Stumble Stain — A semi-transparent stain for application over an opaque groundwork of paint. Brush, stipple or sponge may be used for manipulating the stumble, or it may be combed, so that various effects, namely, wood graining and other more formal patterns are possible. In this, the non-flowing property of the stumble greatly assists.

Scumbling — A technique of painting, in which portions of the last colour coat are removed or textured whilst- still wet, in order to expose part of colour underneath, used to achieve a variety of broken colour effects.

Sealer — A clear or pigmented liquid used on absorbent surfaces prior to painting, which when dried, reduces the absorptive capacity of surface, often known as suction. Also used where necessary to prevent any soluble or diffusible matter from ‘bleeding’ into and disfiguring new paint, or to protect the existing paint system from the softening action of solvents in a top coat (*see also* ‘Sanding Sealer’).

Sealing Coat — *See* ‘Sealer’.

Seediness — A defect in a varnish, lacquer or paint caused by small particles originating from reaction between the vehicle components or between the vehicle and the pigment. On application coated surface may present bitty, specky or sandy appearance.

Segmar — The repeating or middle unit of the polymer.

Self-Etch Primer — *See* ‘Etch Primer’.

Semi-Drying — Generally attributed to oils having iodine value or number in the range of 125 to 150.

Semi-gloss — *See* ‘Gloss’.

Set — A condition of paint or varnish film when it has dried to a point where for all practical purposes it ceases to flow.

Settling — The deposition of solid constituents, for example, pigment and extenders, in a paint on standing in container (*see* ‘Caking’).

Shade — The term used for a colour especially with regards to its depth or as distinguished from one nearly like it.

Sheariness — A variation in gloss or sheen on a paint surface which should have been uniform in this respect.

Sheen — The gloss seen at grazing angles on a surface, which when viewed normally appears matt.

Shelf Life — The time that a paint, varnishes or its related products will keep in good condition when stored in the original sealed containers, under normal storage conditions on shelves of a shop or stock room.

Shellac — *See* ‘Resin, Natural’.

Soap Priming — The act of priming new wood or iron work on the maker’s premises, prior to the delivery in the primed condition.

Short Oil — A low ratio of oil to polyester part in resin in a varnish medium (*see also* ‘Oil Length’).

Shot Blasting — The removal of rust and scale from steel and certain other metal surfaces by a blast of air laden with fine (metal particles, normally small steel shots (*see* ‘Blast Cleaning’).

Silk Screen Painting — A method of making repeats of a motif or pattern, the process is controlled by a framed screen of fine mesh (of silk or similar material) carrying a transferred masking film into which a design has been previously cut, so that the mesh is exposed only in selected areas. The pattern is reproduced by drawing a suitable paint across the screen with a rubber squeezer, which forces the colour through the parts where the mesh is exposed. By careful registering, a number of screens can be used in succession over the same design for multiple-colour work.

Silking — The parallel microscopic irregularities left on (or in) the dried surface of a glossy paint or varnish film, producing the appearance of silk. In dipping or flow coating, the irregularities appear in the direction of the flow and in brushing, in the direction in which the film was finally brushed.

Sinkage — The blotching effect caused by ‘sinking in’ or the similar effect caused by softening an underlying undercoat.

Sinking In — Loss of gloss due to absorption of the medium of a finishing coat by the undercoat.

Size — This term originally referred to an aqueous solution of animal glue, but has subsequently been extended to cover water soluble cellulose derivatives and starches.

Sizing — It is the process of:

- a) applying size to various building and decorating materials to regulate porosity or to provide a buffer coat, for example, to prevent oil in varnish striking into a sanitary wallpaper.
- b) applying a mordant in gilding processes, for example, gold size or isinglass.
- c) applying a thin coat of varnish to tin plate or aluminium sheet before enamelling, in the tin printing industry.

Skinning — The formation of a surface skin on paints or varnishes in the container.

Sleepy — The description of a recently applied glossy coating which has lost its initial gloss other than by bloom and become dull or lacking in lustre.

Slushing — The process by which a coating is liberally applied to surfaces, which require protection but which are more or less hidden from view and not readily accessible for painting by ordinary methods. The paint or similar material is swilled on and the excess drained off.

Smudge — A mixture of residues of paints to which thinners are sometimes added. It is of unknown and variable quality, and has no place in normal paint system.

