

Filtration Glossary of Terms

Glossary

ABRASION: Migration of foreign material which enters the fluid stream from system components that wear from close tolerances, vibration, or shock.

ABRASIVE: Any solid material, such as grit, with erosive properties.

ABRASIVES: Hard structurally strong solid.

ABSORB: To take up by cohesive, chemical or molecular action.

ABSOLUTE EFFICIENCY RATING: (ANSI B93.2) - An indication in microns of the largest particle that will pass through a filter element under controlled test conditions where the average filtration (BETA) ratio = 75.0 (98.7% efficiency).

ABSORBENT: A filter medium that holds contaminants by mechanical means. When one substance soaks completely through another, sometimes undergoing a chemical change.

ACFM: Actual Cubic Feet Per Minute. Measured at operating temperature and pressure.

ACIDITY: The quality, state, or degree of being acid. In lubricating oils, acidity denotes the presence of acid-type constituents whose concentration is usually defined in terms of a neutralization number. The constituents vary in nature and mayor may not markedly influence the behavior of the fluid.

ACTIVATED ALUMINA: A highly porous and granular form of aluminum oxide having preferential adsorptive capacity for moisture from gases, vapors, and some liquids. May be regenerated for extended use under specified conditions.

ACTIVATED CARBON: Any form of carbon characterized by high adsorptive capacity for gases, vapors, or colloidal solids. The carbon or charcoal is produced by destructive distillation of wood, peat, lignite, nut shells, bones, vegetable or other carbonaceous matter, but must be activated by high temperature steam or carbon dioxide which creates a porous particle structure.

ACTIVATED CHARCOAL: See activated carbon.

ADHESIVE: A substance placed in the fibers of the media to aid in trapping and holding of fine dust particles.

ADDITIVE: A material, usually chemical, added to a product to impart new or unusual characteristics or to improve existing characteristics.

ADSORB: To take up by adhesion of molecules of gases or dissolved substances to the surface of solid bodies, resulting in high concentration of the gas or solution at place of contact. Gas or solution is condensed on the surface of the adsorbent, while in adsorption; the material absorbed penetrates throughout the mass of adsorbent.

ADSORBATE: The material which is adsorbed; i.e., the gas, vapor, or liquid which adheres or is chemically attracted to the surface of the solid.

ADSORBENT: A material which adsorbs; i.e., the solid which attracts and holds on its surface the gas, vapor, or liquid. Also materials added to liquors to decolorize or purify by adsorbing the color or impurity. Fuller's earth, activated carbon, activate alumina, etc. are all adsorbents.

ADSORBENT: A filter medium primarily intended to hold soluble and insoluble contaminants on its surface by molecular adhesion - no chemical change.

ADSORPTION: The natural phenomenon of a gas, vapor, or liquid being attracted to and held on the surface of a solid. To some extent adsorption takes place on any solid surface, but certain materials have sufficient adsorbent capacity because of the finely divided material to make them useful in such industrial applications as the purification and separation of gases and liquids.

AGGLOMERATE: A group of two or more particles combined, joined, or clustered, by any means.

AGGREGATE: A relatively stable assembly of dry particles formed under the influence of physical forces.

AMBIENT: Surrounding. For example, ambient operating temperatures of a vessel is temperature essentially the same as that surrounding the vessel.

APPROACH VELOCITY: The actual velocity of the air as it passes through the filtration bank area. Approach velocity can be determined by dividing the cfm of a system by the area of the filter bank opening. A 20,000 cfm/fpm with a filter bank opening-10ft high by 10ft wide an area of 100 sq ft would have an approach velocity of 200 fpm.

ARRESTANCE: Capacity of a filter to stop and retain dust and dirt. Measured in percentage of efficiency.

ASME: American Society of Mechanical Engineers.

ASPHALTINE: Product of partial oxidation of oil.

ATMOSPHERIC PRESSURE: The force exerted on a unit area by the weight of the atmosphere.

ATOM: Smallest particle of an element which retains properties of the element. Example: Carbon atom (C).

