GLOSSARY OF COATING TERMS

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Kayalar

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Publisher:
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PREFACE

The "Glossary of Coating Terms" has been prepared to cover Turkish and English terms frequently used in the paint and organic coatings sector, along with their definitions in both languages. The Glossary has been created by the studies initiated by Mustafa Tunçgenç in 2005 and carried out more intensively between 2010 and 2017. The first edition of the Glossary was published in 2018 by The Association of Paint Industry (BOSAD).

Within the framework of a consultancy relationship established in May 2024 between the firm EVA Consultancy in Training and Research, and Kayalar Kimya, a leading manufacturer of paints and coatings, an updated and enhanced edition of the "Glossary of Coating Terms" was decided to be published by Kayalar Kimya.

The present copy of the "Glossary of Coating Terms" has been prepared as a bilingual resource in Turkish and English for the use of professionals in the paint and coatings sector. Kayalar Kimya envisions translating the Glossary into the languages spoken in neighbour countries of Türkiye and in the important export markets of Turkish paint industry in near future.

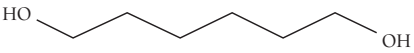
The Glossary has been prepared with the aim of addressing paint professionals working in companies operating as raw material suppliers, equipment providers, paint manufacturers, distributors, retailers, and users within the paint industry. We hope "Glossary of Coating Terms" will be a useful tool for the stakeholders of the paint and coatings sector.

Mustafa Tunçgenç

eva
Consultancy

İstanbul, March 2025

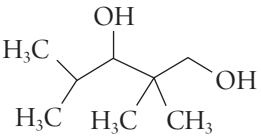
1,6-Hexanediol
A polyol used in limited amounts during the production of polyester resins to give the resin a flexible structure.
Chemical formula: $(CH_2CH_2CH_2OH)_2$



2-(2-ethoxy) Ethoxy ethanol
See: Ethyl diglycol

2,2,4-Trimethyl 1,3-pentanediol (TMPD)
An asymmetric diol used in the synthesis of low molecular weight polyester resins included in high solids (low VOC) paint formulations. Chemical name: 2,2,4-trimethyl-1,3-pentanediol.
Chemical formula:

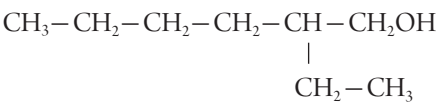
$(CH_3)_2CHCH(OH)C(CH_3)_2CH_2OH$



Melting range: 50-53°C; Boiling point 232°C

2-Ethyl hexanol
A solvent included in organic coating compositions, typically in amounts below 10%, when a slowly evaporating polar tail solvent is required. Also known as isooctanol and isooctyl alcohol.
Chemical formula:

$CH_3CH_2CH_2CH_2CH(CH_2CH_3)CH_2OH$



Boiling point: 184°C; evaporation number relative to ether: ~600; specific gravity: 0,833; refractive index: 1,4328; flash point: 74°C

2-Hydroxy ethyl methacrylate (HEMA)
See: Hydroxy ethyl methacrylate (HEMA)

A.S.T.M.
Abbreviation for American Society for Testing and Materials. ASTM is a highly respected organisation; its specifications, standards and recommendations regarding material properties and their test methods are widely accepted worldwide by paint industry as well as many other industries.

Abrasion
Measurable loss in the thickness of an organic coating film due to succesive mechanical damage such as scratching and impact.

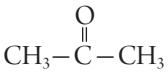
Abrasion resistance
A measure of resistance of organic coating film to wear.

ABS
A thermoplastic copolymer of acrylonitrile-butadiene-styrene, that softens with heat and can change shape.

Absorption
The complete incorporation of an external substance or energy by a material (e.g., the absorption of a binder by a wooden substrate; the absorption of sunlight by a black object).

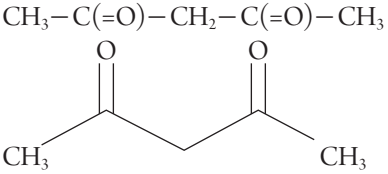
Accelerated tests
Tests that aim to accelerate the destructive effects of external factors compared to those under normal conditions by increasing the severity of those factors. (e.g., accelerated settling tendency test or accelerated corrosion test and so on).

Acetone
Strong solvent for cellulose-based resins, polyvinyl acetate, short oil alkyd resins and natural resins.
Chemical name: Propane-2-on, dimethylketone
Chemical formula: $(CH_3)_2CO$



Boiling point: 56,2°C; evaporation number relative to ether: 2,1; specific gravity: 0,791; refractive index: 1,3587; flash point: <-20°C

Acetyl acetone
A ketone solvent with two ketone functionalities.
Chemical name: 2,4-pentanedion
Chemical formula:



Boiling point: 140°C, evaporation number relative to ether: 20, specific gravity: 0,975, refractive index:1,452, flash point: 34°C.

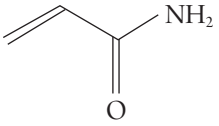
Acid catalysts
Catalysts that are most widely used to promote the polimerization reaction between amino-formaldehyde resins and OH functional resins like alkyds, polyesters and thermoset acrylic. Weak organic acids of very low water solubility are prefered in order to prevent weakening of water resistance of the cured dry film.

Acid cleaning
Removal of oils and oxide layers on a surface using acid solutions, either by saponification of oils to obtain water soluble soaps or by formation of water-soluble salts from oxides. Unlike other acids, chromic and phosphoric acids are particularly prefered for surface cleaning because they form insoluble metal chromates or metal phosphates strongly adhering to the metal and behave as electrochemically inactive layers.

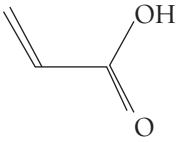
Acid resistance
Resistance of coating films to the harmful effects of acids.

Acid value
A measure of the amount of acid groups present in a chemical. In coating industry, acid value of binders is important. Acid value is defined as the grams of potassium hydroxide (KOH) required to neutralise the acid groups present in 1 gram of solid resin (e.g. 30 mg KOH/g solid resin).

Acrylamide
An acrylic monomer used in synthesis of acrylic resins with amide functional groups. Polyacrylamide polymers can be synthesized with carboxylic acid functionality, allowing cross-linking with epoxy resins. Additionally, self cross-linking acrylamide resins can be synthesized by copolymerizing acrylamide with hydroxyl functional monomers.
Chemical formula: C_3H_5NO



Acrylic acid
The most widely used acidic monomer in acrylic polymer synthesis.
Chemical name: Propenoic acid, vinyl formic acid
Chemical formula: $C_3H_4O_2$



Melting point: 13°C; Boiling point: 142°C.

Acrylic resins
Resins formed through addition polymerization of acrylic and metacrylic acids and their esters over their ethylene double bonds with the help of free radicals. If acrylic acid esters and metacrylic acid esters have functional groups, the resulting is a thermoset acrylic resin, or else, the product is a thermoplastic acrylic resin. Solvent soluble, water-thinnable, water emulsified types are available.

Activation energy
Minimum amount of energy required to initiate a chemical reaction at a given temperature.

Addition polymerization
The polymerization of unsaturated reactive molecules by addition reactions initiated at its unsaturated segments by the additives called initiators. The addition polymerization process consists of four steps: Initiation, propagation, chain transfer, and termination. Addition polymerization reactions forming free radicals, organic cations or organic anions via initiators are named as free radical polymerization, cationic polymerization and anionic polymerization, respectively.

Additives
The general term for small quantities of ingredients in organic coating formulations, usually not

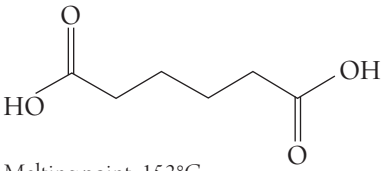
exceeding two percent, but causing significant changes in the paint's properties. Additives are used to achieve desired properties during the production, application, and storage of organic coatings.

Adhesion
The state in which two surfaces (i.e., solid-liquid or solid-another solid) are held together by attractive forces. Components that result in adhesion are: (a) mechanical component, (b) chemical component, (c) dispersion component, (d) electrostatic component and (e) diffusion component. In any adhesion event, all or some of these components play a role.

Adhesion promoter
Primer applied as a thin layer to promote interlaminar adhesion to challenging surfaces such as polyolefinic plastic surfaces like polyethylene and polypropylene etc. and some aluminum alloy surfaces. Typical examples of adhesion promoters are chlorinated polyolefin, organosilane and polyvinylbutyral based primers.

Adhesive strength
The tensile stress needed to seperate a coating film from the surface to which it is applied (That is: adhesion force per unit area).

Adipic acid
A polyacid obtained by oxidizing cyclohexane, which, when used in the synthesis of polyester resin, imparts flexibility to the resin but weakens its water resistance.
Chemical formula: $(CH_2)_4(COOH)_2$



Melting point: 153°C

Adsorption
The process by which a substance adheres to the surface of a solid or liquid in a thin molecular layer.

Aerospace coatings
Aerospace coatings include primers, topcoats and specialty coatings to paint the interior and exterior surfaces and various parts of airplanes. In aircraft, aluminum alloys, composite plastics, and titanium are commonly used as surface materials due to the need to meet high mechanical strength with the lowest possible density. Aircrafts are subject to severe UV exposure, especially during flights above the clouds. Moreover, sudden temperature change is another challenging factor. Therefore, in aerospace coatings, primers with good surface adhesion as well as topcoats with exceptional UV durability and flexibility are used.

Afterburner
Equipment that burns solvent vapors, which cover the furnace atmosphere during the baking process of coatings that harden by baking, instead of releasing them into the environment. The heat generated in afterburners is used to preheat the air to be used for combustion via heat exchangers, reducing energy consumption.

Agglomerate
A loose pigment cluster with air pockets inside, formed by pigment particles adhering to each other through point contacts at their corners. See also: Clusters of pigments and extenders

Aggregate
A pigment cluster formed when pigment particles make contact along their surfaces, requiring a high amount of energy to break down, typically achieved by grinding in a mill. See also: Clusters of pigments and extenders

Aging (film aging)
Deterioration of the properties of an organic coating film over time under defined environmental conditions. In addition to selection of appropriate paint raw materials, the addition of additives like antioxidants and light stabilizers allows an improvement in aging properties.

Agitator
A device used to homogenize liquid coating during production or before application. It consists of a motor, a shaft vertically attached to the motor, and a mixing blade attached to the shaft. Depending on the type of mixing blade, they are called propeller type, serrated type and anchor type agitators.

Air cap
Perforated housing for directing the atomizing air at the tip of a spray gun.

Air drying coatings
Organic coatings which give hard, dry films by auto oxidation and solvent evaporation upon exposure to air without heat or catalyst.

Air entrapment
Paint defect due to the incorporation of air bubbles into applied coating films during the application process and holding air bubbles inside the film due to the increased film viscosity. Air entrapment risk can be decreased by using substrate wetting agents, defoamers or by the reduction of application viscosity.

Air spray applications
Applications based on spraying the liquid paint broken into tiny droplets with the help of compressed air. Spray applications performed by air spray guns using air at 2,5-5,5 atm pressure are widely used, especially in industrial coating applications. In air spray applications, the paint is sprayed in droplets of 20-50 micron diameters.

Air-assisted airless spray application
A coating application method that is a modification of airless spraying. In air-assisted airless spraying, pressurized air is supplied at the edges of the airless spray pattern. By this method, a finer atomization can be achieved with lower airless spray pressure.

Airless spray applications
The application method where paint is pressurized at 5-35 atmospheres and then passed through a thin nozzle. In airless spray applications, the paint can be sprayed in droplets with diameters of 70-150 micrometer diameters. In these applications, the bouncing effect and related paint loss is less compared to air spray applications.

Alcohols
Organic compounds defined with the general formula R-OH, where R represents an alkyl group.

Aliphatic hydrocarbon solvents
A general term for solvents made of linear chains and dissolve low polarity binders like long oil alkyd resins. These types of solvents are produced from the distillation of petroleum with high aliphatic content. Hexane, heptane and white spirit are some of the commonly used aliphatic hydrocarbon solvents.

Alkaline resistance
The resistance of organic coating films to the destructive effects of basic (alkaline) chemicals. Basic chemicals may cause structural breakdown of ester-based resins (e.g. alkyd and polyester resins) and some organic pigments.

Alkaline surface cleaning
Cleaning of metal surfaces with aqueous alkaline solutions to get rid of all kinds of oils, especially rolling oils. The oil on the surface is dissolved and removed by saponification with the help of alkaline surface cleaners usually held at temperatures above the room temperature. See also: Degreasing

Alkyd resins
Class of resins obtained by the reaction of polyols, polyacids, and mono-functional oils or fatty acids. Polyester backbones of alkyd resins formed by the reaction of polyols and polyacids are modified by the addition of monofunctional fatty acids. They are defined as drying, semi-drying and non-drying alkyd resins depending on the type of fatty acids added; and as short oil, medium oil and long oil alkyd resins depending on the amount of fatty acids.

Aluminum pigments
Aluminum pigments are used to create a metallic effect on painted surfaces. They are composed of pure aluminum flakes with diameters of 10-30 micrometers and thicknesses of 0,1-0,9 micrometers. See: Visual effect pigments

Amides
Class of compounds formed by replacing one of the hydrogens in ammonia with another element (resulting in inorganic structures) or with an acyl group (RCO+) (resulting in organic structures). Organic amides (RCONH2) are used in the paint industry for cross-linking epoxy resins.

Amines
Compounds formed by the replacement of one or more hydrogen groups of ammonia (NH3) with hydrocarbon groups. The resultant compounds are named as primary amines (RNH2), secondary amines (R2NH), tertiary amines (NR3) depending on thr number of hydrogens replaced. They are commonly used in the paint industry for pH adjustment and for the curing of epoxy resin-based paints.

Amino resins
Resins formed by the reaction of formaldehyde with amino functional groups of compounds such as melamine, urea and benzoguanamine. The resulting resins undergo etherification with alcohols to promote solubility in hydrocarbon solvents and also to enable cross-linking reactions with hydroxyl and carboxyl groups on coatings binders. The main types of amino resins, listed in order of highest consumption, are urea formaldehyde resins, melamine formaldehyde resins, and benzoguanamine formaldehyde resins.

Amyl alcohol
A commercial solvent comprised of below two of the eight isomers of penthanol:
Chemical formula: $C_5H_{11}OH$

$$CH_3-CH_2-CH_2-CH_2-CH_2-OH \quad \%70$$
$$CH_3-CH_2-CH(CH_3)-CH_2-OH \quad \%30$$

Boiling range: 133-139°C; evaporation number relative to ether: 65; specific gravity: 0,812-0,817; refractive index: 1,410-1,411; flash point: 43°C

Anaphoresis
See: Electrophoresis

Anaphoretic coatings
Type of electrophoretic coating in which the object to be coated is connected to an electrolysis circuit as the anode, thus coated with the negatively charged paint particles dispersed in the coating bath. See also: Electrodeposition coatings

Anatase
A crystal form of titanium dioxide with a lower refractive index, compared to that of the other crytal form, rutile (2,488 vs 2,609). Since the refractive indices of organic binders generally lay between 1.40 and 1.60, the hiding power of films with anatase is lower than that of films with rutile.

Anchimeric effect
Functional groups on a molecule can have positive or negative effects on the tendency of the neighbouring groups of the same molecule to react with other compounds. This phenomenon is called "neighbouring effect". Synonym: Neighboring effect

Animal fats
General name for fats stored in animal bodies and formed by reaction of three hydroxyl groups of glycerine with animal fatty acids, especially stearic acid.

Anode
The electrode in an electrochemical circuit where the net chemical reaction is oxidation.

Anodic polarization
Slowing down of electrochemical processes in an electrolysis circuit, as a result of increased circuit resistance due to accumulation of solid, liquid or gaseous layer with a high electrical resistance on anodic surfaces.

Anodized aluminum surfaces
By connecting aluminum objects as the anode in an electrolysis circuit, a well-adhered aluminum oxide layer is formed on their surface. Coated aluminum oxide layer creates an impermeable barrier enhancing resistance to atmospheric corrosion. This process is called eloxal (Electrolytic Oxidation of Aluminum), and the resulting surfaces are called eloxal surfaces.

Anti-corrosive coatings
Coatings primary function of which is to protect the surface underneath from corrosion. Anticorrosive paints prevent corrosion with the help of binders, pigments and additives in their composition. Water-resistant binders with good metal adhesion, anticorrosive pigments passivating and protecting the metal surface, and additives that improve adhesion, water repellency, or protect the

metal electrochemically are used for this purpose.

Anti-corrosive pigments
Functional pigments added to the paint formulation to improve the corrosion resistance of the paint film. Most widely used anticorrosive pigments are chromate, phosphate, phosphosilicate and borosilicate salts, which passivate metal and have controlled water solubilities. Besides, zinc powder, cathodically protecting the metal surfaces; and micaceous iron oxide (MIO or MIOX), preventing water penetration with their plate-like structures are also used as anti-corrosive pigments.

Anti-fouling coatings
Coatings applied to surfaces of objects submerged in water to prevent accumulation of certain organisms, their residues and the foulings associated with those residues.

Anti-skinning agents
The additives added to air-drying (hardened by oxidative curing) coatings to prevent skinning in their containers during storage.

Application roller
The term used for the roller which transfers the paint to the surface to be coated. If the application roller runs in the same direction with the conveyor line, the process is called direct roller application, if roller runs in the opposite direction, it is called reverse roller application. See also: Direct roller application / reverse roller application.

Application viscosity
The viscosity at which paint is best applied using the chosen method.

Architectural coatings
General name used for the coatings for buildings. Architectural coatings are applied primarily for the decoration of interior and exterior surfaces of buildings, and secondarily for the protection of concrete, plastered concrete, iron, and wood surfaces in building constructions. Architectural coatings are also referred to as decorative coatings.

Aromatic hydrocarbon solvents
A common name of a group of strong solvents containin a benzene ring structure. They dissolve several coating binders, including alkyd, polyester, and acrylic resins. They are obtained from distillation of fossil fuels with high aromatic content. Toluene, xylene, and solvent naphtha are typical examples.

Ash content
The ash content is determined by heating the organic coating material up to the temperature where the binder decomposes or burns. For this purpose, a 2 gr sample is heated at 800°C for 5-6 hours, and ash content is calculated as the weight percent of residual ash in the original sample.

Associative thickeners
Additives, with both hydrophilic and hydrophobic parts. Hydrophobic (oleophilic) parts form secondary bonds with waterborne binders when they are repelled by water. These secondary bonds increase the viscosity of coating that can easily be reversed when sheared.

Atomization
Breaking down of the wet paint into tiny droplets while being sprayed onto a surface. In air spray applications, droplets of 20-50 micrometers are obtained by atomization with the help of high -pressure air. In airless spray applications, paint particles, compressed under 5-35 atm pressure are broken down upon impact with stationary air molecules as they exit the gun nozzle. However, in airless spray applications achieving fine atomization is more difficult. Thus, a fineness level of 70-150 micrometers is considered satisfactory.

Auto repair coatings
Putties, primers and topcoats used for refinishing or repairing motor vehicles. Auto repair coatings (also called car repair coatings or auto refinishes) are either used for complete refinishing or partial repairs. Plastic parts, seats, electrical parts, polymeric foams and other heat sensitive accessories, do not allow the car to be exposed to temperatures above 80°C. Therefore, car repair paints should be dried and cured below 80°C. On the other hand, the resins and pigments used in repair coatings and original automotive coatingd must have similar durability properties, to eliminate color and gloss differences between the repainted

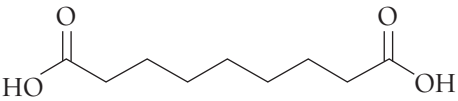
part and the rest of the vehicle, both initially and after long-term use.
Synonym: Car Refinishes

Automotive component coatings
Vast majority of automotive parts used in manufacturing plants where the primary activity is assembly, are produced in automotive subcontracting facilities. Putties, primers, topcoats and clear coats used for painting metallic or plastic parts like engines, radiators, filters, seats, mirrors, bumpers, interior plastic parts, rims, hubcaps etc. are called automotive component coatings. Paints applied to original vehicle parts that will be assembled in auto manufacturing plants, as well as those applied to spare parts required during the vehicle's service life, fall into this category. Synonym: Automotive part coatings

Automotive OEM coatings
Paints applied to automotive products in OEMs' paintshops to provide protection and visual appeal. Nowadays, coating system of a passenger car is composed of the following layers.
1) Cathodic Electro Deposition (CED) Primer applied to car body by dipping (to provide high corrosion resistance).
2) Primer surfacer applied by spraying (to increase stone chip resistance and smoothen the surface for topcoating).
3) Top coat layers applied by spraying (to increase exterior durability of coating system and to bring an appearance with glossy and attractive colors that last for long periods).

Auxochrome groups
Chemical groups which can be present in the structure of pigments and dyestuffs and can contribute to color of the compound together with main chromophore groups.

Azelaic acid
Organik kaplamaların, uygulandıkları metalin A dicarboxylic acid, naturally found in wheat, rye, and barley, and industrially produced by the ozonolysis of oleic acid. Used in pharmacological products, and in the synthesis of polyester resins. It improves the flexibility of the polyester resins but weakens water resistance.
Chemical formula: $HOOC(CH_2)_7COOH$



Melting point:109-111˚C.

Backcoat
Decorative and protective paint that is applied to the reverse side of metal coils.

Baking
Exposing the oven drying coatings to high temperature in ovens in order to activate cross linking mechanisms. Synonym: Stoving

Ball mills
In ball mills, ceramic and metal balls of 20-30 mm diameter disperse pigments in a cylindrical drum rotating around its horizontal axis. Ball mills are the main equipment that can disperse pigments by both hammering and rubbing. However, due to space they occupy in shop floor, long dispersion times and limited adaptation to the variable capacity batch processes, their use has been gradually decreased.

Ballast tank
The water tank utilised to balance the ships by adjusting their center of gravity.

Barite
Natural barium sulfate ore (BaSO4). It has rhombic crystal structure; refractive index: 1,64; specific gravity: 4,25-4,50; oil absorption: ~10 g/100 g barite. The micronised filler is obtained by grinding the natural ore. Due to its low oil absorption and high density, it is widely used as a cost-reducing matting agent, especially in markets where paint is sold by weight.

Barrier coat
The coating used to isolate a coating system from the surface to which it is applied or from another coating underneath. Permits to increase adhesion or to insure compatibility.

Base coat
An intermediate coating layer applied onto dried primer layer, primarily in automotive OEM and refinish paints. Basecoat paints are typically ap-

plied wet-on-wet, followed by a clear coat to obtain both an appealing appearance and good intercoat adhesion. Base coats may contain metallic and pearlescent pigments.

Basket mills
Basket mills are wet grinding machines consisting of an agitator disc connected to a vertical shaft. They work by immersing the agitator disc into a pigment or extender paste. Basket assembly is filled with high density milling beads, and the basket surface is made of a sieve which allows the pigment paste to pass through but keeps the milling beads inside. Agitator disc creates a vacuum while rotating which draws the paste into the basket through an opening at the top. In addition to these basic concepts, some basket mill producers offer different designs that provide extra advantages.

Basswood (in latin: Tillia Sp.L)
A very soft wood. The growth rings are not distinct. It has a small- pored structure and its appearance is uniform. It considerably shrinks during drying. It decays fast in open air and changing weather conditions. Its durability against physical conditions is poor. It is an easily processable and light weight tree. Its timber is whitish yellow and reddish white. Timber of lime tree is primarily used in wood carving, statuary as well as mannequin and drawing board production. Synonym: Lime tree/ Linden

Bead mill
A mill consists of a rotating shaft with several steel discs concentrically located on it, which is located in a steel chamber. The chamber is filled with hard beads of 0,5-3,0 mm diameter and the pigment + vehicle mixture. The pigment aggregates and agglomerates are grinded by the shear and impact applied by the beads in the chamber. Synonym: Pearl mill

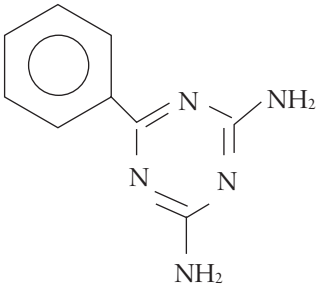
Beech (in latin: Populus Sp.L)
Wood of beech tree is dense and tough. Its sapwood is reddish brown. It lasts long and is durable because of its hard structure. Fibers of beech tree can absorb varnish well. In addition to any type of solidwood work and furniture, beech tree is used in the production of panels, tool handles, and musical instruments as well as in woodturning.

Bell applications
Bells rotating at a speed of 25,000 to 60,000 rpm are used for spray applications, especially in otomotive OEM coatings. The centrifugsl force breaks paint into tiny droplets, with diameters varying between 5 to 100 µm. Bell applications employ electrostatic spraying techniques for higher transfer efficiency.

Bénard cell
During the paint drying process, honeycomb-like hexagonal cells are created by the convection currents driven by solvent evaporation caused by temperature differences. These hexagonal cells are called Bénard cells. Film defects such as floating, flooding, silking and haze occur due to the formation of Bénard cells of different sizes.

Bending resistance
Resistance of a coating film to cracking, breaking and delamination when bended together with the metal surface. Bending resistance is measured by bending the panel around a cylindrical or conical mandrel or by directly folding the panel. These tests are called cylindrical bending test, conical bending test and T-Bend test, respectively.

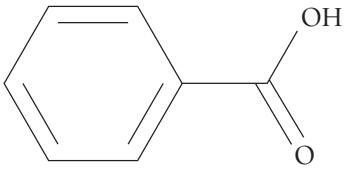
Benzoguanamine
A compound used in the production of benzoguanamine- formaldehyde resins.
Chemical name: 1,3-Diamino-5-phenyl-2,4,6-triazine Chemical formula: $(CNH_2)_2(CC_6H_5)N_3$



Melting point: 227°C

Benzoguanamine resins
Resins synthesized by the polymerization of benzoguanamine with formaldehyde. Their use in organic coatings is limited to some oven-cured primers.

Benzoic acid
A monofunctional organic acid used as a chain stopper in the production of alkyd and polyester resins to control the molecular growth.
Melting point: 121°C
Chemical name: Benzenecarboxylic acid
Chemical formula: C_6H_5COOH



Bilge
Empty containment in a ship's engine room. Oil, fuel, dirty water, utility water and seawater leaked from engine and its components or water discharged during the maintance work are collected in bilge.

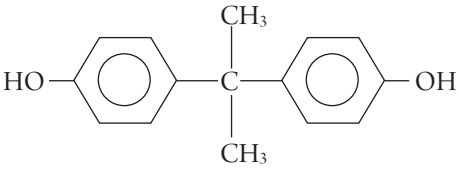
Binder
Chemical substances in organic coatings responsible for bonding the components together and ensuring the adherance of the coating to the substrate. Binders commonly have polymeric structures, while, less commonly, they may have oligomeric or monomeric structures.

Biocides
Chemicals used to prevent growth of various bacteria, fungi and wood borers in especially waterborne coatings either in the package or after application. Commonly used biocides include formaldehyde and its derivatives, tin compounds and basic quarternary copper compounds.

Biodegradation
The process by which microorganisms like bacteria, algae, and fungi break down organic matter. Biodegradation of coating materials may cause changes in the liquid paint (like viscosity loss, and odor spoilage) and in the dry film (like delamination and discoloration).

