DAMASK: A firm, glossy, Jacquard-patterned fabric that may be made from linen, cotton, rayon, silk, or a combination of these with various manufactured fibers. Similar to brocade, but flatter and reversible, damask is used for napkins, tablecloths, draperies, and upholstery.

DAMPENING (IN TIRE CORD): The relative ability to absorb energy and deaden oscillation after excitation.

DECATING MARK: A crease mark or impression extending fillingwise across the fabric near the beginning or end of the piece.

DECATIZING: A finishing process in which fabric, wound tightly on a perforated roller, either has hot water circulated through it (wet decatizing), or has steam blown through it (dry decatizing). The process is aimed chiefly at improving the hand and removing wrinkles.

DECITEX: One tenth of a tex.

DECORTICATING: A mechanical process for separating the woody matter from the bast fiber of such plants as ramie and hemp.

DEEP-DYEING VARIANTS: Polymers that have been chemically modified to increase their dyeability. Fibers and fabrics made therefrom can be dyed to very heavy depth.

DEFECTS: A general term that refers to some flaw in a textile product that detracts from either performance or appearance properties.

DEFORMATION: A change in the shape of a specimen, e.g., an increase in length produced as the result of the application of a tensile load or force. Deformation may be immediate or delayed, and the latter may be recoverable or nonrecoverable.

DEGRADATION: The loss of desirable physical properties by a textile material as a result of some process or physical/chemical phenomenon.

DEGREE OF ESTERIFICATION: The extent to which the acid groups of terephthalic and/or other acids have reacted with diols to form ester groups in polyester polymer production.

DEGREE OF POLYMERIZATION: Refers to the number of monomer units in an average polymer. It can be controlled during processing and affects the properties of the end product.

DEGUMMING: The removal of gum from silk by boiling in a mildly alkaline solution. Usually accomplished on the knit or woven fabric.

DELAYED DEFORMATION: Deformation that is time-dependent and is exhibited by material subjected to a continuing load; creep. Delayed deformation may be recoverable following removal of the applied load.

DELUSTERING: Subduing or dulling the natural luster of a textile material by chemical or physical means. The term often refers to the use of titanium dioxide or other white pigments as delustrants in textile materials.

DELISTRANT: A substance that can be used to dull the luster of a manufactured fiber. Often a pigment such as titanium dioxide.

DENIER: A weight-per-unit-length measure of any linear material. Officially, it is the number of unit weights of 0.05 grams per 450-meter length. This is numerically equal to the weight in grams of 9,000 meters of the material. Denier is a direct numbering system in which the lower numbers represent the finer sizes and the higher numbers the coarser sizes. In the U.S., the denier system is used for numbering filament yarns (except glass), manufactured fiber staple (but not spun yarns), and tow. In most countries outside the U.S., the denier system has been replaced by the tex system. The following denier terms are in use:

Denier per Filament (dpf): The denier of an individual continuous filament or an individual staple fiber if it were continuous. In filament yarns, it is the yarn denier divided by the number of filaments.

Yard Denier: The denier of a filament yarn. It is the product of the denier per filament and the number of filaments in the yarn.
**Total Denier:** The denier of a tow before it is crimped. It is the product of the denier per filament and the number of filaments in the tow. The total denier after crimping (called crimped total denier) is higher because of the resultant increase in weight per unit length.

**Denier Variation:** Usually variation in diameter, or other cross-sectional dimension, along the length of a filament or bundle of filaments. It is caused by malfunction or lack of process control in fiber manufacturing and degrades resulting fabric appearance or performance.

**Denim:** A firm 2 x 1 or 3 x 1 twill-weave fabric, often having a whitish tinge, obtained by using white filling yarns with colored warp yarns. Heavier weight denims, usually blue or brown, are used for dungarees, work clothes, and men’s and women’s sportswear. Lighter weight denims with softer finish are made in a variety of colors and patterns and are used for sportswear and draperies.

**Density:** The mass per unit volume (usually expressed as grams per cubic centimeter).

**Dent:** On a loom, the space between the wires of a reed.

**Deregistering (Crimp):** Process of disordering or disaligning the crimp in a tow band to produce bulk.

**Desulfurizing:** An aftertreatment to remove sulfur from newly spun viscose rayon by passing the yarn through a sodium sulfide solution.

**Detergent:** A synthetic cleaning agent containing surfactants that do not precipitate in hard water and have the ability to emulsify oil and suspend dirt.

**Developing:** A stage in dyeing or printing in which leuco compounds, dyes, or dye intermediates are converted to the final, stable state or shade.

**Dewpoint:** The temperature at which a gas begins to condense as a liquid at a given pressure. Thus in air, it is the temperature at which the air becomes saturated when cooled with no further addition of moisture or change in pressure.

**Dial:** In a circular-knitting machine, a circular steel plate with radially arranged slots for needles. A knitting machine equipped with both a dial and a cylinder (q.v.) can produce double-knit fabrics.

**Diamine:** A compound with two amino groups. Hexamethylenediamine, one of the intermediates in the manufacture of nylon 66 salt, is an example of this chemical type.

**Dielectric Breakdown Voltage:** In an electrical insulating material, the voltage at which electrical breakdown occurs, i.e., the voltage at which current will flow and/or the material melts.

**Dielectric Constant:** Measure of the ability of a dielectric material to store electrical potential energy under the influence of an electric field, measured by the ratio of the capacitance of a condenser with the material as the dielectric to its capacitance with a vacuum as the dielectric.

**Dielectric Strength:** The average voltage gradient at which electrical failure or breakdown occurs. Expressed in volts per mil.

**Differential Thermal Analysis:** A method of determining the temperature at which thermal events occur in a material undergoing continuous heating.

**Diffusion:** 1. A more or less gradual movement of molecules or ions through a solution or fiber as a result of the existence of a concentration gradient or repulsive or attractive forces. 2. The random movement of gas molecules.