ATTAPULGITE: A vein of mineral clay mined primarily in Georgia and Florida; the active ingredient in most fuller's earth. Activated by specific thermal treatment and ground to fine particle size.

AUTOCLAVE: Sterilizing apparatus which uses steam at high pressure.

BACK PRESSURE: In filter use, resistance offered by filter, usually measured in PSI.

BACKWASH: To clean a filter element by reversing the direction of flow through it.

BATCH: The quantity of material prepared or required for one operation. Example, a batch may be exemplified as a discontinuous process, such as batch process of paint, soap, etc.

BASKET STRAINER: Vessel for the removal of coarse bulk solids from liquid, air, or gas; element is a basket covered with a screen of a given mesh.

BED (CAKE): Mass of impurities which form on a filter element.

BETA RATIO: An accurate indication of how the filter performs throughout the life of the filter. The Beta Ratio is an average filtration rating.

BLEEDER: A system in which part of the fluid from the main flow is diverted.

BLOTTER TEST: A visible means of checking oil clarity; one drop on a blotter will concentrate dirt or foreign matter in the center of the ring.

BLOWBACK: To reverse flow air, stream, or fluid through the media to effect solids removal. Sometimes referred to as backwash.

BREAKTHROUGH: Used to describe the passing of solids through the cake built up on a filter media. Also referred to as the breakpoint.

BRIDGING: A condition of filter element loading in which contaminant spans the space between adjacent sections of a filter element thus blocking a portion of the useful filtration area.

BUBBLE TEST: Measurement of the largest opening in an element by determining the minimum pressure required to force air or gas through the element while submerged in alcohol or other liquid. Used as a quality control bench mark to determine if a surface type separator or filter cartridge meets the same value as the prototype cartridge.

BUBBLE POINT TEST: (ISO 2942) - This test is a nondestructive test that uses differential gas pressure to measure the maximum pore size of filter media.

BUNA N: Gasket material. A synthetic rubber frequently used for vessel closures, flanges, and filter elements.

BURST: An outward structural failure of the filter element caused by excessive differential pressure.

BY-PASS: Condition resulting from the product flowing through a vessel other than through the media. Also a filtering system which filters only part of the stream on a continuous basis.

BY-PASS INSTALLATION: A system where part of the main flow is diverted to pass through a filter.

BY-PASS VALVE: Valve to pass the flow around the media or the vessel, usually activated at a given differential pressure setting.

CAKE: Solids deposited on the filter medium during filtration in sufficient thickness to be removed in sheets of sizable pieces. In many cases, cake may provide its own filter media by adding to the surface of media. Also referred to as discharged solids or residue.

CALENDERED WIRE CLOTH: Wire cloth that has been passed through a pair of heavy rollers to reduce the thickness of the cloth or to flatten the intersections of the wires and provide a smooth surface. The term "rolled" is often used.

CANISTER: Container or mounting mechanism for elements.

CAPACITY: Volume of product which a vessel will accommodate. This is expressed in gallons or similar units. Also amount which will filter at a given efficiency and flow rate, expressed in gallons per minute or similar units.

CARTRIDGE: Medium used in a vessel to perform the function of coalescing, filtering, or separating. Also referred to as element, media, repack, etc. made in a specified physical shape to be mounted by use of hardware designed for that purpose.

CARTRIDGE: The porous device, usually fitting in a filter housing, which performs the actual process of filtration.

CENTER CORE: Material formed into a tube or cylinder for structural purposes to permit a cartridge to retain its original physical form. May also be the basic media, formed with sufficient strength so as to service the purpose of a center tube. Example: a tube of glass fibers may be formed and cured to such a degree that a center core is not required. Sometimes referred to as a center tube.

CENTER PIPE: Component of a vessel which is used as a mount for cartridges. Made with perforated effect to accommodate flow. A center rod is used for the same purpose but is not perforated and does not accommodate flow.

CENTER-ROD: Components of a vessel used for mounting cartridges in the vessel. Usually made of a round bar material. A center pipe can also be used for the same purpose, but is made with perforated effect and directs flow through the cartridge.