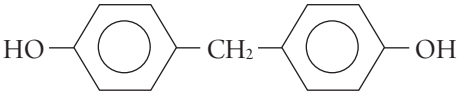
Birch (in latin: Betula Sp.L)
Birch is a dense, fine-grained and moderately tough tree. It is flexible and strong. Its sapwood and heartwood are of the same color. Its use in woodturning is difficult and it has a poor exterior durability. It decays fast in outdoor exposure. It is used in engraved furnitures, musical instruments, sledges, skis, plywood production, barrel, pulley, bobbin case and wooden shoe last manufacturing.

Bisphenol A
A polyol obtained by the reaction of phenol and acetone under strongly acidic conditions and used in the production of epoxy resins. It is also the main building block of polycarbonate polymer. Bisphenol A has been identified to be an endocrine disruptor and was added to the SVHC candidate list of European Chemical Agency, ECA, in late 2016.
Chemical name: Diphenylolpropane
Chemical formula: $(CH_3)_2C(C_6H_4OH)_2$



Melting point: 155°C

Bisphenol F
A ppolyol obtained by the reaction of phenol and formaldehyde under strongly acidic conditions and used for production of epoxy resins with lower molecular weights and higher functionalities.
Chemical name: Dihydroxydiphenylmetane
Chemical formula: $(C_6H_4OH)_2CH_2$



Melting point: 163°C

Blanc fixe
Synthetic barium sulfate (BaSO4) obtained from barite by a series of chemical and physical processes. Firstly, barium sulfide (BaS) is formed by reduction; then, BaSO4 is produced by the reaction of BaS with sulfuric acid (H2SO4) or sodium sulfate (Na2SO4). Finally, Blanc fixe powder is obtained after separation and grinding processes.

Bleeding
A defect caused by the diffusion of the pigments and/or dyestuffs in a paint film into the succeeding wet paint layer due to the influence of solvents (sometimes binders) contained in the latter. Bleeding defect results in unwanted discolorations. To prevent bleeding, it is important to use pigments and dyestuffs with sufficient solvent resistance to prevent bleeding.

Blistering
A defect in the cured paint film characterized by the formation of bubbles filled with gas or liquid. Main causes for the formation of liquid-filled blisters include the development of local corrosion on the substrate and presence of water-soluble salts in wet paint or on the substrate. Another cause, especially for oven dried coatings, is the retention of solvents in thick paint films that cannot escape during baking. Blister formation reduces both the protective and decorative functions of the paint film.

Blocked isocyanate resins
Isocyanate resins, which react with hydroxyl and amine groups at room temperature, are blocked by volatile compounds to enable the production of one-component oven-curable coatings. The blocked isocyanate resin to be used should have unblocking temperatures lower than the oven temperature.

Bloom
Coating defect defined by dull, uneven, or shadowed appearance caused by the accumulation of certain insoluble substances on the coating surface. Bloom is typically caused by foreign substances such as non-transparent oils or waxes.

Blushing
A paint film defect observed as whitening on the paint and varnish surfaces when paint application is performed in high relative humidity conditions. It mainly occurs in solventborne coatings. After application, solvent evaporation cools down the substrate causing moisture in the air to condense on the paint film, which, in turn, causes organic binders to precipitate.

Board
The portion of a ship's hull above its "full load line". The hull surfaces are usually dry, however occasionall wet due to seawater splashes or condensed water vapor, and they are constantly exposed to oxygen and sunlight.

Boiling point
Boiling point is defined as the temperature that vapor pressure of a pure liquid reaches to the total outside pressure. At this temperature, the liquid boils and evaporates rapidly.

Boiling range
Boiling of a liquid that does is not composed of a pure substance, occurs over a range of temperatures rather than a single temperature. This range is called the "boiling range".

Boot topping
Part of a ship between submersion levels of empty and full load conditions. Surfaces at boot topping part are exposed to frictional effects of guide boats, piers and buoys. In addition, depending on the loading level, these surfaces can either receive spatters or submerge.

Bouncing effect
Scattering of paint droplets sprayed by conventional air spray guns to the surroundings after bouncing back from the air cushion formed next to the substrate. Bouncing effect decreases the transfer efficiency since some of the sprayed coating is not transfered to the application surface.

Branched polymers
Polymers with three or more polymer segments connected to a branch point. They are formed by reaction of di-functional, F=2, monomers bearing at least one of their functional groups located in their central parts thus leading to branching. In step growth polymerization, a small amount of F=3 monomer is used. In addition, polymerization an F≥4 monomer or a branching initiator is used in very small amounts. Some common types of branched polymers are shown below:

Branched polymers can be thermoplastic or thermosetting.

Brookfield viscometer
A viscometer in which a cylinder or a disk is rotated in the test liquid, and the torque necessary to overcome the viscous resistance is measured. The instrument measures also the shear thinning and thixotropic properties of non-Newtonian fluids in the shear range of 0.1 to 50 s-1.

Brush
Apparatus used to apply paint by means of its fibers attached to a handle. Brush fibers are prefered to be made of nylon or polyester for waterborne coatings; and of polyester or animal hair for solventborne coatings.

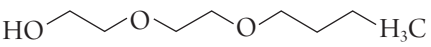
Brush mark
Fiber streaks can be observed right after the application of the paint by brush. If those streaks do not dissappear during drying, a coating defect named "brush mark" arises. Brush marks can be overcome by lowering the surface tension or viscosity, or by adding slow solvents to the coating system.

Bubble breakers
In waterborne coatings, defoamers help bubbles reach the surface but they still may not break easily. For this reason, it may become necessary to use bubble breakers to ensure bursting of the bubbles on the surface. (e.g., mineral oils, and dimethylpolysiloxanes with limited compatibility)

Bubbling or boiling
See: Pinholing defect

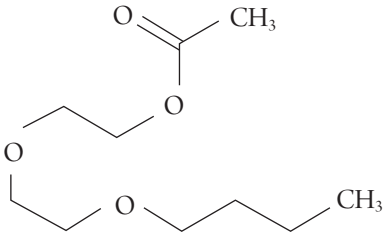
Buchholz hardness
A test that aims to determine hardness of a coating film by measuring the length of a V-shaped groove created by a sharp-edged metal wheel under a constant weight as it rolls across the surface of coating.

Butyl diglycol
A "tail" solvent generally used in small amounts either to retard drying of solventborne paint films or employed as a co-solvent in the waterborne coatings.
Chemical name: Diethylene glycol mono butyl ether; 2-(2-butoxy-ethoxy) ethanol (also called Butyl carbitol) Chemical formula: $C_8H_{18}O_3$



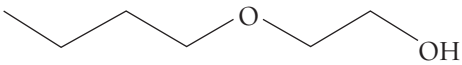
Boiling point: 230°C; Evaporation number relative to ether: ~1200; specific gravity:0,954; refractive index: 1,4322; flash point: 105°C

Butyl diglycolacetate
A "tail" solvent generally used in small quantities to retard drying of cellulose derived resins, polyester and short oil alkyd-based solventborne coatings.
Chemical name: diethylene glycol mono ether acetate (also called butyl carbitol acetate)
Chemical formula: $C_8H_{16}O_3$



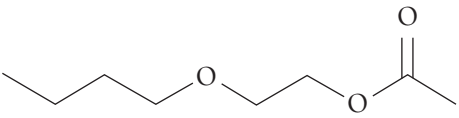
Boiling point: 247°C; Evaporation number relative to ether: >1200; specific gravity:0,979; refractive index: 1,4262; flash point: ~108°C

Butyl glycol
A slow polar solvent which readily dissolve polar resins like nitrocellulosic, polyester and epoxy resins, and also used as a co-solvent in waterborne organic coatings.
Chemical name: Diethylene glycol mono butyl ether; 2-(2-butoxy-ethoxy) ethanol (also called Butyl carbitol)
Chemical formula: $C_6H_{14}O_2$



Boiling point: 171°C; Evaporation number relative to ether: 160; specific gravity:0,901; refractive index: 1,4196; flash point: 60°C

Butyl glycol acetate
A slow solvent with strong dissolving power for certain cellulose derivatives and polyester resins.
Chemical name: Ethylene glycol mono butyl ether acetate; butoxy ethyl acetate (also called butyl cellosolve acetate or butyl oxitol acetate)
Chemical formula: $C_8H_{16}O_3$



Boiling point: 192°C; Evaporation number relative to ether: 190; specific gravity:0,941; refractive index: 1,4139; flash point: 75°C

Butylated melamine formaldehyde resins
Melamine formaldehyde resins modified by reacting with butanol. Butylated melamine formaldehyde resins are widely used in oven-curing coatings due to their compatibility with several hydroxy functional resins, and their contribution to film quality in owen-curing coatings. However, they are not used in high solid systems because of their high molecular weights.

Calcite
Calcite is the ore of limestone (CaCO3) with a rombic structure. Refractive index: 1,60; specific gravity: 2,70-2,71; oil absorption: 17±2 g/100 g calcite. Extender obtained by grinding of the ore, is widely used especially in architectural coatings.

Can coatings
Organic coatings applied on interior and exterior surfaces of a can is called "can coating". Can coatings are used to form an insulation between packaged goods and packaging material, to prevent rust formation on the outside surface of packaging materials and to decorate the packaging

Carbon black
Decomposition of liquid petroleum distillation products, natural gas or acetylene to carbon and hydrogen leads to hydrogen generation and carbon black (soot) formation. Carbon black is a black pigment widely used in the coating industry.

Carbon steel
Carbon steel is an alloy of iron and contains 0,05-2,00 % carbon. It has superior mechanical strength and corrosion resistance compared to pure iron. Manganese, silica and copper are also added to carbon steel in addition to iron and carbon.

CASS Test
See: Copper Accelerated Salt Spray Test (CASS)

Castor oil
Vegetable oil obtained from seeds of Ricinus communis. It is used in the production of oven drying or two component coatings as OH functional and monounsaturated ricinoleic acid constitutes almost 90% of the fatty acids it contains. During dehydration, castor oil loses one OH group and one H atom. This results in the formation of a new carbon-carbon double bond and since number of double bonds increases to two, the molecule turns into a drying oil which is called and separately used as "dehydrated castor oil".
See also: Dehydrated castor oil

Castor oil derivatives
Castor oil derivatives, having tendencies to establish hydrogen bonds with the binders over their OH groups, provide a thixotropic structure to organic coatings. Sensitivity to high temperatures applied during paint production can be noted as their weak point.

Catalyst
The additives used to accelerate the crosslinking reactions in organic coating formulations. Catalysts can be directly added to the coating formulation or packaged separately and added to the formulation right before the application.

Cataphoresis
The physicochemical process that proceeds with the migration and deposition of positively charged organic polymer-containing particles on cathodic surfaces in an aqueous medium. The particles migrating under direct current discharge and deposit on the cathode surfaces.
See also: Cathodic Electrodeposition Coatings

Cataphoretic coatings
See: Cathodic Electrodeposition Coatings

Cataplasm test
Test applied to determine the water resistance of organic coatings. In the cataplasm test, a water-soaked cotton piece is covered by a thin polymer sheet to avoid evaporation. Then the piece of cotton is placed on the coating film at a certain temperature between 50°C and 80°C for a certain period (e.g, 8 hours), and the degree of impact (softening, lifting, color change etc.) is determined.

Cathode
One of the basic electrodes present in an electrochemical circuit where the net reaction is a reduction reaction.

Cathodic electrodeposition coatings
Organic coatings formed by coating a substrate having a conductive surface connected to a circuit as the cathode. Positively charged paint particles suspended in aqueous medium deposit on the dipped substrate under direct current. Cathodic electrodeposition coatings are most widely utilized for automotive coatings. Perfect adhesion enables superior corrosion resistance. These coatings are also known as cataphoretic coatings. Synonym: CED

Cathodic polarization
Process that causes a decrease in corrosion rate due to the deposition of less conductive layers on the cathodic surfaces.

Cathodic protection
A metal object, desired to be protected from corrosion, is made the cathode of an electrolytic circuit and therefore, corrosion rate is decreased dramatically. This method is called cathodic protection. Cathodic protection can be obtained by constructing a circuit with the metal to be protected and an inert electrode; and using the metal as the cathode by applying a voltage. Another method is to connect the metal object with a more active metal (called sacrificial anode) to form an electrochemical cell.

Cationic polymerization
See: Addition polymerization

Cedar (in latin: Cedrus Libani A. Rich)
Its wood is resistant to weather conditions and decay. The odor of cedar oil keeps moths away therefore it is used to produce wardrobes as solid wood or veneer. Besides, due to its odor absorption feature, shoe cabinets are made of cedar. Some types of cedar wood are used to produce guitar bodies and necks.

Cellulose acetobutyrate (CAB) resin
An outdoor durable, thermoplastic resin formed by the reaction of cellulose with acetic acid and butyric acid. It is used in automotive OEM and automotive refinish basecoats, and in wood varnishes. See also: Cellulosic resins

Cellulose nitrate resin or Nitrosellulose resin
Thermoplastic resin formed by the nitration of raw cellulose with sulphuric acid and nitric acid. Nitration to a level of 10.7-12.3% nitrogen is used in cellulose nitrate resins for paint industry. Cellulose nitrate resins are also referred to as "Nitrocellulose Resins".

Cellulosic paints
Paints in which cellulose nitrate (nitrocellulose) is the main binder. Cellulosic paints harden by the evaporation of solvent. The flexibility of cellulosic paints is increased by adding alkyd resins and plasticizers into their formulation.

Cellulosic resins
Resins synthesized by reaction of acids and alcohols with cellulose, which is typically derived from cotton and wood. Cellulose nitrate (nitrocellulose) resins are the most widely used type. Other types include cellulose acetobutyrate (CAB), ethyl cellulose, hydroxyethyl cellulose and hydroxypropyl methyl cellulose resins.

Chain polymers
They are also referred to as linear polymers. Their structure is like a linear chain. They are composed of monomers with double functionality (F=2). They are generally thermoplastic in nature.

Chalk
Chalk is obtained from shell remains of marine microorganisms and is composed mostly of amorphous calcium carbonate (CaCO3). It is mainly used as an extender in architectural coatings for interior use.

Chalking
A paint defect described as the formation of a powdery layer on the surface of the paint film due to decomposition of some paint binders due to UV rays, temperature differences and oxydation effects in external environment.

Chemical drying
State of dryness and hardness needed for a coat-

ing film to reach the expected chemical resistance is called chemical drying. The period needed to achieve chemical drying is called chemical drying time. Chemical drying time is determined by measuring the chemical resistance of the coating film.

Chemical polarity
If the electronegativity of the atoms composing a molecule are different, the valence electrons on these atoms will not be distributed homogenously. This uneven distribution of electrons causes the molecule, or some groups in the molecule show a polar behaviour. Such molecules or groups are called as polar, and the phenomenon as chemical polarity.

Chemical resistance
Resistance of organic coating films to possible effects of chemical substances that they may be exposed during the service live. For industrial coatings, resistance to various acids, alkalines, fuel and solvent; and for those used in houses alcohol, ketchup, oil, sweat, tomato paste resistances are considered important.

Chemorheology
Branch of science that investigates the changes in the rheology of a fluid, while some of its components undergo chemical reactions. Chemoreology is also used to investigate the rheological behaviour of crosslinking organic coatings during the film formation process.

Cherry (in latin: Cerasus Avium (L.) Moench.)
Its durable and reddish wood with uniform grains is used for interior decoration as solid wood or plywood, and for making high quality furniture. Good for the production of objects that require lathing, embossing and engraving on wood, and modeling, and for the production of musical and scientific instruments. In producing high quality articles, its sapwood is used. It is suitable for varnish application.

Chestnut (in latin: Castanea Sativa Mill.)
Its timber is between dark yellow and white in color. It is easy to process but heavy and brittle. It has good water resistance. Growth rings are distinctive and uniform. They are used in the production of veneers, solidwood furnitures, and interior decoration. It is suitable for producing long-lasting and durable furnitures. Chestnut wood is a good substrate for paint and varnish application.

China clay
Mineral of aluminum silicate containing crystal water is known as kaolin ($Al_2O_3.2SiO_2.2H_2O$). Refractive index: 1,56; specific gravity: 2,58; oil absorption: 40 g/100 g kaolin. Filler material obtained from grinding of the mineral, mainly used in paper industry and also used in exterior architectural coatings in coatings industry. Synonym: Kaolin

Chipboard (U.K.)
Panels with various thicknesses, produced by pressing wood chips mixed with specific chemical binders. It is frequently used in furniture sector. Chipboards have low resistance to water and fire. Kitchen cabinets, wardrobes and shelves that are used for carrying lightweight objects; and some office furnitures are made from chipboard. Synonym: Particle board (US)

Chlorinated hydrocarbon solvents
Chlorinated hydrocarbon solvents have been used in paint formulations because of their unique dissolving charateristics, and their non-flammability. Yet, their use as solvents in paint industry is being diminished because of their toxic properties revealed afterwards. Some examples of chlorinated hydrocarbon solvents are trichloroethylene; 1,1,1-trichloroethane; methylene chloride; and carbontetrachloride.

Chlorinated rubber
Hard thermoplastic resin that is obtained by the reaction of natural rubber with chlorine. It contains approximately 65% chlor atom and is soluble in aromatic solvents. It has superior chemical resistance and water resistance. There are also some commercial products obtained from the chlorination of synthetic rubber.

Chroma
See: Saturation

Chromaticity values
Color parameters obtained by converting measured X, Y and Z values of any color to decimal

numbers that sum up to 1. This creates a simpler two-dimensional color coordinate system for the identification of colors.

$$x = \frac{X}{X+Y+Z} \qquad y = \frac{Y}{X+Y+Z}$$

Chromophore groups
Chemical groups present in pigment and dyestuff molecules that can impart color to the molecules.

CIE Lab color system
A mathematically structured color identification system developed by the International Commission on Illumination (Commission Internationale de l'Eclairage, CIE). The system is based on the fact that there are three types of conically shaped color perception cells, and rod-shaped light sensitive cells in human eye. Taking this into account, each color is expressed in terms of three variables; L (denoting the intensity of light), a (denoting the location of its color on the green-red axis) and b (denoting the location of color on the blue-yellow axis). Because it takes both the light and the observer into account, CIE Lab color system gives more sensitive and reproducible results compared to the other color identification systems. See also: Color identification systems

Circulation stability
Transfer of liquid paint to the application point in assembly lines is carried out via circulation systems. There are various hydraulic and mechanical factors affecting the paint stability in these circuits/routes which include several pipe segments, elbows, valves, and pumps. Circulation stability property of a liquid paint determines its resistance to such destabilizing factors.

Clear coat
1) Transparent organic coating material containing no pigments.
2) Transparent film formed by applying and curing of a clearcoat. Synonym: Varnish

Clear sealer
A transparent primer applied to wood surfaces when it is aimed to build a transparent coating system.

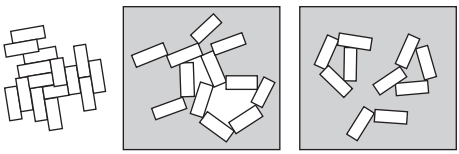
Climate chamber
An enclosed container used to test the effects of specified environmental conditions on the packaged coatings products, and/or the cured coating films on selected substrates.

Clolorant (or Toner)
A paint semi-product containing a high pigment concentration and change the color properties of a mixture when added.

Closed cup flash point test
A sample put in a covered cup is exposed to a test flame at short intervals, while it is being heated. The temperature at which the sample ignites is the flash point of the sample. The most used test is ASTM D 56. Since the closed cup prevents compositional changes of volatiles contained in the paint, closed cup flash point test gives more reliable results compared to open cup tests.

Cloudiness
For basecoats containing aluminum and pearlescent pigments, sometimes the surface appearance becomes partly cloudy, and with low glitter and low luminosity. Cloudiness may be observed if factors such as low film viscosity or non-uniform film thickness prevent the flake pigments to be alligned parallel to the surface. This phenomenon is also called as mottling.
Synonym: Mottling

Clusters of pigments and extenders
Although pigments and extenders are produced as primary particles, they form aggregates and agglomerates when in contact in bulk. In the dispersion stage, these pigment clusters are tried to be broken down to primary particles. If dispersed pigments are not stable, they form loosely recombined units called flocculates. Since, the distinction between these three terms might not be clear, a schematic representation is given below for a better understanding.



See also: Aggregate / Agglomerate / Flocculate

Coal tar epoxy coatings
A corrosion resistant coating using coal tar and bisphenol A based epoxy resin as binders. The toxic risks caused by polycyclic aromatic hydrocarbons contained in the coal tar tend to restrict the use of coal tar containing coatings.

Coalescence
In latex or emulsion paints, during the process of drying, emulsified polymer spheres fuse together to form the film. A small amount of glycol solvents is generally added to latex-based architectural coatings to enable hardening through fusion (coalescence) even at low ambient temperatures.

Coatings for white household appliances
Coatings used for painting of household appliances like refrigerators, ovens, dishwashers, washing machines and driers. While wet coatings were predominantly used for this application until the end of 20th century; powder coatings are the coatings of choice since then.

Co-grinding
A pigment grinding method used in paint production by grinding multiple pigments and/or fillers together. The advantage of this approach is to shorten the grinding time. However, grinding pigments with different grindability together and achieving optimal color development often involves challenges. Additionally, when the grinding time is extended to grind a more difficult pigment, there is a possibility that pigments which are grinded more easily may be overgrinded, leading to their degradation and deterioration of durability properties. See also: Paint production using monopigmented pigment pastes

Cohesion
Cohesion is the intermolecular attraction between the molecules of the same type. Cohesion holds the molecules together in liquid and solid states of the matter. Attraction forces that create the phenomenon of cohesion are called cohesive forces.

Coil coatings
Coil coatings are paints applied to metal substrates delivered to the coating facility in rolls. Coil coatings are applied on the coil, which is uncoiled, surface-treated, painted, baked, and recoiled in continuous, high-speed lines. The painted product is called as pre-coated metal, PCM, and are subjected to forming processes to create final products. See also: Pre-coated metal (PCM)

Cold-rolled steel
Carbon steel billets, pass through a series of work rolls while being kept below their recrystallization temperatures, thus thin, cold-rolled steel sheets are formed. Sheets produced by cold-rolling have higher yield strengths and hardness values than hot-rolled steel sheets.

Colloid
A colloid is a mixture where microscopic insoluble particles are stably dispersed and suspended in a continuous (and generally lquid) medium.

Color fastness
The ability of a film of paint or varnish to show minimum change in the original color after being exposed to a specific environment, generally light and weathering.

Color identification
The human eye can distinguish thousands of different colors. However, it is not always easy to interpret these colors to someone and expect him/her to understand the same color. For this purpose, color identification systems are developed. See also: Color identification systems

Color identification systems
Systems developed for the objective definition of color. Color identification systems can be divided into two groups."Visual systems" and "mathematical systems". Visual systems consist of many color chips arranged in a systematic way. The color is defined by the code of the closest color chip within that "visual system." "Munsell color system" and "Natural color system, NCS, are the most common visual color identification systems. Mathematical color identification systems are based on three-dimensional color spaces while each point corresponds to a certain color. CIE Lab is the most common mathematical system used. See also: Munsell color system/Natural color system (NCS)/CIE lab color system

Color matching
The process of bringing the color of a sample

closer to a reference color. Color matching can be performed in laboratories by actual colorant additions or by using the results of color measuring devices in a computer environment.

Color measurement
Color measurement is performed by analyzing the light reflected from a colored surface by using colormeter (also called colorimeter) or color spectrophotometer. See also: Colorimeter/Color spectrometer

Color spectrometer
A measuring device that splits light coming from a colored surface, passing through a prism into its wavelengths, and determining the ratio of light at each wavelength to measure the color. Color spectrometers provide more accurate color measurement results compared to colorimeters. See also: Colorimeter/Instrumental color measurement

Color spectrum
A range of colors formed by passing a beam of light, especially white light from sources like the sun, through a prism to separate it into its various colors (i.e., various wavelengths)

Color strength
The potential of a pigment or dye to change the color of a paint or ink. Color strength is affected by the absorption coefficient and the particle size of the pigment or dye.

Colorimeter
A color measurement device that operates based on theoretical models, which define colors by how strongly they stimulate the three different types of cells in our eyes.
Colorimeters define a color using "tristimulus values" which are the blue, green and red present in that color. Synonym: Colormeter

Commercial vehicle
See: Motor vehicles

Compatibility
Tendency of two or more substances mixed with each other to form a stable and homogenous mixture. The opposite tendency between two or more substances is referred to as "incompatibility".

Complementary colors
The color pairs which produce colorless compounds when mixed are referred to as complementary colors. For instance, when two lights with complementary colors are mixed, a white light form. On the other hand, when two paints with the complementary colors are mixed, a black paint is obtained.

Condensation polymerization
Since water is formed as a side product during this type of polymerization reactions, the process is referred to as condensation polymerization. In condensation polymerization, starting from the initiation, in every step during the polymerization, a repeatable unit forms from the reaction of two molecules and this structural unit combines to the chain. Therefore, condensation polymerization is also called "step-growth polymerization".

Condensing humidity test
An accelerated test used to measure the water resistance of coatings performed in test cabinets, where the sides of the cabinets are covered with test panels and the air inside is saturated with moisture at test temperature. By ensuring the temperature inside the cabinet to be at least 10°C higher than outside temperature, the water vapour in the cabinet condenses on the inner surfaces. Hence, the surfaces of the panels remain covered with a thin moisture layer throughout the test. Condensing humidity tests are carried out at temperatures between 40°C and 60°C and for 5 to 20 days.

Conductivity
In the paint industry, conductivity is frequently used to indicate the electrical conductivity of the wet coating or dry coating film. The electrical conductivity of a solventborne wet coating is crucial if it will be applied using the electrostatic spraying method. On the other hand, the electrical conductivity of the dry film is particularly important if a second layer is to be applied using electrostatic spraying or electrophoretic methods.

Conical bending
See: Bending resistance

Conjugated double bonds
Term used to describe the position of double bonds in a molecule. It is used when alternating

single and double bonds are spaced "one apart".

Conjugated fatty acids
Fatty acids like eleostearic acid and licanic acid which contain carbon-carbon double bonds on their backbone that are arranged "one apart" (C–C=C–C=C–).

Conjugated oils
Oils containing mainly conjugated fatty acids in their structures.

Contact angle measurement
A liquid droplet in contact with a solid surface makes an angle at the solid-liquid-air triple point. The angle known as contact angle can be measured using a goniometer. In paint industry, the contact angle is used to determine surface tensions of both the liquid paint, and hardened paint films.

Contamination
The condition causing a surface, material, or process to become dirty or impure by an unintended transfer of material from the outside.

Controlled flocculation
A pigment dispersion technique that employs dispersing additives that attach to multiple pigment particles and keep them in a controlled state of flocculation. Controlled flocculation results in larger primary particle sizes compared to those obtained by deflocculation process. Controlled flocculation technique which also prevents "hard settling" is widely used in the dispersion of primer pigments and fillers.

