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Glossary - Terms used in the Plastics Industry

A B C D E F G H I J K L M N O P R S T U V W

A

A-Stage: This is the earliest stage in the reaction of thermosetting plastic resins. In this stage the molecular weight of the resin will be low. It will be fusible, as well as soluble in some liquids.

ABS: This is an acronym for acrylonitrile-butadiene-styrene. This is an impact resistant and tough engineering grade plastic that works well for all types of protective applications. This plastic is well-known for its high stiffness, durability, high tensile strength, as well as formability. The raw material of this polymer is mainly colorless; however, it can be produced in any color to meet specific application requirements. They include ABS/PVC and ABS/thermoplastic, and are mainly used in creating protective applications for the electrical and automotive industries.

Abrasion Resistance: This is the ability of the material to withstand wear, tear, and scraping in regular or abusive work environments.

Absolute Viscosity: This is the tangential force acting on unit area of two parallel planes that are at unit distance apart when the space between them is filled with liquid. In this one plane moves with unit differential velocity. The C.G.S. unit for absolute viscosity is poise (dyne-sec./sq. cm.). However, Centipoise (0.01) is the most commonly used unit.

Acetal: This is a rigid material that has a slippery surface. It can easily withstand wear and tear in abusive work environments. This polymer is used for building applications such as gears, bearings, valve components, and so on. Turcite and Delrin are two popular acetal types. In this, Delrin is a popular acetal copolymer, whereas Turcite is an acetal homopolymer.

Accelerator: It is a substance that would hasten a chemical reaction of the plastic. For instance, accelerator is mainly used for the vulcanization of rubber. It is also known as promoter.

Accumulator: This term is mainly applied in reference to the blow molder equipment, which utilizes an auxiliary ream extruder to ensure the parison delivery. The cylinder of the accumulator is filled with melted

plasticizer that is produced by the extruder between the shorts or parison deliveries. This material is stored until the plunger is needed for the next parison delivery.

Acrylic: This synthetic resin is a derivative of acrylic acid or acrylic acid itself. It has a smooth surface and it is mainly used for various indoor applications. The material can also be used for outdoor applications, with special formulation.

Acrylonitrile: This is a monomer that has a structure CH2: CHCN. It is mainly used in copolymers. The nitrile rubber is copolymer of acrylonitrile. Its copolymers with butadiene and styrene are tougher than polystyrene. This is also used as a chemical intermediate.

Actuation: This is the process of putting a device into motion or mechanical action.

Additives: This is a substance added to the formulation of a resin in its formulation phase before processing to improve its mechanical and thermal capabilities. At times, additives are also introduced during the processing phase to impart better surface finishing. For instance, flame retardants and plasticizers are the common additives used in the plastic formulation.

Adhesion Promoter: This is mainly a coating applied as an intermediate.It is

capable of holding materials together.

Adhesives: These are the substances that are capable of holding two or more materials together. They are mainly applied on the surface of the materials.

Affinity: This is a term used to symbolize the attraction between two substances.

Aging: This is a change of material with time in defined environmental conditions. Aging is often used to depict the deterioration or improvement of properties of certain compounds.

Air Gap: This term is synonymous with extrusion coating. This term is used to show the distance between the die opening and the tip that is created by the chill roll and the pressure roll.

Air Ring: This is a circular shaped manifold used to distribute the air onto a tubular form that is passing through the ring's center. This manifold is used for hollow tubular forms. In blown tubing technique, the air is used to cool the tubing uniformly through its surface. This leads to the formation of uniform thickness throughout the tube.

Air Assist Forming: It is a technique of thermoforming, where the flow of air pressure is employed to pre-from the sheet partially. This technique is employed immediately onto the mold

through vacuum before it is pulled down.

Alloys: They are composite materials created by blending copolymers or polymers with other polymers, as well as elastomers. The alloying is usually performed in controlled conditions. For instance, butadiene-acrylonitrile rubbers alloyed with styrene-acrylonitryle copolymer resins.

Alkalies: These compounds are used for neutralizing acids. They have an acrid taste.

Aliphatic: These compounds feature hydrogen and carbon molecules joined together in straight or branched chains. Even these compounds may have carbon and hydrogen molecules joined together in non-aromatic rings.

Alkyd Resins: These resins are produced by condensing a polyhydric alcohol with a polybasic acid.

Allyl Resin: This is one of the main types of resins that is formed by the polymerization of chemical compounds of the group - CH2=CH-CH2. One of the main commercial allyl resins is the material that produces the carbonate polymer of allyl.

Alpha Cellulose: This is one of the important types of cellulose having special formulation. Alpha cellulose is also prepared by special techniques.

Amine: This signifies organic compounds that are derivatives of ammonia. Amines are produced by replacing the hydrogen with one or more alkyl groups during the formulation.

Amorphous: It is the Latin name for non-crystalline compounds.

Amorphous Phase: This is a phase in which the compound has no definite crystalline structure. Many plastics undergo this phase at their processing temperatures.

Angle Press: This is a special type of molding press used for the production of complex moldings that may have deep undercuts. Angle press is basically a hydraulic molding press, and it has vertical and horizontal rams.

Anisotropy: It is the property of the substance to align across different molecular axis. This property is mostly seen in liquid crystals than liquids. During the injection molding, the macromolecules are usually aligned in the direction of the flow. The strength of the material will vary depending on the direction of the flow.

Anneal: This term symbolizes the removal or formation of stresses by cooling them at a typical temperature.

Annealing: This refers to the process, where the material is held at a temperature mean, to permit the stress relaxation without any change

in shape. The temperature mean is usually the temperature below the melting point. This is mostly used on different types of molded articles to remove their stresses that are set by the material flow to the molds.

Anti-Friction Compounds: These are the compounds that are used for eliminating or reducing friction.

Antifogger: This is an additive that prevents the formation of moisture on transparent materials such as lenses, windshields, and glass.

Antioxidants & Antiozonants: Antiozonants are the type of additives that are designed to prevent the adverse effects of ozone and oxygen on resins.Antioxidants are the materials that help reduce the effects of oxidation on the material that is exposed to air.

Antistatic Agents: These chemicals are formulated to reduce the built up of static electricity in plastic materials. The antistatic agents can be chemical agents or they can be metallic devices. The chemical agents that are incorporated into compounds during the processing phase to modify their surface. However, metallic agents are kept in contact with the plastic material and they help ground the static electricity.

Aramid: These are synthetic aromatic polyamide materials that have high thermal capabilities and are

lightweight. Aramids are shaped into filaments, fibers, and sheets.

Arc: The electric current when made to pass through ionized gas, air, and vapor produces a luminous glow. This arc is usually created between two separated contacts or electrodes.

Arc Resistance: When the voltaic arc resists the flow of electric current, the phenomenon is known as arc resistance.

Aromatic Hydrocarbons: These compounds are characterized or derived from the benzene rings.

Asbestos: These materials are used for reinforcement or as a filler in various compounds. They are non-conductive, non-burning, and chemical resistant materials in nature.

Assembly: This is a manufacturing function, where the different parts are fused together to form a new body.

Aspect Ratio: It is the length-to-diameter (l/d) ratio of fibers or materials.

Atactic: These polymers are devoid of stereochemical regularity.

Autoclave Molding: This technique is mainly used for molding reinforced plastics. The entire assembly is positioned in a steam autoclave at 50-100 psi. Autoclave molding is the modification of the pressure bag

method. Higher reinforcement loadings and better removal of air can be achieved at pressures above 100 psi.

Automatic Mold: A term used to depict mold for compression or injection molding. This type of mold requires no human intervention and it can meet all cycle requirements easily, including ejection.

Autarkic Temperature Control: In injection molding, the water is used as a coolant. Sometimes, the device is not connected to a regular water supply, and it produces cold water through an internal module. This is called autarkic temperature control.

Average Molecular Weight: In the viscosity method, the molecular weight of a polymeric material is determined by its viscosity at a specific temperature. To determine the viscosity, the material is kept in a solution. This weight provides an insight on average molecular weight of the molecular chains in the polymer. Typically, the average molecular weight falls between number average molecular weight as well as weight average.

AWG: This is the antonym for American Wire Gauge, which is a standard system for designating diameter of the wire.

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B-Stage: This is a stage of reaction where the material will soften on heating and may also swell a little when other liquids are present. However, it may not dissolve or fuse completely in this stage. The resin is provided in this uncured state.

Back Pressure: It is defined as the viscosity resistance shown by a material to the continuous flow, when the mold is in the closing state. In the case of extrusion, it is the resistance to the forward flow shown by the material that is molten.

Backing Plate: During injection molding, a plate is used for supporting guide pins, cavity blocks, bushings, and so on. This plate is known as backing plate.

Baffle: This is a device used to divert or restrict the flow of material through a channel or a pipeline. The baffle is commonly found in the joint of the pipeline. In terms of a mold, a plug or some similar device is used as baffle. It is located in the water or stem channel of the mold, and is mainly used to restrict or divert the flow to a desired path.

Bag Molding: During molding or bonding, the pressure is applied to the material being molded for achieving the perfect shape. A flexible cover is used with a die or the mold to exert

the pressure on the object being molded. This pressure is applied through vacuum or air.

Bakelite: This is a trademark for plastic materials and phenolics produced by Bakelite Limited. It is often used to describe a phenolic molding or phenolic material. The name Bakelite is derived from the name of Dr. Leo. Hendrik Baekland, who is regarded as the father of the plastic industry for his contributions in commercial development of plastics.

Barrier Resins: These are the polymers with low permeability to gas. Barrier resins are mainly used for packaging and they prevent vapor, gas, or liquid penetration.

Base: This is the material created in the form of rolls or sheets, which is used for the creation of lamination plastics. The base material is impregnated with a resin to produce the desired laminated plastics. Woven material, paper, glass fabric, cotton, or glass fiber mat, aramid fibers, felted asbestos are a few common base materials used in the plastic industry.

Benzene Ring: This is the primary structure of benzene, which comprises 6-carbon ring and three double bonds. In this, one or 6 hydrogen atoms of benzene can be easily replaced by other groups or atoms.

Biaxial Orientation: This is the process of stretching a plastic film in

two directions such that they produce molecular orientation in two directions.

Binder: This is a material or a resin used to bind particles together. Some typical binding materials include glue, casein, and gum. The binder material is always in the continuous phase in the reinforced plastic. This helps improve its strength, and ensures a better adhesion to the surface coating.

Biodegradation: This term refers to the degradation of plastics by microorganisms in the soil. At times, some plastics are made biodegradation by altering their formulation. The natural additive such as corn starch is added to the plastics to improve its biodegradability.

Biocides Fungicides: These additives are used in the plastic to inhibit the growth of pests and fungus.

Bleed: Some colored materials release color when they come in contact with a fluid or water. This phenomenon is referred to as bleeding. It mainly happens due to the movement of materials in plastic. For instance, plasticizers used in vinyl move to the surface of the object when it comes in contact with water or certain strong chemical fluids. This term is also referred to as migration.

Blend: This term refers to mixing of copolymers or polymers. Blending is often done to alter the mechanical properties of a polymer.

Blister: It is a raised or swollen area on the surface of a molding. Blisters are mainly caused due to gases that create pressure on an incompletely hardened surface.