CENTER SEAL: Part which forms seal between two elements when one element is on the top of another element. Can also be called an adaptor.

CENTER TUBE: Component of an element or cartridge which supports the media at the center or smallest diameter.

CENTIPOISE: One one-hundredth of a poise. A poise is the unit of viscosity expressed as one dyne per second per square centimeter.

CENTISTOKE: One one-hundredth of a stoke. A stoke is equal to the viscosity in poises times the density of the fluid in grams per cubic centimeter.

CENTRIFUGAL LOADING: The process by which contaminants tend to collect at the back of a cube, bag, or "V" type filter rather than evenly throughout the media. As air flows into an extended area filter, it must bend or change direction to go through the sides of the filter. Because of their inertia, many heavy particles resist change in direction and tend to continue on in their original paths to the back of the filter.

This phenomenon causes the filter resistance to rise less sharply than would be expected on the basis of extended area alone.

CHANNEL: To cut grooves or lines in or through the solids deposited on the media, or through the media itself. Also may be described as a break-through in the media which would result in a by-pass.

CLARIFICATION: Filtration of liquids containing small quantities of suspended solids; filtration takes out most of these solids and increases the clarity of the liquids.

CLASSIFICATION: A condition in which the larger particles settle out below the finer ones. Also referred to as stratification. May also be referred to as the action to sort out particles by various size groups or to some other established criteria.

CLEANER BLADES: Stationary blades located between stacked discs of a metallic self cleaning filter cartridge to comb out dirt particles as the cartridge is rotated.

CLEAN PRESSURE DROP: The differential pressure (drop) across a vessel, measured in pounds per square inch at rated flow on new elements with clean product.

CLOUD POINT: Temperature of a petroleum oil at which paraffin, wax or other solid substances begin to crystallize out or separate from solution when the oil is chilled under definite prescribed conditions.

COAGULANT: That which produces agglomeration of suspended solids.

COALESCER: A mechanical device which unites discrete droplets of one phase prior to being separated from a second phase. Can be accomplished only when both phases are immiscible. Requires a tight media which is preferentially wettable and, by its nature of being tight, the media is also a good filtering material. Good coalescing permits gravity separation of the discontinuous phase. Coalescing may be accomplished by only a coalescer cartridge when the specific gravities of the two phases are widely separated. As the gravities difference become less, the two stage principle is generally required where finely coalesced discontinuous droplets are repelled by the second stage separator cartridge.

COALESCING: The action of uniting of small droplets of one liquid preparatory to its being separated from another liquid.

COLLAPSE PRESSURE: The pressure impressed across a filter element (cartridge), sufficient to cause collapse of the element.

COMBINATION: A filter medium composed of two or more types, grade or arrangements of filter media to provide proportion which are not available in a single filter medium.

CONTAMINANT: Anything in the fluid that should not be there.

CONTAMINATE: The foreign matter in a fluid which is accumulated from various sources such as system dirt, residue from wear of moving parts, atmospheric solids which settle in an open system. Contaminates tend to discolor a liquid, cause additional wear on moving parts, cause system upsets in process stream, or reduce the efficiency of a fluid. Water as well as solid may be considered a contaminate when the presence of water causes adverse results. The presence of contaminates, whether liquid or solid, is the basis on which the use of filters or separator/filters are sought.

CORE: Material used for the center of an element, generally of the wound design. May also be called a center tube when used in the coalescer, separator, or other type filter element.

CORROSION: The conversion of metals into oxides, hydrated oxides, carbonates, or other compounds due to the action of air or water, or both. Salts and sulphur are also important sources of corrosion. Removal of solids and water reduces the effect or speed of corrosion in many cases; and in other cases, corrosion inhibitors are used to reduce the effect of corrosion.

CP: A section of less dense material in the media which allow a cold liquid to flow through the element controlling pressure drop below bypass opening.

DEGRADATION: Wearing down, or reduction in the efficiency, of a media.

DEGREE OF FILTRATION: Fineness of a filter medium size of the smallest particles filtered out.