Convection ovens
Heating ovens that contain hot combustion gases or heated air used to cure the oven-curing coatings. See also: Direct heating convection ovens/ Indirect heating convection ovens

Conventional air spray application
Application of paints and varnishes by spraying in tiny droplets using air guns with air at 2,5-5,5 atm pressure. Feeding of coating to the gun is achieved by gravity, suction, or pressurization.

Copolymer
Polymers having more than one type of repeting units such as –ABABAB– or –AAABBBAAA–, where A and B are two different units. (e.g., ethylene vinyl acetate copolymer)

Copper accelerated salt spray test (CASS)
An accelerated corrosion test for coated metals. Unlike the standart salt spray test in which a 5% aqueous solution of sodium chloride is sprayed on the coated panels, Copper Accelerated Salt Spray Test (CASS) test employs a spray solution which includes 0,025% copper chloride dihydrate, in addition.

Corona discharge (in powder coating applications)
An electrostatic coating method used to coat a positively charged surface with minimal loss, using powder coating particles charged by air molecules ionized under high voltage.

Corrosion
See: Corrosion of metals

Corrosion circuit
An electrochemical circuit where the two electrodes are made of different metals, and that more active electrode becomes the anode and corrodes.

Corrosion coupon
Corrosion coupons are pieces of metal in varying size and shape which are used to monitor the effect of corrosive environment on the equipment or structural elements under corrosion risk. They are made of the same composition with the target material. The impact of corrosive environment is monitored by visual inspection of coupon and measure of its weight loss after a certain exposure period.

Corrosion inhibitor
Corrosion inhibitors are substances which prevent or retard the corrosion of metals and alloys. They prevent or slow the corrosion by forming a passivating layer on the surfaces of metals and alloys.

Corrosion of metals
Wearing away of metals due to electrochemical reactions is known as metallic corrosion. Oxidation of metals through electrochemical processes leads to the formation of metal oxides or other

metal salts. Among these corrosion products, insoluble metal oxides are commonly named as "rust". Synonym: Metallic corrosion

Corrosion tests
Laboratory tests that aim to determine the corrosion resistance of coated or uncoated materials in much shorter times than the real-world exposure by intensifying the corrosive conditions.

Co-solvent
A co-solvent is a substance that enables two or more immiscible liquids to mix, when added. Co-solvents are added to increase the solvency powder of the primary solvent in the mixture.

Crater
Craters are cup shaped tiny depressions on coating film that remind volcano craters caused by local surface tension drops. Gel particles, oils, foreign materials, fibers, incompatible silicon-based contaminants, and spray dusts of other coatings are among the crater causes.

Critical pigment volume concentration
Pigment volume concentration at which all the binders in a coating formulation is used up to wet the pigments and to fill up the pigment pores, with no excess binder remaining. Synonym: CPVC

Cross cutting
See: End cutting.

Crosslinked polymers
Crosslinked polymers are formed by the reaction of at least two initially linear or branched polymers via their active functional groups. Functionalities of the monomers constituting these polymers can not be less than 2, and at least one of the monomers should have a functionality of F=3 or more. Crosslinked polymers are thermosetting in nature. See also: Functionality

Crosslinking
Besides solvent evaporation, polymerization of organic coating binders by reacting with each other may also contribute to the film forming (i.e., drying) process. Polymerization based on the reactions between the reactive binders contained in the paint film is called "crosslinking".

Curing
The process by which a rigid thermosetting film of organic coating is formed on a substrate as the result of polymerization reactions.

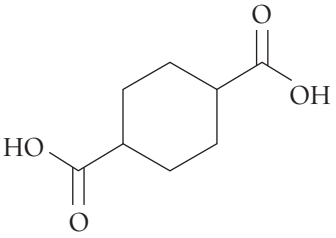
Curtain coatings
A coating technique in which paint is continuously poured through a narrow slit onto the panels mowing along a conveyor belt. This method is used especially in fast lines for manufacturing sheet-shaped furniture components and in mirror coating lines.

Curtain rupture
Vertical rupture of the wet paint curtain dynamically formed during curtain coating applications due to air bubbles or impurities. Curtain rupture causes unpainted spots on the object to be coated.

Cuvette
A round shaped dent on dry paint film. A hole formed while the gas or solvent vapor trapped in the coating film escapes. The hole may widen during the further levelling of the film. This surface defect is called "cuvette". This defect is mainly encountered in oven-cured coatings containing trapped air or solvent vapor, and in polyurethane films with trapped carbon dioxide gas.

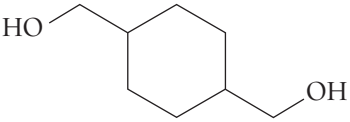
Cyclic ether group
See: Oxirane group

Cyclohexane dicarboxylic acid (CHDA)
A cycloaliphatic diacid used for the synthesis of outdoor durable polyester resins. CHDA provides a good balance of hardness, flexibility, and stain resistance. Chemical name: 1,4-CHDA (1,4-cyclohexanedicarboxylic acid
Chemical formula: $C_6H_{10}(CO_2H)_2$



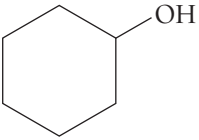
Melting range: 163-169 °C

Cyclohexanedimethanol (CHDM)
Polyol that is used in polyester resins employed in industrial coatings for outdoor use which require high water and UV resistance.
Chemical name: 1,4-cyclohexane dimethanol
Chemical formula:



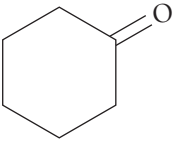
Melting point: 35°C

Cyclohexanol
Alcohol that dissolves several natural resins, cellulose ethers and phenol formaldehyde resins.
Chemical formula: $C_6H_{11}OH$



Boiling range: 160°C; Evaporation number based on the ether: 28; Specific gravity: 0,942; Refractive index: 1, 4191; Flash point: 63°C

Cyclohexanone
Cyclo aliphatic ketone solvent used in solvent-borne coatings.
Chemical name: Cyclohexanone
Chemical formula: $C_6H_{10}O$



Boiling point: 156,7°C; evaporation number relative to ether: 40; specific gravity: 0,948; refractive index: 1,4500; flash point: 43°C

Cylindrical bending
See: Bending resistance

Deck
A platform in a ship horizontally extending from one side to the other and covering the storage and/or cabins.

Decorative coatings
See: Architectural coatings

Deep cupping
A test performed by pushing a knob that is in contact with the unpainted side of a coated panel, at a constant speed until the painted side shows signs of deformation (cracks) in the coating film. During the test, which is also called Erichsen deformation test, knob is stopped when the first sign of crack formation is observed on the paint film, and the depth of deformation is recorded.

Deflocculation
Brakdown up of pigment agglomerates and aggregates to their primary particles by the process called pigment dispersion. See also: Controlled flocculation

Defoamers
These additives accumulate on the surfaces of microbubbles in the wet coating and enable them to grow into larger bubbles and migrate to the paint surface to leave the system. (e.g., polyethers with limited compatibility, polyacrylates, polymethylalkylsiloxanes) Synonym: Anti-foaming agents

Degreasing
Oils left on the surface to be coated, causes poor adhesion for nearly all types of coatings. Therefore, it is important that any oil should be removed from the surface before painting. First method to degrease before paint application is, wiping/washing the surface with a solvent-soaked cloth or brush. The second method is to apply hot alkaline solutions to saponify the oil and remove from the surface.

Dehydrated castor oil
Castor oil derivative, obtained by the dehydraton of castor oil. Dehydrated castor oil molecule contains two conjugated double bonds and exhibits drying oil properties. See also: Castor oil

Delamination
Separation of the paint film from the surface to which it is applied or seperation of different layers of paint from each other due to poor adhesion.

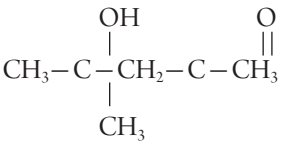
Design quality
Design quality is the quality of a product, or a

service determined by the total set of product / service qualifications intended during the design stage. For example, during the design of a paint to provide lon-term rust prevention to metallic articles, the primary objective is to obtain a very good adhesion. However, when painting certain newly produced machinery or bench-like metal objects for overseas transportation and installation, the paint needs to protect against impacts, scratches, and rust and then be easily removable once installed. This requires the paint to have a limited adhesion to the substrate. Therefore, the different adhesion performances of two paints produced for these two different purposes are not signs of superiority or weakness but a reflection of the difference in in design qualities. See: Peelable coatings See also: production quality

Dew point
Dew point is the temperature to which air must be cooled to become saturated with water vapor it already contains. When further cooled, the airborne water vapor will condense to form liquid dew.

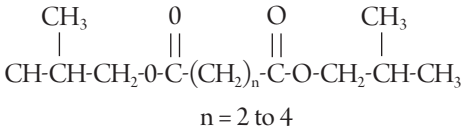
Dewetting
A coating defect observed when it fails to form a continuous film and withdraws during or after being applied to the surface. Dewetting occurs when surface tension of wet coating is lower than that of the application surface.

Diacetone alcohol
A solvent, having both ketonic and alcoholic functional groups. Diacetone alcohol is obtained by condensation of two acetone molecules and used as a solvent in cellulose derived resins and epoxy based coatings.
Chemical name: 4-hydroxy-4-methyl pentane-2-one.
Chemical formula: $C_6H_{12}O_2$



Boiling point: 167,9°C; evaporation number relative to ether: 135; specific gravity: 0,938; refractive index: 1,4241; flash point: 58°C

Dibasic ester
A blend of dimethyl glutarate, dimethyl succinate and dimethyl adipate which is a good solvent for polyester resins. Mixing ratios of three esters differ by the solvent producer. Typical composition and some properties of a widely used product of Invista, named DBE, are given below:
Typical chemical composition:



n = 2 to 4

Dimethyl glutarate 59%
Dimethyl succinate 20%
Dimethyl adipate 21%

Boiling range: 196-225°C; evaporation number relative to ether: >100; specific gravity: 1,092; refractive index: 1,423; flash point: 103°C

Diethyleneglycol monoethylether
See: Ethyl diglycol

Dilatant fluids
Fluids that undergo a viscosity increase upon exposure to shear force (e.g., during mixing)
See: Shear thickening fluids

Diluent
Although their solvency is moderate, diluents do not reduce the dissolving power of strong solvents when mixed with them. Diluents are added to thinners to reduce cost.

Dilution ratio
Mass percent of the thinner that needs to be added to a wet coating to bring it to the required viscosity. Synonym: Thinning ratio

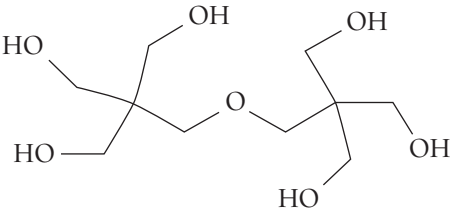
Dimensional change
Dimensional change especially in wooden and metallic materials due to shrinkage and expansion. Dimensional changes in metal materials are related to their higher thermal expansion coefficients and occur as expansion and shrinkage with varying ambient temperatures. In wood surfaces, dimensional change is due to the swelling of the material by water absorption at humid conditions

and shrinking due to loss of humidity in dry conditions.

Dimensional change of wood
See: Dimensional change

Dip coating
See: Dipping applications

Dipentaerythritol
A byproduct formed during the synthesis of pentaerythritol. Its presence in alkyd and polyester compositions is usually due to impurities in pentaerythritol rather than deliberate choices. Yet, due to its high functionality (F=6) it is a useful building block in the production of fast drying low molecular alkyd resins.
Chemical name: 2-[[3-hydroxy-2,2-bis(hydroxymethyl)propoxy]methyl]-2-(hydroxymethyl) propane-1,3-diol Chemical formula: C10H22O7



Diphenylol methane
See: Bisphenol F

Diphenylol propane
See: Bisphenol A

Dipping applications
A coating application performed by dipping the object into a vessel or tank filled with wet paint at application viscosity. Possible coating defects such as sagging, settling, foaming and uneven film thickness are tried to be prevented by maintaining control over the application parameters.

Direct heating convection ovens
Paint drying ovens which heat up through the supply of hot combustion gases are called "Direct heating convection ovens"; and this heating method is called "direct" heating". It is known that the nitrogen oxides (Nox's) present in the combustion gases trigger the degradation of organic polymers. Consequently, intercoat adhesion failures may be observed between the primers cured in direct heating ovens and the topcoats applied on them, due to polymer degradation at the surface of the former. See also: Indirect heating convection ovens/Convection ovens

Direct roller application
Roller application is a technique used for the application of wet paint on flat panels or sheets moving on a conveyor system. In direct roller applications, the "application roller" rotates in the same direction with the flow direction of the conveyor, hence, relatively lower shear forces are applied in these applications. Therefore, direct roller applications are suitable only for primers and non-glossy topcoats. See also: Roller coating applications/ Reverse roller application

Direct-to-metal (DTM) coatings
Coatings suitable for direct application to metal without using a primer.

Dispersants
See: Wetting and dispersing additives

Dispersion
1) Fine and homogenous distribution of a substance in a continuous phase. 2) A homogeneous and stable mixture obtained by a dispersion process.

Dispersion of pigments and extenders
The process of breaking down pigment and filler aggregates and agglomerates in a binder and solvent medium. Dispersion of pigments and extenders is generally carried out using high-speed dispersers and wet mills.

Distinctness of image (DOI)
DOI is one of the major three concepts determining the quality of the reflected image. Low DOI is an important defect for automotive OEM and car repair coatings. Low DOI is perceived as reduction in sharpness and distinctness at the edges of the reflected image. Measurement of DOI is performed by DOI-meters produced by some equipment manufacturers. Low DOI can arise from light scattering caused by semi-crystalline additives or binders in the coating film, or by tiny wrinkles on the surface of the coating.

Dolomite
Rocks formed by the co-precipitation of calcium and magnesium carbonates are called dolomite ($CaCO_3.MgCO_3$). The extender obtained by grinding this mineral is used in exterior architectural coatings.
Refractive index: 1,60; Specific gravity: 2,90.

Driers
The general name for organic coating additives that catalyze the oxidative drying processes. Almost all commercial driers are metal soaps that can dissolve in coating solvents. Among the main driers cobalt, manganese, lead, zinc, zirconium, and calcium soaps made with octoic and naphtanic acids. On the other hand, concerns over the use of lead- and cobalt-based drying catalysts have led to the exploration of alternatives. Organometallic complexes of manganese and iron are the most notable alternatives developed so far. Synonym: Siccatives

Dry bulb temperature
If the thermometer bulb containing mercury or alcohol is in direct contact with air, measured temperature is called dry bulb temperature. See also: Wet bulb temperature/Dew point.

Dry film conductivity
The first primer coat applied to plastic substrates need to provide sufficient electrical conductivity if the succeeding layers will be coated by electrostatic spray applications. On the other hand, cases or boxes which will contain electronic components are required to be free from charge accumulation which could cause signal disturbances. Therefore, the paint films formed on such substrates is expected to ensure rapid discharge of static charge.

Dry film thickness (DFT)
Thickness of the dried/cured coating films. Dry film thickness can be measured either by destructive or nondestructive methods. Dry film thickness values are typically reported in micrometers or mils (one thousandth of a inch).

Dry to handle
The state in paint curing in which the paint film on applied on an object gets sufficiently hard not to be damaged by firm grasping, handling, raising and pushing during the assembly of the objectetc. Since, different parameters come into play during the assembly of each painted object, ; customized test methods are often used instead of a standard method.

Dry to stack
The drying condition necessary for painted parts to be stacked is called aa "dry to stack". In order to measure dry to stack time, coated pieces are stacked so that coated surfaces contact each other and are subjected to a constant pressure (e.g. 50 kg/m^2) applied by a weight for 24 hours. Afterward, it is checked whether they can be easily separated and if any defects, such as peeling, appear on the separated surfaces.

Drying alkyd resins
Alkyd resins with fatty acids that contain two or more unsaturation tend to form films that harden with air oxygen. Alkyd resins, containing fatty acids with average drying index of 70 or higher, are generally classified as drying alkyd resins.

Drying index
For the definition of drying oils, Grieves' "drying index" is widely accepted:
Drying index= (Percentage of fatty acids with 2 double bonds) + 2 x (Percentage of fatty acids with 3 double bonds)
Oils having a drying index greater than 70 are classified as drying oils. Grieves' formula cannot be applied to oils containing conjugate unsaturated fatty acids. "Iodine value" is also used to indicate drying tendency.

Drying oils
Natural vegetable oils that contain unsaturated fatty acids connected to three hydroxyl groups of glycerine molecule. Drying oils react with the oxygen in the air and polymerize by opening the double bonds in the fatty acids, causing them to dry.

Drying time
The drying time is the period required for the applied wet paint to reach the desired level of dryness. Depending on the required level of drying, different drying times can be mentioned, such as dust-free drying time, dry-to-touch time, dry-to-assembly time, dry-to-stack time and chemical drying time etc.

Dry-through
According to the SSPC definiton, a film is considered to be dry-through when no loosening, detachment, wrinkling, or other distortion of the film occurs when the film surface is pressed by the thumb that is simultaneously turned around an axis perpendicular to the film. During the process, the operator's arm, from wrist to shoulder, should not be bent, and maximum force should be applied.

Dust-free drying
Dust free drying is defined as the shortest time which a dust dropped on a wet film will no longer stick to the surface. A commonly used test method defines dust drying time as the time when the paint no longer transfers to a finger lightly touched to the surface. If this method is employed, before starting, the point finger should be wiped with a rag wet with acetone and the moisture and skin oil on the finger should be removed. In a less subjective method cotton fibers are dropped on the wet test film from a height of 15 cm. After 10 seconds, cotton fibers are tried to be removed by blowing over the test film. If no marks are left on the film, then stopwatch is stopped; and the period of time and temperature are recorded (e.g., Dust-free drying time= 5 minutes at 25°C).

Dyestuff
Transparent colorants which transmit the incoming light withot scattering. Dyestuffs are soluble in water and/or some organic solvents. Dyestuffs are, in principle, have lower outdoor durability than pigments.

Edge cutting
During the production of wooden materials, if the cutting is done parallel to the grain direction of wood, the cutting pattern is called "edge cutting". See also: End Cutting

Effect pigments
Pigments added to coating formulations to give the coated surface additional appealing properties other than color. Flaky aluminum pigments and mica-based pigments are commonly used for this purpose. There is a special aesthetic expectation in metallic and pearlescent basecoat applications: the flip-flop property. This coating property, formed by the allignment of aluminum or pearlescent platelets parallel to the surface, leads to a mirror-like appearance when viewed head-on, and to a dark color appearance when looked from a very low angle. The use of transparent binders enhances the flip-flop effect.

Elastomer
Natural or synthetic polymer that can be elongated to at least two times of its length at room temperature and can recover to its original length after removal of force. Vulcanized rubber usually demonstrates elastomeric behaviour.

Electrical conductivity of paint
See: Conductivity

Electrical resistance
A term generally used in coatings industry to describe the electrical resistivity of wet paints. In order for the wet paint to be sprayed by electrostatic methods, it has to reach the cathodized substrate with the help of coulombic attraction. For this purpose, electrical resistance of the wet paint should be decreased to make it sufficiently conductive. See also: Dry film conductivity

Electrochemical impedance spectroscopy (EIS)
A technique usually based on the appication of an AC potential to an electrochemical cell, the measurement of the resultant current through the cell, and calculation of the impedance (Impedance refers to the frequency dependent resistance to current flow of a circuit element). Use of EIS in paint industry is typically in predicting the corrosion behaviour of a coated metallic objects.

Electrodeposition coatings
A coating material composed of charged colloidal particles in an aqueous medium filled in an electrolytic bath, which migrate towards the oppositely charged electrode under the influence of the applied electric field (electrophoresis) and deposit on the electrode surface.

Electrogalvanic coating
The process of coating of iron-based surfaces with zinc by connecting them as the cathode in an electrolysis circuit filled with an electrolyte rich

in zinc ions. Through electro-galvanization, the iron-based surface gains corrosion resistance as the zinc layer on top protects it by acting as a "sacrificial anode" that undergoes oxidation.

Electron beam curable coatings
UV-curable coatings and electron beam-curable coatings are two popular subgroups of radiation-curable coatings. Electron beam-curable coatings are based on the exitation and ionization of specially designed resins using high energy electrons to initiate cross linking reactions.

Electrophoresis
The phenomenon of electrically charged emulsified particles suspended in water migrating toward the oppositely charged electrode and accumulating on its surface when an electric current is applied. If the migration of the material involves the movement of positively charged particles towards the cathode, the process is called cataphoresis. Similarly, processes in which negatively charged emulsion particles move towards the anode are referred to as anaphoresis.

Electrostatic spray applications of powder coatings
In these applications, powder coating fluidized by mixing it with air and sprayed using a powder gun with a nozzle. A high voltage of 40-100 kV connected to a negative electrode at the nozzle ionizes air molecules. This cloud of ions is called "corona". Powder particles pick-up anions when passing through the corona and become negatively charged. Since the object to be coated has become anode because of grounding, it attracts particles to its surface. Particles are neutralized when they reach the surface. Loose powder coating film, turns to a tough and durable continuous film with good adhesion after baking.

Electrostatic spray coatings
In electrostatic paint applications, the conductive object to be painted is connected to an electronic circuit as the positively charged electrode, and the paint to be sprayed is either negatively charged or surrounded by a cloud of ionized air in order to direct the spray particles onto the object. Electrostatic spray coating is used for both wet and powder coatings.

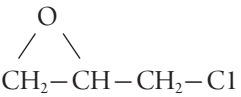
Emulsifier
A surface-active substance used to facilitate the stable dispersion of a liquid in another immiscible liquid as suspended particles.

Emulsion
A system formed by the suspension of a liquid in another immiscible liquid as fine droplets. The size of the diameters of dispersed droplets can range between 10 µm and 100 µm.

Enamel
A topcoat which forms a a smooth and glossy film.

End cutting
During the production of wooden articles, if the cutting direction is perpendicular to the grain direction of wood, it is called "end cutting" or "cross cutting". See also: Edge cutting

Epichlorohydrin (ECH)
A compound used in the production of epoxy resins and epichlorohydrin rubber.
Chemical name: Chloromethyloxirane
Chemical formula: C_3H_5ClO



Boiling point: 116°C

Epoxide groups
See: Oxirane group

Epoxy ester resins
An organic coating resins obtained by the reaction of Bisphenol A based epoxy resins with fatty acids. Air drying or oven drying epoxy resins can be synthesized depending on the type of fatty acid used.

Epoxy resins
Resins containin two or more epoxide groups at both ends of the polymer chain. The most commonly used type is produced by the reaction of epichlorohydrine (chloromethyl oxirane) and bisphenol A (diphenylolpropane). Liquid or solid epoxy resins can be produced depending on the length of the polymer chain. In the field of organic coatings, epoxy resins are crosslinked with polyamides, polyaminoamides,

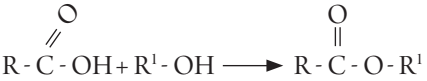
isocyanate compounds, amino resins and ketimines. They are used in the production of organic coatings with exceptional adhesion, chemical resistance, and corrosion resistance.

Epoxy-ketimine based coatings
Epoxy based coatings where ketimine compounds are used as hardeners. Cross-linking occurs through the typical epoxy-amine reaction when ketimine decomposes into amine and ketone in the presence of water or moisture. See also: Moisture curing coatings

Epoxy-polyamide based coatings
Two component coatings containing epoxy resin (s) in the first component, and polyamide resin (s) in the second one.

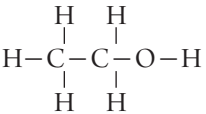
Erichsen deformation test
See: Deep cupping

Esters
Organic compounds formed by the condensation reaction of organic acids and alcohols.



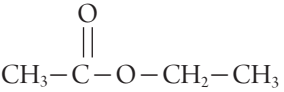
Etching
Treatment of paint application substrates with an acid or a chemical solution in order to remove the loose particles, and provide a suitable profile for paint application.

Ethanol
A two-carbon alcohol derived from ethane by replacing one of its hydrogen atoms with a hydroxyl group.
Ethanol, just like methanol, is not a strong solvent for most of the coating polymers. However, its mixtures with aromatics can result in high solvent efficacy.
Chemical name: Ethyl alcohol
Chemical formula: C_2H_5OH



Boiling point: 78,3°C; evaporation number relative to ether: 8,3; specific gravity: 0,789; refractive index: 1,3614; flash point: 12°C

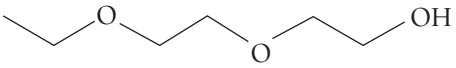
Ethyl acetate
An ester which is a strong solvent for a wide range of coating polymers including many cellulose derivatives, polyvinyl acetates, and polyesters.
Chemical name: Acetic acid ethyl ester
Chemical formula: $C_4H_8O_2$



Boiling point: 77,2°C; evaporation number relative to ether: 2,9, specific gravity: 0,901; refractive index: 1,3725; flash point: –4°C

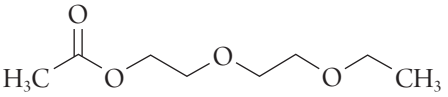
Ethyl cellulose resins
Water soluble cellulose ether resins obtained by the reaction of cellulose with ethanol. They are used as binders and thickeners in water-borne architectural coatings.

Ethyl diglycol
An ether alcohol "tail solvent", used as a drying retarder in coatings based on cellulose derivatives, epoxy resins, and polyester resins.
Chemical name: Diethylene glycol mono ethyl ether; 2-(2-ethoxyethoxy) ethanol (also known by the commercial name Carbitol)
Chemical formula: $C_6H_{14}O_3$



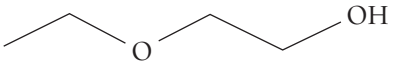
Boiling point: 202°C; evaporation number relative to ether: ~1200, specific gravity: 0,990; refractive index: 1,4270; flash point: 90°C

Ethyl diglycol acetate
A tail solvent used to retard drying in coatings based on cellulose derived resins, polyester resins and short oil alkyds.
Chemical name: Diethylene glycol mono ethyl ether acetate; 2-(2-ethoxyethoxy) ethyl acetate.
Chemical formula: $C_8H_{16}O_4$



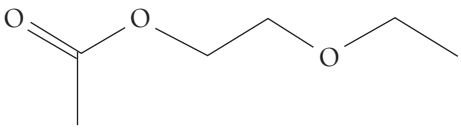
Boiling point: 217°C; evaporation number relative to ether: >1200, specific gravity: 1,009; refractive index: 1,4213; flash point: 98°C

Ethyl glycol
An ether alcohol used to dissolve nitrocellulose, polyvinyl alcohol, epoxy resins and many natural resins. Its use is limited due to possible health risks.
Chemical name: Ethylene glycol mono ethyl ether, ethoxy ethanol (also known as Cellosolve or oxitol)
Chemical formula: $C_4H_{10}O_2$



Boiling point: 135°C; evaporation number relative to ether: 43, specific gravity: 0,930; refractive index: 1,4081; flash point: 42°C

Ethyl glycol acetate
An ether acetate also used to dissolve polyester and short oil alkyd resins, besides being used for the same applications as ethyl glycol. Its use is limited due to health concerns.
Chemical name: Ethylene glycol mono ethyl ether acetate; ethoxy ethyl acetate (also known as Cellosolve acetate).
Chemical formula:
$CH_3CH_2OCH_2CH_2O_2CCH_3$



Boiling point: 156,2°C; evaporation number relative to ether: 60, specific gravity: 0,975; refractive index: 1,4058; flash point: 51°C

Ethyl silicates
Group of coating binders obtained by reaction of silica with ethyl groups. Ethyl silicate-based coatings are known with their high corrosion resistances. Most widely used example is tetraethylorthosilicate monomer. They are used in the production of zinc-reach waterborne primers.