Block Copolymer: This is a linear copolymer that have several repeating sequences of polymeric segments with differing chemical structure.

Blocking Anticaking Agents: These additives are added to the composite to avoid the sticking of two layers of films that are close to each other in the fabrication or storage phase.

Bloom: It refers to efflorescence or exudation on the surface of a finished product. This is usually caused by the additive exudation. Slip adhesives are designed to migrate to the film surface.

Blowing and Foaming Agents: These are chemicals which when added to the rubber or plastic produces inert gases, which helps assume a cellular structure.

Blow Molding: This is a method of plastic fabrication where the warm plastic parison is held at the center of the mold cavity to assume a specific shape. The material is usually placed on the two halves of the cavity and air is blown at high pressure to complete the process.

Blow Pressure: The term is used to depict pressure that is used to mold a part during the process of blow molding.

Blow Rate: It is the speed at which the air is blown into the parison during the blow molding process.

Blowup Ratio: The term is synonymous with blow molding, and used to depict the ratio of the parison diameter to the diameter of mold cavity. In blown tubing, this ratio is used to symbolize the ratio of final tube diameter to the diameter of original die.

Blown Tubing: During the blown molding, a thermoplastic film is created by tube extrusion. A slight pressure is applied on the tube in the molten state to expand it. In the next phase, it is allowed to set through cooling. Then the sides of the set tube are flattened through guides or it is wound on the rolls. The size of the blown tube is determined by its flat width in inches. However, in case of rigid tubing it is determined by the diameter.

Bond Strength: This is the force required to separate the objects that are bonded together. The term is also used in various scenarios. It may refer to the bond strength between matrix and fiber or the degree of attraction between the atoms in a molecule, especially the atoms that are lying

near to each other. In the last case, it is expressed in J/mol.

Boss: It is the protuberance created on the part to improve its strength, or to facilitate easy fastening or to facilitate alignment at the time of assembly.

Boston Round: This is the particular shape of the container, where the shoulders and cross section are round.

Bottom Blow: It is a type of a blow molding machine that create hollow materials by blowing air into the parison. This air is blown from the mold's bottom, thus the name.

Bottom Plate: This is the part of the mold that features the push-up and the heel radius.

Branched: This is one of the important types of molecular structure, where the main chain is supported by side chains. The side chains may be short or long.

Breakdown: The disruptive discharge that is caused when the material fails due to stress.

Breaker Plate: It is a perforated plate that is placed at the rear end of the extruder. The plate acts as a supporting component for screens that prevent the entry of foreign particles in the die.

Breathing: A term for closing or opening of the mold to allow gases to escape the molding cycle. This is also known as degassing. When used for plastic sheets, this term depicts the permeability of air.

Brighteners: These materials are used to improve brightness or smoothness of coatings.

British Thermal Unit (BTU): This is the quantity of heat needed to increase the temperature of 1 pound of water by 1°F.

Brittle Temperature: It is the temperature where the materials rupture due to the impact.

Brittleness: This is a property of a material to break down under an impact or force. It is seen that brittle materials have high stiffness and low impact properties.

Bubbler Mold Cooling: It is a method of uniform cooling in injection molding. The injection mold is cooled using a stream of cooling liquid that flows into an outlet that is positioned on the opposite end of the inlet.

Bulk Density: According to the ASTM D1182-54 test method, this is a measurement of mass per unit volume of a powder used for molding.

Bulk-Molding Compounds (BMC): These compounds are used as premix in the manufacturing of composites.

They comprise a mixture of resins, inert fillers, reinforcements, and other additives. BMC is shaped into a sheet or rope.

Bulk Factor: This is the ratio of the volume of molding powder to the same volume of resin compared after the molding.

Bushing: It is the outer ring of a pipe die or circular tubing which forms the outer surface of the ring or the tubing.

Butadiene: It is a gas that is soluble in ether or alcohol and remains insoluble in water. The gas is formed from the cracking of petroleum, from acetylene produced from lime and coke or from coal tar benzene. Butadiene is mainly used in the formation of copolymers with acrylonitrile, styrene, vinyl chloride, and several other monomeric substances. This gas lends flexibility to moldings.

Butadiene Styrene Plastics: It is a synthetic resin derived from the copolymerization of styrene liquid and butadiene gas.

Buttress Thread: A threading type where the thread sides terminate abruptly while tapering to the neck finish. The buttress threading can withstand force in one direction. The thread has triangular cross-section.

Butylene Plastics: This is a type of polymer made from copolymerization or polymerization of butane with

saturated compounds. The polymerization or copolymerization may include more than one unsaturated compounds.

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C-Stage: This refers to the final stage of the reaction where the materials are infusible or insoluble.

Calendering: It is a form of extrusion featuring two or more counter rotating rolls. In this type of extrusion, the sheet and the film is produced by squeezing a viscous material between them.

Carbon Fiber: This is a composite comprising carbon graphite fibers, woven-glass fabric, and epoxy. The fiber is used in various structural applications.

Canvas: It is a cotton fabric that weighs more than four ounces in a square yard. This is used as a base material for NEMA grades such as CE, C, and some L grade laminates.

Capacitance: This property is exhibited by non-conductor material. Capacitance is the ability of the non-conductor material to store an electric charge.

Carbon Black: This is a pigment produced due to incomplete burning of material such as oil or natural gas.

The carbon black is used as a filler in the rubber industry. Carbon black is widely used in the polyethylene compounds that are used for applications such as designing black agricultural sheets or cold water piping. This material has excellent ultraviolet properties.

Carbonyl: This is the organic function group feature ketones, aldehydes, esters, carboxylic acids, and so on. All these compounds have a chemical structure of a carbon atom that is double bonded to an oxygen atom. The structure is symbolically depicted as C=O.

Casting: This is a process where a plastic object is created by pouring a monomer-polymer solution in an open mold. In this mold, the poured solution attains a polymer state. Alternatively, this is also defined as forming a plastic film and sheet by pouring the resin in liquid form onto the moving belt. This resin is sometimes precipitated in a chemical bath.

Cast Film: This type of film is created by depositing a plastic layer onto a surface and it is then solidified. The plastic layer can be in a molten form, or in a dispersion, or a solution.

Catalyst: This is a substance that helps improve the speed of the compound curing. During any mixing process, the substance is added in minor quantity as compared to other major reactants.

Cavity: This is a depression in a mold that is made by hobbing, casting, machining, or a combination of all these methods. The cavity is defined as multi-cavity or single-cavity depending on the number of depressions made in it.

Cellular Plastics: These are the plastics featuring several small cells (cavities) that may or may not be interconnected.

Celluloid: This thermoplastic material is created by blending cellulose nitrate with camphor. During the blending, alcohol is used as a volatile solvent to accelerate plasticization. The alcohol is removed once the plasticization is achieved.

Cellulose: This is a natural occurring polymeric compound that is widely found in plants. It is a main constituent of materials such as hemp, jute, woods, flax, ramie, and so on. Cotton is one of the purest forms of cellulose.

Cellulose Propionate: This is an ester of cellulose that is created due to the action of anhydride and propionic acid on the purified cellulose. Cellulose propionate is used as a base material for thermoplastic molding.

Cellulose Triacetate: This material is created by combining purified cellulose and acetic anhydride. Often, this reaction is carried out using a

catalyst. Cellulose triacetate serves as a base for fibers and films. A few applications of cellulose triacetate include magnetic recording tapes, book jackets, and several types of packaging. The sheets made of this material are used in making articles such as map wallets, safety googles, as well as transparent covers.

Celsius: This is SI unit of temperature, and is also known as Centrigrade scale. It is equivalent to the difference between the temperature units in Fahrenheit minus 32 and the whole quantity divided by 1.8.

Cement: It is a dispersion of non-vulcanized plastic or rubber in a solution that is volatile by nature. This definition is more appropriate to rubber and plastic industries and may not have adhesive properties.

Centrifugal Casting: This method is employed for producing thermoplastic resins. During the process, the granular resin is positioned in a rotatable container, and is heated till they melt. The molten material is rotated such that the centrifugal force will drive the molten material to conform the shape of the container. This technique is mainly employed for fabricating cylindrical items and pipes of large diameter.

Chalking: A residue found on the surface of the material. Many times, the residue is in powder form and it is

produced due to degradation of the material.

Charge: It is the measurement of material that is used to load the mold during different times.

Chlorinated Polyvinyl Chloride Plastics: They are the plastics created from chlorinated polyvinyl chloride. In this type of plastics, the chlorinated polyvinyl chloride is found in large amounts than other materials.

Chlorofluorocarbon Plastics: These plastics have monomers made of compounds such as fluorine, chlorine, and carbon.

Chromium Plating: In this process, a hard film of chromium material is deposited on the working surface of other material. This type of plating is mostly preferred in applications, where high level of abrasion, corrosion, and erosion resistance is required.

Clamping Plate: It is a type of plate fitted to a mold. This plate is used to fasten the mold to the machine.

Clamping Pressure: In transfer molding and injection molding, the pressure is applied to the mold to close it. This is done in opposition to the fluid pressure of the molding material that is compressed.

Clarifier: This is an additive material that improves the transparency of the material.

Co-Extrusion: This is the process of combining two or couple of layers of extrudate material to create a multiple layer product.

Coefficient of Expansion: This is a change in the length of material for a change in temperature. The values for plastic range from 0.01 to 0.2 mils/inº C

Coefficient of Friction: It is a ratio of the limiting friction that is developed in correspondence to the normal pressure. This friction is produced when two materials move relative to each other.

Cold Flow: This is a strain developed on solids due to stress. Usually, the strains are time-dependent. The term cold flow is sometimes referred to as creep.

Cold Molding: A process of compression molding that involves shaping an unheated compound in a mold at high pressure. The shaped compound is heated to cure it.

Colorants and Pigments: These additives are used to change the color of the plastic. They can be color or resin premix.

Composite: This is basically a structure made of several distinct components. For instance, fiberglass is a composite material comprising two or more different complimentary substances such as polymers or

glasses. A composite material has a combination of structural properties that is not found in any single composite.

Compound: A combination of materials needed to finish a product. It may include Bulk Molding Compounds (BMC), Thick Molding Compounds (TMC), and Sheet Molding Compounds (SMC).

Compression Molding: It is one of the important types of molding process. In this process, the compound is molded into a specific shape by applying heat and pressure.

Compressive Strength: This is the ability of the material to resist a force that crushes it.

Concentricity: The container in which various cross sections may share a center.

Condensation: It is a type of chemical reaction where two or more molecules get combined with separated water or some other substance. The condensation process where the polymer is formed is referred to as polycondensation.

Conditioning: The material is subjected to a treatment to ensure that it behaves in a particular way to subsequent processing or testing. Conditioning is mainly associated with treatment given to specimens before they are subjected to testing.

Conductor: This is a conductor or wire capable of carrying electricity. Conductor wires may or may not be insulated from each other.

Continuous Service Temperature: As the name indicates, this is the highest temperature at which a material can perform reliably for a long time. This temperature may differ with different manufacturers.

Convergent Die: It is a die where the internal channels in the orifice converge. Most times, the convergent dies are hollow dies.

Conveyor: A device used to transfer material from one point to another.