DELTA "P": A Symbol (P) designating pressure drop. The difference in pressure between two points, generally measured at the inlet and outlet of a filter, separator/filter, etc. Normally measured in pounds per square inch gage (psi), inches of mercury (In. Hg.), or inches of water (In. H2O).

DENIER PER FILAMENT: Weight in grams of a single continuous strand of yarn, 9,000 meters long. For each material the dpf is proportional to the cross-sectional area of the filament.

DENSITY: The weight per unit volume of a substance (specific weight).

DEPTH: A filter medium which primarily retains contaminants within the tortuous passages within the depth of the element wall.

DEPTH LOADING: A characteristic of filter media. Measured as the ability of the media to retain dirt through its total depth, as opposed to surface or face loading.

DEPTH TYPE FILTRATION: Filtration accomplished by flowing a fluid through a mass filter media providing a tortuous path with many entrapments to stop the contaminates. Flow may be cross flow such as from the outside to inside and then down the center of an element, or from end to end. Certain types of solids, or combinations of solids, do not lend to surface filtration and depth type filtration is found to be more suitable.

DESICCANT: A drying agent or medium used in dehydration of air, gas or liquids. Examples: silica gel, activated alumina, molecular sieve, etc.

DETERGENT OILS: Lubricating oils possessing special sludge dispersing properties for use in internal combustion engines. These properties are incorporated in the oil by the use of special additives.

DIATOMACEOUS EARTH: A soft earthy rock composed of the siliceous skeletons of small aquatic plants called diatoms (algae). Frequently used as material for a precoat of a filter media. Capable of absorbing 1.5 to 4 times its own weight in water. Insoluble in acids except hydrofluoric and soluble in strong alkalis.

DIELECTRIC: A substance which will not conduct electricity. A nonconductor.

DIFFERENTIAL PRESSURE: The difference in pressure between two given points of a filter, separator filter, etc.

DIFFERENTIAL PRESSURE, MAXIMUM: The highest pressure differential which an element is required to withstand without structural failure or collapse, or maximum recommended for service.

DILATANT: A flow condition where certain liquids will show an increase in viscosity as the rate of shear or flow volume is increased.

DIRT HOLDING CAPACITY: The volume of contaminate an element can hold before reaching the maximum allowable pressure drop. Volume will vary depending on the size and design of the element and the density of the solid particles. Usually reported by weight such as grams or pounds per element. Also called solids retention or solids holding capacity.

DISCHARGE: Flow rate through a filter.

DISPOSABLE: Describes element which is to be discarded after use and replaced with an identical element. Same as replaceable. Opposite of reusable.

DOWNSTREAM: The air leaving at sides of a filter or such equipment or areas located after the filter system.

DROP: The quantity of fluid which falls into one spherical mass; a liquid globule. May also be described as several to many droplets.

DROPLET: A minute drop which mates to form larger drops capable of falling by gravity.

DUAL DENSITY: A depth element that is constructed of two different medias not blended into a homogeneous mixture but remaining as two different distinctive medias.

DUST HOLDING CAPACITY: Weight of dust, or contaminants, in grams, that is fed into the filter media before the resistance rises to a specified level at a specified velocity. By one rating method, dust holding capacity actually refers to the dust fed, not the dust held by the filter. By the second method, the dust fed is multiplied by the efficiency, thus giving the amount of dust held.

EDGE FILTER: Filter using shearing edges to separate solids from a liquid by shearing the oil film surrounding the particles (solid particles).

EDGE TYPE: Applies to liquid filters constructed of metal or paper discs, or specially constructed wire wound cylinders; contaminants are entrapped at the edges of the medium. Generally used to remove small quantities of very fine particles. Some have knife or blade cleaners to remove the accumulated solids.

EFFECTIVE AREA: The area of a medium that is exposed to flow and usable for its intended purpose: coalescing, filtering, or separation. Opposite of blind spots or dead area.

EFFECTIVE OPEN AREA: Area of the filtering medium through which the fluid may flow.

EFFICIENCY: Depending on the type of test used, efficiency is (1), the percentage, by weight, of the contaminant removed from the air by the filter, or (2) the percentage change in the straining properties of the contaminated air after it has passed through the filter.