Ethylene glycol
Type of polyol that is obtained by hydration of ethylene oxide. It is widely used in the production of alkyd and polyester resins. Also widely used in closed circuit anti-freeze solutions.
Chemical name: Ethane-1,2-diol
Chemical formula: $(CH_2OH)_2$

Boiling point: 197°C; specific gravity: 1,113; refractive index: 1,4310; flash point: 110°C Synonym: Monoethylene glycol (MEG)

Ethylene propylenediene (EPDM) rubber
Type of synthetic rubber. Tailor-made plastics with adjusted strength, flexibility and brittleness are obtained by the preparation of alloys of polypropylene and ethylene propylenediene polymer (PP/EPDM) at various ratios. PP/EPDM alloys are most widely used in automotive bumpers.

Evaporation number
"Evaporation number" is defined as the ratio of time it takes for a certain amount of a solvent to evaporate under specific temperature, relative humidity, and airflow conditions compared to the time it takes for the same amount of a reference solvent to evaporate under the same conditions. The reference solvents are either diethyl ether (DIN 53170) or n-butyl acetate (ASTM 3539).

Evaporation rate
The coefficient indicating how much faster a solvent, or a solvent blend evaporates compared to a reference solvent. DIN 53170 which defines diethyl ether as reference solvent, ans ASTM 3539 which defines n-butyl acetate as reference solvent are the most widely adopted methods used in Europe and in USA, respectively. These two methods have different details. See also: Evaporation number.

Explosion limits
When the concentration of flammable chemicals, including solvents, in the air reaches a treshold level, the gas mixture explodes in case a spark occurs nearby. The flammable concentrations leading to explosion are referred to as explosion limits. The lowest flammable concentration enough to cause an explosion is called Lower Explosion Limit (LEL).

On the other hand, when the flammable concentration exceeds a certain level, the ratio of oxygen in "air-flammable mixture" becomes insufficient to cause explosion. The highest flammable concentration that can still cause explosion is called Upper Explosion Limit (UEL).

Extenders
A general name for non-functional micronized powders employed in coating formulations. Among the widely used extenders are some natural mineral powders (baryte, calcite, talc, kaolin, mica) and some syntheticly produced ones (Blanc fixe, lithopone). While the primary reason for using extenders is cost reduction, they can also be used to improve certain paint properties. Extenders used in clear coatings should be colorless and should have a refractive index close to that of the binders to have a colorless and transparent look.

Exterior wall coatings
Architectural coatings applied to the exterior surfaces of building walls are called exterior wall coatings.

Fading
Fading is the degradation of paint pigments by exposure to outdoor effects, especially UV radiation and chemicals. This degradation results in a reduction in color saturation.

Faraday cage
During electrostatic spray applications, electrical field lines, formed between spray gun and coated object, prevent the coating from reaching some cavities on the object. Formation of electrical field lines in a cage form preventing the transfer of coating to the inner surfaces of the cage is called the "Faraday Cage".

Fatty acids
Acids that form oils by the esterification with polyols. Majority of fatty acids are "vegetable fatty acids" which esterify with by glycerol, and form vegetable oils. Monofunctional vegetable oils having 18 Carbon chain in their backbone are classified according to the number of C=C bond they have, as drying, semi-drying and non-drying. Fatty acids are widely used in paint industry for alkyd resin production.

FDA
See: Food and Drug Administration (FDA)

Feeding roller
The middle roller used in a three-roller paint application system (between the pick-up roller and application roller). See also: Roller coating applications

Film formation
Liquid paint is transferred to the substrate by different application methods, after which the thin liquid layer is converted to a dry film as a result of physical and/or chemical processes. In powder coatings, the applied powder layer is thermally liquified and then converted to a solid film. Major physical processes playing role in film formation are evaporation (in solventborne and waterborne coatings), coalescence (in waterborne coatings), and melting (in powder coatings); while the major chemical conversion process is polymerization by crosslinking. Autooxidation, UV curing, oven curing are some examples of chemical conversion processes.

Film formers
A group of coating raw materials, also called binders, employed to form continuous and cohesive films. See also: Binder

Filtration
The mechanical separation of solid particles from the liquid medium through a filter that limits certain particle size to pass. See also: surface filtration /In-depth filtration

Filtration by cartridge filters
Filtration of liquid coatings with "in-depth filtration method" using porous cartridge filters that have pores with controlled sizes. Cartridge filters with pore sizes ranging from 1µm to 100µm are used in the filtration of paint.

Fineness of grind
Upper limit of the particle size range obtained after dispersion. Fineness of grind is usually determined using two gauges: Metric gauge and Hegman gauge. Metric gauge directly reads the size of the detected particles in micrometers. Whereas the scale of hegman gauge is based on Hegman units ranging from 8 (0 µm) to 0 (101,6 µm). The

interval between two subsequent Hegman units equals to 0,5 mil or 12,7 micrometers.

Fir (in latin: Abies Sp. Mill)
Its wood is coarse and lacks resin ducts. Timber yellowish white and matt. Owing to distinctive growth rings with minimal color differences, it is also used as veneer.

Fisheye
The coating defect described by a crater appearance caused by an incompatible liquid with a lower surface tensionin the coating. As the fisheye defect is caused by a liquid contaminant such as a droplet of incompatible silicon oil or an undissolved polymer, no solid residue is observed in the center of the crater.

Flame retardant coatings
Flame retardant coatings retard fire by (a) reducing the rate of flame spread, (b) resisting combustion when exposed to high temperatures, (c) insulating the substrate they are applied to. The latter function is efficiently accomplished by intumescent coatings which form, when heated, a thermally insulating foam layer, and protect the underlyingn substrate from fire.

Flash point
The temperature at which a solvent, solvent mixture or solvent borne paint is heated to ignite when exposed toa a spark. Flash point test performed by exposing a heated solvent to a spark in an open cup is called "open cup flash point test", whereas if the solvent in a closed cup is exposed to a spark the test is called "closed cup flash point test".

Flash-off
Process of keeping the oven-baked wet paint at a lower temperature for a while before baking to ensure that fast evaporating solvents leave the coating film. This process is also called "pre-drying".

Flattening additives
Mattness, which is the scattering of incident light in a broad range of angles can be imparted using some additives. These additives, which are also called flattening agents are primarily micronized silica particles and particles of various types of polymer waxes. Synonym: Matting additives/ Matting agents

Flexibility tests
Certain mechanical tests applied to determine the flexibility of dry coating film. Flexibility tests are carried out by deforming the paint film along with the panel it is applied to, either slowly as in bending and deep-drawing tests or rapidly as in impact tests. Flexibility tests also provide information about the thoughness of the coating film.

Floating
Floating is a term used to describe a mottled, splotchy, or streaked appearance on the surface of the paint film. Floating is due to separation and uneven distribution of different pigments in the paint. Difference between floating and flooding is that, in flooding, one or more pigments migrate to the surface at different rates. As a result, color changes occur along the depth of the film On the other hand, in floating, color variations may occur in different areas of the panel and do not develop deeply within the paint film.

Flocculate
Pigment lumps formed by the coalescence of pigments at their edges and containing resin and solvent in their interspaces. Flocculates generally arise from reagglomeration of previously dispersed pigment particles. See also: Clusters of pigments and extenders

Flocculation
Reagglomeration of previously grinded and dispersed pigments, as a result of unstable dispersion process. Lumps of pigments formed by this way are called flocculates. See also: Flocculate

Flooding
Flooding is the color change along the depth of the paint film due to differences in the mobilities of pigments (or pigment flocculates) exist in the formula. Differences in the size of pigments and/or flocculates, and of their densities are the primary factors contributing the flooding phenomenon.

Flow coating applications
A paint application technique where the paint is poured on the surface of the object to be painted using a hose. Remainders of the poured coating is then collected in a bottom reservoir and recirculated for further applications.

Flow cups
Cylindrical cups, with an inner volume around 100 ml, with flat or conical bases and holes at the bottom, used to measure fluid viscosity. There are various flow cups defined by various standards (e.g. DIN cups, ISO cups, Ford cups, Afnor cups, Iwata cups)

Fluid
The general term for substances that demonstrate flow chaacteristics. Liquids and gases are fluids.

Fluidized bed coating
A coating method used in powder coating applications. The article to be painted is preheated or electrostatically charged prior to application and dipped in a bed of powder coating particles fluidized by mechanical vibration or by air flow. The article with powder coating particles adhered on its surface is then heated in an oven in order to convert the adhered layer into a uniform coating film.

Fluorescence
Most of the opaque objects absorb some of the light they are exposed to and reflect the rest, while they return the light energy they absorbed to the surrounding in the form of heat energy. There are few objects, however, which return some part of the energy gained from the light they absorbed, again in the form of light but at a higher wavelength. This phenomenon is called flourescence.

Fluorescent pigments
Flourescent pigments, after absorbing the UV spectral part of the light, return part of this energy in the form of a blue light. Therefore, flourescent pigments emit more visible light than they are exposed to.

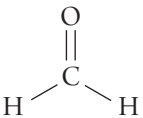
Fluorocarbon surface additives
Similar to polysiloxane surface additives; fluorocarbon surface additives, having low surface tensions and compatibility with the coating formulation, migrate to the surface to avoid formation of film defects.

Fluoroplymers
General name for polymers, structural units of which contain fluoro compounds. Polytetrafluoroethylene (PTFE), polyvinylidendifloride (PVDF or PVF2) and polyvinylidenfloride (PVF) can be mentioned among the main fluoropolymers that are used in organic coatings. Fluoropolymers have superior resistance to light, heat, and chemicals.

Foam stability
Foam stability is defined as the resistance of bubbles, caused by air trapped in the wet coating during production or application, to burst and vanish. It is known that silicon additives increase the foam stability if they are highly compatible with the coating and effectively decrease the surface tension.

Food and drug administration (FDA)
The U.S agency that arranges the standarts, norms and recommendations related to food and drug. FDA is important also for the coatings industry due to its standarts and limitations about the coatings applied to food contact surfaces.

Formaldehyde
Reactive gas obtained by catalytic oxidation or dehydrogenation of methanol. Exposure to formaldehyde can cause irritation of the skin, eyes, nose, and throat. High levels of exposure may cause some types of cancers.
It is the basic structural unit used in production of various resins such as melamine formaldehyde, urea formaldehyde, phenol formaldehyde etc.
Chemical name: Methanal
Chemical formula: $CH_2=O$



Boiling point: –21°C
See also: Paraformaldehyde

Framing
Frame-like appearance caused by higher coating thickness on the edges of the coated object. This phenomenon occurs because evaporation is faster at the edges due to more interface presence. Since solvents have lower surface tension values than the rest of the paint ingredients, surface tension of the remaining wet film is higher at edges, and consequently, paint accumulates next to the edges of the application surface. See also: Marangoni effect

Free radical polymerization
The most common type of addition polymerization. The monomers transform into free radicals and become activated with the help of an initiator, and the polymerization starts.

Free volume
The volume difference between the net volume occupied by the molecules, and the total bulk volume of a polymer and its solution.

Functional group
General name for groups formed by atoms, present in the structure of a chemical compound which create a potential to have tendency to undergo chemical reactions. (e.g, –OH, –COOH, –NCO, –HC=CH–)

Functionality
Functionality is the total number of functional groups in the molecule of a chemical compound (total capacity for chemical bonding).

Fungi
Fungi are eukaryotic organisms that include microorganisms such as yeasts, moulds, and mushrooms. These organisms are classified under kingdom fungi. Fungi may grow especially in waterborne paints and destroy them.

Galon Gallon (U.S. or Imperial U.K)
A volume unit. The British gallon or Imperial gallon is equivalent to 4.54 liters; the American gallon is equivalent to 3.785 liters.

Galvalume
The name given to inorganic coatings applied by dipping cold rolled carbon steel plates or various carbon steel objects into a molten bath of aluminum, zinc, silicon alloy. These coatings are composed of 55% zinc, 43,4% aluminum, 1,6% silicone; and are also known as Aluzink or Zincalume.

Galvanic protection
See: Cathodic protection

Galvanizing
Coating carbon steel items with zinc, either by electrocoating or hot dipping (into molten zinc). The zinc layer in contact with iron-rich substrate, protects iron from corrosion while itself is oxidized due to its higher electrochemical activity.

Gasoline
A flammable liquid obtained by the distillation of crude oil which heavily includes aliphatic hydrocarbons. While its primary use is as a fuel for internal combustion engines, it is also used as a coating solvent. Besides the general-purpose gasoline, some special gasoline types, distilled at different temperature intervals, are also used as coating solvents. Depending on the characteristics of the crude oil, gasoline can chemically contain more than 120 hydrocarbon types, most of which are saturated hydrocarbons with 4 to 12 carbons on their backbone.

Gel fraction
The aim is to create an insoluble coating film through the cross-linking of binders contained in the paint. The degree of cross-linking of coating film has a significant influence on its performance throughout its service life. For its determination, a solvent or a solvent mixture is selected to dissolve the non-cross-linked binders remaining in the film. The paint film (F) scraped off the surface are subjected to vapor phase extraction with a chosen solvent or solvent mixture, separating the binders that dissolve because they have not undergone cross-linking (M), together with the components like pigments and fillers attached to them (P+E), from the insoluble cross-linked binder (X). In this case, the gel fraction can be approximately expressed as follows: Gel Fraction = mX / mX + mM

General industrial coatings
Segment of industrial coatings market that covers the sub-segments which are not classified as seperate technical or commercial groups. According to Paint Research Association (PRA) of the UK, these sub-segments are as follows: Heavy Duty Coatings, Heating, Ventilation and Air Conditioning (HVAC) Coatings; Coatings for Automotive Parts; Metal Furniture, Accessories and Connections Coatings, General Metal Industry Coatings.

Glass
A transparent or semi-transparent inorganic substance, main raw material of which is silica (SiO2). There are subtypes of glass like soda-lime-silica

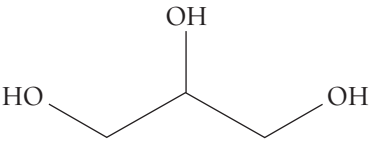
glass, borosilicate glass, phosphate glass and crystal (lead glass). Despite its high hydrogen bonding potential, glass is a difficult substrate for coatings.

Glass transition temperature
Temperature at which amorphous polymers undergo an evident transformation from a brittle glassy state to elastomeric behaviour upon heating.

Gloss
The percentage of light reflected from a surface at the same angle as the incident light is called the "specular gloss" or simply "gloss" of that surface.
Synonym: Specular gloss

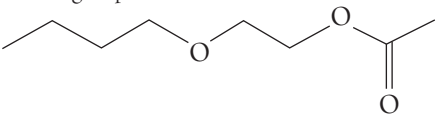
Gloss retention
A term that indicates the degree to which the gloss of an organic coating is retained after a period of service-life. Generally, gloss retention is used for high gloss topcoats and it is the ratio of the gloss after service-life to the initial gloss.

Glycerine
Glycerine is found naturally in the structure of vegetable oils and animal fats. Synthesis is achieved by the oxidation of propylene. It is the most widely used polyol in the production of alkyd resins.
Chemical name: Propane-1,2,3-triol or 1,2,3-propanetriol
Chemical formula: $C_3H_8O_3$

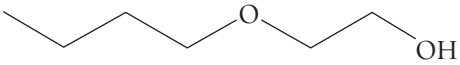


Melting point: 18,2°C; boiling point: 290°C

Glycol ether acetates
Compounds that have both ether and ester functions formed through reactions of glycol ethers with acetic acid (e.g., butyl glycol acetate, ethylene glycol monobutyl ether acetate). Glycol ether acetates are among the most widely used oxygenated solvent groups.



Glycol ethers
Glycol ethers with both alcohol and ether functional groups formed by reactions of ethylene oxide with different alcohols. An example is ethylene glycol monobutyl ether, whose molecular structure is shown below. Glycol ethers are among the most widely used oxygenated solvent groups.



Goniospectrometer
A spectrometer that carries out color measurements via detectors placed in positions to analyze the fragments of lights reflected from a colored surface at different angles. Goniospectrometers are used especially for measuring angle-dependent colors in paints containing metallic or pearlescent pigments.

Grinding
Paint production step applied to decrease the particle size of pigment aggregates and agglomerates in the fluid vehicle using mechanical energy. As the grinding of pigments used in wet paints is achieved in liquid media including resin solutions, this process is also called "wet grinding".

Grindometer
A simple laboratory device used to determine the upper limit of pigment size of coatings or semi-finished coatings. It consists of a steel block with a groove of varying depth starting from zero depth. The deeper end of the groove is filled with a few drops of liquid material, which is scraped towards the shallow end with the help of a knife. Depth of groove where the particles start to be visible is recorded as the fineness of grind.

Grounding
An operation of creating a conducting connection between an equipment or electrical circuit and earth in order to dissipate an electric current or electrostatic charge.

Group transfer polymerization
Type of polymerization where a silicon-based initiator activates the alternating ends of a polymer chain or the ends of two growing chains with a monomer throughout the polymerization process, causing the polymer to propagate from different ends. The mon-

omers used in group transfer polymerization must contain carbonyl or nitrile groups. The polymers formed in this way are also called "living polymers."

Hammertone effect
Visual effect created using metallic paints containing silicone based incompatible surface additives. Local surface energy differences caused by the incompatible nonhomogeneous silicone surface additive, create a hammered metal appearance on the dry coating film.

Hardboard
A High-Density Fiberboard (HDF) having a density around 0,9 g/cm3. It is made by adding some adhesive to chips of hardwoods like pine, oak, and beech. Hardboards produced by steam pressing, the so-called wet process, have one smooth side and one textured side to allow moisture to leave.

Hardener
The component that initiates hardening through cross-linking when mixed with the main componentcontaining the primary binder(s). The hardener may contain cross-linker(s) or a catalyst.

Hardening
Transformation of the liquid organic coating film to a tough and durable dry film. Curing may take place by (a) solvent evaporation in liquid paints, b) melting of coated powder into a film and then cooling to ambient temperature in powder coatings, (c) polymerization reactions occuring within the film in liquid or powder coatings that contain reactive resins.

Hardness
Measure of resistance of a paint film to scratch, indentation or fatigue deformation caused by a hard object.

Hardness tests
Majority of the tests used to measure the hardness of organic coatings are based on one of the following three principles: resistance to scratching, resistance to indentaition, and fatigue resistance against periodic deformation.
The most widely used scratch resistance test is the pencil hardness test. Pencils with varying hardnesses are used to scratch the paint film. The hardness of the film is reported as the grade of pencil that does not cause any scratching on the surface. In indentation resistance tests, an indenter harder than the organic coating is forced against the film under a fixed load. The size of the indentation indicates the resistance of the paint. Buchholz hardness test and Tukon (Knoop) hardness test are the most known indentation hardness tests.
The most recognized fatigue resistance test based on periodic deformation is the "Pendulum Hardness Test". In pendulum hardness test, a small but periodic force is applied to the paint film to determine how many cycles or seconds it takes for the film to suffer permanent deformation through fatigue. See also: Pencil hardness test/Buchholz hardness/ Knoop hardness/Pendulum hardness

Hazardous air pollutants
Chemicals that are suspected to cause cancer or other serious health effects. Among the HAPs is benzene which is found as impurity in liquid petroleum-based fuels, perchloroethylene, emitted from dry cleaning shops, and methylene chloride used in the production od thinners and paint removers. Moreover, dioxins, asbestos, chromium and lead compounds are also known as hazardous air pollutants. Synonym: HAPs

Haze
On the high gloss paint surfaces, the incident light coming from an angle of 20o is reflected mostly at 20o, and a small part of the light scatters around 20o. This defect is perceived by the eye as haze on the paint surface.

Heavy commercial vehicle
Motor vehicles with a minimum loading capacity of 3,5 tons. This class of vehicles include buses intended to carry more than 8 passangers (excluding the driver), and load trucks. Also called "heavy vehicle" See also: Motor vehicles

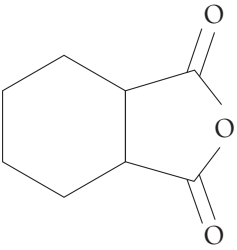
Heavy duty coatings
A general term for paints with high corrosion resistance and mechanical strength, used to protect surfaces susceptible to severe corrosion damage.

Heavy solvent naphta
A mixture of hydrocarbon solvents obtained during the distillation of aromatically rich petroleum,

boiling within the 226-285°C range. Evaporation number relative to ether: >1000; specific gravity: 0,990; refractive index: 1,591; flash point: 102°C.

Hegman gauge
Fineness of grind gauge with the deepest edge of 100 microne depth marked as "zero" and the shallowest edge of zero depth marked as "eight". Therefore, in Hegman gauge, each unit between zero to eight corresponds to a grinding fineness difference of 12,5 microns.

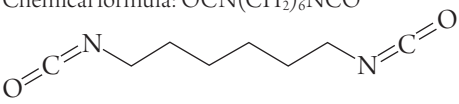
Hexahydrophthalic anhydride
Cycloaliphatic polyacid used in the synthesis of polyester resins with high exterior durability.
Chemical formula: $C_8H_{10}O_3$



Melting point: 35°C

Hexamethoxymethylated melamine formaldehyde (HMMM) resins
Monomeric melamine formaldeyde fully etherified with methanol. Its low molecular weight and solubility both in water and organic solvents make it suitable to be employed in high solid coatings. Because it is completely etherified, acid catalysts need to be added to the coating formulations in order to enhance the reaction tendency, which is lower compared to butylated melamine formaldehyde resins.

Hexamethylene diisocyanate (HMDI, HDI)
A diisocyanate used to produce polyurethane coatings with high flexibility and high outdoor durability. In coatings industry, non-volatile biuret, and trimer of HMDI are used as hardeners instead of volatile HMDI monomer for concerns related to occupational health.
Chemical formula: $OCN(CH_2)_6NCO$



Boiling point: 140-142°C Synonym: HMDI

Hiding power
Ability of any pigmented organic coating to hide or obscure the surface of the substrate. Hiding power is assessed by applying paint layers with gradually increased thicknesses over a surface with black/white contrasting stripes or squares until the difference between the contrating background colors is no longer observable. The dry film thickness at this point refers to hiding power and reported in micrometers or mils. Hiding power changes proportionally with the opacity of the applied coating film.

High density polyethylene (HDPE)
A common type of polyethylene which has a less branched structure than low density polyethylene, LDPE. Its density and crystallization ratio are higher, as well. The tensile strength of HDPE is higher but shape formation and biodegrading properties are lower than LDPE. Synonym: HDPE

High gloss paint
Paints which give films with a gloss value over 80 when measured at 60° with a glossmeter, are classified as "high gloss paints".

High speed dissolvers
High-speed dissolvers are used in the paint production, both for the pre-mixing of pigments and extenders, and for the difficult homogenization processes. Cowles type dissolver discs are typically used in high-speed dissolvers.

High temperature curable coatings
Coatings that require exposure to temperatures above ambient for the polymers in their composition to crosslink and harden.

High volume low pressure (HVLP) spray guns
Using HVLP guns high volumes of air at low preesure (0.2-0.7 atm) instead of conventional air supply of 2.5-5.5 atm air in conventional spray guns. The special channels in the spray gun enable adequate atomization by low-pressure air. Thus, rebound effect is reduced and transfer efficiency is increased due to low air pressure.

High-solid coatings
The general term for the of liquid paints with a

solid content considerably higher than that of the conventional paints. High-solid coatings are gaining attention because, due to reduced volatile content, the environmental impact is reduced, and the same dry film thickness is achieved in shorter application times. The main objective of high-solid coating formulation is to reach application viscosity by adding minimum amount of solvent.

Hindered amine light stabilizers (HALS)
The paint additives that absorb and destroy free radicals, which occur due to UV light. However, HALSs themselves decompose as well, while destroying the free radicals. Using HALS will greatly improve the exterior durability of paint.
See also: UV stabilizers

Homopolymer
A polymer is called a homopolymer if it grows by repeting a single monomer (e.g., -AAAAA-, A being the monomer). Examples are polyethylene, polypropylene etc.

Hornbeam (in latin: Carpinus Sp.L)
Its timber is dense and tough. Hornbeam timber is not suitable to use in construction carpentry and furniture production. It gives the best results in producing small scale but tough objects. It is used in flooring and production of wooden parts of laboratory equipment.

Hot rolled steel
Sheet metal products obtained by passing carbon steel billets heated above their recrystallization temperature, through a set of hot rolling cylinders.

Hot-dip galvanizing
It is the process of coating iron or carbon steel with a thin zinc layer, by passing the metal through a molten bath of zinc at a temperature of around 460 °C. Since Zinc is more prone to corrosion than iron or steel, zinc layer acts as a sacrificial anode and protects the metal it covers from corrosion.

Household chemicals
Chemicals like detergents, alcohols, ammonia, sodium hypochloride, soaps, oils, vinegar that have destructive effects on the coated surfaces of household objects such as furniture, home appliance, electronic devices, floors, walls, doors etc.

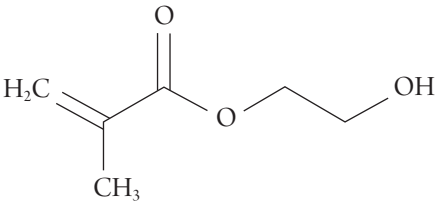
Hue
The fundamental color component that leads to the perception of color as red, yellow, green, blue, purple, etc. In addition to hue, chroma and lightness are the other components of color.
See also: Saturation / lightness

Humidity resistance
The resistance of the cured paint film to the deteriorating effects of ambient humidity. Humidity resistance of painted film is measured in closed cabinets where temperature and relative humidity is kept constant. The changes in the gloss, hardness, adhesion and appereance of the film are determined after a specified exposure period.
See also: Condensing humidity test / non-condensing humidity test

Hydrophilic
The general term for substances that tend to absorb water or a strong affinity to water.

Hydrophobic
The general term for the substances that do not absorb water or have no chemical affinity to water.

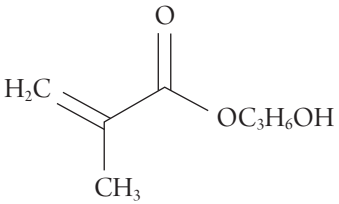
Hydroxy ethyl methacrylate (HEMA)
An acrylic monomer of ester structure which contains a primary hydroxyl group. HEMA is used in the synthesis of acrylic polymers with hydroxyl functional groups.
Chemical formula: $C_6H_{10}O_3$



Synonym: HEMA

Hydroxy propyl methacrylate (HPMA)
An ester-structured monomer used in synthesis of acrylic polymers with hydroxyl functional groups. The commercial monomer is a mixture of isomers with primary and secondary hydroxyl groups. Therefore, the acrylic polymers which employ HPMA as hydroxyl source, are less reactive than those based on HEMA. Thus, they need

more energy for the crosslinking reactions to proceed.
Chemical name: 2-Hydroxypropyl methacrylate
Chemical formula: $C_7H_{12}O_3$



Hydroxyethyl cellulose (HEC)
Cellulose derivative used as rheology modifier and thickener especially in latex based architectural coatings.