Cooling Channels: These are passageways or channels located on the body of a mold. The cooling medium is circulated through these channels to control the temperature of the body.

Cooling Fixture: This is a block of wood or metal that is used to hold the shape of a piece of molded material. The fixture is used until the shape is cooled enough to retain its original shape without a support. Sometimes, the cooling fixture is also known as shrink fixture.

Copolymerization: This is a reaction involving two different monomers to form a compound.

Copper Clad Laminate: These are the laminates that have copper foil bonded to their surfaces. Sometimes the foil is bonded to their single or both surfaces. The copper clad laminate is mainly used for printed circuit board.

Core: This is a center of a sandwich assembly to which its face is connected. For instance, a foamed plastic or solid sheet or honeycomb material have a core where its face is connected. The term is also used for a channel in a mold that is used to transfer media.

Core Drill: A type of machine used to make cooling channels in a mold.

Corona Resistance: The electricity passing through a conductor will induce a surrounding electrostatic field. If there are voids in the insulation close to the conductor, the electrostatic field will ionize and accelerate the air molecules, ionizing them, and filling the hole in the insulation. When there is a resistance to this process, it is termed as corona resistance.

Corrosion: A process where the material surface is destructed due to chemical combination or oxidation. It is also caused due to the reduction of electrical efficiency between a contiguous substance and metal or due to disintegrating effects of ground return currents or electrical currents.

The term is sometimes referred to as electrostatic corrosion.

Corrosion Resistance: This is the ability of the material to resist oxidation or corrosion.

Coupling Agents: These are the materials used to create a chemical bridge between the glass fiber and resin.Coupling agents help improve the bonding strength of the materials.

Crater: A small and imperfect surface on a mold.

Crazing: They are small cracks found near the surface of injection molded materials.

Creep: A material undergoes a dimensional change under load along with time and this phenomenon is known as creep. When this change occurs at the room temperature, it is known as cold flow.

Crystallinity: It is a molecular structure produced by solid crystals with a specific geometric pattern.

Cure: At times, the properties of a material are altered to create a stable polymer, and this process is known as curing. The curing is mostly done through radiation, heat, or reaction with chemical additives.

Cure Cycle: They are time periods where a reacting thermoset materials

are processed to attain desired properties.

Curing Temperature: The temperature at which an extruded, molded or cast product is subjected to curing.

Curtain Coating: It is one of the important methods of coating that makes use of low viscosity resins, emulsions of resins, suspensions, and so on. The substrate that needs coating is passed through a freely falling waterfall which also resembles a curtain. Often this substrate is let in such way that it approaches the curtain perpendicularly. The linear speed of the substrate to be coated and the flow rate of the falling liquid is coordinated to achieve the desired thickness in coating.

Cycle: It is the complete sequence of operations in a process. In the process of molding, this cycle time is known as elapsed time, or the period, or the time between a certain point in a one cycle and the same point occurring in the next cycle.

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Damping: It is a phenomenon wherein an oscillating system can reduce or restrict its oscillations because of energy dissipation.

Daylight Opening: It is the area of a glass visible in the open position. It is also the locus of all points on a vehicle, other than the door, where a horizontal line goes tangent to the periphery of the opening

Deckle Rod: A small rod or a device used to adjust the length of the die opening. It is inserted at each end of the extrusion coating die.

Decomposition Product: When a compound or multiple compounds decay or decompose, they break down into simpler elements, which may be reusable. These are decomposition products.

Decompression: It is a method wherein the volume of plastic increases and the pressure on the melt is relieved after the plastic pellets or material get pushed in from of the screw in the loader. The turning of the screw is really what affects the size of the plastic. So, the screw decompresses and does not turn until the plastic attains the required set point.

Decorative Sheet: It is a laminated plastic sheet with a specific surface, colors and a pattern, which is used for decorative purposes.

Deflashing: It is one of the finishing techniques used to remove the excess, unwanted material on a plastic molding, also known as flash.

Deflection Temperature (1): Also known as heat distortion temperature, it is the temperature at which the specimen deforms under a certain load. This property is used when designing a product and studying the environment it would be exposed to.

Degree of Polymerization (DP): It is the number of repeating monomeric residues in a polymer molecule in a particle sample. In most plastics, the DP must reach several thousands in case of worthwhile physical properties.

Degassing: It is the opening and closing of a mold to allow gas to escape as trapped gas and/or air can be dangerous and may cause parts blistering and bubbles.

Degenerated Element: When multiple nodes of a square or triangle elements fall on the same coordinate, the element is known as adegenerated element. Likewise, a square can be converted into a line, point, triangle, or any other shape. The multiple nodes may be joined automatically or manually to one more nodes. These elements lead to wrong results in a simulation or create blocks in it.

Delamination: This is the removal in parts or separation of the laminate from the substrate along the plane of its layers. The term is also applicable for the separation of bonded insulation

within the adhesive layer or at the adhesive interface.

Deliquescent: It is the capacity of a substance to absorb and dissolve moisture from the air within it and soften.

Demolding Force Measurement: The demolding process is carried out at the end of each injection molding cycle. Sometimes, however, specific conditions in demolding lead to reduced quality of product such as ejector marks or stress whitening. These issues may be difficult to rectify at that level as there are several other factors that influence the quality of the product. These include material selection, checking of plastic- and process-relevant part and mold designs, and so on.

Demolding: It is the process of removing a material or casting from a mold.

Densifier: This is a chemical applied onto a concrete surface to fill pores and increase surface density.

Density: It is a property which shows the relationship between mass and volume and is measured by displacement.

Desiccant: This is a substance that absorbs moisture and is hygroscopic in nature. It is used in containers as a drying agent to keep the other contents dry.

Design Review: This is a review of a blueprint, of an application, to be molded in a plastic material, with recommendations given for design, material, processing, tooling.

Destaticization: It is the process of treating plastic materials to reduce their tendency to accumulate static charge, and subsequently the amount of dust stuck on these plastics because of static electricity.

Deterioration: A gradual decline or alteration in the physical properties of a plastic which may cause deformation or impairment.

Dielectric Constant: Dielectric is a term for a material that is a bad conductor of electricity. So, when two dielectric elements are placed in one electric field, there is no current flowing through them. Dielectric constant is the ratio of the capacitance of a condenser filled with some dielectric material to the capacity of a similar capacitor in a vacuum without any dielectric material filled in it. It is measured at a frequency of 106 cycles per second.

Diaphragm Gate: This is a gate used in molding cylindrical or round parts which have one open end. It is a link between the part and the runner system.

Die Gap: This is the distance between the two opposite metal faces, which

forms the die opening.

Dielectric Heating (Electronic Heating): High-frequency voltage is applied onto the dielectric or the plastic part of the condenser to be heated. It is based on the amount of loss of the dielectric material. This process is used for sealing vinyl films and preheating thermoset molding compounds.

Dielectric Strength: This is the measure of the electrical strength of an insulator material and indicates the maximum voltage required to breakdown a dielectric material. It is measured in volts per unit thickness.

Dieline: These are the vertical marks on the parison caused due to contamination of the damaged die parts.

Die Swell Ratio: This is the ratio of the outer parison diameter (parison thickness) to the outer diameter of the die (die gap). Factors which influence the die swell ratio are polymer type, head construction, land length, extrusion speed, and temperature.

Differential Cooling: This occurs when one area of the part cools at a different rate or the mold surfaces are at different temperatures. Warping can result from differential cooling.

Differential Scanning Calorimetry (DSC): This is a method used to determine thermal histories of

polymers including melting points and glass transition points.

Dimensional Stability: This is capacity of a polymer to retain the exact shape in which it was molded, fabricated, or cast, irrespective of external influential parameters.

Dip Coating: This is a coating process wherein a coat or layer of plastic is applied to an object by dipping it into a container of melted resins or plastisol, and then chilling the adhered melt.

Direct Pressure Sensor: Cavity pressure is the pressure created in the interior portion of the mold in the injection molding process for plastics. Cavity pressure sensors or direct pressure sensors are used to measure this pressure with the help of the piezoelectric measuring principle. The sensors can be used directly or indirectly in a contact-free manner.

Discoloration: The original color of an object at times changes due its reaction with some external parameters such as overheating, light exposure, irradiation, or chemical attack. This phenomenon is called discoloration.

Dispersion: This is a white light separation phenomenon; wherein white light disperses into various colors depending on the wavelength. The same applies to any material or object which undergoes division into

particulate matter and is dispersed over a certain area.

Dished: A symmetrical distortion of a flat or curved section of a plastic object such that when normally viewed it appears concave.

Dispersion: Fine, agglomerated solid particles of one substance are scattered in a liquid or another substance to form a suspension or solution particles of a material in suspension in another substance.

Dissipation: The lost heat or energy which is a byproduct of heat generated in a circuit.

Dissipation Factor: It is the rate of loss of heat or energy in a dissipative system. Measured in watts, it is the ratio of the energy to the product of the effective voltage and the current. It is measured at a frequency of 106 cycles per second.

Divergent Die: This is a die in which the internal channels leading to the orifice diverge, thus the name. Divergent dies are mainly used for hollow structures or objects.

DoE: Design of Experiments (DoE) is a systematic approach designed to plan, conduct, analyze, interpret controlled tests done to reach an optimized result by evaluating required parameters.

Dome: It is the end of a filament-wound cylindrical container, in reinforced plastics.

Double-shot molding: Also known as two-shot molding, it is a method of using two different materials to produce complex molded parts. It is performed by molding plastic around a preformed plastic or metal.

Dowel: It is a rod or a pin made of plastic or metal. The pin used to maintain alignment between two or more parts of a mold when making furniture, cabinets, toys, and so on**.**

Draft: This is the degree of taper of a side wall or the angle of clearance designed to facilitate the removal of parts from a mold.

Drape Assist Frame: In sheet thermoforming, a frame (made up of anything from thin wires to thick bars) is shaped to the peripheries of the depressed areas of the mold and is suspended above the sheet to be formed. During the forming process, the assist frame drops down, pulling the sheet tightly into the mold to prevent webbing between high areas of the mold and permitting closer spacing in multiple molds.

Drape Forming: This is a method of forming thermoplastic sheets, wherein the sheet is clamped into a movable frame, heated, and draped over high points of a male mold. Vacuum is then

pulled to complete the forming operation.

Drawdown Ratio: It is the ratio of the thickness of the die opening to the final thickness of the product. During the extrusion, the extrudate is pulled away from the die at a high linear speed than the melt coming out of the die. This helps reduce the extrudate's cross-sectional dimensions.

Drawing: It is the process of stretching a thermoplastic sheet or rod to reduce its cross-sectional area.

Drop Test: It is a testing method, wherein the object under consideration is dropped in a specific manner for a specific number of times to check the impact and robustness.

Dry-blend: Also called as a powder blend, this is a process in which dry ingredients such as pigments and stabilizers are mixed before further use to make a free-flowing dry compound without fluxing or addition of solvent.

Dry Coloring: It is plastic coloring method widely used by fabricators for coloring plastics. It is done by tumble blending of uncolored particles of the plastic material with selected dyes and pigments.

Dry Strength: It is the strength of an adhesive joint determined immediately after drying under specified conditions. Dry strength adhesives are used in the

pulp and paper industry, and are a mixture of synthetic and natural polymers.