**Dimensional Restorability:** The ability of a fabric to be returned to its original dimensions after laundering or dry cleaning, expressed in percent. For example, 2% dimensional restorability means that although a fabric may shrink more than this in washing, it can be restored to within 2% of its original dimensions by ordinary home pressing methods.

**Dimensional Stability:** The ability of textile material to maintain or return to its original geometric configuration.

**Dimethyl Terephthalate:** \([p-C6H4(COOC3H5)]_2\) An intermediate used in the production of polyethylene terephthalate, the polymer from which polyester fibers and resins are made.
**DIMITY**: A sheer, thin, spun cloth that sometimes has cords or stripes woven in. It is used for aprons, pinafores, and many types of dress goods.

**DIP**: 1. Immersion of a textile material in some processing liquid. The term is usually used in connection with a padding or slashing process. 2. The rubber compound with which tire cords and other in-rubber textiles are treated to give improved adhesion to rubber.

**DIP PENETRATION**: The degree of saturation through a tire cord after impregnation with an adhesive.

**DIP PICKUP**: The amount of adhesive applied to a tire cord by dipping, expressed as a percentage of the weight of the cord before dipping.

**DIP TREATING**: The process of passing fiber, cord, or fabric through an adhesive bath, followed by drying and heat-treating of the adhesive-coated fiber to obtain better adhesion.

**DIRECT ESTERIFICATION**: In the production of polyethylene terephthalate, the process in which ethylene glycol is reacted with terephthalic acid to form bis[·]-hydroxyethyl terephthalate monomer with the generation of water as a by-product.

**DIRECTLY ORIENTED FABRICS**: Rigid fabric constructions containing inlaid warp or fill yarns held in place by a warp-knit structure. Used in geotextiles, coated fabrics, composites, etc.

**DISC TEST**: An in-rubber test used to predict the fatigue resistance of tire cords and other industrial yarns.

**DISPERSANT**: A dispersing agent, often of a surface active chemical, that promotes formation of a dispersion or maintains a state of dispersion by preventing settling or aggregation.

**DISPERSION**: 1. A system consisting of finely divided particles and the medium in which they are distributed. 2. Separation of light into colors by diffraction or refraction. 3. A qualitative estimation of the separation and uniform distribution of fibers in the liquid during the production of a wet-formed nonwoven fabric.

**DISTRIBUTION LENGTH**: In fibers, a graphic or tabular presentation of the proportion or percentage (by number or by weight) of fibers having different lengths.

**DIVIDED THREADLINE EXTRUSION**: Spinning of two separate threadlines from one spinneret.

**DOBBY**: 1. A mechanical attachment on a loom. A dobby controls the harnesses to permit the weaving of geometric figures. 2. A loom equipped with a dobby. 3. A fabric woven on a dobby loom.

**DOCTOR BLADE**: A metal knife that cleans or scrapes the excess dye from engraved printing rollers, leaving dye paste only in the valleys of engraved areas. Also used to describe other blades that are used to apply materials evenly to rollers or fabrics.

**DOCTOR STREAK**: A defect in printed fabrics consisting of a wavy white or colored streak in the warp direction. It is caused by a damaged or improperly set doctor blade on the printing machine.

**DOESKIN FINISH**: A soft low nap that is brushed in one direction. Cloth with this type of finish is used on billiard tables and in men’s wear.

**DOFF**: A set of full bobbins produced by one machine (a roving frame, a spinning frame, or a manufactured filament-yarn extrusion machine).

**DOFFER**: 1. The last or delivery cylinder of the card from which the sheet of fibers is removed by the doffer comb. 2. An operator who removes full bobbins, spools, containers, or other packages from a machine and replaces them with empty ones.

**DOFFER COMB**: A reciprocating comb, the teeth of which oscillate close to the card clothing of the doffer to strip the web of fibers from the card.

**DOFFER LOADING**: Fibers imbedded so deeply into the doffer wire clothing that the doffer comb cannot dislodge them to form a traveling web.

**DOFFING**: The operation of removing full packages, bobbins, spools, roving cans, caps, etc., from a machine and replacing them with empty ones.

**DONEGAL**: A tweed fabric with colorful slubs woven in, donegal is used for suits and coats.
DOTTED SWISS: A sheer cotton or cotton blend fabric with small dot motif, dotted swiss is used for dress goods, curtains, baby clothes, etc.

DOUBLE BACK: A secondary backing glued to the back of carpet, usually to increase dimensional stability.

DOUBLE-CLOTH CONSTRUCTION: Two fabrics are woven in the loom at the same time, one fabric on top of the other, with binder threads holding the two fabrics together. The weave on the two fabrics can be different.

DOUBLE END: Two ends woven as one in a fabric. A double end may be intentional for fabric styling, or accidental, in which case a fabric defect results.

DOUBLE-KNIT FABRIC: A fabric produced on a circular-knitting machine equipped with two sets of latch needles situated at right angles to each other (dial and cylinder).

DOUBLE WEAVE: A fabric woven with two systems of warp or filling threads so combined that only one is visible on either side. Cutting the yarns that hold the two cloths together yields two separate cutpile fabrics.

DOUBLING: 1. A process for combining several strands of sliver, roving, or yarn in yarn manufacturing. 2. The process of twisting together two or more singles or plied yarns, i.e., plying. 3. A British term for twisting. 4. The term doubling is sometimes used in a sense opposite to singling. This is unintentional plying. 5. A yarn, considerably heavier than normal, produced by a broken end becoming attached to and twisting into another end.

DOUPPIONI: A rough or irregular yarn made of silk reeled from double or triple cocoons. Fabrics of douppioni have an irregular appearance with long, thin slubs. Douppioni-like yarns are now being spun from polyester and/or rayon staple.

DOWNDRAFT METIER: A dry-spinning machine in which the airflow within the drying cabinet is in the same direction as the yarn path (downward).