Hygroscopic
General name for subtances having tendency to adsorp and absorp water.

Impact strength
The resistance of the coated film to surface defects such as teating and delamination even under impacts that can cause physical changes in substrate. For this purpose, a ball of standard mass is dropped onto the coated surface from gradually increasing altithights. The impact strength applied at the moment when the first damage is observed is indicated as the product of the mass of the weight and the drop height (e.g., kg.cm, lb.ft etc.)

Impregnation
Saturation of the voids of a solid substance with a fluid by its penetration to the substance.

In-can preservatives
Water-soluble biocides used to protect wet paints against biodegradation (caused by fungi or bacteria) during storage.

In-depth filtration
In-depth filtration is performed using porous filtration media (e.g, porous cartridges) with a thickness much higher than the desired particle size in the paint. Paint is filtered by the retention of undesired particles in the pores of the filtering medium.

Indirect heating convection ovens
Paint drying ovens which heat up through the supply of pre-heated ambient air are called "Indirect heating convection ovens"; and this heating method is called "indirect heating". See also: Direct heating convection ovens/Convection ovens

Industrial coatings
Industrial coatings market is divided into subcategories. Prestigious UK based research institute Paint Research Association (PRA) defines these subcategories as follows: Original Automotive Paints; Automotive Refinish Paints; Motorcycle Paints; Bus and Truck Paints; Train Paints; Marine Paints; Aircraft Paints; Protective Coatings; Industrial Wood Coatings; Agricultural, Construction, and Earthmoving Machinery Paints; Coil and Extrusion Coatings; Metal Packaging Coatings; and General Industrial Coatings. Depending on the sizes of the activity areas, the above grouping is modified accordingly.
See also: General industrial coatings.

Industrial hiding
Industrial hiding refers to the hiding ability of paint applied on the actual subtrate it is applied to. It is determined by applying layers at gradually increasing thicknesses on the real substrate (sometimes a bare surface, sometimes a surface with primer of a certain color.) The color difference between a thin film and a thicker film is measured with a color measuring device. If the color difference between two succeeding layers is less than $\Delta E<0.3$, that film thickness is recorded as the "industrial hiding thickness".

Initiators
A general term for chemicals that activate the unsaturated reactive molecule by converting it into a free radical, an organic cation or an organic anion during addition polymerization. Most widely used initiators include peroxide compounds, azo compounds, alkali metal alkyls, and boron trifloride. The initiators that start to act under the influence of light energy (e.g. UV) are referred to as photoinitiators.

Inorganic color pigments
Color pigments, primarily formed by metal oxides, metal oxide mixtures and carbon black. Almost all inorganic pigments used today are produced synthetically.

Inorganic phosphate coatings
The general name for a group of surface treatments applied to increase the corrosion resistance of metal surfaces and to improve adhesion of organic coatings. Iron phosphate coatings are obtained by converting the iron atoms already present on the metal surface to iron phosphate molecules by using phosphoric acid rich compounds. On the other hand, zinc phosphate or zinc-nickel-manganese (trication) phosphate coatings are obtained by the formation of a thick crystalline layer that provides higher corrosion resistance than iron phosphate.

Instrumental color measurement
Determination of parameters that define a color using a colorimeter and spectrometer.
See also: Colorimeter / Color spectrometer

Insulating putties
Insulating putties are used in automotive OEM, and automotive refinish sectors, the aerospace industry, and the marine industry. Main purpose of using insulating putties is to prevent transfer of water, humidity, chemical, and gas by elastically sealing of edge joint points and junction points of coated objects. Furthermore, their flexible and (in some types) porous structure absorbs vibrations, providing sound insulation, and in some cases, their low thermal conductivity and (in some types) porous structure also provide thermal insulation.

Intercoat adhesion failure
A coating defect described by the insufficient adhesion observed between the successive layers of a coating system. The problem can arise when chemically incompatible layers are applied insuccession. Besides, excessive curing of the underlying layers of a coatings system may cause the degradation of surface-active additives they contain. Degraded surface-active additives may become incompatible thus accumulate at the intercoat surfaces, and consequently weaken the intercoat adhesion.

Interference colors
Light beams falling on transparent thin films with thicknesses close to their wavelength, are reflected both from the front and rear surfaces of the thin plate. These separately reflected light rays undergo a physical interaction called "interference" and perceived as different colors. These colors which are especially observed with pearlescent pigments, are called "interference colors".

Interior wall coatings
Architectural coatings applied to the interior surfaces of the building walls.

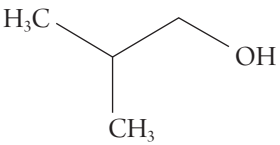
Intermediate coat
Type of coating applied between the primer and topcoat in heavy duty coating systems to achieve sufficient total thickness.

Intumescent coatings
See: Flame retardant coatings

Iodine value
The amount of iodine, in grams, required to saturate the double bonds in 100 grams of oil is called the iodine value. The iodine value generally increases in direct proportion to the oxidative drying capacity.

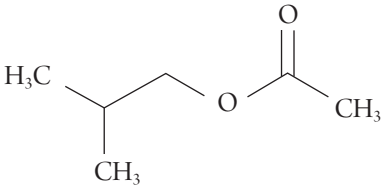
Iron oxide pigments
Natural or synthetic oxides of iron are among the oldest and most widely used pigments. Oxides with Fe2O3 structure are red (PR 101), those with Fe2O3xH2O structure are yellow (PY 42), and those with Fe3O4 structure are black (PBl 11). And mixtures of these three in varying ratios are used as brown pigments (PBr 6).
See also: Transparent iron oxide pigments.

Isobutanol
An alcohol similar to n-butanol in terms of solvent strength.
Chemical name: Isobutyl alcohol, 2-methylpropane-1-ol
Chemical formula: $(CH_3)_2CHCH_2OH$



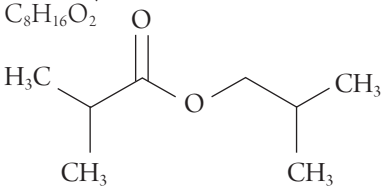
Boiling point: 108°C; evaporation number relative to ether: 25, specific gravity: 0,803; refractive index: 1,3959; flash point: 27°C

Isobutyl acetate
Type of acetate similar to n-butyl acetate in terms of solvent properties.
Chemical name: Acetic acid isobutyl ester
Chemical formula: $C_6H_{12}O_2$



Boiling point: 117,2°C; evaporation number relative to ether: 7,7, specific gravity: 0,870; refractive index: 1,3902; flash point: 18°C

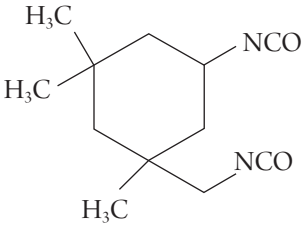
Isobutyl isobutyrate
Solvent having similar but weaker solvent properties to butyl acetate.
$C_8H_{16}O_2$



Boiling point: 140,7°C; evaporation number relative to ether: 21, specific gravity: 0,853; refractive index: 1,3999; flash point: 37°C

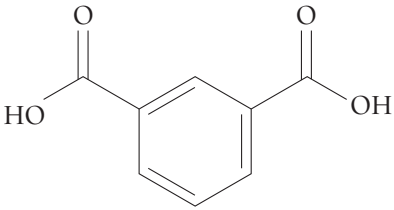
Isocyanate prepolymers
The general name for compounds with NCO functional groups, formed either by the self reaction of polyisocyanate monomers or by their reaction with monomeric poliols like trimethylol propane, water, s.o. Due to their lower vapor pressures, use of these larger molecules is safer for human health than direct use of NCO monomers.

Isophoronediisocyanate
A polyisocyanate that provides an outdoor durability to coatings as good as hexamethylene diisocyanate (HDMI), but with slightly lower flexibility.
For polyurethane coatings, its prepolymer is used instead of monomeric IPDI due to the occupational health concerns. Monomeric IPDI, like other monomeric isocyanates, partially evaporates at room temperature and leads to health risks.
Chemical name: 5-isocyanate-1-(isocyanomethyl)-1,3,3- trimethylcyclohexane
Chemical formula: $OCNC_6H_7(CH_3)_3CH_2NCO$



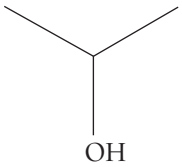
Synonym: IPDI

Isophtalic acid
Isophtalic acid is obtained by oxidation of m-Xylene. When used as a building block for unsaturated polyester and alkyd resins instead of phtalic anhydride, results in resins with better thermal and chemical resistance and mechanical strength.
Chemical name: Benzene-1,3-dicarboxylic acid
Chemical formula: $C_6H_4(COOH)_2$



Melting point: 347°C

Isopropanol
An alcohol widely used for thinning organic coating solutions when combined with aromatic solvents. On the other hand, isopropanol readily dissolves the polar resins like urea and melamine formaldehyde resins, polyvinyl acetate and polyvinyl butyral.
Chemical name: Isopropyl alcohol, propane-2-ol
Chemical formula: C_3H_8O



Boiling point: 82,4°C; evaporation number rela-

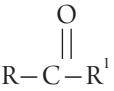
tive to ether: 10, specific gravity: 0,785; refractive index: 1,3772; flash point: 12°C

Juniper (In latin: Juniperus Sp.L.)
While it grows as a tree in hot areas, it takes the form of shrubs in colder climates. Typically, its wood is soft and durable against water, decay and pests. Used to make pencils, and its timber is used as railway sleepers.

Kesternisch test
A special corrosion test performed to simulate the resistance of coatings to corrosive effects of sulfur dioxide from chimney waste.

Ketimine
The reaction product of an aliphatic amine with a ketone.

Ketones
Organic chemical compounds containing a carbonyl group (C=O) and having a general formula given below.



Knife Putty
Name given to putties that unsaturated polyester or epoxy resins are used as binders. Knife putties are applied by putty knives and reach a very high stiffness when dried. Synonym: Polyester Putty

Knoop hardness
Knoop hardness is measured by pressing a diamond tip that carries a certain weight into an organic coating film. Hardness value is calculated by dividing the mass, that applies the weight, by the area of the resulting indentation.

Krebs–Stormer viscometer
Krebb–Stormer viscometer is used to measure the visvosities of transparent fluids. By the method, the time for an air bubble in the fluid to rise a specified height is measured and recorded as Krebs unit.

Laké
The general term given by the coaters in the Turkish furniture industry to pigmented topcoats.

Latent heat of evaporation
The amount of heat energy required to completely vaporize a unit quantity of liquid heated to its boiling point under atmospheric pressure. (unit: cal/g)

Latex binders
Binders produced by stable dispersion of solid polymer particles, primarily, natural, and synthetic rubbers, in aqueous phase.

Latex paints
Paints produced using latex binders which are aqueous emulsions of solid polymer particles

Leather coatings
Flexible coatings used to coat the processed leathers of animals such as cattles, pigs and sheep to give them a more appealing look.

Let down
The step in the paint production where other ingredients in the paint formulation are added to and mixed with pigment pastes.

Levelling
Transformation of the wet paint applied to a surface into a thin film layer due to surface tension and gravity forces. If the paint film is continuous and uniformly thick, it is said to have a good levelling. Synonim: Flow

Lifting
A film defect where a partially cross-linked dry film swells and then dries with a wrinkled leather appearance when a wet paint with strong solvents is applied on it.

Light commercial vehicle
See: Motor vehicles

Light fastness
Light fastness is defined as the durability of the components, especially dyes and pigments, in organic coatings against the degrading effects of sunlight. The term "lightfastness" is also used to describe the light resistance of a hardened paint film applied to a surface.

Lightness
One of the three components used to define

a color (the other two are hue and saturation). Highest lightness corresponds to white, while lowest lightness corresponds to black. Therefore, by lightness of a color refers to its lightness or darkness along the black-and-white axis. See also: Hue, and Saturation.

Lineer polymers
See: Chain polymers

Linseed oil
Type of vegetable oil obtained from linseed and used in organic coatings for over a thousand years. Linseed oil contains 52% triene linoleic acid, 16% diene linoleic acid and 22% monoene oleic acid. Because linseed oil is a drying oil, it can either directly be used as a paint binder, or as a raw material for drying alkyd resins.

Lithopone
BaSO4.ZnS mixed Crystal. Refractive index: 1,84; specific gravity: ~ 4,3; oil absorption value: 11-17 g/100 g lithopone. Lithopone is a white extender with poor hiding power, and it is produced by the coprecipitation of barium sulfate and zinc sulfide.

Living polymers
See: Group transfer polymerization

Local corrosion cells
Since a perfect homogenization can not be reached in materials, there are many anodic and cathodic regions on a surface of every alloy or metal with some level of of impurity. Hence, these neighbouring regions that have different compositions and therefore different oxidation potentials act like opposite electrodes of an electrical circuit. If a liquid layer, even as thin as a humidity layer is formed on the surface of this metal, this circuit acts as an electrochemical cell. This type of a cell is referred to as a "local corrosion cell".

Low Density Polyethylene
Type of polyethylene with a more branched structure compared to high density polyethylene (HDPE), resulting in larger volume and thus lower density. LDPE has a lower crystallinity and tensile strength than HDPE, but higher formability and biodegradability. Synonym: LDPE

Low Volume Low Pressure (LVLP) spray guns
Spray guns designed to atomize the wet paint using less air by mixing the paint in the gun with air at less than 0,7 atm positive pressure. LVLP spray guns are used for high transfer efficiency and high surface quality.

Lower explosion limit
See: Explosion limits

Luminescent pigments
Luminescent pigments are synthetic crystalline compounds with the property of emitting light with lower energy than the absorbed light, after a slight delay. There are two types of luminescent pigments: fluorescent and phosphorescent pigments. The time interval between the two events is in the order of microseconds or shorter for the fluorescent pigments, and longer for the phosphorescent pigments.

Mahogany (in latin: Swietenia Macrophylla)
Its wood is tightly structured and has low flexibility. It is easy to work with and has a rich grain. Therefore, it is one of the best woods for painting. It shows a great resistance against changing weather conditions. Its drying quality is good and is suitable for carving and lathing.

Maintenance coatings
A coating which is designed to protect highway and railroad structures, manufacturing plants and their equipment, public utilities, and other, heavy-duty industrial facilities and equipment from deterioration.

Maple (In latin: Acer Sp.L.)
Its wood is heavy, light-colored, and hard. It is easily processable with hand tools and machines, resulting in smooth surfaces. Used in the production of rotary-cut or sliced veneer sheets. Veneer sheets with a particularly wavy appearance is traditionally used the furniture industry, in the manufacture of parquets, musical instruments, violin backs, pulley wheels, brush handles, food containers, and marquetry.

Mar resistance
Mar resistance refers to the resistance of a hardened paint film to being affected by the "mar ef-

fect." The mar effect is defined as the formation of permanent marks on a hardened paint film due to mechanical rubbing. What distinguishes the mar effect from the scratching effect is that the marks on the film do not turn into deep tears. In matte paints and varnishes, the mar effect is generally observed as localized increases in gloss.

Marangoni effect
When a half-full bottle of wine is turned upside-down with its neck sealed, it can be observed that the wine starts to "climb" the side walls of the bottle. The physicochemical mechanism lying under this phenomenon was explained in the early 1900's by the Italian physicist Carlo Marangoni and is known as "Marangoni Effect". The surface tension and evaporation number of of pure ethanol are higher than those of water. Due to its low surface tension, the ethanol concentration at the surfaces becomes higher compared to that in the bulk. And it evaporates more rapidly than water component at the surface of the thin film formed on side walls. Resultant decrease in ethanol concentration increases the surface tension of the thin film. In conclusion, the surface tension difference between the bulk and the thin film triggers a material flow from the alcohol-rich bulk to the thin film.

Marine coatings
Coatings with superior corrosion and water resistance used in the coating of yachts, commercial vessels, military ships and containers for the transportation of goods by sea.

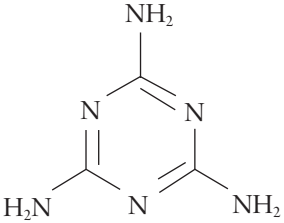
Mastic
The general name for putty-like elastic organic coating materials containing high amount of extender. They elastically fill the junction points or the whole surface of objects, to impart protection against water and chemicals and to provide heat and sound insulation.

Mattness
Mattness occurs in case some of the incoming light is reflected from the surface by scattering. Paints and clear coats are classified according to the mattness they have as silk matt, semi matt or satin matt, flat and eggshell matt. However, there are no universally accepted industry standards for the brightness levels corresponding to these mattness classes. A common misperception is that matt surfaces reflect less light. However, a matt surface reflects the same amount of light with the glossy surface of the same color. The difference is that light reflected from matt surfaces reaches the eye from all angles, whereas light from a glossy surface reaches the eye from the angle equal and opposite to the incidence angle. It is the color of the surface but not the gloss which determines the amount of reflected light reaching the eye.

Medium density fiberboard
A sheet product formed by drying steam-fibered chips under hot pressing with the addition of urea formaldehyde binder and a small amount of paraffin wax. MDF has a typical density of 600-800 kg/m^3. Since the wood chips in MDF are shredded into long fibres, mechanical strength and humidity resistance of MDF is higher than other fiberboards like chipboard. It is used in the production of kitchen and bathroom cabinets, drawers, shelves, bookshelves, office furniture and interior decoration works. Synonym: MDF

Medium heavy solvent naphta
Mixture of distillation products composed predominantly of aromatics. Chemical structure: No definite chemical structure. Boiling range: ~180-210°C; Evaporation number based on the ether: 115 (for Solvesso 150), 148 (for Shelsol AB); Specific gravity: 0,894-0,895; Refractive index: 1,512; Flash point: 62°C

Melamine
Symmetrical triazine compound synthesized by heating up urea in the presence of ammonia. It is primarily used in the production of melamine formaldehyde resins.
Chemical Name: 1,35,-Triamino-s-2,4,6-triazine
Chemical formula: $C_3H_6N_6$



Melting Point: 354°C

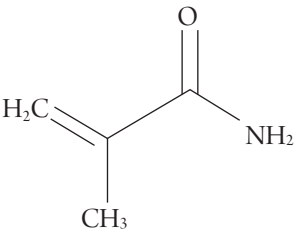
Melamine formaldehyde resins
Polymerization products of melamine and formaldehyde. They are the most common cross linkers in oven-curing systems. Melamine formaldehyde resins are modified with various alcohols to increase their solubility in paint solvents and their compatibility with polymers.

Metal marking
Marks left on a painted film when rubbed with metal obects. Especially, white and light-colored surfaces are more susceptible to metal marking. This paint defect can be prevented to a large extent by using slip additives, extenders like platelet-shaped kaolin, or some special-purpose resins.

Metallic coatings
General name for the paints giving a shiny look resembling newly sandblastedmetallic surfaces, due to the flake-shaped aluminum pigments they contain. Synonym: Metallic paints

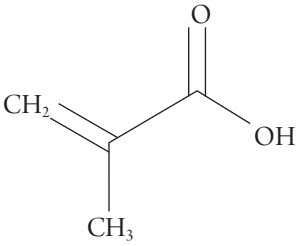
Metamerism
The appearance properties like color and gloss of two materials that match under at least one set of specified light conditions may exhibit different appearances under different light conditions. This phenomenon is called as metamerism.

Methacrylamide
An acrylic monomer used in the production of methacrylamide - formaldehyde resin, a less frequently employed amino resin used for the cross linking of hydroxyl functional polymers. In addition, methacrylamide is a compound that forms during an intermediate stage of methyl methacrylate synthesis. Chemical formula: C_4H_7NO



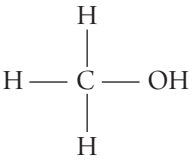
Methacrylic acid
An acidic monomer commonly used in the synthesis of acrylic polymers.

Chemical formula: $C_4H_6O_2$



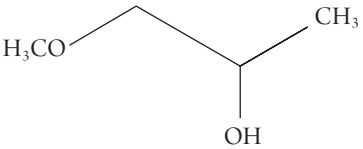
Melting point: 14°C; Boiling point: 163°C

Methanol
Methanol is the alcohol with the lowest molecular weight. It is rarely used in paint industry as it is too polar to be a good solvent for most organic polymers, and it has severe toxic properties.
Chemical name: CH_3OH



Boiling point: 64,7°C; Evaporation number based on the ether: 6,3; Specific gravity: 0,792; Refractive index: 1,3287; Flash point: 11°C
Synonym: Methyl Alcohol

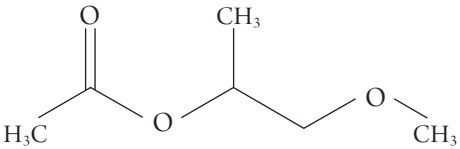
Methoxy propanol
A glycol ether having similar solvency as ethylene glycol. Chemical name: propylene glycol monomethyl ether
Chemical formula: $C_4H_{10}O_2$



Boiling point: 121°C; Evaporation number based on the ether: 25; Specific gravity: 0,922; Refractive index; 1,4040; Flash point: 30°C

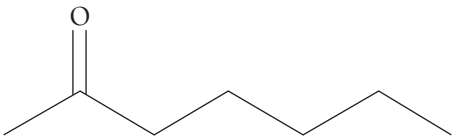
Methoxy propyl acetate
A glycol ether acetate that dissolves cellulose derivatives, polyvinyl alcohol, polyester, and short oil alkyd resins. It is also used as a co-solvent in waterborne organic coatings.

Chemical name: propylene glycol monomethyl ether acetate
Chemical formula: $C_6H_{12}O_3$



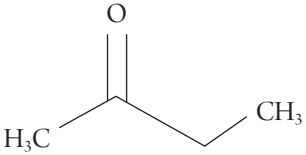
Boiling point: 146°C; Evaporation number based on the ether: 33; Specific gravity: 0,966; Refractive index: 1,4020; Flash point: 45°C

Methyl amyl ketone
A ketone having a similar evaporation rate with methoxy propyl acetate, and preferred to be used in the production of low VOC coatings because of its lower density.
Chemical name: Heptane-2-one, 2-heptanone
Chemical formula: $C_7H_{14}O$



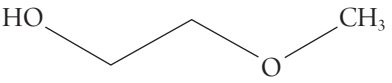
Boiling point: 150°C; Evaporation number based on the ether: 30,2; Specific gravity: 0.818; Refractive index: 1.408; Flash point: 39°C

Methyl ethyl ketone
A ketone having comparable solvent properties with acetone but slightly less volatility.
Chemical name: butan-2-one (abbreviated as MEK).
Chemical formula: C_4H_8O



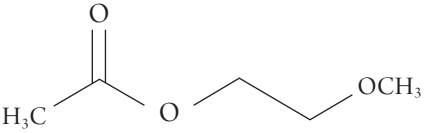
Boiling point: 79,6°C; Evaporation number based on the ether: 2,6; Specific gravity: 0,805; Refractive index: 1,3788; Flash point: -1°C

Methyl glycol
A glycol ether used for dissolving cellulose derivatives, epoxy resins and polyvinyl acetate. Due to potential risks to human health, its use is restricted.
Chemical name: Ethylene glycol monomethyl ether; 2-Methoxyethanol (also known as methyl cellosolve)
Chemical formula: $C_3H_8O_2$



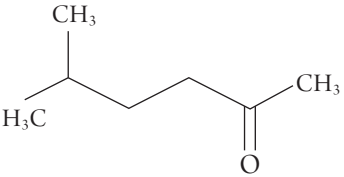
Boiling point: 124,5°C; Evaporation number based on the ether: 34; Specific gravity: 0,964; Refractive index: 1,4021; Flash point: 37°C

Methyl glycol acetate
An ether acetate used in similar areas where methyl glycol is used. Due to the potential risks to human health, its use is restricted.
Chemical name: Ethylene glycol monomethyl ether acetate; 2-Methoxyethyl Acetate (also known as methyl cellosolve acetate)
Chemical formula: $C_5H_{10}O_3$



Boiling point: 145°C; Evaporation number based on the ether: 35; Specific gravity: 1,005; Refractive index: 1,4019; Flash point: 47°C

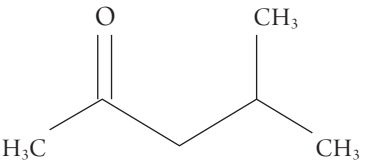
Methyl isoamyl ketone
A ketone having a higher evaporation rate than that of mehoxy propyl acetate. It is preferred to be used in the production of high solids coatings because of its lower density and lower surface tension.
Chemical name: 5-methyl-2-hexanone
Chemical formula: C_7H_4O



Boiling point: 144°C; Evaporation number based on the ether: 24.2; Specific gravity: 0.813; Refractive index: 1.408; Flash point: 36°C

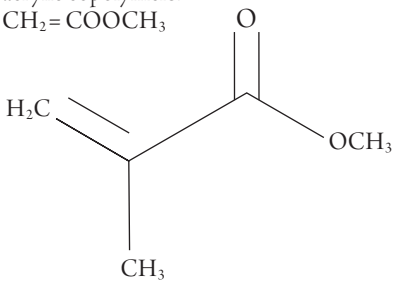
Methyl isobutyl ketone
It is a ketone that affects polymer groups dissolved by acetone but with slightly lower solvency.

Chemical name: 4-Methylpentan-2-one (abbreviated as MIBK).
Chemical formula: C_6H_2O



Boiling point: 117°C; Evaporation number based on the ether: 7,0; Specific gravity: 0,801; Refractive index: 1,3958; Flash point: 14°C

Methyl methacrylate (MMA)
Ester based monomer of polymethylmethacrylate. It is also used in the synthesis of various acrylic copolymers.
$CH_2 = COOCH_3$



Boiling point: 100,5°C

Mica
A mineral found in muscovite rocks. It is primarily composed of aluminum potassium silicate (Al3KSi3H2O12). Its color is light brown and its structure is flaky. Refractive index:1,58-1,61; Specific gravity: ~2,80; oil absorption value: ~65 g/100 g mica. Its use in paint industry is rare.

Micaceous iran oxide
A hard, dense, lamellar pigment of iron oxide which provides barrier protection by impeding the path of water and other corrosive agents in industrial coatings. It is used in protective coatings to increase the resistances against corrosion, blistering, and delamination.

Micro-indentation hardness test
A test method where an instrument records the motion of a sharp pointed tip impressed into the paint film under gradually loads. The test allows measuring the micro-indentation hardness of the coating film and also determining the elastic and plastic deformation thresholds of the paint film.

Micron (micrometer), µm
A unit of length equal to one millionth of a meter.

Mill base
Mill base is the portion of the paint formulation that is transferred to the grinding mill. It generally consists of highly concentrated pigments and a liquid medium suitable for the dispersion process. The mill base contains a mixture of pigments, wetting and dispersion agents, and resins. After the grinding process is completed, the mill base is mixed with other ingredients in the production step called "let down" to produce the final paint.

Mill scale
Surface layer, formed during hot rolling of steel that contains iron oxide and rolling oils in their compositions besides steel.