Dyes: These are synthetic or natural chemicals soluble in maximum commonly used solvents. They are usually transparent, have low specific gravity and high tectorial strength.

Ductility: The extent to which a solid material such as a metal can be drawn into thin wires, lines, and cross sections.

Durometer: It is a numerical scale to measure the hardness of rubber or plastic based on the depth of penetration of an indenter point on the surface of the specimen.

Dwell: It is a pause in the application of pressure to a mold, made just before the mold is completely closed, to allow gases to escape from the molding material.

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Effective Thread Turns: It is the number of 360 degree turns on a threaded closure which are in contact with the neck thread.

Ejector Pin (on Sleeve): Also called as knockout pin, it is the pin or thin plate inserted into a mold cavity from the rear end as the mold opens, to push out the finished pieces.

Ejector Pin Retainer Plate: This is the retainer in which ejector pins are assembled.

Ejector Return Pins: These are the projections meant for the ejector assembly to withdraw as the mold closes.

Ejector Rod: Once the mold is opened, the ejector rod is a bar, which sets the ejector assembly in motion.

Ejection Side: The side of the mold with ejector pins is called ejector side, while the other side is movable and called mold opening.

Elastic Deformation: This is a temporary deformation or change in shape, and reverses on its own once the external force is removed. This is how the object regains its original shape.

Elastomer: It is a material which is viscous, as well as elastic, and hence has stretching ability, which is at its optimum at room temperature. It has weak intermolecular forces.

Electroformed Molds: It is a mold formed by electroplating metal in the reverse pattern on the cavity. It is strengthened by spraying molten steel on the back of the mold.

Electroplating: It is a process used to dissolve cations in a metal to help with coat formation on the electrode. This is done by passing electric current.

Electric Discharge Machining (EDM): Also known as spark machining, it is a manufacturing process used to produce required shapes out of plastic through electrical discharge.

Elongation: It is the fractional increase in the length of a material stretched in tension.

Embossing: It is a technique used to create raised designs along with the required depression, on paper, plastic films, and sheets.

Emulsion: It is a suspension of fine droplets of one liquid in another. These two liquids are immiscible in each other.

Emissivity: This is the measure of an object to emit infrared energy which indicates that object's temperature. Emissivity depends on the material, the surface texture and, in some cases, the temperature of a body.

Encapsulating: This is enclosing or enveloping an object such as an electronic component by immersing it in a casting resin and allowing the resin to polymerize and harden.

Entrance Angle: This is the maximum angle at which the molten material enters the land area of the die. It is measured from the center line of the mandrel.

Environmental Stress Cracking: It is the susceptibility of a thermoplastic article to crack under the influence of certain chemicals and stress. Not all polymers can withstand high temperatures and harsh environments and become brittle when exposed to such conditions.

Epoxy Resins: These are oligomeric or monomeric materials, which through certain reactions can help form thermoset polymers which have a high chemical resistance, better electrical properties, and more.

Erucamide: This is a fatty acid-based slip additive used in polyolefin resins.

Ester: It is an acidic chemical compound wherein the hydroxyl group is replaced by an alkyl group. It is formed from the reaction of alcohol and acid.

Ethylene Plastics: These are based on polymers of ethylene or copolymers of ethylene with other monomers, wherein ethylene is present in maximum quantity.

Ethylene Vinyl Acetate (EVA): This is copolymeric member of the polyolefin family, and is derived from random copolymerization of vinyl acetate and ethylene.

Extender: It is a material added to a plastic compound used to reduce the amount of resin required per unit value.

Extrusion: This is the process of melting plastic and forming into a continuous profile by forcing it through a shaping orifice with or without the presence of heat.

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Fabricate: This involves working a material into the required shape, size, and form by machining, forming, or welding operation.

Family Mold: Also known as combination mold, this is a multi-cavity mold wherein each of the cavities form one of the component parts of the assembled finished object.

Fiberglass: This is fiber-reinforced plastic made using glass fiber. These materials have good tensile strength and impact strength. Standard fiberglass is used for a wide variety of lightweight structural applications such as handrails and platforms.

Fiber Show: These are strands or bundles of fibers which are placed at or above the surface of a reinforced plastic.

Fiber: It is a form of chemically jelled fibrous materials manufactured in sheets, rods and tubes.

Filament: It is a conductor wire with a high melting point, commonly used in

old electric bulbs.

Filament Winding: It is a manufacturing technique used to produce open as well as close end structures, which includes winding of filaments under tension over a rotating mandrel.

Fill Point: It indicated as the level to which a container must be filled to achieve the required quantity of the content.

Fill-and-Wipe: Parts are molded with depressed designs, and after the paint is applied, the surplus color is erased. This leaves some paint only in the depressed areas.

Filler: It is a cheap, inert substance added to a plastic to improve its impact strength, hardness, and other physical properties and reduce cost.

Fillet: It is a rounded filling of the internal angle between two surfaces of a plastic molding.

Film: Films are flat, thin sheet-like structures, usually with a thickness of around 0.25 millimeters.

Fin: This is the mesh of materials remaining in holes or openings in a molded part which are removed during finishing.

Finish: This is last forming or shaping done on an object which decides its surface.

Flake: This is a dry, peeled off piece, usually with an uneven surface, and is the base of cellulosic plastics.

Flame Retardant Resin: A resin which is compounded with certain chemicals to reduce or eliminate its combustibility. For polyethylene and similar resins, chemicals such as antimony trioxide and chlorinated paraffin are used.

Flame Spraying: This is a method of applying a plastic coating in which finely powdered fragments of plastic, together with suitable fluxes, are projected through a cone of flame onto a surface.

Flame Treating: This is a method applying glass flam to materials to increase their adhesive capacity. It is usually done on inert thermoplastic objects receptive to inks, lacquers, paints, adhesives, and so on.

Flame, Fire & Smoke Retardants: These are materials added to resins that reduce the capacity of the resin to catch fire or heat up.

Flammability: It is the measure of the extent to which a material is combustible or will burn when exposed to heat or light.

Flange: It is the rib or rim for strength, guiding, or attachment to a pipe.

Flash: It is the extra plastic attached to a molding along the parting line; it

must be removed before the part can be considered finished.

Flash Gate: It is a wide gate extending from a runner which runs parallel to an edge of a molded part along the parting line of a mold.

Flash Line: It is a raised line that appears on the surface of a mold and formed at the junction of mold faces.

Flash mold: It is a mold designed to allow the excess molding material to escape during closing.

Flash Point: The lowest temperature at which a flammable liquid produces a combustible vapor that will burn in the presence of a flame, under the prescribed conditions of a test.

Flexible Molds: These are molds made of rubber or elastomeric plastics used for casting plastics. They can be stretched to remove cured pieces with undercuts.

Flexural Strength: The strength of a material when bended. It is expressed as the tensile strength of the outermost fibers of a bent test specimen at the instance of failure.

Flocking: It is a coating method of plastics which uses sprays of finely dispersed powders or fibers.

Flow Marks: This is a wavy surface appearance of an object molded from thermoplastic resins caused by the

improper flow of the resin into the mold.

Fluidized Bed Coating: This is the method of coat application of a thermoplastic resin onto a heated object, which is immersed in a dense-phase fluidized bed of powdered resin and thereafter heated in an oven for a smooth, pin-hole-free coating.

Fluorine: It is a pale yellow gas, and the most reactive non-metallic element, toxic and corrosive. It reacts with oxidized materials at room temperature to form fluorides.

Fluoropolymers: This is a fluorocarbon-based polymer with multiple carbon-fluorine bonds. These materials are tough yet easy to machine.

Foaming Agents: These are chemicals added to plastics and rubbers, which produce inert gases on heating, and facilitates the formation of foam.

Force Plate: Also called as steam plate, it is a plate that carries the plunger of the force plug of a mold and guide pins and bushings.

Force Plug: This is the portion of a mold that enters the cavity block and puts pressure on the molding compound; it is also called plunger or piston.

Forming: This is a type of welding process, wherein the current shape of the plastic is transformed based on the required dimensions.

Friction Coefficient: This entity expresses and quantifies the amount of frictional effect.

Furan Resins: These are dark colored, thermosetting resins available primarily as liquids ranging from low-viscosity polymers to thick, heavy syrups.

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Gasket: It can be defined as a flexible component that fills the space between two or more mating surfaces. It helps maintain leakage proof sealing.

Gate: A gate is a designed small opening through which the molten plastic flows into the final part. There are manually trimmed and automatically trimmed gates, both play an important role in the process of injection molding.

Gate Blush: It is a cloudy or hazy discoloration commonly found just inside the gate location of a plastic part.

Gaylord: It is a large corrugated container commonly used for bulk shipping or storage. These strong,

heavy boxes are inexpensive compared to other packaging materials. Gaylord boxes are used for storing and shipping numerous materials like recycled plastic, virgin plastic, and metals.

Gel Stage: The gel stage is the point at which resin turns from a liquid to a solid.

Gel Time: Gel time is the time taken for a thermosetting molding compound to reach the semisolid stage. Gel time can vary greatly from resin to resin.

General Purpose Styrene (GPPS): This is one of the most widely used kinds of plastic prepared from styrene monomer polymer. GPPS, which is a transparent material with good heat resistance, high stiffness and excellent moldability, is largely used in the making of toys, CD cases, hangers, plastic cups, among others.

Glass Cloth: It is a fabric used as insulating material base that helps in masking the work piece during heat treatment. This heat resistant glass fiber cloth is formed by weaving yarns comprising glass filaments.

Glass Fiber: It is a lightweight, strong and less brittle material consisting of numerous extremely fine fibers of glass. A glass fiber, which can be easily formed using molding processes, can strengthen thermoplastics such as polyamides, polypropylene, and polyesters.

Glass Transition Temperature: Glass Transition Temperature, which is one of the most important thermophysical properties of amorphous polymers, is the temperature at which the polymer transitions from a hard and rigid state to a more flexible and supple state.

Gloss: A smooth, shiny appearance on a plastic items or any other smooth surface.

Glycolic Acid (PGA): Glycolic acid is a biodegradable, thermoplastic polymer exhibiting unique mechanical, biocompatible, and biodegradable properties. Otherwise known as polyglycolic acid, or Polyglycolide, this simplest linear, aliphatic polyester is widely used for biomedical applications.

Glycoluril-Formaldehyde (GF): Glycoluril-formaldehyde resin (GF) is a cross linkable aminoplast which is commonly used to crosslink industrial thermosetting resins for varied application purposes.

Glyptal: It is a cross-linked polymer widely used in paints, lacquers and surface coatings.

Granulator/Grinder: Granulators are basically rotary grinders that are used in size reduction of plastics. Widely used across many paper / cardboard, plastic, metal and wood recycling facilities, these equipment have the

unique ability to quickly and efficiently cut plastic scrap.

Gross weight: Gross weight refers to the total weight of a product including the weight of the container and packaging.

Gravure printing: Also known as rotogravure printing, it is a reel-fed printing method that helps produce fine, detailed images. Characterized by an excellent print quality and high printing speed, this photomechanical intaglio process is used mainly for high quality multicolor printing.