DOWNGRADE: In quality control, the lowering of the grade and/or value of a product due to the presence of defects.

DOWNTWISTER: A cap, ring, or flyer twisting frame.

DOWNTWISTING: A process for inserting twist into yarn in which the yarn passes downward from the supply package (a bobbin, cheese, or cone) to the revolving spindle. The package or packages of yarn to be twisted are positioned on the creel, and the ends of yarn are led downward through individual guides and stop motions to the positively driven feed roll and from there to the revolving take-up package or bobbin, which inserts twist.

DOWTHERM®: Trademark of Dow Chemical Company for a series of heat transfer media. Dowtherm jackets are used around molten polymer processing lines.

DRAFT: In weaving, a pattern or plan for drawing-in.

DRAFT RATIO: The ratio between the weight or length of fiber fed into various machines and that delivered from the machines in spun yarn manufacture. It represents the reduction in bulk and weight of stock, one of the most important principles in the production of yarn from staple fibers.

DRAPE: A term to describe the way a fabric falls while it hangs; the suppleness and ability of a fabric to form graceful configurations.

DRAW-BACK: A crossed end; an end broken during warping that when repaired was not free or was tied in with an adjacent end or ends overlapping the broken end. The end draws or pulls back when unwound on the slasher.

DRAW DOWN: The amount by which manufactured filaments are stretched following extrusion.

DRAW-FRAME BLENDS: Blends of fibers made at the draw frame by feeding in ends of appropriate card sliver. This method is used when blend uniformity is not a critical factor.

DRAWING: 1. The process of attenuating or increasing the length per unit weight of laps, slivers, slubbings, or rovings. 2. The hot or cold stretching of continuous filament yarn or tow to align and arrange the crystalline structure of the molecules to achieve improved tensile properties.

DRAWING-IN: In weaving, the process of threading warp ends through the eyes of the heddles and the dents of the reed.
**DRAWN TOW:** A zero-twist bundle of continuous filaments that has been stretched to achieve molecular orientation. (Tows for staple and spun yarn application are usually crimped.) **Drawing Sliver**

**DRAW RATIO:** The ratio of final to original length per unit weight of yarn, laps, slivers, slubbings, rovings, etc., resulting from drawing.

**DRAW-SIZING:** A system linking drawwarping and sizing in a continuous process. A typical system includes the following elements: (1) creel, (2) eyelet board, (3) warp-draw machine, (4) intermingler, (5) tension compensator and break monitor, (6) sizing bath, (7) dryers, (8) waxing and winding units.

**DRAW-TEXTURING:** In the manufacture of thermoplastic fibers, the simultaneous process of drawing to increase molecular orientation and imparting crimp to increase bulk.

**DRAW-TWISTING:** The operation of stretching continuous filament yarn to align and order the molecular and crystalline structure in which the yarn is taken up by means of a ring-and-traveler device that inserts a small amount of twist (usually ¼ to ½ turn per inch) into the drawn yarn.

**DRAW-WARPING:** A process in which a number of threadlines, usually 800 to 2000 ends of POY feedstock, are oriented under essentially equal mechanical and thermal conditions by a stretching stage using variable speed rolls, then directly wound onto the beam. This process gives uniform end-to-end properties.

**DRAW-WINDING:** The operation of stretching continuous filament yarn to align or order molecular and crystalline structure. The drawn yarn is taken up on a parallel tub or cheese, resulting in a zero-twist yarn.

**DRILL:** A strong denim-like material with a diagonal 2 x 1 weave running toward the left selvage. Drill is often called khaki when it is dyed that color.

**DROPPED STITCHES:** A defect in knit cloth characterized by recurrent cuts in one or more wales of a length of cloth.

**DROP STITCH:** 1. An open design made in knitting by removing some of the needles at set intervals. 2. A defect in knit fabric.

**DROP WIRES:** A stop-motion device utilizing metal wires suspended from warp or creelled yarns. When a yarn breaks, the wire drops, activation the switch that stops the machine.

**DRY CLEANING:** Removing dirt and stains from fabrics or garments by processing in organic solvents (chlorinated hydrocarbons or mineral spirits).

**DRY FILLING:** The application of finishing chemicals to dry fabric, usually by padding.

**DRY FORMING:** The production of fiber webs by methods that do not use water or other liquids, i.e., air-laying or carding.

**DRYING CYLINDERS:** Any of a number of heated revolving cylinders for drying fabric or yarn. They are arranged either vertically or horizontally in sets, with the number varying according to the material to be dried. They are often internally heated with steam and Teflon coated to prevent sticking.

**DRY- LAID NONWOVENS:** Nonwoven web made from dry fiber. Usually refers to fabrics from carded webs versus air-laid nonwovens which are formed from random webs.

**DUCK:** A compact, firm, heavy, plain weave fabric with a weigh of 6 to 50 ounces per square yard. Plied yarn duck has plied yarn in both warp and filling. Flat duck has a warp of two single yarns woven as one and a filling of either single or plied yarn.

**DULL:** A term applied to manufactured fibers that have been chemically or physically modified to reduce their normal luster. Matte; opposite of bright; low in luster.

**DUMBELLS:** A defect frequently seen in wet-formed nonwoven fabrics; an unusually long fiber will become entangled with groups of regular-length fibers at each end, thus producing a dumbbell-shaped clump.