Mineral spirit
An alihphatic-rich solvent mixture obtained at a boiling range of 130-220°C during the distillation of petroleum. Long oil alkyd resins based synthetic paints, which can be applied with a brush or a roller, are commonly reduced by white spirit.
Chemical name: Hydrocarbon mixture rich in aliphatics. No certain chemical formula exits.
Boiling point: 130-220°C; Evaporation number based on the ether: 85°C; Specific gravity: ~0.750; Refractive index: 1.434; Flash point: 40°C Synonym: Stoddard solvent

Minimum film forming temperature (MFFT)
Temperature below which the effective coalescence of emulsion particles in a latex paint cannot occur. Defects, such as poor water resistance, high permeability, color and gloss variations, poor washability, etc., can result in latex paints cured below the MFFT. See: Glass Transition Temperature.

Mirror coatings
Mirrors are coated with two metal layers on the back. A silver layer is deposited on the glass as a first layer and a thin layer of copper is applied to protect the silver. Finally, organic coatings called

mirror coatings are applied to protect the copper layer from the corrosion caused by humid conditions in bathrooms and toilets.

Mist coat
A thin discontinuous spray coat applied prior to the application of a full thickness of coating. Among the purposes of mist coat application are to make the defects on substrate visible by wetting, to penetrate and fill the prosity of the substrate or film underneath, thereby displacing air and minimizing gassing or bubbling in the finished coating system.

Moisture and water scavenger
Additive used in PU systems, zinc rich paints and other water-sensitive compositions to remove the residual water. This residual water can cause a reduction in binder reactivity and coating defects.

Moisture curing coatings
Isocyanate (NCO)-functional resins that react with moisture in the air to form polyurea based cross-linking. Coatings containing these resins are called "moisture curing coatings". Epoxy-ketimine based 2K coatings are also called moisture curing coatings because amine produced from the reaction of ketimine with water, forms a cross-linked network.

Moisture curing polyurea coatings
See: Moisture curing coatings

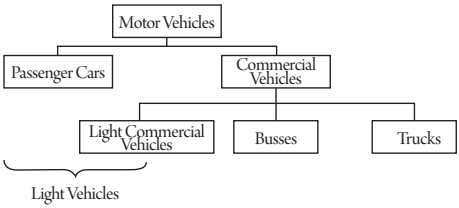
Moisture curing polyurethane coatings
Despite the fact that the product of the reaction between isocyanate-containing resins and moisture is polyurea, coatings containing these binders are commonly and incorrectly referred to as "Moisture-Curing Polyurethane Coatings."

Mold release agent
A material applied to the inner surfaces of molds to ensure easy relaease od molded objects, especially plastics. Release agents are selected from low surface tension materials to prevent adhesion rder for the molded object not to stick to the mold. Poor removal of residues of release on surfaces to be painted may cause surface defects such as craters, orange peel and poor adhesion.
Synonym: Release agent

Monochromatic light
Monochromatic light is a light which consists of rays of a single wavelength. It is obtained either as a result of radiation from heating certain pure metals or by the seperation of beams of multi-wavelength light by the use of prisms (or monochromators).

Monomer
Low molecular weight molecules capable of combining with a number of like or unlike molecules to form a polymer.

Motor vehicles
Wheeled vehicles whose propulsion is provided by an engine and used for the transport of passengers as well as for the carriage of goods on the roads or off-roads. According to the International Organization of Motor Vehicle Manufacturers (OICA), motor vehicles are classified as follows.



Distinction between light commercial vehicles and other commercial vehicles is based on their transport capacity. The figure used in the distinction varies between 3.5 tons and 7.0 tons, depending on the country. In Turkey, vehicles having a transport capacity below 3,5 tons are defined as light commercial vehicles.

Multi-pack coatings
In organic coatings crosslinking at room temperature, reactive participants need to be packed seperately. Coatings, packed as two or more separate components, are called multi-pack coatings.
See also: Two-pack coatings

Munsell color system
A visual color definition system based on ten principal hues: as Blue, Blue-Green, Green, Green-Yellow, Yellow, Yellow-Red, Red, Red-Purple, Purple, Purplish-Blue. Each of these principal hues can be diluted with clear coats to decrease

its chroma or mixed with black pigmented paint to decrease its lightness. For instance, for a color specified as GY5/6 in Munsell color system, one can say Green-Yellow (GY), 50% mixed with black and 60% saturated. Munsell color system is commonly used in the USA. However, in Europe, Natural Color System (NCS) is more commonly preferred. NCS, allows a more detailed definition of color than Munsell system. See also: Natural color system (NCS)/Color identification systems

Nacreous pigments or Pearlescent pigments
Pigments produced by coating the surfaces of 100–500 nm thick mica flakes with TiO2 or some other oxides at thicknesses ranging from 120 nm to 160 nm. Nacreous pigments are perceived in different colors and sheen depending on the viewing angle. Mica based nacreous pigments impart color to the coating by the "light interference" caused by mica flakes of the same thickness with the wavelengths in visible light spectrum (100–500 nm). See also: Effect pigments

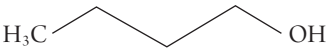
Nanocomposite materials
Nanocomposite materials are multiphase solid materials where either one of the constituents has dimensions less than 100 nanometers. Nanocomposite materials can also be defined as the composites having nanoscale repeat distances between their different phases. The use of polymer nanocomposites, that is matrices formed between polymers and nanoparticles is increasingly growing in coatings industry.

Nanometer, nm
A unit of length equal to one billionth of a meter.

Natural color system (NCS)
A color identification system created by referencing four pure primary colors that are free from any black contamination. In NCS, yelow, red, blue and green standarts are formed with the above-mentioned properties. Various color tones are obtained by mixing the standards at different ratios. Each color can be mixed with transparent varnish to obtain several saturation levels. In addition, these colors can be darkened with black in various ratios. NCS has a "talking code" to define the colors obtained by this method. For example, 2080-R70B means that this color contains 20% black, it is 80% saturated, and its hue is composed of 70% Red (R: Red) and 30% Blue (B: Blue).
See also: Munsell color system/Color identification systems

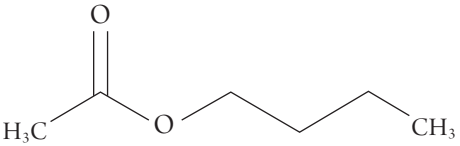
Natural rubber
Remaining part of the sap of rubber tree (Hevea brusiliensis) after the evaporation of water. Rubber, chemically composed of polyisopyrene, and crosslinks with sulfur compounds to form a highly resistant elastomer. Process of crosslinking with sulfur compounds is called vulcanization, and rubber that undergoes vulcanization is called vulcanized rubber.

n-Butanol
An alcohol which dissolves urea/melamine formaldehyde, polyvinyl acetate, and polyvinyl butyral resins in addition to natural resins. It dissolves a broad range of polymers when used together with aromatic solvents.
Chemical name: n-butyl alcohol or butan-1-ol.
Chemical formula: $CH_3CH_2CH_2CH_2OH$



Boiling point: 117,7°C; Evaporation number based on the ether: 33; Specific gravity: 1,809-1,811; Refractive index; 1,3993; Flash point: 35°C
Synonym: n-Butyl alcohol

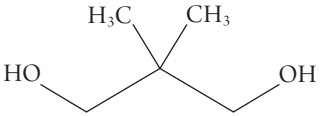
n-Butyl acetate
En ester which dissolves almost all types of cellulose derivative resins, polyesters, acrylics and short oil alkyd resins.
Chemical name: Acetic acid n-butyl ester butile
Chemical formula: $C_6H_{12}O_2$



Boiling point: 126,5°C; Evaporation number based on the ether: 14; Specific gravity: 0,882; Refractive index: 1,3951; Flash point: 25°C

Neopentyl glycol
Polyol synthesized by the reaction of isobutyral-

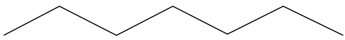
dehyde with formaldehyde. It is used as a raw material for polyester resins.
Chemical name: 2,2-dimethyl-1,3-propanediol
Chemical formula: $HOCH_2C(CH_3)_2CH_2OH$



Melting point: 128°C

Newtonian fluids
Some fluids have the same viscosity at a given temperature without being affected by the shear stresses they are exposed. Since these types of fluids behave according to the model described by Newton, they are called "Newtonian fluids".

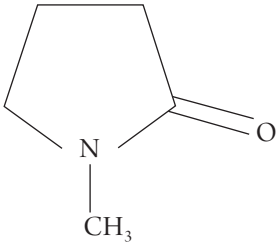
n-Heptane
Aliphatic solvent used in the coatings industry.
Chemical formula: C_7H_{16}



Boiling range: 94-99°C; Evaporation number based on the ether: 3; Specific gravity: 0,715-0,725; Refractive index: 1,397; Flash point: -5°C

Nitrocellulose resin
See: Cellulose nitrate resin

n-Methyl pyrrolidone
A slow ketone which dissoves several coating poliymers and used as an additive in paint formulations.
Chemical name: 1-methyl-2-pyrrolidone
Chemical formula: C_5H_9NO



Boiling point: 202°C; Evaporation number based on the ether: 360; Specific gravity: 1,028; Refractive index: 1,4680; Flash point: 91°C

Non-condensing humidity test
In non-condensing humidity test, the panels are suspended insidethe constant temperature cabinets. The air inside the cabinet should be saturated with moisture at test temperature. Water films may form randomly on some parts of the panels' surfaces which are at the same temperature with the inside air. The difference between condensing and non-condensing humidity tests tests is that in the former, the panels are completely covered with a water film, while in the latter, the water film forms only occasionally and sporadically. The temperature and humidity of non-condensing humidity test can be similar to those in condensing humidity test. It is recomended to test the paint being evaluated alongside a reference paint with known performance.

Non-destructive tests
Tests applied to an object without causing any damage to determine its properties.

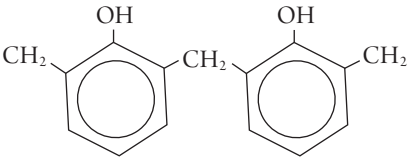
Non-drying alkyd resins
Alkyd resins that contain saturated fatty acids on their backbone. Since non-drying alkyd resins do not polymerize oxidatively via oxygen of air, they are used in oven-cured coatings that commonly crosslink with amino resins and in two-pack coatings cured with isocyanate-based hardeners.

Non-drying oils
The general term for oils formed by the reaction of glycerine with fatty acids that contain very limited or no unsaturation. There is no bjective definition of non-drying oils. However, oils with 1 or fewer average unsaturation per fatty acid molecule are practically classified as non-drying.

Non-newtonian fluids
Viscosity of some fluids may change depending on the applied shear stress. These types of fluids are called "non-newtonian fluids". Non-newtonian fluids may exhibit different flow behaviors such as shear- thinning (Pseudoplastic), shear-thickening (Dilatant) or plastic. See also: Shear thinning fluids/shear thickening fluids/thixotropy

Non-volatile percent by volume
Volume of the non-volatile matter in a hundred volume of wet paint is defined as "non-volatile percent by volume".

Novolac resins
The general name for resins, synthesized by the reaction of phenolic compounds with formaldehyde with a phenol/formaldehyde ratio of significantly greater than 1. Therefore, Novolac resins have functional OH end groups.



n-Propanol
The solvent, which dissolves natural resins, phenol formaldehyde and urea-formaldehyde resins. Mixtures with aromatic solvents provide a wide range of solubility.
Chemical name: n-propyl alcohol
Chemical formula: C_3H_7OH

Boiling point: 97,2°C; Evaporation number based on the ether: 16; Specific gravity: 0,804; Refractive index: 1,4680; Flash point: 23°C

Number average molecular weight
Number average molecular weight is found by summing the products of the number of molecules and molecular weights of each group containing equal molecular weights divided by the sum of the number of molecules in the polymer mixture.

$$\overline{M}_n = \frac{N_1M_1 + N_1M_2 + \ldots}{N_1 + N_2 + \ldots} = \frac{\Sigma N_2M_2}{\Sigma N_2}$$

Nylon
The general name given to the polyamides. Different types of Nylon are among the most used polymers in the world.

Oak (in latin: Quercus Sp. L)
Its timber has a dense structure with thick, short and flexible fibers. Tannin content prevents the wood from decay. White and black oak are used in construction works. Timber of oak tree is hard and heavy with high humidity resistance. Due to its high cost, it is used more in places requiring significant abrasiob resistance. It is preferred for classical furniture making in veneer and solid form, water structures, bridge supports, pier piles, ship hulls, barrel making, sleepers, and mining props.

Oil absorption
The total quantity of linseed oil slowly added to 100 g of pigment while rubbing with a spatula, until reaching a point at which the mixture takes the form of a single ball. Oil absorption value, is commonly used to predict a pigment's binder requirement when formulating paint.

Oil length
The amount of fatty acid added to the polyester backbone of an alkyd resin. Oil length is defined as the total weight of oil in 100 parts solid alkyd resin. If this ratio is higher than 60%, a "long-oil alkyd resin" is obtained, if between 40% and 60%, a "medium-oil alkyd resin" is obtained, and if less than 40%, a "short-oil alkyd resin" is obtained.

Oil-free polyester resins
See: Polyester resins

Oligomer
The general name for the chemicals which are formed by the reaction of a definite number of monomers but not large enough to be considered as polymers. Although, there is no universal agreement on the definition of oligomer, their molecular weights typically range from a few hundred to a few thousand, and the number of monomeric units within an oligomer generally varies between 2 and 20.

Opacity
A property of matter that prevents light from passing through it. A material is said to be opaque if it absorbs, reflects, or refracts all the light that falls on its surface.

Open cup flash point test
A flammable sample placed in an open cup is heated while a test flame is passed over it at short intervals. The point at which the sample ignites gives the flash point value. The widely used method is ASTM D 1310. The open cup test is prone to error

due to changes in the solvent composition of the sample during heating. See also: Closed cup flash point test.

Open-pore coatings
Organic coatings that do not fill and seal the small pores of the wood. Open-pore coatings wet the small crevices without filling and sealing them either because they are applied at the low film thicknesses or because they wet the crevices very well due to their relatively lower surface tensions.

Orange peel
This surface defect can be characterized by bumps and valleys resembling an orange skin. This orange skin texture is generally due to poor leveling, and it is more common in spray and roller applications. If the surface tension differs at various points on the surface, flow of paint under the influence of surface tension differences can lead to orange peel appearance. It is important to remember that high viscosity is another factor which prevents the homogenous leveling of the paint film.

Organic coatings
1) The general name for coating materials, having a backbone formed by polymeric, oligomeric or monomeric organic binders. Organic coating materials with no pigment are called clear coats or varnishes while those containing pigments are called paints.
2) A film formed by the application of organic coating material. See also: Putty/powder coatings

Organic color pigments
A group of color pigments synthesized from simple organic molecules, offering a wide range of color variety, and greatly enhancing aesthetic possibilities in the paint industry.

Organoclays
Natural clays with excess OH groups on their surface are reacted with ammonium salts to increase their compatibility with paints. They impart shear thinning and thixotropic properties to the paint by forming hydrogen bonds.

Organosilane compounds
Compounds having silane groups with high affinity to polar groups at one end, and hydrocarbon part that is highly compatible with the main paint binders at the other end. They may be included as an additive in paint formulations, especially to enhance adhesion to polar surfaces such as metals, glass, or concrete.

Osmosis
Two liquid solutions having the same chemical ingredients at different concentrations are put in the two compartments of a container separated by a semipermeable membrane. This membrane allows the passage of smaller solvent molecules but not the larger solute molecules. The movement of solvent molecules over time from the compartment with the lower solute concentration to the compartment with the higher solute concentration is called "osmosis." During this process, movement of solvent molecules results in mass increase and pressure buil up in that compartment. The equilibrium is reached when concentration difference and pressure difference balance each other.

Osmotic pressure
During osmosis in a container divided into two compartments seperated by a semi-permeable membrane, liquid mass in the section with higher concentration increases, and exerts a pressure on the membrane. When this pressure is high enough to prevent any further transfer of mass, the solvent transfer stops. This pressure is called osmotic pressure. If a paint film containing "water-soluble" impurities either on the substrate or within its structure is exposed to water, it can behave like a semipermeable membrane and allow water to pass through. Osmotic pressure in paint films results in a paint defect called "blistering".

Outdoor durability
Resistance of organic coatings to aging effects of outdoor parameters such as UV, water, oxygen, chemicals, microorganisms, mold, temperature, temperature differences, wind, and abrasives. Synonym: Outdoor weatherability/Weatherability/Weathering resistance

Outdoor testing
Most reliable tests for measuring the resistance of organic coatings to outdoor environments are those carried out under natural outdoor condi-

tions. These tests are preferrebly conducted at test stations located in places where severe weather conditions prevail (e.g, Florida, USA; Arizona, USA; Okinawa, Japan; North Sea Coast, Europe).

Oven cure coatings
See: High temperature curable coatings

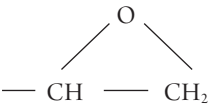
Overcure
Excessive hardening of an oven-cured coating as a result of curing for longer periods and/or at higher temperatures than required.

Overspray
Sprayed coating that is dry when it hits the surface, resulting in dusty, granular adhering particles. Can cause gloss loss with glossy organic coatings and mottling with the flat paints and clearcoats.

Oxichrome groups
See: Auxochrome groups

Oxidative drying
Drying oils, and drying and semi-drying alkyds polymerize via the unsaturated bonds in the fatty acids with the oxygen in the air. If the drying of the organic coating films occurs through this mechanism, this process is called "oxidative drying", "auto-oxidative drying" or "air-drying". See also: Air drying coatings/Drying oils/Drying alkyd resins

Oxirane group
The cyclic ether group found at the ends of epoxy resins. Oxirane groups are also called as epoxy group. Also called epoxy group or cyclic ether group.
Chemical formula:



Packaging viscosity
Viscosity of wet paint at the stage of packaging. Also known as delivery viscosity. Packaging viscosity is required to meet the two key two points:
1) It should be high enough to prevent settling of fillers, pigments and particulate additives throughout the shelflife of the paint,
2) It should be low enough to provide homogeneous and easy mixing of the thinner that added before application.

Paint
1) Organic coating material that contains coloring substances called pigments; 2) A film of pigmented organic coating applied to a surface. (Note: The word "paint" is often used interchangeably with the term "organic coating").

Paint borer
A destructive test device used to determine the thickness values of different layers in a coating system by punching a conical hole in the paint film and observing the layers with a scaled magnifying glass. The paint borer consists of a right-angled triangle shaped steel knife rotating around its vertical edge, and a scaled magnifying glass.

Paint inspection gauge
A destructive measuring device used to determine the thickness of paint film by cutting a V-shaped groove in the film and measuring the thickness with a scaled magnigier.

Paint production using monopigmented pigment pastes
In this paint production approach, a resin with a high compatibility range is selected as the main dispersion resin and different pigments are dispersed separately to a certain grain size using this resin. Color matching is performed using these pigment pastes, and letdown is done by adding remaining ingredients determined br appropriate calculations. The main advantages of this approach include better optimization of production capacity of production equipment (especially the mills) and storage areas and increase the grinding quality. The total production times decrease despite to an increase in grinding perios. It is achieved by producing common pigment pastes, which can be used in various product groups owing to the compatible resin used. See also: Co-grinding

Paint remover
An auxiliary material used to remove the dried coating film from the surface. Paint remover contains strong solvents gelled by special binders and additives. When applied on a painted surface, it

swells and lifts the paint film after a few ten minutes. Paint removers should be water-miscible to facilitate easy washing.

Paint roller
A simple paint application tool with a rolling cylindrical core. They are preferred for fast work. Application viscosity in roller applications should be in the same range with that for brush application. The rotating main cylinders of rollers are usually made from fiber-reinforced plastics or metals.
The outer bristles are made of polyester, nylon, mohair, or lamb's wool. Fibre lengths of fabric is generally between 5 mm and 20 mm. Roller application is the method that requires the least technical skill.

Paint spray equipment
The device used for the application of paint by spraying. Among the major types are the conventional spray guns, airless spray guns, air-assisted airless spray guns, electrostatic spray guns, and turbobells.

Paints for agricultural tools
Paints applied to various agricultural machines, tankers, valves, tanks, plows and other agricultural equipment in addition to some parts of agricultural hand tools like shovel, scissors and handsaw. Paints for agricultural tools are designed to have high resistance to wear, chemicals and corrosion.

Paper coatings
Glossy, silk-matte, matte varnishes applied as a thin layer on paper surfaces to prevent them from the effects of moisture, oil etc. and enhance appearance. They are mainly used for packaging papers and papers for brochures, catalogs, magazines etc. Many of then are formulated by using UV-curable binders

Paraformaldehyde
A polymer composed of 10 to 100 formaldehyde units. Not only the hazardous effects on human health and environment but also the difficulties in processing and storing of formaldehyde gas leads to paraformaldehyde use in the production of formaldehyde resins. Paraformaldehyde decomposes into formaldehyde at nearly 150°C.
Chemical formula: $HO(CH_2O)_nH$

Parquet varnish
A varnish applied on indoor parquet floors to increase their durability against water, household chemicals and most importantly, abrasion, while enhancing their aesthetic appeal.

Passenger car
According to the definition of OICA (The International Organization of Motor Vehicle Manufacturers) the passenger car is defined as "the vehicle used for passenger transport, with at least four wheels and a maximum of nine seats, including the driver seat". See also: Motor vehicles

Peelable coatings
Paints that are designed to provide temporary protection to the substrate on which they are applied, and after the predetermined temporary period, they can be easily peeled off.
Synonym: Strip coats/ Strippable coatings

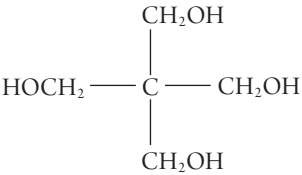
Peeling
Seperation of cured organic coating film from the application surface, as flakes.

Pencil hardness test
A test method used to determine the surface hardness of a dry organic coating film using pencils of standart hardness. The following standart hardness pencils are used in the order of increasing hardness: 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H. Coated surface is scratched with a pencil tip, square shaped using sandpaper. A coating's pencil hardness is defined as the hardness that is one level softer than the softest pencil leaving a permanent mark on the surface.

Pendulum hardness
Oscillating of a pendulum, which is in contact with the paint film through two hemispherical contact points, damps over time due to the non-elastic response of the paint film. The swinging time passed until the pendulum stops is considered as a measure of the hardness of the paint film. This value is called "pendulum hardness".

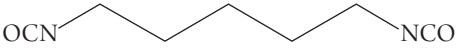
Pentaerythritol
A polyol prepared by the polymerization of acetaldehyde and formaldehyde in a basic environment. It is used as a raw material for the preparation of

alkyd and polyester resins.
Chemical name: tetramethylolmethane, 2,2-Bis (hydroxymethyl)-1,3-Propanediol
Chemical formula: $C(CH_2OH)_4$



Melting point: 262°C

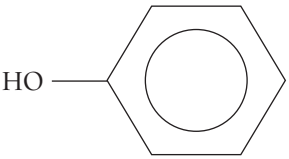
Pentamethylene diisocyanate (PDI)
An aliphatic diisocyanate compound synthesized from the bio-based chemical pentamethylenediamine. For reasons related to occupational health, non-volatile trimer of PDI is used in hardeners for polyurethane coatings. It gives film properties comparable with HMDI.
Chemical formula: $OCNC_5H_{10}NCO$



Pearlescent pigments
See: Nacreous pigments

pH
Measure of acidity and alkalinity. The matrial is acidic if the pH value is between 1 and 7, and alkaline if between 7 and 14.

Phenol
White and crystalline chemical substance used as a raw material for phenolic resins.
Chemical formula: C_6H_6O



Phenolic resins
General name for resins, formed by reaction of phenol and aldehydes, which have outstanding thermal and chemical resistance.

Phosphating
Surface treatment performed to metal surfaces to improve the adhesion of coatings and to reduce corrosion tendency (by passivation) of metal surfaces. Phosphating is carried out by using iron phosphate solutions which provide a modest protection, or by using solutions containing one or more of zinc, manganese, and nickel salts of phosphoric acid to obtain better adhesion and higher corrosion resistance.

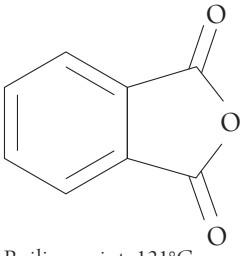
Phosphorescence
Similar to fluorescent materials, also a different group of materials do return some part of the energy gained from the light they absorb, in the form of light at a higher wavelength, but with some delay. This fact is called phosphorescence.
See also: Fluorescence

Phosphorescent pigments
Phosphorescent pigments, following absorption of the UV spectral part of the light, return some of the energy as heat energy; after a time lag they emit the rest of it in the form of a blue visible light. Therefore, phosphorescent pigments continue to emit a blueish glow even after the light source is removed.

Photodegradation
The breakedown of organic polymers (of dried coating films, as well) into smaller molecules under the influence of visible or UV light.

Photoinitiators
See: Initiators

Phtalic anhydride
Chemical substance obtained by oxidation of o-xylene or naphthalene. Phtalic anhydride is the most widely used polyacid in the synthesis of alkyd and polyester resins.
Chemical name: 2-Benzofuran-1,3-dione
Chemical formula: $C_8H_4O_3$



Boiling point: 131°C

Pick-up roller
In roller coating applications, pick-up roller immersed in a paint pan, moves around its axis and transfers the paint in the pan to its surface as a wet film. See also: Roller coating applications

Pigment
Powdery chemical substances that impart color, special visual effects and in some cases corrosion resistance to paint. Two main differences between pigments and dyestuffs are as follows: pigments are insoluble in both organic solvents and water, and pigments have higher exterior durability than dyestuffs.

Pigment affinic groups
Chemical groups present in dispersion additives to ease their attachment to the surfaces of polar pigments. Pigment affinic groups include carboxylic acids, amines, isocyanates, and their derivatives.

Pigment paste
A viscous paint semi-product in which pigments are grinded and finely dispersed in higher pigment amounts than in the finished paint.

Pigment volume concentration
The percent of the volume of total pigment (and extender) to the volume of total nonvolatile materials present in paint formulation.

$$PVC = \frac{\text{volume of pigment (+ extender)}}{\text{volume of pigment (+ extender) + Solid binder}} \times 100$$

Synonym: PVC

Pigment/binder ratio
The ratio by weight of pigment content to solid binder content in a paint formulation.
See also: Solid binder content

Pinholing defect
Solvent vapours and other gas bubbles present in wet paint film, tend to make holes while leaving the film during drying process. Drying results in an increase in viscosity, in turn, makes it impossible for the paint film to spread to disappear these holes. This defect is also known as bubbling or boiling.

Pinholing limit
When the film thickness of applied paint increases, the escape of solvent vapours and other gases from the film is delayed. Since paint film starts to get hardened during this period, and at a certain film thickness the holes formed by escaping solvent vapours and other gases become permanent. The dry film thickness at which this defect starts to occur is called pinholing limit.

Pitting corrosion
Localized corrosion of a metal surface, confined to a point or small area, that takes the form of cavities.

Plasticizers
Plasticizers are used as softening additives in paints based on large, and therefore hard and sometimes brittle polymeric binders like cellulose nitrate (nitrocellulose) and polyvinyl chloride.