Solids — The non-volatile matter in a coating composition which, after drying, are left behind and constitute the dry film.

Softening Point — When the primary thermodynamic properties of a polymer are plotted against temperature, a change in the thermodynamic properties, such as volume or heat content, becomes apparent at some temperature. This is a discontinuity of the first derivative of the property. Hence this is considered a second order phase transition. This transition occurs at a characteristic temperature for all high polymeric materials and known as second order phase transition temperature or generally softening point.

Solid Contents — The residue left over after evaporation of the volatile matter without affecting any appreciable change in the physico-chemical characteristics of the resin, under stated conditions.

Solution Polymerization — Polymerization in presence of a solvent where the polymer is in solution.

Solvent — Liquids, usually volatile, which are used in the manufacture of paint, to dissolve or disperse the film-forming constituents, and which evaporate during drying, and therefore do not become a part of the dried film. They are used to control the consistency and character of the finish and to regulate application properties.

Solvent, Tolerance — The capacity of a resin in solution in a stated solvent to undergo dilution by a solvent without causing any precipitation or haziness or increase in viscosity. Solvent tolerance is generally stated as parts by volume or mass of the resin that can remain in solution in a stated solvent without undergoing any of the above stated changes.

Solventless Paint or Varnish — A term used strictly to describe an organic coating material containing no thinner, but which is extended in practice to cover a material containing a small proportion of thinner.

Space-Network High Polymer — When there are two or more reactive functional groups in the monomer or mer building block, the growth of the polymer in three dimensions is possible during the course of the polymerization. Such a process gives rise to a space-network high polymer. A good illustration is the reaction between glycerol and phthalic anhydride, which yields a three-dimensional network polymer. Other examples are thermosetting resin, such as the phenol formaldehyde and the urea-formaldehyde (*see* also Polymer).

Spinning — A method of coating, which distributes the paint over a flat surface by centrifugal action.

Spirit — Generally refers to commercial ethyl alcohol, normally sold as industrial methylated spirit.

Spirit Stain — *See* ‘Stain’.

Spirit Varnish — A lacquer based on a solution of resin or resins in industrial methylated spirit. The more correct term would be ‘spirit lacquer’.

Spiriting Off — The final operation in a French polishing process by which the last trace of oil are removed by drawing a rag, damped with methylated spirit, rapidly and repeatedly over the surface.

Split Spray — An unsymmetrical spray pattern, resulting in the application of bands of paint of uneven thickness, caused either by a defective spray or nozzle, or by partial blockage of the nozzle or air passages of a spray gun.

Spot Finishing — *See* ‘Spotting In’.

Spotting — The development of small areas on a painted surface, which differ in colour or gloss from the major portion of the work.

Spotting In — Rubbing down and refinishing small defective patches in the coating.

Spray Mottle — *See* ‘Orange Peel’.

Spraying — A method of application in which the coating material is broken up into a fine mist, which is directed on to the surface to be coated. This atomization process is generally but not necessarily, effected by a compressed air jet (*see also* ‘Hot Spraying’). Spraying can also be carried out by electrostatic ‘Spraying’ or ‘Airless Spraying’.

Stabilizer — Substance added, usually in small proportions, to retard undesirable chemical or physical changes, for example, small quantities of stabilizers are added to retard the dechlorination of chlorinated rubber or the coagulation of an emulsion.

Stain — A solution or suspension of colouring matter in a vehicle designed to colour a surface by penetration without hiding it. True stains are classified as ‘Water Stains’, ‘oil Stains’ and ‘Spirit Stains’ according to the nature of the vehicle. The so called varnish stains are varnishes coloured with transparent material. These have not the same power of penetration as the true stains, and leave a colour coating on the surface.

Stainer — Coloured pigments ground in media compatible with paint vehicle, added in relatively small proportions to already prepared paint to modify their colour. With the introduction of latex paints of many types, stainers have been developed which can be used both with organic solvent thinned paints and with water thinned paints. Such dual purpose tinters are known as ‘Universal Stainers’ or ‘Universal ‘Tinters’.

Staining Power — The degree to which a coloured pigment imparts colour to a white pigment under defined conditions of tests. Also called ‘Tinting Strength’.