Graft Copolymers: Graft copolymer is a type of copolymer exhibiting a unique set of mechanical, thermal, dilute solution, and melt properties. Graft copolymers are composed of a main polymer chain to which side chains of a different type are attached or grafted.

Granular Structure: Non-uniform appearance of molded or compressed material due to retention or incomplete fusion of particles of composition.

Grit Blasting: It is a surface treatment process whereby abrasive particles are fired through a nozzle to produce a roughened surface. These high-speed abrasive particles clean, improve, or modify the surface properties of components.

Guide Pins: Guide pins provide an essential element of stability and

alignment to two unattached components. Available in several types, they are also known as “Leader Pins.”

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Hardener: It is a component of certain types of mixtures that accelerates or promotes setting of paint, varnish or coatings.

Hardness: Simply defined, hardness of a plastic material is its resistance to deformation, indentation, or penetration.

Haze: It is one of the most common injection molding defect which results in forming a cloudy appearance on the plastic material.

Heat Sealing: This is one of the widely established techniques of joining two or more thermoplastic films or sheets using heat and pressure. During the process, heat is supplied conductively or dielectrically.

Heat Stabilizers: Heat stabilizers are specially designed plastic stabilizers that ensure that plastic end products retain their physical properties and withstand the negative effects of exposure to heat/high temperatures.

High-Density Polyethylene: HDPE is a hydrocarbon polymer with a very high strength to density ratio.

Produced from the monomer ethylene, HDPE is famous for its tensile strength and ability to stand high temperatures.

High Molecular Weight Polyethylene: It is a subset of the thermoplastic polyethylene with extremely long chains. This tough material is known for its highest molecular density and impact strength.

Heat Chamber: Offering outstanding temperature accuracy, heat chambers allow for efficacious and quick drying or heating of materials.

Heat Deflection Temperature: The heat deflection temperature or heat distortion temperature (HDT, HDTUL, or DTUL) is the measure of polymer's resistance to distortion under a specified load.

Heat Loss: Heat loss is a measure of the total transfer of heat from inside to outside (high temperature to low temperature)

High-Pressure Laminates: High pressure laminate (HPL) is a form of decorative laminates possessing special chemical, fire and wear resistance properties.

Homopolymers: Homopolymers are polymeric molecules consisting of identical monomer units.

Hopper Dryers: Hopper dryers, also called hot air dryers, are used for heating hygroscopic plastic granules

and removing the surface moisture. Widely used in the plastic industry, they contribute to extrusion and injection molding of varied components.

Hopper Loader: Designed specifically to automatically load regrind & virgin material without human intervention for further processing. Available in various sizes, they are developed to convey free-flowing powders and/or granules.

Hot Runner: Hot runner systems are feed systems for injection molds, which revolutionized injection molding processing capabilities. This molten plastic conveying unit is immensely helpful in conveying molten plastic from the machine nozzle into the cavity.

Hot Stamping: Hot stamping or foil stamping is a printing method using high temperatures to transfer foils or pre-dried ink to print an image on plastic products.

Hoop Stress: Hoop stress (σh) is the mechanical stress defined for pipe wall or tubing due to internal pressure.

Hot Gas Welding: Hot-gas welding is a manual plastic welding process, which uses a stream of heated gas to heat and melt the parts to be welded. This particle-free and oxidation-free welding method is ideal for all types of thermoplastic molded parts.

Hydrocarbon: Hydrocarbon is a class of organic chemical compounds that only contain hydrogen and carbon atoms. Hydrocarbon is processed to make hydrocarbon monomers and other carbon monomers, which in turn serve as the raw materials for the production of plastics.

Hydrogenation: It is referred to as the chemical reaction between molecular hydrogen (H2) with an organic compound. This is a fundamental process and is a potential alternative for breaking down the polymer chain in plastic.

Hydrolysis: A chemical process of decomposition involving the use of water to break chemical bonds in other reactant. When it comes to the plastic industry, hydrolysis refers to the degradation of a polymeric material into smaller components using water.

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Impact Bar (specimen): A test specimen of specified dimensions that is utilized to examine the relative resistance of a plastic to fracture by impact or shock.

Impact Modifiers: Impact modifiers are additives added to in order to improve their impact strength, ductility, and durability of molded or extruded plastics.

Impregnate: Impregnate in injection molding refers to the process of filling the voids and interstices of material with a compound.

Impact Strength: Impact strength or toughness of a material is defined as its ability to resist to fracture by a blow or a sudden applied load or force.

Impregnation: The process of impregnation involves soaking material in synthetic resin of choice.

Impulse Sealing: Impulse sealing is a method of heat sealing thermoplastic done by applying a pulse of energy to the sealing area, which is then followed by cooling.

Infra-red (IR): IR is a region of the electromagnetic radiation spectrum with wavelengths (range from about 700 nanometers (nm) to 1 millimeter (mm) longer than those of visible light.

Injection molding Cycle: The sequence of events during the injection molding of a plastic part including its injection, die close and die open time, among others is refer to as Injection molding Cycle.

Injection Ram: It is one of the important part of Injection moldingmolding machines. The component plays a crucial role of forcing molten plastic material into a mold cavity.

Injection Pressure: Injection pressure and holding pressure are sometimes used interchangeably to indicate the pressure applied when a material is being injected into the mold.

Insulation: Insulation is a thick layer of material designed to prevent heat, sound, or electricity from escaping or entering from one area to another.

Injection Blow Molding: Injection blow molding is the process involving the forming of molten tube (referred to as the parison or preform) of thermoplastic material (polymer or resin),in which is put a mold,and then shaped by having compressed air blown into it. The technique is commonly employed in the production of hollow objects in large quantities.

Injection molding: Injection molding is a manufacturing process wherein molten metal or plastic is injected into the mold to create a mass amount of identical plastic parts.

Insert: It is a previously fabricated component made of metals or different types of plastic incorporated at the time of the moldingmolding process in molten resin to produce a finished part.

Ionenes: This is any polymer that may have ionic groups, which form a main chain.

Ion-exchange Resin: An ion-exchange resin or ion-exchange

polymer is a resin or polymer containing a backbone of cross-linked polystyrene and side chains of ion-active groups. Fabricated from an organic polymer substrate, they are usually prepared in the form of granules, beads, or sheets.

Ionomers (EAA, EMAA): Ionomers are transparent thermoplastic elastomers of glass-like clarity that consist of both electrically neutral and ionized groups.

Isobutylene (Butyl, IIR): Butyl rubber, also known as Isobutylene-isoprene (IIR), is a synthetic elastomer possessing excellent resistance to oxidation and aging, exceptional ozone resistance.

Ionomer Resins: An ionomer is a polymer composed of both electrically neutral repeating units and ionized units.

Isoprene Rubber (IR): Isoprene rubber is a synthetic rubber manufactured by the polymerization of synthetic isoprene. Similar to natural rubber in properties, Isoprene rubber is highly resistant to fractures and abrasion.

Isocyanates: Isocyanates are highly reactive, low molecular weight chemicals, which are used as a raw material in the production of polyurethane, polyureas, polyisocyanurates, and their copolymers.

ISO: The International Organization for Standardization is a nongovernmental organization that comprises standards bodies who are majorly involved in developing standards to ensure the quality, safety, and efficiency of products, services.

Isomer: Isomers are compounds or molecules with the same molecular formulas, but distinct structures.

Izod Impact Test: Izod impact testing is an ASTM standard method of measuring the resistance to failure of a material to a suddenly applied force. In other words, the test is used to measure the impact resistance of plastics.

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Jacket: A strong cover that protects a group of two or more insulated wires or cables from mechanical damage during and after installation.

Jet molding: A modified version of an injection molding technique characterized by the fact that more heat can apply to the material rather than a heating cylinder, as is done in ordinary processes.

Jetting: An unstable flow of the resin forced out from a small nozzle into a heavy mold section to oppose the laminar flow of material, progressing

consistently from the gate to the edges of the cavity.

JIG: A device that guides or holds the tool during distinct assembly operations.

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K Show: Also called as K-Show Trade Show, it is one of the important international innovation platforms for the rubber and plastic industry. Started in 1952, it takes place every three years. The show is a witness to thousands of exhibitors or experts from 60 nations with a complete range of auxiliaries and raw materials, equipment and machinery, semi-finished products, and offers a global overview of pioneering developments and new approaches to plastics.

Kelvin: The Standard International unit of thermodynamic temperature having symbolic representation K. One kelvin is defined as K = °C + 273.

Kirksite: A moderate strength aluminum and the zinc-based alloy used for the construction of blow molds. Because of the alloy's excellent fluidity, it is used in rubber tooling as a replacement for slush casting alloy.

Kiss-roll Coating: A roll arrangement method carries a film of coating to the web. The roll may rotate in the same

or opposite direction as the web, in which case the coating is split between the roll and web. The remainder of the coating is transferred to the web.

Knite Lines: Also known as the weld line or mold line, it occurs when the mold or material temperatures are set to low.

Knockout Pin: Knockout pins, also known as ejector pins, are widely used in the injection molding process to push the final molded product out of the mold. Made using high-quality stainless steel material, they also used to eject solid parts out of the mold.

Ketone-Aldehyde Resin: Also referred to as ketonic resins, they are a combination product of an aldehyde and cyclohexanone. Owing to their high oxidative stability, superior adhesion, and good drying and pigment-wetting properties, they are used for improving gloss in automotive paints, flexo, and gravure inks and many more.

Ketones, Aliphatic: It is a new class of polymers with attractive unique and attractive properties such as exceptionally high abrasion resistance and tribological properties, high tensile and impact strength and many more. Additionally, other interesting properties of aliphatic polyketons include outstanding chemical resistance, very low water absorption,

excellent hydrolysis resistance, and many more.

Ketones, Aromatic: A semi-crystalline, high-performance thermoplastic possesses excellent mechanical properties, outstanding chemical resistance, low flammability, high thermal dimensional stability over a wide temperature range.

Kevlar: A strong synthetic fiber which is heat-resistant, and is used to make modern drumheads that withstand high impact. It has many applications ranging from racing sails and bicycle tires to bulletproof vests. Owing to its weight ratio to high tensile strength, it is several times stronger than steel.

Kraft Paper: Kraft paper is a paperboard produced from high, heavy strength surface paper designed for packaging products with high demands for durability and strength.

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LTL: Stands for less than load or less than truckload shipping (LTL); it is a transportation term that refers to relatively small freight.

L/D Ratio: It is the result that divides the flighted length of the screw by its outside diameter.

Lactams: They are a family of synthetic aliphatic thermoplastic resins, which has high flexibility and abrasion resistance, low creep, and high impact strength. They are produced through ring-opening polymerization of cyclic amides.

Leader Pin: It provides the initial alignment of two unattached components. For instance, the two halves of an injection mold.

Lactic acid (PLA, PDLA): It is the most important bio-based and biodegradable thermoplastics produced via either ring-opening polymerization of the cyclic diesters or direct condensation of the lactic acid monomers.

Laminar Flow: When fluid particles move along in a straight line in separated layers at the same temperature, it is called laminar flow.

Laminate: A structure or surface composed of sequential layers of material bonded under pressure and heat to build up to the desired shape and width.