Plywood
End cut (or crosscut) and edge cut thin wood sheets with 1 mm thickness are glued and pressed together such that adjacent plies have different wood grain at right angles to each other. Wood panels obtained by this technique are called plywood.

Polarity
If the electronegativities of the atoms in a molecule are different, distribution of the molecule's valence electrons on these atoms will not be homogenous. This uneven distribution of electrons causes the molecule, or some groups in the molecule show a polar behaviour. Such molecules or groups are called as polar, and the phenomenon as chemical polarity. See: Chemical polarity

Polarization
Deposition of solid or gas phase insulating materials on an anode or cathode in an electrochemical cell hinders the current generation. This phenomenon is called electrode polarization. If the electrochemical cell is a corrosion cell, polarization reduces the rate of corrosion.

Polish
Polish is a transparent and wax-like substance that fill the pores/pinholes on the surface of a material.

Thus, the specular gloss of polished surfaces increases. However, in Turkish furniture industry, varnishes applied to wooden surfaces are also referred to as "polish".

Polishing Paste
A paste-like material of a viscous dispersion of abrasives in liquid phase that are used to eliminate defects and scratches on high gloss coatings or chalking that occurs over time. Polishing pastes are used in the first stage of polishing to smooth the rough surface.

Poly (vinylidene fluoride)
It is a plastic material having a melting point of 170oC and around 50% crystalline structure. It is durable against shape deformation and creep at high and low temperatures. PVDF polymers are used in the production of coil coating topcoats with superior exterior durability. Synonym: PVDF

Polyacid
The general term for acids having more than one reactive hydrogen atoms in their structure. They are known as polybasic acids as well.

Polyacrylate surface additives
Surface additives that prevent defects by forming a thin continuous layer on the surface. These additives are designed to have limited compatibility with the paint binders and solvents so that they can migrate to the surface. See also: Surface additives

Polyamide adduct
Amide functional macromolecules formed by controlled polyaddition of polamides with various compounds especially epoxy resins. Polyamide adducts, due to their higher glass-transiton temperatures (Tg) compared to those of polyamides, provide a partial physical drying property for epoxy resins which in turn leads to an increase in drying rate.

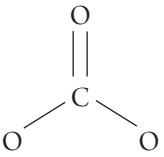
Polyamide hardener
A hardener for epoxy resins, composed of aliphatic polyamide resins which can crosslink with oxirane groups of epoxy resins using the active hydrogens it contains.

Polyaminoamid hardener
An amine and amide functional hardener for epoxy resins which can crosslink with oxirane groups of epoxy resins using the active hydrogens it contains.

Polybasic acid
See: Polyacid

Polybutylene terephtalate
A hard thermoplastic polyester resin obtained from the polymerization of dimethyl terephthalate with 1,4-butanediol according to a relatively old process, or from the polymerization of terephthalic acid with 1,4-butanediol according to a process that has gained popularity in the last decade of 20th century. Synonym: PBT

Polycarbonate
Thermoplastic organic polymers containing a carbonate group in the repeating unit. Generally, they are produced by reacting bisphenol A with organic carbonate (diphenyl carbonate) or phosgene. The carbonate group is given below:



Synonym: PC

Polychromatic light
Formerly, polychromatic light was defined as the bundle of visible light that contained many light rays in various colors. Over time, its meaning expanded to include light consisting of rays with multiple wavelengths, whether or not the components were within the visible region (i.e., whether the light was chromatic or not).

Polydispersity
The ratio of weight average molecular weight to number average molecular weight of a polymer is defined as polidispersity or polidispersity index.

$$PDI = \frac{M_w}{M_n}$$

Polydispersity index
See: Polydispersity

Polyester resins
Ester based polymers derived from polycondensation of polyols and polyacids. Despite having the same backbone, to emphasize their difference from alkyd resins containing fatty acids, they are called oil-free polyesters. If the polyols and polyacids contain unsaturation, polyester resins are called "unsaturated polyester resins", if not, they are called "saturated polyester resins"

Polyethylene terephthalate
Thermoplastic polyester resin synthesized by condensation polymerization of terephthalic acid or terephthalic acid dimethyl ester with ethylene glycol. Synonym: PET or PETP

Polymer
A large molecule composed of numerous numbers of repeating structural units called monomers typically connected by covalent chemical bonds.

Polymeric dispersing additives
Dispersion additives having polymeric backbones compatible with paint resins and solvents, having pigment affinic groups at one or more ends. With their large molecules, polymeric dispersing additives form layers around the pigment particles they attach, and thus prevent other pigments from coming closer. Therefore, they provide dispersion stabilization by steric hindrance.

Polymeric thickeners
Polymeric thickeners are polymeric in nature and impart shear-thinning to the paint. They prevent pigment settling and sagging by forming a network in wet paint by entangling themselves with polymer branches of the resin. Since polymeric thickeners contain oxygen and nitrogen atoms, they impart thixotropy to paint by forming hydrogen bonds.

Polyol
General name of alcohols having more than one hydroxyl groups. They are also known as polyalcohol or polyhydric alcohol.

Polypropylene
The general name of thermoplastic polymers synthesized by polymerization of propylene. In paint industry, polypropylene is encountered as a substrate material since its impact resistance is high. On the other hand, low surface tension of polypropylene (30,1 mN/m) makes it a challenging substrate for paint wetting and adhesion. Synonym: PP

Polysiloxane surface additives
The general name of surface additives that prevent surface defects like craters, orange peel, telegraphing etc. by virtue of their compatibility with paint ingredients as well as lower surface tensions they have compared to other paint ingredients.
See also: Surface additives

Polystyrene
It is a transparent thermoplastic polymer. It is easily colored and processed. Although brittle, its overall mechanical and thermal properties make it suitable for production of everyday goods like packaging materials, household items, and home decoration objects. Synonym: PS

Polytetrafluoroethylene
It is synthesized by free radical polymerization of tetrafluoroethylene under high pressure and in aqueous medium. It is a highly crystalline, linear and orientable polymer. Solvent and corrosion resistances are high but surface tension and friction coefficient are low. It has by far the lowest dielectric constant for all known polymeric materials. It is used in non-stick paints for painting kitchen utensils, and hygienic materials for bathroom and toilets. Synonym: PTFE

Polyurethane resins
See: Urethane resins

Poplar (in latin: Populus Sp.L)
It has white, dark white, yellowish white and brown heartwood depending on the type. Growth rings and grains are not distinctive. It has a very soft, coarse and loose structure. It sticks well with glue. It has a low physical strength. Large diameter poplar trees are commonly used in veneer and plywood industry. Poplar timber is used in the production of matches. Furthermore, poplar is used in the production of packing boxes, barrels for dry stuff storage, and chipboards. Synonym: Poplar

Pot life
The length of time after combining two or more components of a multiple-component coating system that the mixed coating can be successfully applied.

Powder coatings
The solvent free coatings in which resins with glass transition temperatures above room temperature are used. Powder coatings are comminuted to 20-100 microns. The powders covering the surface melt in high oven temperatures, forming a thin film.

PP/EPDM alloys
A material obtained by mixing polypropylene with EPDM rubber, produced by the polymerization of ethylene, propylene, and diene monomers. See also: Ethylene propylenediene (EPDM) rubber.

Pre-coated metal (PCM)
Material produced by coating the metal coils in high-speed lines with oven curing coatings. Pre-coated metal is an optimum solution: 1) to obtain metal sheets coated with specially formulated paints with high durability,
2) to minimize the carbon footprint by incinerating the released VOC after-burners and by recycling the energy of combustion,
3) to obtain high efficiency by fast production in high-speed application lines.

Primary particles
Smallest particles of pigments and extenders that can be obtained during the dispersion operation.

Primer
The first pigmented layer of a multi-layer coating system.

Production quality
The production quality refers to how well the quality targeted at the design stage is achieved in the production process.

Pseudoplastic fluids
See: Shear thinning fluids

Psychrometer
An instrument used to determine humidity and dew point.

Pull-off adhesion test
The method to measure the perpendicular force a coating can withstand to detach from the surface (adhesion), or to fracturing within a layer of coating. Pull-off method is defined in ASTM D 4541.

Putty
Organic coating material that contains extenders above the Critical Pigment Volume Concentration (CPVC). Putties are used to fill holes, pores and cracks on the substrate. Putties are highly viscous thus can be applied using spatulas and rollers.

PVC plastisol-based coatings
Paints produced using PVC plastisol resins. PVC plastisol resins are prepared by dissolving plasticizers like dibutyl phthalate or benzylbutyl-phthalate in thermoplastic PVC resin. PVC plastisol-based coatings have notable properties like high resistance to water, chemicals, and corrosion when they are applied as topcoats on metals in 100-200 micrometer thick films.

Radiation curable coatings
Coatings which give hard dry films by the reaction of its reactive film formers with the help of radiation energy. UV curable coatings and Electron beam (EB) curable coatings are the two main types of radiation curable coatings.

Reactive diluents
Chemicals that dissolve organic coating binder and participate in the cross-linking reaction through its functional groups. Therefore, they are not volatile or hazardous to the environment.

Red Pine (in latin: Pinus Brutia Ten.)
It is named as red pine because of its reddish buds. Red pine is a resinous tree. Since its trunk is curved and branched, red pine tree is used in production of packing boxes as well as in rough construction works.

Reflectance
Percent ratio of the intensity of reflected light to that of the incident light.

Refractive index
Refractive index of a substance is the ratio of

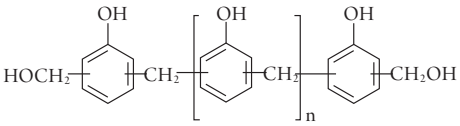
speed of light in vacuum to the speed of light in that substance. It is also defined as the ratio of sinus of the angle between the incoming light and normal, to the sinus of the angle between refracted light and normal.

Refractometer
An instrument used for measuring the refractive index of a material.

Relative humidity
Percentage of water vapour in a gas to the maximum water vapor amount the gas can contain (saturation amount) at the same temperature. The relative humidity of air is most commonly referenced.

Resin
Solid, or semi-solid organic material which often has a high molecular weight. Resins may be natural and synthetic. Higher molecular weight synthetic resins are more generally referred to as polymers.

Resol resins
Resol resins are synthesized by reacting phenol compounds with formaldehyde with a phenol/formaldehyde ratio higher than the stoichiometric ratio but lower than the ratio used for novolac resins. Part of phenol compounds in resol resins are methylated.



See also: Novolack Resins.

Retarder
Name given to slow evaporating solvents added to coating formulations to prevent surface defects such as brush marks, orange peel, pinholing and blushing etc. caused by "fast" evaporation of solvent blends during the application and curing of coatings.

Reverse impact strength
Reverse impact strength is measured by dropping a plunger of a cetain weight from a gradually increased height onto the back side of a painted metal sheet. See also: Impact strength

Reverse roller application
The paint application method where the applicator rolls run in the opposite direction to the movement direction of the conveyor belt. In this application, better levelling is achieved on the paint surface because sheer stress exerted on the paint film is higher than that in direct rolling application. Reverse roller method is preferred especially in glossy topcoat applications. See also: Roller coating applications/direct roller application

Rheology
Science of flow and deformation of materials.

Rheology modifiers
Additives that modify the flow behaviour of organic coatings during production, storage and application. These additives impart shear thinning and thixotropic properties to wet paint.

Roller coating applications
Paint application performed by using three parallel rollers in contact with each other. They are called "pick-up", "feeding" and "application" rollers. Pick-up roller immersed in paint pan, rotates around its axis and transfers the paint in the pan to the feeding roller. Feeding roller transfers the paint to the application roller. Application roller, transfers the coating onto the material to be coated which is moving on a conveyor belt.

Rotary disc
A rotating device for the application of liquid coatings which sprays the wet paint in fine droplets with the effect of the centrifugal force generated by rotation. Rotary discs which typically rotate at a speed of several hundred rpms are most widely used for the coating of home appliances and other metal goods.

Rubber
The general name for very durable and elastic organic polymers. Natural rubber is the most frequently used type of rubber. Natural and synthetic rubbers are cross-linked through vulcanization

so that their strength, elasticity and chemical resistance improve. Rubbers, especially the vulcanized rubbers are also referred to as elastomers.

Rub-out test
The test performed to check for pigment flocculation or flooding in the wet paint films. The paint to be tested is applied to a panel. After a short drying time (flash-off) rub-out test is carried out by rubbing the paint film with a finger while it is drying. If there are any pigment flocs, in the paint film, they will be re-dispersed during rubbing and the active pigment surface will increase. As a result, the rubbed area will exhibit a higher color intensity compared to the unrubbed area. Therefore, if defects described above exist in paint film, there would be a color difference between the rubbed and the unrubbed area.

Running
Coating defect described by runs and sags formed under the influence of gravity when it is applied to vertical surfaces. The likelihood of sagging increases with increasing coating thickness. The maximum possible film thickness that a coating can be applied to a vertical surface without sagging is defined as the "sagging limit".

Rust
Water insoluble metal oxides formed by the oxidation of metals due to corrosion.

Rutile
Rutile is one of the natural forms of titanium oxide (TiO2) with a refractive index value around 2.7. When rutile titanium oxide is used with organic resins having a refractive index in between 1.40 and 1.60, white paints with the highest hiding power can be obtained.
See also: Anatase

Sacrificial anode
Valuable metal objects, which need to be protected, are connected to electrochemically more active metals or alloys to construct a corrosion circuit. In this case, the active metal becomes the anode and corrodes at a certain rate. Meanwhile, the other metal is protected from corrosion. The material connected to the circuit to behave as the anode is called the sacrificial anode.

Safflower oil
A vegetable oil extracted from safflower seeds (Carthamus tinctorius). It is used in food industry and in the synthesis of alkyd resins. Safflower oil is a semi-drying oil, which has a fatty acid composition quite similar to those of sunflower oil. Safflower oil contains 75% of linoleic acid (two unsaturated bonds) and 13% oleic acid (a single unsaturated bond).

Sagging
The coating defect characterized by gravity-driven runs and non-uniform appearance that occur during the time it takes for paint applied to vertical surfaces to form a solid film. The possibility of sagging increases as the thichness of applied coating increases. The highest film thickness that a coating can be applied to a vertical surface without sagging is called the "sagging limit".

Sagging limit
See: Sagging

Salt spray test
It is an accelerated test to assess how efficiently the paint film protects the substrate from corrosion. Coated steel panels scribed down to the metal are placed in a 35°C chamber, where they are exposed to a continuous mist of 5% NaCl salt solution. After a test period ranging from several hundred hours to a few thousand hours, the panels are examined for the degradation of the paint films and the corrosion damage on the panels.

Sand blasting
A surface preparation process performed to remove dirt, oil, rust etc. from paint application surfaces like metal, and concrete, and to increase surface roughness thus improve paint adhesion. In sand blasting, sand with a high silica content, hard metalic abrasives, and for more sensitive surfaces (e.g., aircraft bodies) hazelnut shells, plastic granules etc. are sprayed to the surface with the aid of compressed air. The SSPC (Steel Structures Painting Counsel) standards are widely used to grade sandblasted surfaces.

Sand mills
Mills that aim to grind pigment aggregates and agglomerates using high silica sand as the grinding medium. See also: Bead mill

Sandability
Ease of sanding of a coating.

Sanding
Sanding is the mechanical removal of material from the surfaces by using sandpaper. In the paint industry, sanding is done to prepare surfaces to painting. Thus, by sanding, physical imperfections on the surface and the contaminants that can weaken adhesion are removed. Sanding results in an increase in the surface ares of the substrate which provides an additional contribution to adhesion.

Sanding paper
Sandpaper or cloth with abrasive particles adhered to it is used to remove material from the surface of wood, metal, etc. It is used to remove small amounts of material from surfaces. There are different types of sandpapers for use on bare or painted metal and wood surfaces. Sandpapers are wrapped around blocks for manual use or attached to rotating discs powered by electric motors. The abrasives on sandpapers can be made from different materials like garnet, aluminum oxide, or silicon carbide, and come in various grain sizes (commonly referred to as grit size). Symbols denoting the grit sizes range from P12 to P2500. The higher the number in the symbol, the finer the grit.

Sapele (in latin: Entandrophragma Cylindiricum)
A valuable tree grown in tropic regions of Africa. Its reddish-brown wood resembles Mahogany. It is an extremely durable tree with an attractive surface because of its growth rings. It is used for the production of furniture, musical instruments, interior decoration and parquet flooring. In Turkish furniture sector, it is also referred to as "sapelli".

Saturated polyester resins
See: Polyester resins

Saturation
One of the three components used to define a color (other two are hue and lightness). Saturation describes the concentration of color components constituting the hue.
The terms chroma and purity are also used in place of saturation.
See also: Hue / Lightness

Scotch Pine (in latin: Pinus Sylvestris)
Although its wood is easily processable, it has a low mechanical strength. Its timber is used for mould making in construction, in the packaging industry and in the manufacture of particle boards.

Scratch resistance
Formation of irreversible little surface cavities which may disrupt the continuity of dried coating film is called "scratching". Organic coatings with high "scratch resistance" either have high resistance to scratching or scratches dissappear after a while due to the nature of the coating.
See also: Mar resistance.

Sea container
A big rectangular metal box transported on ship decks and used to carry dry goods. Sea containers, also called marine containers, are typically 20 ft (approx. 6 meters) or 40 ft (approx. 12 meters) long.

Sea container coatings
Coatings used for the interior and exterior surfaces of sea containers. Primary function of exterior coatings is their high corrosion and water resistance. Epoxy based primers and, acrylic, chlorinated rubber or alkyd-based topcoats are commonly used for this purpose. Films of interior coatings are required not to have any interaction with the dry load carried in the container.

Sedimentation
Settling of pigments, fillers and other solid particles in the paint formulation due to gravity. If the settled particles can be homogenized by mixing, the phenomenon is called "soft settling". If the settled particles can not be evenly dispersed even with vigorous mixing, it is called "hard settling".
Synonym: Settling

Seeding
Formation of small agglomerates or gel particles (seeds) in a coating. Seeding is caused by resin insolubility, aggregation of pigment particles, or a combination of both factors.

Self polishing coatings (SPC)
Self polishing coatings are based on the binders that undergo controlled hydrolization when exposed to sea water. Residues which accumulate, leave the surface together with the outermost coatings layer as a result of ablation by hydrolysis. A clean and polished surface is thus formed again.

Semi-drying alkyd resins
Alkyd resins containing semi-drying oils.

Semi-drying oils
General name of oils, formed by the reaction of glycerine with fatty acids containing limited unsaturation. While there is no objective definition of semi-drying oils, oils with an average of 1-2 unsaturations per fatty acid chain can be practically referred to as semi-drying oils.

Shear
Separation of a substance's neighbouring particles from each other by applying different parallel forces causing different particle velocities.
(e.g., pair of scissors cut a piece of paper by applying forces in two opposite directions normal to paper surface. These forces are called shear forces. Shear force is applied to the paint by rotating mixer blades.)

Shear thickening fluids
Fluids that undergo a viscosity increase upon exposure to a shear force (e.g., mixing or shaking). They regain their original viscosity after the shear force is removed, and also called dilatant fluids. Some pigment pastes with high pigment loading demonstrate shear thickening behaviour.

Shear thinning fluids
Fluids that undergo a viscosity decrease upon exposure to shear force (e.g., mixing or shaking). They regain their original viscosity after removal of the shear force. Pseudoplastic fluids regaining their viscosity after the shear force is removed are called thixotropic fluids. Paints often exhibit this behavior.
See also: pseudoplastic fluids

Shelf life
The amount of time a coating or other material remains in usable condition during storage.

Shrinkage (Film shrinkage)
During the formation of a dry film from wet paint, the evaporating water or organic solvents leave the film. Simultaneously, if the binders undergo cross-linking via condensation polymerization, the water and carbon dioxide produced also leave the film. Even if cross-linking does not occur via condensation reactions, the chemical bonds formed between the reactants reduce the distances between them. Due to one or more of these three mechanisms, the resulting volume reduction leads to the film shrinkage.

Silica
Silica is a commonly used term for silicon dioxide, SiO2, which is the most abundant mineral in the Earth's crust. In paint industry, highly porous pyrogenic silica produced by burning of organosilicone compounds, and nano sized colloidal silica are used to adjust sagging, leveling and settling behaviors of paint. Micron sized silica dust is used as a matting agent.
Nano-scale precipitated silica in suitable solvent and/or resin vehicle is used to improve scratch and flame resistance of paints.

Silica extenders
Quartz powder produced by grinding amorphous quartz to micron sized particles is widely used in paint industry as matting additive. Furthermore, SiO2 based diatomaceous earth is used for the same purpose. Also, the pyrogenic silica obtained by burning silicon tetrachloride (SiCl4) is used as rheology modifier in paints.

Silicate based binders
Alkali metal silicates like sodium and potassium silicates are used as inorganic paint binders to a limited extend. Furthermore, ethyl silicate is used as a binder in anti-corrosive paints, especially in high corrosion resistant zinc-rich primers.

Silicone additives
See: polysiloxane surface additives

Silicone resins
Heat resistant coating resins produced by copolymerization of silanediol and silanetriol in various ratios. Their hardness, flexibility, chemical and heat resistance properties as well as solubilities

vary depending on the hydrocarbon segments of the silane compounds and diol/triol ratios.

Silking
A paint film defect observed in brush-applied paints as glittery streaks parallel to brush marks that appear thread-like. In brush-applied paints, this defect is caused by large-particle fillers in the formulation. In dip and flow-applied coatings, similar vertical lines can form due to surface tension differences.

Sinking
See: Strike-in

Sizing
The grains on the wood surface are disrupted during sanding. These grains are filled with dilute thermoplastic, aqueous varnishes by a process called "sizing". A second sanding is performed to remove these protrusions thus prepare the wood surface for a a high-quality painting application.

Slip agents
Additives that reduce the friction coefficient and thereby improve slip characteristics of coating films. Various waxes, paint compatible silicone or fluorine compounds, and modified polyesters can be used for this purpose.

Solid binder content
Amount of binder, free from solvents, present in 100 units of wet coatings material.

Solid content by weight
Weight percent of non-volatile substances present in an organic coating.

Solid wood
The wooden material obtained by giving a shape to timber cut from log or by joining different timbers. Unlike processed materials like MDF, particleboard, and hardboard, solid wood retains its natural wood texture.

Solubility parameters
Parameters based on the structual features of a chemical. Solubility parametes proposed by Hildebrand predict the solvency and dissolution characteristics of that chemical material. Hansen later developed a more advanced, "three dimentional" system (dispersion forces, polar forces and hydrogen bonding capacities).

Solvating power
A property of a solvent or a solvent blend that describes the capability of the solvent/solvent blend to dissolve a polymeric binder and to decrease the solution viscosity.

Solvent
The organic liquid of mostly volatile nature that is employed in the coating formulations to dissolve the binders.

Solvent naphta
Aromatic-rich solvent mixture obtained in a boiling range of 150-195°C during the distillation of petroleum with high aromatic content. Evaporation number based on the ether: 35-46; Specific gravity: 0.872-0.875; Refractive index: 1, 50; Flash point: ~42°C. (Commercial samples: Solvesso 100, Shelsol A etc.)

Solvent-borne paints
Coatings based on the binders which are soluble in volatile organic solvents. Synonym: Solvent-based paints

Solvent-free liquid coatings
Coatings that, despite containing no solvent, have a viscosity low enough to be applied. Solvent-free liquid coatings are produced by using low molecular weight polymers, oligomers, or reactive monomers as binders (e.g, Radiation cured coatings, solventless epoxy coatings etc.).

Soybean oil
Soybean oil is a vegetable oil extracted from soybeans. It is used in food industry and in the synthesis of alkyd resins. Soybean oil is a semi-drying oil, which has a fatty acid composition and drying characteristics similar to those of sunflower oil. Soybean oil contains 51% of linoleic acid (two unsaturated bonds) and 25% oleic acid (single unsaturated bond).

Specific heat
Amount of energy required to increase the temperature of one gram of a pure substance by 1°C.

Spectral colors
Colors in the visible color spectrum each of which are lights of certain wavelength.

Spectrometer
See: Color measurement

Spectrum colors
See: Spectral colors

Spray booth
A booth or chamber designed for spray paint applications. It is necessary to ensure effective air exchange inside in order to decrease health and fire risks, and to prevent the formation of overspray in the booth. For this purpose, filtered fresh air is supplied while the air inside the booth is is extracted, passed through wet or dry filters to capture paint particles, and then released into the environment. The flow rates of supplied and exhausted air are arranged to create a positive pressure inside the booth in order to ensure a dust-free paint application. Importantly, the electrical installations inside the cabin should be explosion-proof (ex-proof), and precautions should be taken to prevent the formation of sparks inside the booth (such as proper grounding, avoiding the use of insulating materials, and using non-sparking maintenance tools).

Spray dust sensitivity
During wet paint applications, visual defects as the formation of bits, craters or orange peel appearances can occur on the surface of the paint film if spray dust from the paint itself or another paint applied in similar environments falls onto the still-wet paint film. The paint characteristic that leads to these defects is called "spray dust sensitivity".

Spray nozzle
A small-diameter hole in paint spray guns through which the dispersed paint droplets leave the gun with an increased speed.

Spread rate
The area of the surface to be covered by the unit weight (or volume) of the coating material at a specified dry film thickness. Spread rate is also referred to as coverage.

Spring woods
The soft, dark colored, and more porous rings that are present in the cross-section of a tree. Spring woods are formed during humid period of the year.

Spruce (in latin: Picaea Orientalis L)
Its timber is flexible and strong, with a high humidity resistance. Spruce is frequently used in all types of construction works, outdoor and indoor woodworks, flooring and in staircases. As it can be polished, it is used in making of furnitures. Furthermore, spruce is used in the production of plywoods, matchsticks, paper, and artificial silk.

Stabilization of dispersions
Process of maintaining the homogenous dispersed state of the pigments in the paint vehicle. Stabilization is achieved through two basic mechanisms: (a) Pigment surfaces are electrically charged using appropriate additives, and the pigment agglomeration is prevented due to the repulsion forces between similarly charged particles; (b) Polymeric dispersion additives containing pigment-affinic groups are attached to pigments and prevent their agglomeration by acting as spacers between them (stabilization via steric hindrance)

Stackability
The condition where coated pieces can be stacked without sticking to each other is defined as "stackability". The safe dry to stack timethat a paint can provide for a specific item is determined under laboratory conditions by conducting a "dry to stack test".

Stain
An organic coating containing dyestuff and/or transparent pigments, applied as a thin layer on wooden substrates. Stains are absorbed into the wood surfaces by wiping, spraying or brushing.

Step-growth polymerization
See: Condensation polymerization

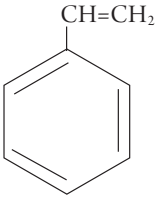
Steric hindrance
Some segments on a molecule may block the access of other molecules with chemical affinity to some reactive groups on the same molecule. This

hindrance arises from the shielding effect caused due to spatial arrangement of that molecule.

Stone chip resistance
The resistance of coatings especially those applied on the exterior parts of vehicles, to the impacts of stones thrown-up from the road. The paint film should have strong and elastic chemical bonds so that the impacts are damped without deforming the coating. For this reason, aliphatic polyurethanes are generally preferred for high stone chip resistant coatings.