**DUNGAREE:** A term describing a coarse denim-type fabric, usually dyed blue, that is used for work overalls.

**DURABILITY:** A relative term for the resistance of a material to loss of physical properties or appearance as a result of wear or dynamic operation.
DURABLE PRESS: A term describing a garment that has been treated so that it retains its smooth appearance, shape, and creases or pleats in laundering. In such garments no ironing is required, particularly if the garment is tumble-dried. Durable press finishing is accomplished by several methods; two of the most common are the following: (1) A fabric that contains a thermoplastic fiber and cotton or rayon may be treated with a special resin that, when cured, imparts the permanent shape to the cotton or rayon component of the fabric. The resin-treated fabric may be precured (cured in finishing and subsequently pressed in garment form at a higher temperature to achieve the permanent shape) or postcured (not cured until the finished garment has been sewn and pressed into shape). In both cases, the thermoplastic fiber in the garment is set in the final heat treatment. This fiber, when heat-set, also contributes to the permanence of the garment shape, but the thermoplastic component of the blend is needed for strength since the cotton or rayon component is somewhat degraded by the durable-press treatment. (2) Garments of a fabric containing a sufficient amount of a thermoplastic fiber, such as polyester, nylon, or acrylic, may be pressed with sufficient pressure and time to achieve a permanent garment shape.

DUST-RESISTANT: A term applied to a fabric that has been tightly woven so that it resists dust penetration.

DWELL TIME: The time during a process in which a particular substance remains in one location (e.g., the time during which molten polymer remains in a spinning pack.)

DYE FLECK: 1. An imperfection in fabric caused by residual undissolved dye. 2. A defect caused by small sections of undrawn thermoplastic yarn that dye deeper than the drawn yarn.

DYING: A process of coloring fibers, yarns, or fabrics with either natural or synthetic dyes. Some of the major dyeing processes are described below:

Batik: A resist-dyeing process in which portions of a fabric are coated with wax; during the dyeing process, only the uncovered areas take up dye. The process can be repeated so that several colors are used. Batik dyeing is often imitated in machine printing.

Chain Dyeing: A method of dyeing yarns and fabrics of low tensile strength by tying them end-to-end and running them through the dyebath in a continuous process.

Cross Dyeing: A method of dyeing blend or combination fabrics to two or more shades by the use of dyes with different affinities for the different fibers.

High-Temperature Dyeing: A dyeing operation in which the aqueous dyebaths are maintained at temperatures greater than 100°C by use of pressurized equipment. Used for many manufactured fibers.

Ingrain: Term used to describe yarn or stock that is dyed in two or more shades prior to knitting or weaving to create blended color effects in fabrics.

Jet Dyeing: High temperature piece dyeing in which the dye liquor is circulated via a Venturi jet thus providing the driving force to move the loop of fabric.

Mass-Colored: A term to describe a manufactured fiber (yarn, staple, or tow) that has been colored by the introduction of pigments or insoluble dyes into the polymer melt or spinning solution prior to extrusion. Usually, the colors are fast to most destructive agents.

Muff Dyeing: A form of yarn dyeing in which the cone has been removed.

Pad Dyeing: A form of dyeing whereby a dye solution is applied by means of a paddler or mangle.

Piece Dyeing: The dyeing of fabrics “in the piece,” i.e., in fabric form after weaving or knitting as opposed to dyeing in the form of yarn or stock.

Pressure Dyeing: Dyeing by means of forced circulation of dye through packages of fiber, yarn, or fabric under superatmospheric pressure.

Reserve Dyeing: 1. A method of dyeing in which one component of a blend or combination fabric is left undyed. The objective is accomplished by the use of dyes that have affinity for the fiber to be colored but not for the fiber to be reserved. 2. A method of treating yarn or fabric so that in the subsequent dyeing operation the treated portion will not be dyed.

Short-Liquor Dyeing: A term used to describe any yarn or piece dyeing in which the liquor ration has been significantly reduced. The technique was designed to save water and energy.
**Skein Dyeing:** The dyeing of yarn in the form of skeins, or hanks.

**Solvent Dyeing:** A dyeing method based on solubility of a dye in some liquid other than water, although water may be present in the dyebath.

**Space Dyeing:** A yarn-dyeing process in which each strand is dyed with more than one color at irregular intervals. Space dyeing produces an effect of unorganized design in subsequent fabric form. The two primary methods are knit-de-knit and warp printing.

**Thermal Fixation:** A process for dyeing polyester whereby the color is diffused into the fiber by means of dry heat.

**Union Dyeing:** A method of dyeing a fabric containing two or more fibers or yarns to the same shade so as to achieve the appearance of a solid colored fabric.

**Yarn Dyeing:** The dyeing of yarn before the fabric is woven or knit. Yarn can be dyed in the form of skeins, muff, packages, cheeses, cakes, chain-wraps, and beams.

**Dyeing Auxillaries:** Various substances that can be added to the dyebath to aid dyeing. They may necessary to transfer the dye from the bath to the fiber or they may provide improvements in leveling, penetration, etc. Also call dyeing assistants.

**Dye Range:** A broad term referring to the collection of dye and chemical baths, drying equipment, etc., in a continuous-dyeing line.

**Dyes:** Substances that add color to textiles. They are incorporated into the fiber by chemical reaction, absorption, or dispersion. Dyes differ in their resistance to sunlight, perspiration, washing, gas, alkalies, and other agents; their affinity for different fibers; their reaction to cleaning agents and methods; and their solubility and method of application. Various classes and types are listed below.

**Acid Dyes:** A class of dyes used on wool, other animal fibers, and some manufactured fibers. Acid dyes are seldom used on cotton or linen since this process requires a mordant. Acid dyes are widely used on nylon when high washfastness is required. In some cases, even higher washfastness can be obtained by aftertreatment with fixatives.

**Aniline Dyes:** Dyes derived chemically from aniline or other coal tar derivatives.

**Anthraquinone Dyes:** Dyes that have anthraquinone as their base and the carbonyl group (\(>\text{C}=\text{O}\)) as the chromophore. Anthraquinone-based dyes are found in most of the synthetic dye classes.

**Azo Dyes:** Dyes characterized by the presence of an azo group (\(-\text{N}=\text{N}-\)) as the chromophore. Azo dyes are found in many of the synthetic dye classes.

**Basic Dyes:** A class of positive-ion-carrying dyes known for their brilliant hues. Basic dyes are composed of large-molecule, water-soluble salts that have a direct affinity for wool and silk and can be applied to cotton with a mordant. The fastness of basic dyes on these fibers is very poor. Basic dyes are also used on basic-dyeable acrylics, modacrylics, nylons, and polyesters, on which they exhibit reasonably good fastness.