EFFLUENT: Stream of fluid at the outlet of a filter or separator filter. Opposite of affluent or influent.

ELEMENT: Medium used in vessel to perform the function of coalescing, filtering, or separating. Also referred to as a cartridge, repack, etc. The porous device which performs the actual process of filtration.

ELEMENT BY-PASS VALVE: A valve within a filter to limit the differential pressure which can be impressed across the filter element.

EMULSIFICATION: A dispersion of one substance in the form of minute drops within another substance.

EMULSION: A dispersion of fine liquid particles in a liquid stream which do not necessarily dissolve in each other but are held in suspension. Many emulsions may be broken by coalescing if the liquids are immiscible. Emulsion stabilizers modify the surface tension of the droplets which makes coalescing difficult, if not impossible.

ENTRAINED WATER: Discrete water droplets carried by a continuous liquid or gas phase when water is immiscible with the liquid. May be separated from the continuous phase by coalescing and gravity separation. Usually picked up in a system by condensation or a water washing used in process.

ENTRAINMENT: Mist, fog, or droplets of a liquid which is usually considered to be a contaminate when used in the filtration industry.

EXTENDED AREA: Principal of shaping the element to give it more effective area than a simple cylinder of the same size.

FACE LOADING: The phenomenon by which contaminants in the air load up on the surface of the filter, causes an abnormal rise in resistance.

FELT: A fabric built up of the interlocking of fibers by a combination of mechanical work, chemical action, moisture, and heat. Frequently used as a filter medium, some types of which have been adapted to high temperature applications for air or gas.

FELTED ELEMENT: Constructed by random layer of fibers, usually strengthened by a resin binder.

FIBER: Flexible material with two relatively small dimensions and one long dimension.

FIBER BREAKOFF: Particles of the media fiber breaking off and entering the airstream, thereby becoming contaminant.

FILTER: A term generally applied to a device used to remove solid contaminate from a liquid or gas, or separate one liquid from another liquid or gas. A filter, as referred to in the industry today, is a device which removes contaminates. If a device is used to remove solids and liquids contaminates, it is referred to in general terms as a separator, separator/filter, or entrainment separator. A filter may be one of a number of such types as replaceable cartridge, cyclone, edge, leaf, baffle, plate and frame, precoat, and centrifuge. The term filter is sometimes erroneously used to describe the media used inside the vessel or filter case, but the correct use should be filter element, cartridge, etc.

FILTER AID: A substance of low specific gravity which remains in suspension when mixed with the liquid to be filtered. It should be porous and must be chemically inert to the liquid being filtered. Increases filtering efficiency and maintains cake porosity.

FILTER BANK: An installation consisting of a number of filters.

FILTER CLOTH: The porous material mounted on a plate or frame which separates the solids from the liquids in filtering. Also referred to as a filter medium, filter plate, or septum.

FILTERICOALESCER: Single stage vessel for coalescing and separating one immiscible fluid from another and the removal of solids. Generally recommended for use where continuous phase has light gravity. Available with various efficiencies.

FILTER EFFICIENCY: Expressed as a percent of contaminant introduced to the system, it is the ability of a filter to remove specified contaminants at a given contaminant concentration under specified test condition.

FILTER ELEMENT LIFE: Span of operation from clean unit to a predetermined pressure drop build up - usually measured in lapsed time.

FILTER LIFE: Span of operation from start to complete plugging usually measured in hours of operation.

FILTER MEDIUM: The porous material mounted on a plate or frame which separates the solids from the liquids in filtering. Also referred to as filter cloth, filter plate, or septum. The material that performs the actual process of filtration.

FILTER PLATE: The porous material mounted on a plate or frame which separates the solids from the liquids in filtering. Also referred to as filter cloth, filter medium, or septum.

FILTRATE: Filtered fluid which flows out of a filter.

FILTRATION (BETA) RATIO: (ANSI/(NFPA) (T3.10.8.8R1)The ratio of the number of particles greater than the given size in the influent fluid to the number of particles greater than the same size in the effluent fluid.