Laminated Plastics: Laminated plastics are a special form of polymer-matrix composite consisting of layers of reinforcing materials that have been impregnated with thermosetting resins, bonded together, and cured under heat and pressure.

Land: The load-bearing panel of semi-positive or flash mold with a high-strength-to-weight ratio, which prevents material escapes.

Land Area: The mold surface area that communicates when the mold is closed.

Lattice Pattern: A structure made with a fixed arrangement of open voids is called a lattice pattern.

Leach: Extraction of the soluble component from solid material via a particular liquid solvent.

Light Transmission: When light falls on a surface, a part of it is absorbed, reflected, and scattered, which results in loss of energy. The remaining light is transmitted and converted into energy. This energy travels through the surface medium.

Light Resistance: The ability of the material to withstand exposure to UV (ultraviolet) light without a change in chemical and physical properties.

Light-Curable Resins: These curable resins are commercially available which include epoxies, silicones, polyethers, and urethanes. Most of these resins are free radical curing acrylic-functionalized oligomers, which can be cured with radiation.

Light Stability: The ability of a material to maintain its physical as

well as chemical properties upon exposure to sunlight.

Light, UV Stabilizers and Absorbers: These additives are used to dissipate ultraviolet light into the lower energy state. They protect polymers by preventing the infrared light from degrading the material. This helps increase the service life of the material.

Lignosulfonates: They are important pulping byproducts of the sulfite pulping process used as additives in many products including concretes, agricultural chemicals, drywalls and many more. Additionally, they are added as extenders to many wood types of glue such as fiber, phenol-formaldehyde, melamine-formaldehyde, tanin-formaldehyde, and resorcinol-formaldehyde resins.

Limit Gauge: It is the method of checking the actual dimensions in which a fixed gauge is applied to work.

Limiting Oxygen Index: A minimum concentration of oxygen that supports the burning of polymer.

Linear-Low-Density Ethylene (LLDPE): LLDPE is one of the important grades of polyethylene, which consist of a large number of short branches. This type of low-density polyethylene increases the degree of crystallinity, which results in impact strength and higher tensile than LDPE. This polyethylene can be

processed into thinner films with better environmental stress crack resistance.

Linear Mode Shrinkage: The measurable difference between the size of the mold cavity and the size of the part.

Linear Molecule: It describes a long chain of molecules whose central atoms are bonded to two other atoms at a bond angle of 180

Linear Thermal Expansion: In linear thermal expansion, the length of the material increases based on the increase in temperature.

Liquid Crystal Polymers (LCP): LCPs are a class of aromatic polymers. Owing to its great dielectric properties and the ability to withstand soldering temperatures make LCP an excellent choice for various electronic components including electrical motor components, static dissipative connectors, encapsulated capacitors and many more.

Liquid Injection Molding (LIM): It is an industrial fabrication method that focuses on the assigned mixing and dispensing of plastic-based materials. Acrylics and silicone are the most commonly used materials in the liquid injection molding process. The process can efficiently produce a large number of versatile items such as O-rings, isolators, and many more.

Low Density Polyethylene (LDPE): This type of plastic has excellent resistance to acids, bases and vegetable oils. LDPE has significantly relative transparency, toughness, and flexibility, which make it ideal for packaging applications requiring heat-sealing.

Loss Factor: It is the ratio of maximum power loss in the circuit over the given period.

Low Pressure Laminates: It is defined as a plastic laminate molded at a pressure range of 400 pounds per square inch.

Low Temperature Flexibility: The ability of the material to resist changes of shape at reduced temperatures without fracture.

Lubricant: This is a substance that reduces friction between surfaces of two adjacent or connected objects. This helps in smooth functioning of the part and reduces excess heat generation that occurs due to friction.

Longitudinal Stress: It is the stress produced by the pressure of the fluid in the long axis of any shape.

Location Ring: The location ring is used to orient the injection mold on the platen. Also, it supports the mounting of the mold.

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M

Machine Shot Capacity: This is the largest volume of resin that can be injected in a single stroke.

Maleic Anhydride Resins: These are clear and amorphous thermoplastic resins that are created by free-radical polymerization of maleic anhydride and styrene. The resins offer high chemical and heat resistance, high melt viscosity, and high gloss. A few resin grades also assure high impact resistance.

Maltodextrins: These are a type of carbohydrate compounds that are created by heating starch in the presence of moisture and acids, which leads to depolymerization of the starch. They are available in three grades – white dextrins, yellow dextrins, and British Gum. The maltodextrins are carbohydrates of low molecular weight, and they are water soluble.

Manifold: The hot runner system used for injection molding is divided into different hot runner gates to form different components. The area where this division occurs is referred to as manifold. A homogenous pressure distribution and melt temperature becomes necessary for the multi-cavity molds and this is only possible if the manifold is symmetrical.

Masterbatch: It refers to the concentration of a pigment, additive, or filler in a polymer. This term is more synonymous with the base polymer.

Mat: A type of nonwoven fabric made of fibrous material such as glass. This non-woven fabric is used as a plastic reinforcement.

Material Drying: Moisture may affect the properties of plastic granulates. To avoid this, the base material is dried before processing in a vacuum dryer or a hot air dryer at a certain temperature to minimize its residual moisture. This temperature and drying times may vary across various plastics to attain the minimum residual moisture. This drying will not alter the properties of the material in any way.

Material Safety Data Sheet (MSDS): The sheet is designed in accordance to the REACH-Regulation (EG) NR. 1907/2006. It provides information on safety, handling, and environmental protection of a plastic material. The sheet may comprise 16 sections including identification and manufacturer, compositions, hazards, first-aid measures, fire-fighting measures, accidental release measures, storage and handling, and so on.

Matte Finish: It is a type of non-reflective finish applied to the plastic material.

Medium-Density Polyethylene (MDPE): These are polyethylene compounds in a density range of 0.926 – 0.940 g/cm3. MDPE are used for creating garbage bags as well as packaging. Thus, they are used on a much smaller scale than HDPE.

Melamine: It is a type of versatile and durable thermosetting plastic, which has excellent heat and fire resistance. This plastic serves as a replacement for phenolic resins and urea-formaldehyde (UF) in many applications, and is mainly used for furniture construction.

Methacrylate Acrylonitrile Butadiene Styrene: It is a commodity and engineering thermoplastic which assures excellent impact strength, durability, and high chemical resistance. The property of the compound depends on its chemical construction. This resin is mainly used in the production of consumer goods and household appliances as well as creating office accessories, industrial covers and housings, as well as toys.

Methyl Cellulose (MC): This is one of the important types of cellulose ethers, and is water soluble. However, the films made of this compound can retain its strength for a long time, even if exposed to water. The water soluble films made of this compound are used for packaging soluble products such as tooth pastes, medical capsules, rat

poison, bread dough, bubble baths, and detergent powders.

Melamine Resins: These resins are made of formaldehyde and melamine resins.

Melt Flow: The term used to depict a rate of extrusion of liquefied resin through a die at a certain diameter and length.

Melt Fracture: At times, the irregularities in the melt flow through a die can lead to surface abnormalities such as ripples or helix, and so on. This is known as melt fracture.

Melting Point: In science, it is defined as the temperature at which the two forms of a material – liquid and solid – are found to be in equilibrium. In regular usage, the term melting point stands for a temperature where the solid turns into a liquid.

Mer: A structural unit that repeats in any polymer.

Metallizing: This is a process of applying a thin coat of metal to surface, especially a non-metallic surface. Metallizing may be achieved by chemical deposition or by subjecting the surface of the non-metal to be coated in a vacuum chamber.

Metal Injection Molding: This is a process wherein fine powder of metal is mixed with a thermoplastic binder

material in a compound. This is also known as feedstock, and it is processed with plastic injection molding.

Mica: A transparent material that has a flaky structure. Mica can be easily split into thin sheets. It has excellent thermal resistance and insulating characteristics. The group of mica features more than 37 phyllosilicate minerals that lend it a layered structure.

Model: It is a pattern or an object that serves as a mold template. A model can be of any shape or size, and it can be made of any material such as plastic, wood, clay, wax, plaster, metal, rock, bone, and so on.

Modified: A term for any additive, filler or pigment that helps alter the physical properties of a plastic resin. For instance, oil modified plastic resin is an example where oil is used to modify the properties of the resin.

Modulus of Elasticity: This refers to the resistance of a material to be deformed elastically on the application of stress. In other words, it refers to the ratio of stress to strain in a plastic material or any other material.

Molecular Weight: It is a sum of atomic weights of atoms present in a molecule. This is sometimes referred by its abbreviation MW.

Molecular Weight Distribution (MWD): A polymer comprises several constituent polymers of different molecular weights, and this is known as MWD.

Moisture Resistance: It is the ability of any material to resist moisture and stay dry.

Moisture Vapor Transmission: It is the rate at which water vapor percolates through the wall of a plastic material or plastic film at a relative humidity and particular temperature.

Mold: A cavity or a shaped matrix into which liquefied resin is poured to form a particular shape. The shaping is a combined effect of pressure and temperature.

Mold Breathing: During the injection molding, two mold halves are forced by a few hundredths or thousands of millimeters, which is known as mold breathing.If the breathing is too small or too large then it may lead to manufacturing defects such as burn marks and flash.

Mold Release Agent: A type of lubricant that is used to coat a mold. This helps avoid adhesion of the molded piece on removal.

Moldability: It is the ability of the substance for easy molding without rupturing or developing a flaw. The flaws such as rupturing may take

place due to the movement of polymer in gelation phase.

Molding Cycle: The molding process involves several steps that are a completed in a predefined time frame. A molding cycle is defined as the time taken to complete all processes for the production of a mold.

Molding Pressure: It is the pressure applied to the ram of an injection molding press or machine to force the liquefied plastic to fill the mold cavity.

Mold Seam: A vertical line is formed at the point where the mold halves connect and it is referred to as mold seam. The prominence of this line will entirely depend on the accuracy of the matching of the mating mold halves.

Mono Layer: A homogenous film is created by pumping a polymer from an extruder through a die assembly.

Monomer: This is a building block of a polymer. In simple terms, it is a molecule that is bonded with other molecules to form a polymer.

Mounting Plate: In a blow molding unit, the mold is attached is attached to the component called mounting plate.

Movable Platen: The platen to which a half part of the mold is secured during compression molding or injection molding process. This platen is moved by toggle or a hydraulic ram.

Movable Side: The mold is divided into two parts - a movable and immovable part. A movable part is used for mold opening. It is feature ejector pins, due to which it is also known as the ejection side.

Multi-Cavity Mold: This type of mold may have more than one mold impressions. Multi-cavity molds may produce more than one molding in a one molding cycle.

Multi Shot Molding: It is a process where more than two plastic substances are injected into the mold to form a particular part. This technique is employed to make regular use items such as toothbrushes and so on.

Micro Injection Molding: This term sometimes overlaps injection molding, however, it is mainly used to define parts that are being produced from 0,001 g to 0, 4 g cavity. The part dimensions usually vary from a few millimeters to one micrometer.

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Nest Plate: The retainer plate present in the mold. They have a depressed area for cavities.

Net Weight: It is the weight of the material or product, minus the weight of the container.