Strike-in
A film defect described by dull or blurry appearance of topcoat due to the migration of some portion of binders into the previously applied wet paint layer in wet-on-wet applications.

Styrene
A monomer used as a fundamental building block or modifier in the synthesis of most polymers.
Chemical name: phenylethene, vinyl benzene
Chemical formula:



Boiling point: 145°C, Refractive index: 1.5164

Sublimation
The phase transition of a solid element or compound directly to the gas phase without passing through liquid stage.

Substrate
Any surface to be painted, including wood, concrete, masonry, steel, other metals, and various other materials or previous paints.

Summer woods
Name of the harder, darker, and denser rings that are present in the cross-section of a tree. As the name implies, they are formed during dry summer period.

Sunflower oil
Vegetable oil obtained from sunflower oil seeds and used widely in food industry and in production of alkyd resins. It is a semi-drying oil containing approximately 52% di-unsaturated linoleic acid and 29% mono-unsaturated oleic acid.

Surface additives
Surface additives are added to paint formulation to prevent film defects. They either have surface tensions lower than paint ingredients (typically silicone and fluorine compounds) or have limited compatibility (typically polyacrylate compounds). They migrate to the surface and form a thin surface layer. Thus, surface tension gradients that cause defects on paint film are prevented.

Surface cleaning by solvent
Removal of dirt, oil or other contaminants from the paint application surface using effective oil dissolving solvents.

Surface filtration
The process of filtering unwanted particles presents in the paint using sieves with certain mesh sizes.

Surface tension
The forces which tend to minimize the surface area of any liquid. Intermolecular attraction foces (cohesive forces) exist among all liquid molecules. Molecules in the bulk of a liquid, are attracted equally in all directions by similar neighbouring molecules. Thus, the forces acting upon them balance each other. However, a molecule at the surface (assume that the liquid is in absolute vacuum) is attracted only by neighboring surface molecules and by those beneath the surface. Therefore, the resultant attraction is inwards. To raise a molecule from within the liquid to the surface, work must be done against the cohesive forces between the liquid molecules. As a result, the molar free energy of the surface is higher than that of the bulk. The work required to increase the surface area is equal to the surface tension of the liquid. (Note: Another definition of surface tension is the free surface energy per unit surface area of liquid).

Surface tension measurement
There are various methods to determine the surface tension of liquids. The following four meth-

ods are frequently used in paint industry. (a) Du Noüy Ring method for liquid paints. (b) Wilhelmy plate method for liquid paints. (c) Contact angle measurment for liquid paints. (Sessile drop method) (d) Test ink method for cured paint films.

Surfactant
The term contracted from English words (Surface+active+agent). Surfactants are used to reduce surface tensions of organic coatings. Surfactants comprise one polar group at one edge and one organophilic group at another end. They are used in the preparation of emulsions, aqueous pigment dispersions and also as defoamers.

Sweating
Sweating is a paint defect where the ingredients of a paint film, which are liquid at room temperature, migrate to the surface of the dry film and create a sweating appearance.

Synthetic paints
Paints manufactured using synthetic resins as binders instead of natural oils, natural resins, or cellulosic resins. Since, first synthetic resins that became widespread were alkyd resins, historically, synthetic paints are understood as alkyd-based paints. Although most of the paint resins used nowadays are synthetic, use of synthetic paint term for defining alkyd resins is still common.

Synthetic waxes
Wax polymers produced synthetically for various purposes. Polyethylene, polypropylene, polyvinyl acetate, and polytetrafluoroethylene waxes are frequently used in the paint industry to improve scratch resistance, to increase film mattness, and to modify the rheology of paint. See also: Wax

Taber abrasion test
Test for evaluating the abrasion resistance of paint films. An abrading wheel loaded with a certain mass wheel rolls on painted panel mounted on a on a rotating turntable. The weight loss due to abrasion is recorded after a certain number of revolutions.

Tail solvent
Solvent added in small amounts to organic coating formulations as the last solvent to leave the coating film due to its slower evaporation rate compared to other solvents in the formulation.

Talc
Magnesium silicate mineral containing crystal water [Mg(SiO10)(OH)2 or 3Mg.4SiO2.H2O]. It is found in crystal structures that are spherical, lamellar, and fibrous. Refractive index: 1,54-1,59; specific gravity: 2,70-2,85; oil absorption value: 23-52 g/100 g talc. It enhances sanding of paint, primer, and putty films. Due to its high oil absorption value, it increases the viscosity and matting efficiency of paint. Synonym: Talcum

Tall oil
Wood oil obtained as a byproduct of the alkaline process used for the manufacture of wood pulp (Kraft process). After decolorization by distilation, tall oil and its fatty acids are used in alkyd resin production. Tall oil is a semi-drying oil with a fatty acid composition of 30% oleic acid, 45% linoleic acid and 14% pinoleic acid.

Tanning
Tanning is the process of converting animal hides into a material resistant to microbial decay and transforming them into textile raw materials by chemically treating them after removing flesh, fat, and hair.

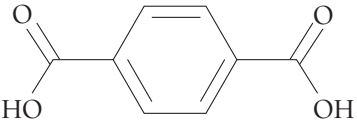
Tape adhesion test
A test conducted to measure the degree of adhesion of a dry organic coating film to the application surface. Adhesion performance is checked by adhering a tape on the rectangular grid created by a series of cuts on the film and pull it afterwards. The adhesion quality is evaluated by comparison with descriptions and images specified in several standards.

T-bend
See: Bending resistance

Telegraphing
Telegraphing is the reflection of surface structure of the substrate to the upper surface of the paint film. Sometimes, the visibility of fingerprints, water spots or sanding marks on the substrate is also called telegraphing. In principle, telegraphing is

caused by surface tension gradients on the surface of substrate caused by the temperature or concentration variations.

Terephthalic acid
Polyacid produced by the oxidation of p-xylene. It is commonly used as precursor of polyethylene terephthalate polyesters for textile industry.
Chemical formula: $C_6H_4(CO_2H)_2$



Sublimation temperature: 300°C

Terpene solvents
The solvent group obtained from roots and trunks of some of the pine trees and used in long-oil alkyd-based coatings. Terpene solvents have the general formula of (C5H8)n. The most widely used terpene solvents are turpentine and dipentene, both with an empirical formula of C10H16. Over time, use of terpene solvents decreased since they are replaced by petroleum based white spirit.
Synonym: Terpenes

Thermoplast
See: Thermoplastic

Thermoplastic
General name for substances that can repeatedly soften when heated and return to their original hardness when cooled.

Thermoplastic acrylic resins
See: Acrylic resins

Thermosetting
General name for substances that are capable of being permanently rigid when heated or cured

Thermosetting acrylic resins
See: Acrylic resins

Thinner
A solvent or solvent mixture used to adjust the viscosity of wet coatings for a defined application.
Synonym: Reducer

Thixotropy
A phenomenon observed in some of the shear-thinning (pseudoplastic) fluids as a delay in their response to the application of shear. If a pseudoplastic fluid is not thixotropic and a constant shear stress is applied on it (i.e., stirring at a constant speed), its viscosity drops and stays constant. On the other hand, if fluid is thixotropic, viscosity drop may continue even after a homogenous stirring is reached. When stirring stops, viscosity of a non-thixotropic fluid immediately rises to its original resting value, while in a, thixotropic fluid it may need minutes, hours even days to return back to its original viscosity.
See also: Shear thinning fluids/pseudoplastic fluids

Three roll mills
A paint production tool that effectively grinds pigment flocs between three rollers rotating at different speeds. Despite their effective grinding capabilities, three-roller mills are becoming less commonly used due to their low production speeds.

Through drying
Hardening of an organic coating film to a degree at which it has its final physical and chemical properties.

Throwing power
In electrophoretic coating, it is desired that coating particles which begin travelling the shortest distances between the electrodes reach to the remotest parts of the coated object as well. The ability of electrophoretic paints to coat the remotest parts of the coated object is called "throwing power". Coating of the remote parts usually requires bending of electrical field lines that normally follow the shortest distance between the two electrodes.

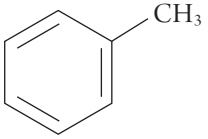
Tinting
Obtaining different colors by adding colorants at varying concentrations.

Titanium dioxide, TiO2
Dioxide of titanium having anatase, rutile, ilmenite crystal forms. Rutile type titanium dioxide is the prime pigment in paint industry. The rutile

titanium dioxide used in paint industry is produced by converting the crude ore to high purity titanium dioxide through either sulphate process or chloride process.

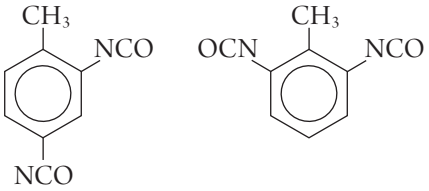
to penetrate
The process of diffusing through a substance by overcoming its resistance.

Toluene
An aromatic paint solvent, obtained from coal tar and petroleum.
Chemical formula: $C_6H_5CH_3$



Boiling range: 110-111°C; Evaporation number based on the ether: 6; Specific gravity: 0,871; Refractive index: 1,4969; Flash point: 6°C

Toluenediisocyanate
Polyurethane raw material which is commonly used in coating industry as a mixture of 2,4 and 2,6 isomers with a ratio of 80% and 20%, respectively.
Chemical formula: $CH_3C_6H_3(NCO)_2$



Synonym: TDI

Topcoats
The final coat applied in a coating system. Since topcoats are exposed directly to the outdoor conditions, they are expected to have the desired durability properties. Synonym: Topcoat paints

Touch-free drying
The state of a paint film drying to the extent that no mark is left when touched with a finger. Touch-dry tests are conducted by (a) applying "moderate pressure" with a finger on the dried surface, or (b) checking if a cotton piece pressed onto the panel at 250-500 g/cm^2 adheres when the panel is inverted.

Toughness tests
Resistance of a paint film to crack under stress is called toughness. The tests to assess this characteristic property is called toughness test.

Transfer efficiency
A term especially used for spray applications. It refers to the percentage of the sprayed paint that reaches the surface.

$$\text{Transfer efficiency} = \frac{\text{Amount of paint reaching the surface}}{\text{Total amount of paint sprayed}} \times 100$$

Transparency
Property of a material by which all the incoming light to its surface passes through, without any loss by reflection and absorption. Clearcoats and paints with small pigment particles are expected to highly transmit the light. For this purpose, the transparency of films applied to glass is visually compared, or the light transmittance of free films is instrumentally measured.

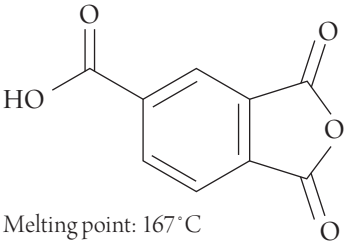
Transparent iron oxide pigments
Iron oxide pigments produced to have particle sizes around 0.01 micron practically have no hiding power, and produce transparent, colored films. Excellently light-fast transparent red and yellow iron oxide pigments are used in metallic and pearlescent coatings, and in wood stains.

Tricationic phosphate coatings
Ferrous metal surfaces cleaned from oil and dirt are pretreated before paint application. Since use of Cr+6 is restricted, it's been replaced by phosphate coatings. Among phosphate coatings, the best corrosion resistance and surface adhesion are achieved by tricationic phosphate coatings (zinc-nickel-manganese phosphate). Phosphate coatings can be applied by dipping or spraying. Shape of the formed metal phosphate crystals depends on the application method. In dipping, crystals cover the metal surface as a protective shield made of ordered fish scales. In spray applications, acicular (perpendicular to metal surface) metal

phosphate crystals are formed. Consequently, the dipping method leads to more impermeable, more corrosion-resistant phosphate coatings, which are also more resistant to stone chipping. Therefore, by dipping method, impervious and highly corrosion resistant phosphate coatings with high stone chip resistance are formed.

Triglycerides
The general term for the compounds formed by the esterification reaction of glycerol with acids, particularly fatty acids, through three hydroxyl groups of glycerol. Triglycerides that are formed by the esterification of vegetable fatty acids and glycerol are called vegetable oils.

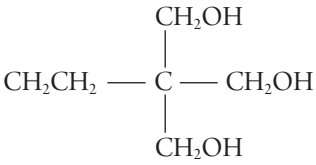
Trimellitic anhydride
A polyacid used for the synthesis of polyester resins, especially the resins to be used in water-dilutable coatings. Chemical name: 1,2,4-Benzenetricarboxylic anhydride
Chemical formula: $C_9H_4O_5$



Melting point: 167˚C

Trimethyl pentanediol (TMPD)
See: 2,2,4-trimethyl 1,3-pentanediol (TMPD)

Trimethylolpropane
Polyol synthesized by the reaction of formaldehyde with butyraldehyde. Trimethylolpropane is used in the production alkyd resins and isocyanate prepolymers.
Chemical name: 1,1,1- Trimethylolpropane
Chemical formula: $CH_2CH_2C(CH_2OH)_3$



Melting point: 58,8°C; Boiling point 295°C

Tristimulus values
Three different receptor cells in the retina of human eye are sensitive to blue, green and red lights. The proportion of these lights in any color can be measured with color spectrophotometers. Results will be tristimulus values represented by the symbolsn X, Y, and Z.

Tung oil
Tung oil is a vegetable oil obtained from tung tree with a fatty acid composition containing 80% eleostearic acid. Eleostearic acid has three conjugated double bounds. Therefore, it is rapidly oxidized with oxygen in air at room temperature to give tough and durable films. On the other hand, if baked over 120°C, tough and durable films are also formed but due to self- polymerization.

Two-pack coatings
Cross-linking systems that must be stored in separate containers before use. Since these systems contain rom temperature-reactive groups, they otherwise would react and turn into gel in the container.

Underbake
Insufficient drying of high temperature cured organic coatings as a result of lower baking temperatures and/or shorter or exposure times.
Synonym: Undercure

Undercoat lifting
The solvents in the topcoat may cause a type of lifting problem in the undercoat that has not fully cured. This is particularly observed in wood clearcoat systems, where the "undercoat lifting" is observed at the upper surface of the clear sealer beneath the topcoat, in the form of wrinkles measuring several tens of microns. See also: Lifting

Unsaturated polyester resins
See: Polyester resins

Unsaturated polyester-based composites
Name given to composites obtained by mixing unsaturated polyester resin with fiber, sand etc. to provide mechanical strength. Glass fiber reinforced polyesters, called as FRP or GRP, are the most widely used unsaturated polyester-based composites.

Upper explosion limit
See: Explosion limits

Urea
A compound produced by reaction of liquid CO_2 with ammonia and used in the synthesis of urea formaldehyde resin.
Melting point: 132-136°C

Urea formaldehyde resins
Polymerization products of urea and formaldehyde. Commonly used as adhesives. In addition, they are used as cross-linkers for alkyd and polyester based oven-curing coatings.

Urethane modified resins
Resins that have alkyd, acrylic structures but modified with monomers and prepolymers containing isocyanate groups to improve flexibility, chemical resistance and so on.

Urethane resins
Urethane resins are formed by the reactions of compounds bearing at least two isocyanate groups with molecules with more than one hydroxyl groups. Urethane coatings have high water, solvent and chemical resistances, and give strong and flexible films. Urethane coatings with no aromatic groups have superior UV resistance.

UV absorbers
See: UV stabilizers

UV curable coatings
The coatings which crosslink by the polymerization of its functional monomers and oligomers under the influence of UV radiation. The UV curing process proceeds through free radical polymerization or cationic polymerization initiated by the photoinitiators in the coating formulations.

UV stabilizers
The general name for additives used to prevent degradation of organic coating films exposed to UV light. UV stabilizers are classified into two groups: UV absorbers which convert the absorbed UV energy into heat which then dissipates around. Benzophenone and benzotriazole derivatives are among the commonly used UV stabilizers. The other group is free radical scavengers. By the collision of UV light to the molecules of some organic ingreadients of coating film, some free radicals may form. Free radical scavengers added to coating composition react with these free radicals, neuralize them while being decomposed themselves. Hindered amine light stabilizers (HALS) are the group of compounds most widely used free radical scavengers.

UV-CON test
A test performed to predict the degrading effect of outdoor exposure as UV light, rain/fog and temperature change. UV-con test devices have cycles simulating the"dry sunny period", and "dark rainy period" of the day. Yet, it is commonly agreed that the "dry sunny period" does not simulate the degredation of binders in nature, since the spectrum of light emitted by the used UVB bulbs contain high energy segments which do not exist in earth's atmosphere.

Varnish
See: Clearcoat

Vegetable fats
The general name for oils stored in seeds, fruits, and bodies of plants, and obtained by the esterification of three vegetable fatty acids with the hydroxyl groups of glycerine. Among the commonly used vegetable oils in coatings industry are soybean oil, sunflower oil, linseed oil, tung oil, olive oil and castor oil. See also: Triglycerides

Vehicle
Fluid medium in which powdered pigments and extenders are dispersed. In liquid paints, vehicle comprises binders and solvents. In powder coatings, binders that can be fluidized by heat are used as vehicle.

Veneer
A wooden layer of ca. 0.5 mm thickness to cover the surfaces of solid wood, chipboard and MDF. Veneers are made of different woods using different cutting techniques. Veneers are bonded to wooden substrates using glues (adhesives).

Vinyl resins
Organic coating resins synthesized by the polymerization of unsaturated vinyl groups, CH2=CH–, and their derivatives.

Viscometer
General name for the devices used to measure viscosity of fluids.

Viscosity
Measure of resistance of a fluid against flow. The higher the viscosity of a fluid, the greater its resistance to flow.

Viscosity cups
See: Flow cups

Viscosity stability
An accelerated test for predicting the change in the viscosity of a liquid organic coating during storage. To simulate the stability during storage, the temperature of the paint is raised to 50–60°C and kept at this temperature for a predetermined time.

Viscous
1) Having a high viscosity or a high resistance to flow (e.g., viscous fluid)
2) Related to viscosity or to the resistance to flow (e.g., viscous force)

Visible region
Wavelength range of light perceived by the human eye (between ~380-780 nm). When atoms and molecules are exposed to external energy of sufficient intensity, their electrons become excited and emit light. These radiations may differ from X-rays (the most energetic) to radio waves (the less enegetic), and only a small part is visible to human eye.

Visual Determination of color
Determination of color only with human eye without using any measuring instrument. One or more of the following goals is to be achieved by this process: (i) Estimating which pigments or dyestuffs make up the observed color. (ii) Determination of matching quality of the observed color with a reference color. (iii) Determination of types and amounts of colorants required to match the observed color with a reference color.

Visual film properties
All properties affecting the visual perception of the dried coating film. Most important properties for visual evaluation are color, specular gloss, levelling, distinctness of image (DOI) and haze.

Volatile
A term used for chemicals that are lquid at room temperature but have high evaporation rates.

Volatile organic compounds (VOC)
The amount of volatile organic compounds in grams per one liter of liquid organic coating. Synonym: VOC

Vulcanization
Cross-linking of natural and synthetic rubber with sulfur compounds. See: Rubber

Wash primer
An anti corrosive primer applied on ferrous or light alloy surfaces at a 4-7 µm dry film thickness. Since first applications used to be done by washing the object with the primer, they are called "wash primers". Wash primers are typically formulated using polyvinylbutyral, with the addition of epoxy and phenolic resins. In the last two decades, wash primers included zinc phosphate pigments instead of zinc chromates due to hazards caused by Cr+6 to the environment and human health. Wash primers are catalyzed with acid-catalysts for a good adhesion on the metal surface. Special care should be taken when applying layers containing basic inputs over wash primer films that may contain residues of acid catalyst, as this could lead to severe intercoat adhesion problems.

Water reducible paints
Water reducible paints that contain water reducible polymers and water miscible solvents like alcohols or glycols generally in amounts less than 15%. Water reducible paints can be thinned using water before application. They are commonly misnamed as "water- soluble paints.

Water reducible resins
Resins, which are made water reducible by adding a sufficient number of hydrophilic groups into their structure.

Water repellency
Wetting of paint film by water gets difficult when surface tension of paint film is much lower than

that of water. This property of paint film is called water repellency.

Water resistance
Resistance of a paint film against degradation and destruction caused by water.

Water spotting
A local visual change on paint film caused solely by water.

Water-based paint
See: Waterborne coatings

Waterborne coatings
Waterborne coatings are defined as coatings in which water is used instead of organic solvents to adjust the flow behaviour. Waterborne coatings are divided into three groups as latex coatings, water reducible coatings and emulsion coatings. Waterborne coatings are commonly misnamed as water-based coatings. However, this term can be misleading because water evaporates during the drying process. In contrast, something's base is its inseparable element that determines its character. Waterborne emulsion paints. Paints in which waterborne emulsion polymers are used as binders.

Waterborne emulsion polymers
Waterborne emulsion polymers are suspensions of small polymer droplets which are stabilized by emulsifiers in water. If the polymerization proceeds inside the droplets formed from the raw materials, the emulsion is called a "primary emulsion". If the solution of a solventborne polymer is emulsified in water, then it is called a "secondary emulsion".

Wax
The general name of low molecular weight polymeric materials that are solid at room temperature and can soften around 50-100°C. Waxes are traditionally produced from animals (e.g., Beeswax, Spermaceti whale wax), and plants (e.g., Carnauba wax, from the leaves of the Carnauba palm) and petroleum products (e.g., Paraffin wax). Chemically, waxes are synthesized by the polymerization of esters, alcohols and carboxylic acids or their mixtures. Other than natural waxes there are also synthetic waxes produced for specific purposes. Some of these synthetic waxes are used as additives in paint. See also: Synthetic waxes

Weathering
See: Outdoor durability

Weatherometer test
An accelerated test for predicting the exterior durability of the paint under the real service conditions. In the UV cycle of the test, the radiation from carbon arc or xenon lamp, is assumed to have the same wavelength distribution as the sun light but higher in intensity. Although it takes longer than the UV-con test, WeatherOmeter test is considered to provide more reliable predictions about the outdoor durability of the paint.

Weight average molecular weight
Weight average molecular weight is calculated by summing the products of the weights of each species and their molecular weights and dividing by the total weight of the mixture.

$$\overline{M}_W = \frac{W_1\overline{M}_1 + W_2\overline{M}_2 + \ldots}{W_1 + W_2 + \ldots} \quad \frac{\Sigma W_1\overline{M}_1}{\Sigma W_1}$$

Wet adhesion
The property of a coating to adhere tightly to a substrate under wet conditions is defined as wet adhesion. Wet adhesion property of a coating is believed to be influential on its corrosion-preventing function.

Wet bulb temperature
The wet bulb temperature is the air temperature measured with a thermometer whose mercury reservoir (bulb) is wrapped in a wet cloth. The lowest temperature which may be achieved by evaporative cooling of water in the surrounding wetted cloth is determined as the wet bulb temperature. See also: Dry-Bulb temperature / Dew point

Wet film thickness
The thickness of the wet paint film measured immediately after application. Wet film thickness is commonly measured by Wet Film Comb Gauges with various depth tabs. Another frequently used tool is the Wet Film Thickness Wheel which consists of nested eccentric discs.

Wet grinding
See: Grinding

Wet paint conductivity
To complete the electrical circuit during the electrostatic applications of wet paints, the paint droplets reaching the surface to be coated should transfer their charge to the substrate and then to the ground. Thus, the conductivity of the wet paint should be adjusted using proper solvents and additives.

Wet paint density
Density of paints in package or application viscosity. It is typically measured in g/ml units. Paint density is commonly measured with pycnometers. Pycnometers are constant volume cups made of aluminum or stainless steel.

Wet paint tests
Tests to determine the properties (such as viscosity, solids%, density, grind size, settling stability etc.) that a paint should have in its packaged form. Wet-on-wet paintingPaint application method based on applying a layer without waiting for the previous layer to dry. Synonym: w/w

Wetting
The spreading of a fluid on a surface as a thin homogeneous layer due to its lower surface tension than that of application surface.

Wetting and dispersing additives
General name for additives that are used to (a) achieve dispersion of pigments and fillers using less energy in shorter time, and (b) increase dispersion stability.

White Ash (In latin: Fraxinus Excelsior Sp. L.)
A tree belonging to the olive family with a hard and valuable wood. Its heartwood is brown, and its sap wood is white-yellow with large pores and distinct annual rings. It is used in furniture production and has a specific gravity of 0,75g/ml.

Wire brush
A simple tool used to remove rust, loose paint, and dirt from the substrate, which otherwise can create adhesion difficulties. The bristles of wire brush are usually made of hardened carbon steel, stainless steel, or brass. (Given in a sequence of use prevalence). Wire brushes are driven by rotating and vibrating motors or used manually.

Wood coatings
General term for organic coatings used to protect and decorate wood substrates for indoor and outdoor applications such as furnitures, doors, window frames, floors, fences etc. Some examples of wood coatings are wood preservatives, stains, primers, sealers, putties, pigmented and clear topcoats.

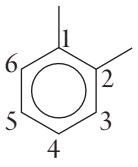
Wooden substrates
Substrates that primarily comprise wood as the main component. Solid wood, plywood, veneer, chipboard, MDF and hardboard are among the widely used wooden substrates that fall within the scope of the organic coatings industry.

Wrinkled paint
Paint especially designed and produced to give a wrinkled appearance. Wrinkled paint is designed to have the upper surface of the wet film to dry faster than the rest of it.

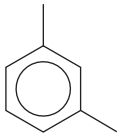
Wrinkling
Coating defect described by the wrinkled appearance caused by faster drying of surface layer of a wet coating film than lower layers, similar to lifting defect.

Xenotest
The accelerated outdoor durability test that aims to simulate the accelerated effects of sun light using xenon lamps.

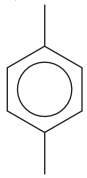
Xylene
A solvent obtained from aromatically reach petroleum and coal tar. The solvent, that is known by the name xylene in coating industry, is in fact a blend of the following three isomers of $(CH_3)_2C_6H_4$



1,2-dimethylbenzene (ortho-xylene) 15-25% by wt



1,3-dimethylbenzene (meta-xylene) 40-50% by wt



1,4-dimethylbenzene (para-xylene) 15-25% by wt

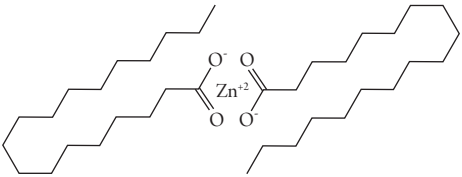
Some characteristics of the mixture of xylene isomers used in the coating industry are as follows: Boiling range: 137-143°C; evaporation number relative to ether: 13; specific gravity: 0,871; refractive index: 1,4980; flash point: 25°C

Yellowing
Shift of color of cured organic coating films to yellowish side under the influence of outdoor conditions.

Zinc coating
See: Galvanizing

Zinc phosphate coatings
Inorganic coatings applied by dipping or spraying to enhance the adhesion of coatings to metal surface and to improve the corrosion resistance.
See also: Phosphating

Zinc stearate
A zinc soap that does not dissolve in paint solvents is used as an additive in paints and varnishes to give mattness and improve sandability.



Zinc-rich coatings
Anti-corrosive primer for iron and steel. Zinc-rich coatings use zinc dust in a concentration sufficient to provide electrical conductivity in the dried film. This enables the zinc metal to corrode preferentially to the ferrous substrate, giving galvanic protection.


Kayalar