**Developed Dyes:** Dyes that are formed by the use of a developer. The substrate is first dyed in a neutral solution with a dye base, usually colorless. The dye is then diazotized with sodium nitrate and an acid and afterwards treated with a solution of B-naphthol, or a similar substance, which is the developer. Direct dyes are developed to produce a different shade or to improve washfastness or lightfastness.

**Direct Dyes:** A class of dyestuffs that are applied directly to the substrate in a neutral or alkaline bath. They produce full shades on cotton and linen without mordanting and can also be applied to rayon, silk, and wool. Direct dyes give bright shades but exhibit poor washfastness. Various aftertreatments are used to improve the washfastness of direct dyes, and such dyes are referred to as “aftertreated direct colors.”

**Disperse Dyes:** A class of slightly water-soluble dyes originally introduced for dyeing acetate and usually applied from fine aqueous suspensions. Disperse dyes are widely used for dyeing most of the manufactured fibers.

**Fiber-Reactive Dyes:** A type of water-soluble anionic dye having affinity for cellulose fibers. In the presence of alkali, they react with hydroxyl groups in the cellulose and thus are liked with the fiber. Fiber-reactive dyes are relatively new dyes and are used extensively on celluloses when bright shades are desired.

**Gel Dyeing:** Passing a wet-spun fiber that is in the gel state (not yet at full crystallinity or orientation) through a dyebath containing dye with affinity for the fiber. This process provides good accessibility of the dye sites.
**Macromolecular Dyes:** A group of inherently colored polymers. They are useful both as polymers and as dyes with high color yield. The chromophores fit the recognized CI classes, i.e., azo, anthraquinone, etc., although not all CI classes are represented. Used for mass dyeing, hair dyes, writing inks, etc.

**Metallized Dyes:** A class of dyes that have metals in their molecular structure. They are applied from an acid bath.

**Naphthol Dyes:** A type of azo compound formed on the fiber by first treating the fiber with a phenolic compound. The fiber is then immersed in a second solution containing a diazonium salt that reacts with the phenolic compound to produce a colored azo compound. Since the phenolic compound is dissolved in caustic solution, these dyes are mainly used for cellulose fiber, although other fibers can be dyed by modifying the process.

**Premetallized Dyes:** Acid dyes that are treated with coordinating metals such as chromium. This type of dye has much better wetfastness than regular acid dye. Premetallized dyes are used on nylon, silk, and wool.

**Sulfur Dyes:** A class of water-insoluble dyes that are applied in a soluble, reduced form from a sodium sulfide solution and are then reoxidized to the insoluble form on the fiber. Sulfur dyes are mainly used on cotton for economical dark shades of moderate to good fastness to washing and light. They generally give very poor fastness to chlorine.

**Vat Dyes:** A class of water-insoluble dyes which are applied to the fiber in a reduced, soluble form (leuco compound) and then reoxidized to the original insoluble form. Vat dyes are among the most resistant dyes to both washing and sunlight. They are widely used on cotton, linen rayon, and other cellulosic fibers.

**Dye Sites:** Functional groups within a fiber that provide sites for chemical bonding with the dye molecule. Dye sites may be either in the polymer chain or in chemical additives included in the fiber.

**Dynamic Adhesion:** The ability of a cord-to-rubber bond to resist degradation resulting from flexure.

**Dynapoint Process:** A continuous computer-controlled process for manufacturing tufted carpets with intricate patterns from undyed yarn. The carpet is dyed as it is tufted and the colors and pattern are clearly visible through the primary backing of the carpet.
EASE-OF-CARE: A term used to characterize fabrics that, after laundering, can be restored to their original appearance with a minimum of ironing or other treatment. An ease-of-care fabric generally wrinkles only slightly upon laundering.

EDGE ROLL: The curl that develops on the edge of a single-knit fabric preventing it from lying flat.

ELASTICITY: The ability of a strained material to recover its original size and shape immediately after removal of the stress that causes deformation.

ELASTICIZED FABRIC: A fabric that contains elastic threads. Such fabrics are used for girdles, garters, and similar items.

ELASTIC LIMIT: In strength and stretch testing, the load below which the specimen shows elasticity and above which it shows permanent deformation.

ELASTIC RECOVERY: The degree to which fibers, yarn, or cord returns to its original size and shape after deformation from stress.

ELASTOMERS: Synthetic polymers having properties of natural rubber such as high stretchability and recovery.

ELECTRICAL CONDUCTIVITY: 1. A measure of the ease of transporting electric charge from one point to another in an electric field. 2. The reciprocal of resistivity.

ELECTRICAL FINISH: A finish designed to increase or maintain electrical resistivity of a textile material.

ELECTRICAL RESISTIVITY: The resistance of longitudinal electrical flow through a uniform rod of unit length and unit cross-sectional area.

ELMENDORF TEAR TESTER: A tester designed to determine the tearing strength of paper. It is also used to measure the tearing strength of very lightweight fabrics and resin-finished apparel fabrics. A trapezoidal fabric sample is employed.

ELONGATION: The deformation in the direction of load caused by a tensile force. Elongation is measured in units of length (e.g., millimeters, inches) or calculated as a percentage of the original specimen length. Elongation may be measured at any specified load or at the breaking load.

ELONGATION AT BREAK: The increase in length when the last component of the specimen breaks.

EMBOSSING: A calendering process for producing raised or projected figures or designs in relief on fabric surfaces. Embossed surfaces are usually produced on fabrics by engraved, heated rollers that give a raised effect. Embossed velvet or plush is made by shearing the pile to different levels or by pressing part of the pile flat.

EMBROIDERY: Ornamental designs worked on a fabric with threads. Embroidery may be done either by hand or by machine.