FILTRATION RATING, ABSOLUTE: The diameter of the largest hard spherical particle that will pass through a filter under specified test conditions. This is an indication of the largest opening in the filter medium.

FILTRATION RATING, MEAN: A measurement of the average size of the pores of the filter medium.

FILTRATION RATING, NOMINAL MICRON: An arbitrary micron value indicated by the manufacturer. Often defined: 95% of all particles this size, and larger, retained by the filter medium.

KARL FISCHER: Analytical method of determining amount of water present in a sample by titration.

FLOW CHARACTERISTICS: The characteristics of flow defined by flow volume, pressure drop, viscosity, and temperature.

FLOW RATE: The rate at which a product is passed through a vessel or system; generally expressed as gallons per minute, barrels per hour, barrels per day, actual or standard cubic feet per minute, hour, day, etc.

FLUID: A liquid or gas which can be filtered by passing through a filter.

FLUID RECONDITIONER: Generally a filter system to remove impurities from a liquid to a degree that the liquid may be reused for its original purpose without loss of efficiency or adverse effects. May be adapted to use on a variety of fluids, mineral or synthetic. Specific example is Mayhew Field Reconditioners marketed by Fram/Warner Lewis which are designed in either portable or stationary types for use on either batch or continuous flow conditions.

FREE WATER: Water entrained in a lubricating oil or fuel forming distinct phases with the fluid and having a tendency to separate as a result of the differences in densities.

FULLER'S EARTH: Medium used in some elements, usually a blend of attapulgite and montmorillinite clay. A timely divided hydrous aluminum silicate. See attapulgite.

FULL FLOW: Product flow through the vessel at the rate for which the vessel is designed to operate. Also refers to all products passing through a medium. The opposite of a bypass filter which is designed to filter only a portion of the stream at a higher efficiency on a continuous basis.

FULL FLOW FILTRATION: System which provides for filtering all the fluid which is pumped to or from wear surfaces or work stations each pass.

GAGE PRESSURE: All pressure greater than atmospheric pressure - as read on a pressure gage.

GAS SCRUBBER: A vessel designed to remove liquid and solid contaminants by impingement on a series of baffles or demister pads. Accomplished by drastic reduction of velocity as the gas enters the scrubber. Recent advances made in entrainment separation would expand the general use of the term to include mechanical cartridge type separators.

GEL: A semi-solid susceptible to pressure deformation. Has habit of sticking to surfaces.

GLASS FIBER: The proper reference to a fibrous material made from glass that is commonly used as a filter and separator media. Glass fibers may be used in blanket or tube form and, due to the random dispersal of the fibers, the material makes a good filter media. Glass fibers are hydrophilic (water wettable) and, as such, perform the function of coalescing immiscible liquids for separation. May be used effectively on compressed air, gas, or liquids which are acidic but only slightly caustic. Also referred to as fiberglass or Fiberglas.

GPD: Gallons per day.

GPH: Gallons per hour.

GPM: Gallons per minute.

GRADUAL DENSITY: A media of different densities. One media of a dense type packed around the center tube with a media of less density around the outside. Both medias are tapered at opposite directions. This allows high flow through the less dense media and tighter filtration through the dense media. Similar to the CP element in performance.

GRAM LIFE: Grams weight of contaminant introduced to a filter element at controlled rate to a determined differential pressure.

GRAVIMETRIC EFFICIENCY: Measure of efficiency in terms of weight.

GRAVITY SEPARATION: Separation of immiscible phases resulting from a difference in specific gravity by coalescing.

HEAD GASKET: A seal by means of a gasket at the main closure of a pressure vessel. Usually the seal used between two flanges. Generally, either a flat gasket or "O" ring.

HOLDING CAPACITY: In general usage refers to the amount of solids, particulate or foreign material one or more elements is capable of retaining up to the terminal or maximum differential pressure. Also can refer to volumetric holding capacity of either a solid or a liquid.

HOUSING: Container for a filter element (s).

HYDRAULIC FILTER, DUAL: A hydraulic filter having two filter elements in parallel.