The detailed procedure for determining staining power normally laid down in specifications for pigments need to be carefully adhered to if consistent results are to be obtained. The corresponding property of white pigment is ‘Reducing Power’.

Stand Oil — Drying oil or semi-drying oil polymerized or bodied by heating under vacuum/inert atmosphere, in contrast to ‘Blown oil’. The unqualified term normally refers to linseed stand oil, but may be applied to other oils. Stand oils dry to films which are generally tough and more water resistant than those from unbodied oils. The degree of change in properties depends on the extent of polymerization as indicated by viscosity.

Stereoregular High Polymer (Atactic Polymer) — When the R-groups or substituted groups are positioned on all sides of the main backbone of a long chain molecule in a completely random manner, an atactic polymer results. Such molecules can not pack tightly together because of steric hindrance and result in soft, non-crystalline and rather gummy products (*see also* Polymer).

Stipple —

- a) To even out a coat of paint and remove brush marks and other imperfections, immediately after application by systematically dabbing the surface with soft stippling brush.
- b) To produce a textured effect, either by applying spots of a different colour or by distributing the surface of paint or rubber stippler.
- c) To produce a textured effect by applying spots of same or different colour on a painted surface with spray gun by applying special technique.

Stopper — A stiff paste used for filling holes and cracks and similar defects in surfaces, normally applied after priming (*see* ‘Hard Stopping’ and ‘Filler’).

Stoving (Backing) — A process of drying and hardening a paint or varnish coating by heating usually at temperature above 80°C (*see* ‘Force-Drying’). The principal stoving treatment consists of:

- a) *Convection oven stoving* — A stoving treatment in which heat is transferred to the paint surface largely, although not entirely, by convection.
- b) *Radiant heat stoving* — A stoving treatment in which heat is transferred to the paint surface mainly by radiation from a hot surface, such as electric lamps or gas heated panels. This is often known as infra-red drying or stoving.

Stripping — The removal of old paint, distemper or other coatings with or without the aid of solvents, blow lamp. etc. It is usually accomplished by the aid of stripping knives or scrapers of various types, to suit the particular job.

Styrenated Alkyd — An oil-modified alkyd resin in which styrene has been already linked and does not exist as a monomer in the form in which the styrenated alkyd is delivered.

Suction — *See* ‘Drying’.

Sulphonamide Resin — These are condensation products of formaldehyde and aryl sulphonamides (*see* Resin).

Surfacer — A pigmented composition, essentially a thin filler and/or sealer, designed particularly for smoothening or facing up slightly uneven surfaces, in preparation for the subsequent application of a paint system. A surfacer is normally sanded to a smooth surface after it has dried.

Suspending Agent — *See* ‘Anti-settling Agent’.

Seating — It is the:

- a) Exudation of oily matter from film of paint, varnish or lacquer after the film has apparently dried.
- b) Development of gloss in a dry film of paint or varnish, after it has been flatted down.
- c) Often incorrectly used to describe condition of moisture from humid atmospheres on relatively cold surfaces, for example, sweating of walls.

Swelling — *See* ‘Water Swelling’.

Syndiotactic (or Syndyotactic) Polymer — When the R-groups or substituted groups occupy position that alternate regularly and in sequence above and below the main backbone of a long chain molecule, a syndiotactic polymer results.

Synthetic Paint — Paints based on synthetic resin.

Synthetic Resin — *See* ‘Resin, Synthetic’

T

Tack — Slight stickiness of the surface of the film of paint, varnish or lacquer, apparent when the film is pressed with the finger.

Tack Free — *See* ‘Drying’.

Tack Rag — A fabric impregnated with a tacky substance, such as a delayed drying varnish, which is used to remove dust from a surface after rubbing down and prior to further painting. Tack rag should be stored in an air-tight container to conserve its tackiness.

Tacky — Having a tack.

Tears — *See* ‘Runs’.

Terpene Resins — Resins derived from terpene, based on α or β pinenes, etc (*see also* Resin).

Textured Paint — A paint which on normal application gives a textured finish (*see* ‘Finish’).

Thermoplastic — Having the property of being softened by heating and hence hardened by cooling; this process is repeatable.

Thermoplastic Paint or Varnish — An organic coating material, the dried film of which is thermoplastic.

Thermosetting — Having a property of becoming a thermoset on the application of sufficient heat curing.