Nonpolar: The material is termed as non-polar if no dielectric loss is observed in it. This happens due to the non-existence of electric charges in a molecule. Polyethylene is one of the widely used nonpolar plastic resins.

Non-Fill: It is the failure to fill the cavities in a mold. Due to this the edges of the product may appear melted.

Non-Return Valve: It is basically a screw tip that only allows the flow of the liquid in one direction, prevents back flow, and injects the material in the mold.

Nontoxic: Any compound that is not poisonous is known as nontoxic.

Non-Rigid Plastic: It is a type of plastic, which has an apparent modulus of elasticity of above 50,000 psi at 25 degrees centigrade.

Notch Sensitivity: The sensitivity of the material to fracture may increase or decrease due to various factors such as cracks, a sudden change in the section, a scratch, and more. High notch sensitivity is usually observed in brittle materials, whereas as low notch sensitivity is observed in ductile materials.

Nozzle: It is a hollow cored metal nose that is screwed into the injection molding machine at its extrusion end. Nozzle can also be screwed into a

transfer chamber of the machine. Shaped spherical or flat, the nozzle creates sealing between the heating cylinder, the mold, and the chamber under heavy pressure.

Nucleating Agent: This is an additive used in the polymer to improve the crystallization rate by providing additional areas for crystal growth. The nucleation leads to improved cycle times.

Nylon: They are synthetic fiber-forming polyamides, which are formed into yarns and monofilaments.The fibers possess excellent tensile strength, durability, and elasticity. They have high melting points, and can resist chemicals and various liquids. Nylon is widely used for creating bristles of painter brushes and tooth brushes. It is also used for creating injection molded parts. Some popular variants of nylon include Nylon 6/6, Cast Nylon 6, Nylon 6/12, and Kevlar/Nylon (Hydlar Z).

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OCC: These are the old corrugated containers, which are most commonly referred to as cardboard.

Odorants and Deodorants: These are chemicals used to improve the odor of materials. The chemicals of this type are mainly used for safety reasons.

Ohms: It is a unit of electrical resistance. Ohms is defined as the electrical resistance offered by two points of conductor when one-volt potential difference is applied to these points. This application of potential difference produces a current of 1 Amp.

Ohms Law: This law states that the current passing between two points of the conductor is directly proportional to the voltage applied across the points.

Olefins: They are the group of unsaturated hydrocarbons depicted by a formula CnH2n. They are usually known by their corresponding paraffin and expressed by adding “ylene” and “ene” such as propylene and ethylene.

Opaque: A type of material that cannot transmit light.It is the opposite of transparent. There are materials which are not opaque neither transparent, and they are referred to as translucent or semi-opaque.

Open Time: This is also referred to as a pot time, which is an amount of time required to mix two parts A & B and apply before gelling.

O-ring: This is a ring used as a gasket.

Orange Peel: It is a type of surface finish that resembles like an orange peel.

Organic Chemical: They are chemicals derived from living beings, however, inorganic chemicals are derived from minerals and other substances. Nowadays, this term is also used for chemicals that contain the element carbon.

Orientation: A uniform structure is observed in polymeric materials due to a certain alignment of molecules. This alignment is known as orientation. It can be accomplished by stretching or cold drawing.

Oriented Vinyl Chloride: Polyvinyl chloride is an amorphous polymer that is known for its rigidity and excellent flame resistance. It is often combined with plasticizers to improve its properties. Sometimes, its properties are altered through different processes. Orientation of polymer chain is performed through an extrusion process, and this helps improve the mechanical properties of the PVC in one particular, and preferred direction.

Out of Round: A non-uniform diameter or radius.

Outgassing: The process of removing occluded gas by heating.

Over coating: It is a process of extruding a web beyond the edge of the substrate.

Overmolding: During the injection molding, part inserts are used to

create parts. In the first phase, the part inserts are added to the cavity, then the melt over molds on the other side. One of the main advantage of this technique is that the materials is strongly connected to each other due to hot melts. This technique is mostly used with films for part inserts.

Overpack: The molten material will fill the easiest flow path. This material will pack the area until it flows to other areas. Overpacking is caused by warping produced by flow that is unbalanced.

Oxidation: It is a chemical reaction where the electrons are lost during a reaction of atoms, molecules, or ions. This reaction usually occurs on increase in the oxidation state of an atom, ion, or molecule. Reduction is the reaction opposite to oxidation.

Octene: It is a comonomer used for creating linear low density polyethylene.

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Permanent Set: It is the increase in length expressed in a percentage of the original length, by which an elastic material fails to return to original length after being stressed for a standard period of time.

Permeability: The permeability of an object or substance depends on the

type and amount of solids, liquids, and gases it allows to pass through it, without any physical or chemical changes to the content.

Phenolic Resin: These are resins produced from the reaction of a phenolic compound or tar acid with an aldehyde.

Pitch: This is the distance from any point on the flight of a screw line to the corresponding point on an adjacent flight, measured parallel to the axis of the screw line or threading.

Plastic: This is a synthetic material made from various polymers such as polyethylene among others. It can be molded into the required shape when heat is applied and cooled later.

Plasticizer: This is a liquid or solid substance added in natural and synthetic resins and related substances to develop elasticity and flexibility.

Plastic Deformation: This is any change in dimensions of a plastic material under load or heat. So, it indicates change in terms of shape, size, color, and surface finish among properties, which is irreversible.

Plastic Tooling: These are sets of tools such as dies, jigs, and fixtures used for machining processes to mold plastic.

Plasticity: This is the property of plastics which allows the material to be deformed and molded continuously and permanently when an external force is applied.

Plastisols: These are mixtures of vinyl resins and plasticizers which can be molded, cast, or converted to continuous films by applying heat.

Platens: These are the mounting plates of a press on which the mold halves are attached.

Plunger: This is a part of a transfer or injection press that applies pressure on the plastic material to push it into the chamber for melting.

Pneumatic: This is a part of engineering which enables operation and movement of machines and equipment through air pressure. This means pneumatic systems are powered by compressed inert gases.

Polymer: A product resulting from a chemical change involving the successive addition of a large number of relatively small molecules (monomer).The molecular weight of a polymer is usually a multiple of that of the original substance.

Polymerization: It is a chemical reaction of several monomer molecules to form polymer chains which leads to the formation of stable covalent bonds.

Polypropylene: It is a type of tough, lightweight, and rigid plastic made through the polymerization of high-purity propylene gas in the presence of an organometallic catalyst at a relatively low pressure and temperature.

Porosity: The presence of tiny holes in certain solid materials through which liquids can pass.

Potting: This is in some ways similar to encapsulation; however, it is done differently.This involves filling a mold with a semi-solid compound to form a protective coat over the materials inside.

Preheating: The heating of a compound prior to molding or casting to facilitate the operation, reduce cycles, and improve product quality.

Premix: This is a molding compound prepared prior to and apart from the molding operations and containing all components required for molding.

Pressure Drop: It is the energy loss in a fluid as it passes through a flow passage. The loss is due to friction between fluid particles and can be measured as a decrease in pressure in the direction of flow.

Pressure Forming: This is a thermoforming process, wherein pressure is applied to push the sheet to be formed against the mold surface.

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Random Copolymer:A copolymer consisting of random placements of monomeric residues. They can be formed by the second polymer to the first one.

Rayon: This is a synthetic fiber used in clothing among other things. It is obtained from cellulose acetate or cellulose triacetate. Rayon fibers are similar in chemical structure to natural cellulose fibers such as cotton, but it contains shorter polymer units.

Reciprocating Screw: It is a combination injection and plasticizing unit in which an extrusion device with a reciprocating screw is used to plasticize the material.

Regrind: This is plastic that has been used earlier and is not granulated to a small size through a grinder or granulator, for further use.

Reinforced Plastics: These are molded, formed, filament-wound, or shaped plastic parts consisting of resins to which reinforcing fibers, mats, and fabrics are added before the forming operation to improve their strength.

Reinforcement: It is the pressure applied by a strong inert material bound into a plastic to improve its

strength, stiffness, and impact resistance.

Relative Humidity: It is the ratio of the quantity of water vapor present in the air to the quantity which would saturate it at any given temperature.

Relative Viscosity: It is the ratio of the absolute viscosities of the solution with a specific concentration to that of the pure solvent at the same temperature.

Release Agent: This is a wax-like lubricant used to coat a mold cavity to prevent the molded piece from sticking to it. This makes its removal from the mold easy.

Relief Angle: This is the angle of the cutaway portion of the cutting tool and the workpiece that has been cut.

Reprocessed Plastic: This is prepared from scrap industrial plastic mostly by third party manufacturers who buy scrap from OEMs.

Resin: It is a viscous or solid substance made from organic compounds. It is used to make various plastic parts and products.

Resistance: This is a property of a conductor that opposes the current flow produced by a producing potential difference or voltage. Resistance of plastic is expressed in terms of its durability or resistance to withstand

high or low temperatures and other physical parameters.

Rigid Plastics: This is the type of plastic that has a modulus of elasticity either in flexure or in tension greater than 100,000 psi at 23 degrees C and 50% relative humidity when tested in accordance with ASTM Methods D 747 or D 790 Test for stiffness of plastics.

Rigid PVC: It is a polyvinyl chloride or a polyvinyl chloride/acetate copolymer characterized by a relatively higher degree of hardness or rigidity. So, for such types of plastic very low amounts of plasticizers are required to achieve the required strength and elasticity.

Rockwell Hardness: This is a test for hardness (resistance to indentation) in which a hardened steel ball or diamond point is pressed into the material under test.

Rotational molding: It is a method used to make hollow articles from plastisols and lattices. Plastisol is added into a hollow mold which fuses the plastisol into a gel. It is then cooled and the product is taken out of the mold.

Round Square: This is a specific shape of a container which has sides of equal width with well-rounded corners and shoulders.

Rubber: It is an elastomer capable of stretching and recovering to its normal

size after being stretched to at least twice its length at temperatures varied temperatures and humidity.

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Screen Molding: Screen molding is one of the traditionally used techniques wherein synthetic or metal screens are overmolded with plastic for a myriad of applications including pocket doors, borders and furniture trims.

Scrap: Scrap is a small amount of something, especially one that is left over from any manufacturing operation.

Sealing: Sealing is the surface-to-surface technique that joints or fill cracks in a porous surface of materials to preventing leakage.

Semi-rigid Plastic: These plastics have a medium modulus of elasticity of between 10,000 and 100,000 pounds per square inch.

Setting Temperature: The temperature at which a liquid resin or adhesive sets for further processing.

Shelf Life: The period of time during which a material lasts or remains effective and free from deterioration.

Short Shot:A short shot is an incomplete molded part which is

caused due to incomplete filling of a mold cavity.

Shrinkage: It is the contraction of a plastic molded part when it cools from viscous liquids to solids.

Silica: Silica, also called silicon dioxide is the most abundant material on earth. The compound is very helpful in the plastic processing sector and is often used to improve the performance of thermoplastics, polymer compounds, composites and Thermoplastic Elastomers(TPE).

Silk Screen Printing: Silk-screen printing, also known as serigraphy or silkscreening, is one of the most popular printing techniques where the printing ink is made to through a stenciled mesh screen to create a printed design.

Sink Mark:A sink mark is a surface depression caused by localized shrinkage of the material at thick sections.