HYDRAULIC FILTER, DUPLEX: An assembly of two hydraulic filters with valves for selection of either or both filters.

HYDRAULIC FILTER, FULL FLOW: A hydraulic filter, which under specified conditions filters all influent flow.

HYDRAULIC FILTER, TWO STAGE: A hydraulic filter having two filter elements in series.

HYDRAULICS: The study of fluids at rest or in motion.

HYDROPHILIC: Water accepting or water wetting. Having an affinity for water. Capable of uniting with or dissolving in water. Effective coalescing requires a media to have hydrophilic characteristics which cause free or entrained water to come into droplets which, when mated with other droplets, form into drops which separate by gravity. Opposite of hydrophobic.

HYDROPHOBIC: Non-water wetting. Having an antagonism for water. Not capable of uniting or mixing with water. Hydrophobic features are induced in the process of cellulose manufacture. Opposite of hydrophilic.

HYDROSTATIC TEST: A test conducted with either air, water, or other fluids at a given value over design pressure, to prove the structural integrity of a pressure vessel.

I. D.: Inside diameter.

IMMISCIBLE: Incapable of being mixed; insoluble; opposite of miscible.

IMPREGNATION: Process of treating a coarse filter medium with resins.

IMPURITY: See "contaminant" - any undesirable material in the fluid.

INDICATOR, BY-PASS: An indicator which signals alternate flow.

INDICATOR DIFFERENTIAL PRESSURE: An indicator which signals the difference in pressure at two points.

INFLUENT: Stream of fluid at the inlet of a filter or separator filter. Same as affluent. Opposite of effluent.

INITIAL PRESSURE DROP: Loss in differential pressure between two points upon the start of flow through a vessel using new elements.

IN-LINE: Describes inlet and outlet connections which are positioned at the same height on opposite sides of a vessel so that an imaginary straight line can be drawn connecting one to the other. Also describes a small filtration unit that fits into a line and forms a similar image to the line, as in the case of a hose.

INSIDE-OUT: Flow of product from inside to outside of element.

INSOLUBLE: Incapable of being dissolved in a fluid; opposite of soluble.

INTERFACE: Surface over which continuous phase and discontinuous phase are in contact.

IMPINGEMENT: The direct high velocity impact of the fluid flow upon or against an internal portion of the filter.

KEROSENE: A petroleum liquid used as a fuel for commercial jet powered aircraft, or for heating purposes.

KNIFE EDGE PLEATS: The sharply defined creases at the outer edge of a pleated element.

KNIFE EDGE SEAL: A narrow, pointed ridge on the sealing surface of an end cap, center seal, or cartridge adaptor which provides a seal by "biting" into the cartridge gaskets.

LACQUER: A natural or synthetic resin which is dissolved in a suitable solvent such as hydrocarbon oil rich in aromatics. When applied, the oil solvent evaporates, leaving behind a lacquer film.

LIFE EXPECTANCY: The amount of use which may be expected from an element before it must be replaced; will vary according to the element's characteristics, the operating conditions, and the condition of the influent.

LINE SIZE: The size of line used to carry the product in a system, such as a six-inch line.

LIQUOR: Material to be filtered. Also referred to as concentrate, feed, influent, intake, mud, prefilter, pulp, slimes, or sludge.

LOFT: Thickness of the filter media.

LUBRICATION: Substituting fluid friction for solid friction by inserting oil between two moving parts.

MAGNETIC SEPARATOR: A separator that uses a magnetic field to attract and hold ferro magnetic particles.

MANOMETER: A gauge used to measure air pressure.

MATRIX: The structural support yarn or twine in wound elements is usually wound in a diamond.

MAXIMUM ALLOWABLE PRESSURE DROP: The maximum pressure differential of a vessel under specified product and flow conditions.

MAXIMUM DIFFERENTIAL PRESSURE: The highest pressure differential which an element is required to withstand without structural failure or collapse.

MAXIMUM OPERATING PRESSURE: The maximum pressure allowed in a system.