Thermosetting Paint or Varnish — An organic coating material, the dried film of which is a thermoset.

Thickening — An increase in consistency of a paint or varnish usually due to loss of thinner or chemical changes in the composition (*see* ‘Fattening’ and ‘Feeding’).

Thinner — Volatile liquids added to paints and varnishes to facilitate application and to aid penetration by lowering the viscosity. They should be miscible with the paint or varnish at ordinary temperatures and should not cause precipitation of the non-volatile portion either in the container or in the film during drying. For some purposes, thinner containing a small proportion of non-volatile material may be used.

Thinning Ratio — The recommended proportion of thinners to be added to a paint or varnish to render it suitable for a particular method of application.

Thixotropic Paint — A paint which while free-flowing and easy to manipulate under a brush, sets to a gel within a short time, when it is allowed to remain at rest. Because of these qualities, a thixotropic paint is less likely to drip from a brush than other types, and can be applied in rather thicker films without running or sagging.

Thixotropic — A full bodied material which undergoes a reduction in body when shaken, stirred or otherwise mechanically disturbed, and which readily recovers the original full-bodied condition on standing (*see* ‘False Body’).

Thixotrophy — Reduction in consistency of the material on the application of shear stress and the recovery of the original consistency when the stress is removed.

Tints — The colour of a large proportion of white paint mixed with a small proportion of coloured paint or stainer.

Tinters — *See* ‘Stainers’.

Tinting — The final adjustment of colour of a paint to the exact colour required.

Tinting Strength — *See* 'Staining Power'.

Tone — The use of this term is to be deprecated since it is variously employed in different senses. According to the context 'hue' or 'under-tone' are the preferred terms.

Toner — A salt of an organic dyestuff without inorganic extender. The term is also loosely applied to pure pigment dyestuff, but this use of the term is deprecated.

Total Solids — *See* 'Solids'.

Touch Dry — *See* 'Drying'.

Tumbling — *See* also 'Rumbling'. A process used in some paint storehouses whereby containers are repeatedly up-ended to redisperse pigments, which may have settled or called during storage of paint.

Turpentine — A colourless volatile liquid, distilled from the products of certain pine trees and consists of complex mixture of terpene hydro-carbons.

Turpentine was formerly extensively used in paints and varnishes, but has now been largely replaced by white spirit.

Two-Pack — A paint or lacquer, the materials for which are supplied in two parts, which must be mixed in the correct proportions before use. The mixture will then remain in a usable condition for a limited time only.

The two parts of the two-pack paint are often (though not necessarily) supplied in the correct relative proportion, either in entirely separate containers of appropriate sizes or in a single container divided into two compartments, the term 'Dual-Pack' is often used to describe the latter type of container.

U

Undercoat — The coat or coats applied to a surface after priming, filling, etc, or after the preparation of a previously painted surface, and before the application of finishing coat.

Undercure — A condition of the coating of film in the process of change in the physics-chemical characteristics which arises when insufficient time and/or temperature has been allowed for adequate development of film properties.

Undertone — Colour obtained when a pigment is used in very thin layers or greatly extended with white pigment. The hue of the undertone may often differ from that of the mass-tone.

Universal Stainers — *See* 'Stainer'.

Universal Tinters — *See* 'Stainer'.

Unsaturated Polyester — *See* Polyester.

Urea-Formaldehyde Resin — *See* Amino Resins.

V

Value — See 'Colour' .

Varnish — A transparent coating composition based essentially on resins and organic solvents, with or without a drying oil. Varnish may generally be of three types:

- a) *Lacquers* — Those which usually form on evaporation of solvents.
- b) *Air-drying varnishes* — Those which usually form films by oxidation, polymerization or by any other chemical reaction at room temperature.
- c) *Stoving varnishes* — Those which form films by chemical reaction on application of heat at specified time and temperature.

Varnish Stain — See 'Stain' .

Vehicle — The liquid portion of a paint in which the pigment is dispersed, it is composed of the binder and the thinner (see 'Medium').

Vinyl Resin — See 'Resin, Synthetic' .