Slip Agent: Slip additives offer a cost-effective solution that help reduce the coefficient of friction and thus improve production efficiency.

Solvent:A solvent is a substance in which other materials dissolve to form a solution. A solvent can be liquid but can also be a solid, a gas, or a supercritical fluid, wherein molecules

of the solvent work to put the solute molecules apart.

Spiral Flow Test: It is a commonly employed test to evaluate the molding flow of a resin in injection molding press.

Specific Gravity: Specific gravity, also called relative density, is the ratio of the density of the substance to the density of a reference substance like water at a given temperature.

Specific Heat: The specific heat is the amount of heat per unit mass required to raise the temperature of an equal mass of substance one degree.

Sprue: In injection molding,sprue refers to a hole through which metal enters the mold cavities.

Spin welding: Spin welding is a form of friction welding that joins circular thermoplastic parts by applying pressure. The process is carried out by rotating one component and forcing it against the other component which is kept stationary.

Stabilizer: Stabilizers, which are available in both solid and liquid form,are additives added to polymers to prevent premature degradation when exposed to heat, light, air, water, radiation, or mechanical loading.

Stiffness: Stiffness (or rigidity) is a property of a polymer, which indicates the ability of the material to distribute a

load and resist deformation or deflection.

Stress: Stress, which is the load (force) per unit area, is an inherent result of plastics manufacturing processes that tends to deform the parts produced.

Stress Crack: Stress cracking is defined as an external or internal crack in a plastic caused by tensile,compressive,or shear forces,which in turn leading to unexpected failure or breakdown of plastic material.

Structural Foam Molding: The structural foam process is a low pressure injection molding process, used to produce large plastic covers, handles, bezels and plastic structural components. In this process, an inert gas (such as nitrogen) is mixed with the chosen plastic material for reducing weight and density.

Surfactants: Surfactant, also called surface-active agent, acts detergents, wetting agents, emulsifiers, foaming agents, and dispersants.The material, which affects the interfacial surface tension, breaks down the interface between water and oils and/or dirt.

Surface Treating:A surface treatment is a process applied to the surface of a material to increase its mechanical, electrochemical, and thermal performance. It alters the surface of a

manufactured item for improved hardness and wear resistance, and corrosion prevention.

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Tab Gate:A tab gate, which is typically employed for flat and thin parts, is a typical impingement gate that can effectively prevent molten plastic.

Tackifier: Tackifiers are low-molecular weight compounds added to hot melt and pressure sensitive adhesives for enhancing the tack,and the stickiness of the surface of the adhesive.

Tear Resistance: Tear resistance (or tear strength) is a measure of the ability of sheet or film materials to resist tearing.

Tensile Strength: Tensile strength is the ability of a material to withstand maximum load without fracture.

Tensile Modulus: It is the measure of stiffness in a material or in other terms the measure of a solid's stiffness or resistance to elastic deformation.

Thermoforming: Thermoforming is a plastic molding technique in which a thermoplastic or glass sheet is heated to a temperature to reach its softening point.This is then formed to a specific shape in a mold.

Thermoplastics: Thermoplastics are defined as polymers that become a soft material when it is heated and becomes hard when it is cooled. Thermoplastics have wide ranging properties and can be remolded and recycled without affecting their physical properties.

Thermosets:A thermosetting polymer, resin, or plastic, often called a thermoset, is a polymer that remain in a permanent solid state once hardened. They cannot be remolded or heated again as in the case of Thermoplastics.

Thermoplast Elastomer(TPE): Thermoplastic elastomers (TPE), sometimes referred to as thermoplastic rubbers, exhibit simultaneous thermoplastic and elastomeric properties. These low modulus, flexible materials are noted for being soft and flexible like thermoset rubber.

Thermoelasticity: Thermoelasticity is the deformation of an elastic substance as the temperature of that object fluctuates.

Thermal Conductivity: The thermal conductivity, which is denoted by the symbol ‘k’, ‘λ’ and ‘κ’, is a material’s ability to transfer or conduct heat.

Thermal Stress: Simply defined, thermal stress is caused due to the change in temperature resulting in

thermal deformation to the structural members, fracture or plastic deformation.

Tie Bars: Tie bars are a part of injection molding machine that provides structural support to the mold in the press.

Toggle: In a molding machine,toggle is an imperative mechanism that is used to mechanically close the mold.

Tolerance:A product's tolerance is defined by the maximum acceptable level of its deviation from the specified measurement or specification.

Translucent: Translucent objects like plastic bottles allow some light to travel through them, but objects on the other side can't be seen clearly.

Transition Temperature: Transition temperature is the temperature at which a material changes form one form into another with sudden change of physical properties.

Transfer Molding: Transfer molding (BrE moulding) is a manufacturing process wherein pre-measured amount of uncured molding compound is inserted and placed into the molding pot. The molding material is preheated and cured.The parts are then removed or ejected from the cavity.

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Undercut: An undercut in injection molding refers to any indentation or protrusion that prevent straight ejection of part at the parting line from a mold.

UL Temperature Index: The material's ability to retain a particular physical property after exposure to elevated temperatures over a reasonable period.

Ultimate Tensile Strength: Ultimate tensile strength (UTS), often shortened to tensile strength (TS), ultimate strength, or Ftu is the maximum stress that a material can withstand when stretched or pulled before failing or breaking.

Ultrasonic Sealing: It is a popular sealing technology widely employed for sealing flexible packaging for dry and liquid foods, personal care items and electronics.The technique guarantees increased seal strength and improved aesthetics.

Urea Plastics: Urea-formaldehyde (UF), also known as urea-methanol is highly cross-linked, semi-crystalline thermosetting plastics.

UV Stabilizer:UV stabilizers are a class of chemical additives commonly added to plastics like polyamides, polyesters, polycarbonates to resist the degradation that plastics can undergo under the effects of sunlight and UV rays.

Unit Mold:A plastics mold composed of a simple cavity designed for quick changing interchangeable cavity parts.

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V

Vacuum Forming: It is the most commonly used plastic processing method. The process involves plastic sheet heating until it is stretched onto a single-surface mold.

Vacuum Metallizing: Also called vacuum deposition, it is the process that allows creating a metal layer, which is of another material, on a substrate.

Valley Printing: The process wherein excess ink is used for embossing and printing on plastics. The perfect embossing and fine finish in this method has increased its demand in various industries.

Vent: It is a small opening in a mold that allows air to enter or leave a closed space.

Vertical Flash Ring: It is a clearing space between the vertical wall of the cavity in a mold and the core. It is also the ring of excess material which discharges into this clearance space from the cavity.

Vicat Softening Point: Also referred to as Vicat hardness, it is the determination of the temperature at

which particular materials become softer in case of increased temperature application.

Virgin Material: It is a basic form of material that has never been used, processed, or developed. It may be considered more valuable than recycled or already used materials.

Viscosity: It is the state between solid and liquid; so, these are semi-solids or thick fluids. It is a measure of resistance the liquid has to deformation at a certain rate.

Void: Also called a bubble, it occurs in the center part of the material due to excessive shrinkage. Sometimes, it can be an empty space in any medium or material.

Volatile: The term is applied to substances which have low melting and boiling points. It describes how a liquid will vaporize easily.

Volume Resistivity: It is an electrical resistance of the material that measures how strongly a material opposes the electric current.

Vulcanization: The chemical process in which the rubber is heated with sulfur at 140–160°C to improve resilience, elasticity, tensile strength,viscosity, and hardness. This process accomplishes by the formation of a cross-linked network.

Valve Gate: Also referred as a sluice gate, is used to shut off the liquid flow. It requires very little space and it opens by lifting a barrier gate out of the fluid path.

Venting: One important process which allows the air to outflow the cavity; else, the air is compressed, which raises the temperature. The venting consists of small gaps and its height needs to be adjusted based on the type of polymer used. If the gap is small, it prevents the air from escaping, else flash formation occurs at the part.

Vertical Rotation Table: It is one of the important precision work positioning devices which enables a machine operator to cut or drill work at particular intervals around a vertical axis.

Vibratory Bowl Feeder:A cylindrical sorting machine used to feed individual parts for various industrial production lines. They are a traditional way of sorting and handling bulk products used on processing and packaging lines.

Volume Model: The independent way of generating a CAD model is called as volume model.

Volumetric Shrinkage: The decrease in the specific volume of the part is called volumetric shrinkage. It is caused due to thermal contraction and

takes place inside the mold between ejection and injection.

VP-Switch: Velocity/Pressure – Switch over point is the transition from filling to the packaging stage during the injection cycle. The correct time for switching can be found with the cavity pressure.

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Warpage: A dimension distortion where the molded part does not follow the intended design shape. Warpage in molded parts is caused due to differential shrinkage because of temperature variations, molecular and fiber orientation, and variable packing such as under-packaging at remote locations and over-packaging at gates.

Water Absorption, 24 hours: The test is used to determine the percentage of water absorbed under specified conditions. The amount of water absorbed by material largely affects its electrical properties. The factors causing water absorption mainly include types of plastic and additives used, temperature and length of exposure, and many more.

Water Hammer: Also referred to as a fluid hammer, it is the pressure surge caused when a liquid in motion is forced to change its direction unexpectedly. This phenomenon occurs when valves close

unexpectedly at the end of the pipeline system. The effect of water or fluid hammer can be reduced with surge tanks, accumulators, expansion tanks, and several other features.

Weir: A weir, also known as a low head dam, is a barrier to divert water flow.

Weld Lines: Also called a knit line, this occurs when two emerging melts in opposite directions meet. Weld lines can be caused by holes in parts, multiple gates where race tracking occurs. If weld lines can't be avoided, then position them at low visibility and low temperature settings by modifying the dimension and gate position.

Weld Mark:A wavy surface appearance on molded material caused by the inappropriate flow of material during the molding operation.

Weather Resistance: The ability of a material to withstand light exposure to the elements – wind, rain, and sun to retain its integrity and appearance.

Welding: The fabrication process that joins two different materials by heating the surfaces to the point of melting. It differs from soldering and brazing, low-temperature metal joining techniques, which do not soften the base metal part.

Wet Lay-up:A molding process which combines reinforced fiber with liquid resin to form a high-quality seal. The

process repeated the steps until reinforcement thickness is achieved.

Wet Strength: It is the strength of paper when soaked with water. It is described as the ratio of wet to dry tensile strength at break.

Wet Winding: The filament-winding process where the element or component is soaked with resin just before contact with the shaft to the spindle. The process involves winding filaments under stain over a rotating mandrel.

Wetting Agent:A substance is called a wetting agent if it decreases the surface tension of a liquid, which allows it to spread even more easily.

Whisker:A thin and long road made of monocrystalline material.

Wrinkle:A slight fold or line that appears into several layers of fabric or other reinforced materials.

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Young's Modulus of Elasticity: As its name suggests, the module describes the ratio of tensile stress to tensile strain.

Yield Point: Often referred to as the elastic limit, it marks the beginning and end behavior of the material, especially plastic.

Yield Stress: It is the value of stress applied to the material to initiate flow.

Yield Value: See yield point.

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Zero Waste: The set of principles eyed on waste prevention. The primary goal of a sustainability/recycling program is for zero trash to be sent to oceans and landfills.

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