EMULSION: A suspension of finely divided liquid droplets in a second liquid, i.e., oil in water or vice versa.

EMULSION POLYMERIZATION: A three-phase reaction system consisting of monomer, an aqueous phase containing the initiator, and colloidal particles of polymer. Polymerization takes place in the colloidal phase. The process enables the production of very high molecular weights at increased polymerization rates. Only applicable to addition polymers.

EMULSION SPINNING: The process of spinning synthetic polymers in dispersion form, then heating to coalesce the dispersed particles. Normally a matrix polymer provides support until coalescence is completed.

END: 1. An individual warp yarn. A warp is composed of a number of ends. 2. An individual sliver, slubbing, roving, yarn, thread, or cord. 3. A short length or remnant of fabric.

END OUT: A void caused by a missing warp yarn.

ENERGY ABSORPTION: The energy required to break or elongate a fiber to a certain point.
ENERGY-TO-BREAK: The total energy required to rupture a yarn or cord.

ENTANGLING: 1. A method of forming a fabric by wrapping and knotting fibers in a web about each other, by mechanical means, or by the use of jets of pressurized water, so as to bond the fibers.

ENTERING: The process of threading each warp yarn on a loom beam through a separate drop wire, heddle, and reed space in preparation for weaving. This process may be done by hand or by a semiautomatic machine.

EPITROPIC FIBERS: Fibers with an altered surface property, e.g., electrically conducting, abrasive, etc.

EPOXY RESIN: In textiles, a compound used in durable-press applications for white fabrics. It provides chlorine resistance but causes loss of tensile strength.

ESTERIFICATION: The chemical process of combining an acid and an alcohol to form an ester. Cellulose acetate is an ester formed by the reaction of acetic acid and the hydroxyl groups of cellulose. Polyethylene terephthalate, the most common fiber-forming polyester, is a product of esterification of terephthalic acid with ethylene glycol.

ETHYLENE: A petroleum derivative (C₂H₄) that is the raw material for polyethylene.

ETHYLENE GLYCOL: A viscous, sweet, colorless liquid, (CH₂OHCH₂OH). Principal uses are as an intermediate in the manufacture of polyester fibers and as automobile antifreeze.

EVENNESS TESTING: Determination of the variation in weight per unit length and thickness of yarns or fibers aggregates such as roving, sliver, or top.

EXCESSIVE CLEARER WASTE: A higher than normal amount of short and regular fibers that become attached to the drafting rolls and are transferred to the clearer brushes to accumulate in abnormal amounts until they are removed manually.

EXHAUSTION: During wet processing, the ratio at any time between the amount of dye or substance taken up by the substrate and the amount originally available.

EXTENDED LENGTH: The length of a face pile yarn required to produce one inch of tufted Carpet.

EXTRACTABLES: The material that can be removed from textiles by means of a solvent (in many cases, water).

EXTRACTION: Removal of one substance from another, often accomplished by means of a solvent.

EXTRUDER: 1. Generally a machine in which molten or semisoft materials are forced under pressure through a die to form continuous tubes, sheets, or fibers. It may consist of a barrel, heating elements, a screw, ram or plunger, and a die through which the material is pushed to give it shape. 2. In fiber manufacture the machine that feeds molten polymer to an extrusion manifold or that first melts the polymer in a uniform manner then feeds it to a manifold and associated equipment for extrusion.

EYELET: 1. A series of small holes made to receive a string or tape. A buttonhole stitch is worked around the holes. 2. A type of yarn guide used on a creel. 3. A fabric style with areas of cut-outs surrounded by stitching.
FABRIC: A planar textile structure produced by interlacing yarns, fibers, or filaments.

FABRIC CONSTRUCTION: The details of structure of fabric. Includes such information as style, width, type of knit of weave, threads per inch in warp and fill, and weight of goods.

FABRIC CRIMP: The angulation induced between a yarn and woven fabric via the weaving or braiding process.

FABRIC CRIMP ANGLE: The maximum acute angle of a single weaving yarn’s direction measured from a plane parallel to the surface of the fabric.

FABRIC SETT: The number of warp threads per inch, or other convenient unit.

FABRIC STABILIZER: Resin or latex treatment for scrims used in coated fabric manufacture to stabilize the scrim for further processing.

FACE: The correct or better-looking side of a fabric.

FACING: A lining or trim that protects the edges of a garment especially at collars, cuffs, and front closings.

FACONNÉ: A broad term for fabrics with a fancy-type weave made on a Jacquard or dobby loom.

FADE-O-METER®: Laboratory device used to determine the fastness of a colored fabric to exposure to light. The test pieces are rotated around a light source simulating the sun’s rays at 45° N latitude in July between the hours of 9 a.m. and 3 p.m. Fabrics are rated by visual comparison with a gray scale according to degree of fading.

FAILLE: A soft, slightly glossy woven fabric made of silk, rayon, cotton, wool, or manufactured fibers or combinations of these fibers and having a light, flat crossgrain rib or cord made by using heavier yarns in the filling than in the warp.

FACCIATED YARN: Yarns consisting of a core of discontinuous fibers with little or no twist and surface fibers wrapped around the core bundle.

FASHIONING: The process of shaping a fabric during knitting by increasing or decreasing the number of needles in action. Fashioning is used in manufacturing hosiery, underwear, and sweaters.

FATIGUE: Refers to the resistance of a material to weakening or failure during alternate tension-compression cycles, i.e., in stretch yarns, the loss of ability to recover after having been stretched.

FELL: 1. The end of a piece of fabric that is woven last. 2. In weaving, the last filling pick laid in the fabric at any time.

FELT: 1. A nonwoven sheet of matted material of wool, hair, or fur, sometimes in combination with certain manufactured fibers, made by a combination of mechanical and chemical action, pressure, moisture, and heat. 2. A woven fabric generally made from wool, but occasionally from cotton or certain manufactured fibers, that is heavily shrunk and fulled, making it almost impossible to distinguish the weave.