Viscosity — The internal resistance to flow, possessed by a liquid. It is determined by measuring the force required to shear the liquid, for example, to move one layer over another in orderly flow without turbulence at defined rate. Most paint solvents, and many oils and varnishes are what are termed Newtonian liquids, that is, when they are tested in suitable viscometers at a fixed temperature, their rate of flow (shear) is proportional to the shearing force. The viscosity of these liquids at a fixed temperature is thus a constant. For most paints and other pigmented materials, the rate of flow is not proportional to the shearing force, but may vary with the time and rate of shearing. For these materials only an apparent viscosity, a figure which refers only to the behaviour of the material under the particular circumstances and precise conditions of measurement, can be determined.

NOTE — Viscosities of Newtonian liquid are usually determined in poises. In some types of viscometers (for example, the Ostwald viscometer, where the liquid fall under its own mass) the rate of flow is determined by the ratio of viscosity to density, termed kinematic viscosity. The results of this type of measurement are often reported in stokes, the unit of kinematic viscosity. The relation between the two units, namely, stokes and poises is:

$$\text{Kinematic viscosity (stokes)} = \frac{\text{Dynamic Viscosity (poises)}}{\text{Density (g/ml)}}$$

Vitreous Enamel — See 'Enamel' .

Volatiles — The liquid portion of the composition which is capable of evaporation.

Volatile Matter — The portion of a surface coating composition which evaporates off under specified conditions leaving behind the non-volatile component.

Volatile organic compound — Any organic compound which participates in atmospheric photochemical reactions and has an initial boiling point lower or equal to 280°C measured at standard condition of pressure.

Volume solids - Percentage residue by volume obtained by evaporation under specified conditions.

W

Wash Primer — *See* 'Etching Primer'.

Washability — The ease with which the dirt can be removed from a paint surface by washing. In case of water-based paints, it refers also to the ability of the coat to withstand washing without removal or substantial damage.

Water Spotting — The spotty appearance of a paint film, which is caused by drops of water on the surface and which remains after the water has evaporated, the effect may or may not be permanent. Water spots usually appear lighter in colour than the surrounding paint.

Water Stain — *See* 'Stain'.

Water Swelling — A continuous absorption of moisture by a solid mass accompanied by an increase of volume, is called swelling. This phenomenon may be regarded as an intermediate stage between solubility and insolubility.

Water Thinnable Paint — Any paint which is thinnable with water for its application.

Weathering — The behaviour of paint films when exposed to sun, rain, frost and atmospheric pollution (*see also* 'Accelerated Weathering').

Webbing — The development of wrinkles, often in well-defined pattern, in the surface of a paint or varnish during drying. This condition results from the irreversible swelling of partially dried surface skin (*see also* 'Frosting') and may be aggregated by impure gas fumes during stoving in a gas oven, in which case it is termed as 'Gas Checking' (webbing is generally regarded as a paint defect, but is made use of in some paint finishes to give textured coating, which obscures minor faults and indentations in the surface to be coated).

Wet Edge — An edge which remains workable. When painting large surfaces, it is generally necessary to join up to the edge of a paint film which has been left for an appreciable time. When this can be done by blending, the edge with free working paint without any lap showing the film is said to present a wet edge.

Wet Edge Time — The time taken to reach the stage at which a paint film no longer has a 'Wet Edge'.

Wet-on-Wet — A technique of painting, whereby further coats are applied before the previous coats have dried, and the composite film then dries as a whole. The process demands specially formulated paints.

Wet Scrub Resistance — Ability of a paint film to withstand scrubbing, when in contact with water or detergent solution or soap solution.

Whirling — Centrifugal removal of excess paint from articles which have been coated by dipping.

White Rust — *See* 'Rust'.

White Spirit — The most commonly used thinner for paints and varnishes. Internationally, however, the preferred term is ‘mineral solvents for paints’ and the description given is that the material shall consist of mainly aliphatic hydrocarbons with certain boiling range.

Whitening in the Grain — A fault which sometimes develops in varnished or polished open grained woods, filled or unfilled. It is manifested as a streaky white appearance.

Wrinkling — The development of wrinkles in a film during drying, usually due to the initial formation of surface skin. Also known as ‘Rivelling’ (*see also* ‘Crinkling’ and ‘Finish’).

Y

Yellowing — The development of yellow colour on ageing; most noticeable in dried films of white paints or clear varnishes.

Z

Zinc Dust — Finely divided zinc metal used as a pigment in protective paints.

Zinc Rich Primer — An anticorrosive 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, to give cathodic protection.