FELTING: 1. The process of exposing wool fibers alone or in combination with other fibers to mechanical and chemical action, pressure, moisture, and heat so that they tangle, shrink, and mat to form a compact material. Felting is generally carried out in a fulling mill.

FESTOON DRYER: A dryer in which cloth is suspended in loops over a series of supporting horizontal poles and carried through the heated chamber in this configuration.

FIBER: A unit of matter, either natural or manufactured, that forms the basic element of fabrics and other textile structures. A fiber is characterized by having a length at least 100 times its diameter or width. The term refers to units that can be spun into a yarn or made into a fabric by various methods including weaving, knitting, braiding, felting, and twisting. The essential requirements for fibers to be spun into yarn include a length of at least 5 millimeters, flexibility, cohesiveness, and sufficient strength. Other important properties include elasticity, fineness, uniformity, durability, and luster.
FIBER ARCHITECTURE: The spatial arrangement of fibers in the preform. Each architecture has a definite repeating unit.

FIBER DISTRIBUTION: In a web, the orientation (random or parallel) of fibers and the uniformity of their arrangement.

FIBERFILL: Manufactured fibers that have been specially engineered for use as filling material for pillows, mattress pads, comforters, sleeping bags, quilted outerwear, etc. Polyester fibers are widely used.

FIBER NUMBER: The linear density of a fiber expressed in units such as denier.

FIBER PLACEMENT: In general, refers to how the piles are laid into their orientation, i.e., by hand, by a textile process, by a tape layer, or by a filament winder. Tolerances and angles are specified. Microprocessor-controlled placement that gives precise control of each axis of motion permits more intricate winding patterns than are possible with conventional winding and is used to make composites that are more complex that usual filament-wound structures.

FIBRETS: Very short (1mm), fine (diameter 50) fibrillated fibers that are highly branched and irregular resulting in very high surface area. Fibrets can be produced from a number of substances including acetate, polyester, nylon, and polyolefins. By selection of polymer type and incorporation of additives, they can be engineered to meet a range of specialized requirements.

FIBRIDS: Short, irregular fibrous products, made by mixing a dilute polymer solution with a nonsolvent with agitation. They can also be made by flash spinning and breaking up the resulting filaments. Used in felts, in papermaking, for filtration product, etc.

FIBRIL: A tiny threadlike element of a synthetic or natural fiber.

FIBRILLATION: The act or process of forming fibrils. The act of breaking up a fiber, plastic sheet, or similar material into the minute fibrous elements from which the main structure is formed.

FILAMENT: A fiber of an indefinite or extreme length such as found naturally in silk. Manufactured fibers are extruded into filaments that are converted into filament yarn, staple, or tow.

FILAMENT COUNT: The number of individual filaments that make up a thread or yarn.

FILAMENT NUMBER: The linear density of a filament expressed in units such as denier or tex.

FILAMENT WINDING: In the fabrication of composites, the process of placing reinforcing fibers over a rotating form, (mandrel) to make the product shape. Prepreg fibers or dry fibers that are treated in a resin bath immediately prior to winding may be used. The wound form can be cured or consolidated after the fiber winding is complete to product specifications.

FILAMENT YARN: A yarn composed of continuous filaments assembled with or without twist.

FILLER: A nonfibrous material added to a fabric to increase its weight or to modify its appearance or hand. Also referred to as back-sizing. Examples of fillers are insoluble clays or gypsum, starches, and gums.

FILLET: A long, narrow strip of wire card clothing with which the doffer and cylinder of the card are spirally wrapped.

FILLING: In a woven fabric, the yarn running from selvage to selvage at right angles to the warp. Each crosswise length is called a pick. In the weaving process, the filling yarn is carried by the shuttle or other type of yarn carrier.

FILTER AID: A powder added to a solution to be filtered that forms a porous bed to improve filtration.

FILTER CLOTH: Any cloth used for filtering purpose. Nylon, polyester, vinyon, PBI, and glass fibers are often used in such fabrics because they are not affected by most chemicals.

FINDINGS: 1. Miscellaneous items attached to garments and shoes during manufacture. Included are buttons, hooks, snaps, and ornaments. 2. Miscellaneous fabrics in garments such as zipper tapes, linings, pockets, waistbands, and facings.

FINE END: 1. A warp yarn of smaller diameter than that normally used in the fabric. 2. A term for a defect in silk warp yarn consisting of thin places that occur when all the filaments required to make up the full ply are not present. This condition is generally caused by poor reeling.
FINENESS: 1. A relative measure of fiber size expressed in denier or tex for manufactured fibers. For cotton, fineness is expressed as the mean fiber weight in micrograms per inch. For wool, fineness is the mean fiber width or mean fiber diameter expressed in microns (to the nearest 0.001-millimeter). 2. For yarn fineness 3. For fineness of knit fabrics.

FINES: Particles or dust of polymer formed during the process of cutting to produce chip.

FINE STRUCTURE: Orientation, crystallinity, and molecular morphology of polymers, including fiber-forming polymers.

FINGER MARK: A defect of woven fabrics that is seen as an irregular spot showing variation in picks per inch for a limited width. Causes are spreading of warp ends while the loom is in motion and pressure on the fabric between the reed and take-up drum.

FINISH: 1. A substance or mixture of substances added to textile materials to impart desired properties. 2. A process, physical or chemical, performed on textile materials to produce a desired effect. 3. A property, such as smoothness, drape, luster, water repellency, flame retardancy, or crease resistance that is produced by 1 and/or 2 above. 4. The state of a textile material as it leaves a process.

FINISH COMPOSITION (YARD): Physical and chemical analysis of the lubricant applied to yarns to reduce friction and improve processibility.

FINISHED FABRIC: Fabric that is ready for the market, having passed through the necessary finishing processes.

FINISHING: All the processes through which fabric is passed after bleaching, dyeing, or printing in preparation for the market or use. Finishing includes such operations as heat-setting, napping, embossing, pressing, calendering, and the application of chemicals that change the character of the fabric. The term finishing is also sometimes used to refer collectively to all processing operations above, including bleaching, dyeing, printing, etc.

FINISHING BAR: A noticeable streak across the entire width of a fabric, usually caused by machine stoppage during processing.

FINISHING SPOT: A discolored area on a fabric caused by foreign material such as dirt, grease, or rust.

FINISH TURNS: The actual degree of twist in the final yarn product.

FIRE-BLOCKING LAYER: A fabric layer composed of fibers with flame-retardant properties used in aircraft seat cushions and other upholstery constructions to decrease the overall flammability of the total construction by preventing access of flame to the body of the construction.

FIRST-ORDER TRANSITION TEMPERATURE: The temperature at which a polymer freezes or melts.

FISSURE: A very minute crack or opening in a material that frequently leads to the breaking or rupture of the material.

FIXATION: The process of setting a dye after dyeing of printing, usually by steaming or other heat treatment.

FLAKE: As used by Celanese, a term that refers to the granular form in which cellulose acetate and triacetate polymers exist prior to dissolving or feeding into the extrusion or molding unit.

FLAKE YARN: Yarn in which roving or short, soft staple fibers are inserted at intervals between long filament binder yarns.

FLAKY WEB: A web at the card that shows thick and thin places, approximately 1 to 6 square inches in size. This indicates that, instead of a free flow of fibers through the card, either an uneven amount has been fed into the card, or groups of fibers have hesitated in the card and then dropped back into production.

FLAME RESISTANT: A term used to describe a material that burns slowly or is self extinguishing after removal of an external source of ignition. A fabric or yarn can be flame resistance because of the innate properties of the fiber, the twist level of the yarn, the fabric construction, or the presence of flame retardants, or because of a combination of these factors.

FLAME RETARDANT: A chemical compound that can be incorporated into a textile fiber during manufacture or applied to a fiber, fabric, or other textile item during processing or use to reduce its flammability.
FLATSPOTTING: A characteristic of certain tire cords. It occurs with all materials but is more noticeable with nylon cord and is associated with nylon cord by users. Nylon exerts a shrinkage force as it becomes heated in tire operation. When the tire is stopped under load, the cord in the road-contact portion of the tire is under less tension than that in other portions of the tire, and it shrinks to conform to the flat surface of the road. When cooled in this position, the cord maintains the flat spot until it again reaches its glass transition temperature in use.

FLAX: The plant from which the cellulosic fiber linen is obtained.

FLEECE FABRIC: A fabric with a thick, heavy surface resembling sheep’s wool. It may be a pile or napped fabric of either woven or knit construction.

FLEXIBILITY: 1. The ability to be flexed or bowed repeatedly without rupturing. 2. A term relating to the hand of fabric, referring to ease of bending and ranging from pliable (high) to stiff (low).

FLEXURAL FATIGUE: A physical property expressed by the number of times a material can be bent on itself through a prescribed angle before it ruptures or loses its ability to recover.

FLEXURAL RIGIDITY: This measure of a material’s resistance to bending is calculated by multiplying the material’s weight per unit area by the cube of its bending length.

FLOAT: 1. The portion of a warp or filling yarn that extends over two or more adjacent filling picks or warp ends in weaving for the purpose of forming certain designs. 2. In a knit fabric, a portion of yarn that extends for some length without being knitted in. 3. A fabric defect consisting of an end lying or floating on the cloth surface instead of being woven in properly. Floats are usually caused by slubs, knot-tails, knots, or fly waste, or sometimes by ends being drawn in heddle eyes incorrectly or being twisted around heddle wires.

FLOC CULATING: Coagulating or coalescing a material into a small, loosely aggregated mass.

FLOCK: The material obtained by reducing textile fibers to fragments by cutting or grinding. There are two main types: precision cut flock, where all fiber lengths are approximately equal, and random cut flock, where the fibers are ground or chopped to produce a broad range of lengths.

FLOCKING: A method of cloth ornamentation in which adhesive is printed or coated on a fabric, and finely chopped fibers are applied all over by means of dusting, air-blasting, or electrostatic attraction. In flock printing, the fibers adhere only to the printed areas and are removed from the unprinted areas by mechanical action.

FLUFFING: A term describing the appearance of a carpet after loose fiber fragments left during manufacture have worked their way to the surface. Fluffing is not a defect; it is simply a characteristic of new carpets that disappears with vacuuming.

FLUORESCENCE: Emission of electromagnetic radiation, usually as visible light, that is caused by the flow of energy into the emitting body. The emission ceases abruptly when the excitation ceases.

FLY: The short, waste fibers that are released into the air in textile processing operations such as picking, carding, spinning, and weaving.

FLYER: 1. A device used to insert twist into slubbing, roving, or yarn, and to serve as a guide for winding it onto a bobbin. The flyer is shaped like an inverted U that fits on the top of the spindle and revolves with it. One arm of the U is solid and the other is hollow. The yarn enters through the top of the hollow arm, travels downward, and emerges at the bottom where it is wound around a presser finger onto the take-up package.

FLYER SPINNING: A method of spinning by means of a driven flyer. It is used primarily for spinning worsted and coarser yarns.

FLYER WASTE: During the roving operation, flyer waste refers to fibers that free themselves by centrifugal force from the regular bulk of roving and accumulate on the flyer and adjacent machinery.

FOAM: Dispersion of gas in a liquid or solid. The gas bubbles may be any size. The term covers a wide range of useful products such as insulating foam, cushions, etc. It also describes the undesirable froth in polymer melts, dyebaths, etc.

FOLDED SELVAGE: A curled selvage.

FOREIGN WASTE: Thread waste or lint that is twisted in the yarn or woven in the fabric. If such foreign matter is of a different fiber, it may dye differently and thus show plainly.