MEAN EFFICIENCY RATING: (ANSI B93.2) - A measurement of the efficiency of a filter medium using the multipass test where the filtration (BETA) ratio = 2.0 (50% efficiency).

MEDIA: Plural of medium. Material of which elements are made.

MEDIA DESIGN VELOCITY: The media velocity which, through experience, has been shown to give the best results in terms of filter life and efficiency.

MEDIA (MEDIUM): A porous or slotted mass in a filter element to separate solids from a fluid by difference in size of openings and contaminant.

MEDIA MIGRATION: Carry-over of fibers from filter, separator elements, or other filter material into the effluent. Less definitive than fiber migration and is quantitative.

MEDIA VELOCITY: The actual velocity of the air as it passes through 1 sq ft of media. This can be lower than the approach velocity where an extended area of "V" bank systems is used. To determine the media velocity do the following formula:

$$\frac{\text{TOTAL CFM}}{\text{Total Sq. Ft. Of Media}} = \text{MEDIA VELOCITY}$$

MEDIUM: The principle component of an element. A material of controlled pore size or mass through which a product is passed to remove foreign particles held in suspension or to repel droplets of coalesced water; or material without controlled pore size such as glass fiber mats which contribute to filtration, coalescence, or separation of two immiscible liquids.

MELAMINE RESINS: Synthetic resins of the thermosetting type, made from melamine and formaldehyde. Certain types are used as binders in felt media.

MEMBRANE: In filtration the term membrane is used to describe the media through which the liquid stream is to be passed or exchanged. Membranes are normally associated with ion exchanged media such as dialysis, osmosis, diffusion, etc., although filter paper itself could be classed as a membrane.

MERCAPTANS: Unsaturated sulphurs.

MESH (WIRE CLOTH): Number of openings, or fractions of openings, in a lineal inch of wire cloth. Where the fractional part of an inch is specified, for example 1/2 mesh or 1/2" mesh, the term is understood to mean the measurement from the center of one wire to the center of the adjacent wire. The term "mesh" should not be confused with clear openings of space.

MICRON: A short unit of length in the metric system. One millionth of a meter, 10⁻⁴ centimeter, 10⁻³ millimeter, or 0.000039 of one inch. Used as a criterion to evaluate the performance or efficiency of a filter media or to describe the condition of either the influent or effluent. Usually stated in terms of being either absolute or nominal. Nominal micron rating is generally taken to mean that 98% of all articles over a given micron value have been removed by a specific media or medium. Absolute micron rating is generally taken to mean that all particles over a given micron value have been removed. The naked eye can see a particle 40 microns or larger.

MIGRATION: Contaminant or media released downstream from filter element.

MMSCFD: Million Standard Cubic Feet per Day.

MMSCFH: Million Standard Cubic Feet per Hour.

MMSCFM: Million Standard Cubic Feet per Minute.

MODULAR: A filter element which has no separate housing of its own, but whose housing is incorporated into the equipment which it services. It may also incorporate a suitable enclosure for the filter cavity.

MULTIPASS TEST: (ANSI(NFPA)T3.1 0.8.8R 1) - A controlled laboratory test where effluent fluid is recirculated through the filter element while new contaminant is continuously added.

NEWTONIAN: A liquid which does not change in viscosity with a change in rate of shear, agitation or flow rate.

NOMINAL: An arbitrary term used to describe or define a degree of filtration. The filtration industry uses various methods of determining nominal ratings which are not necessarily interchangeable. Generally nominal references 98% removal of solids above a specified micron rating on a single pass basis. See absolute.

NON-AQUEOUS: Not water borne, water related, water resembling, nor containing water.

NPT: National Pipe Thread Standard.

NTP: Normal conditions of temperature and pressure. Whenever this term is used, it refers to a gas measured at pressure one (1) atmosphere absolute (760 mm. of Hg.) and a temperature of 0° C. However, some sources use a different reference temperature to define NTP.

O.D.: Outside diameter.

OPEN AREA RATIO: The ratio of pore area of a filter medium expressed as a percent of total area.

OPERATING PRESSURE: The normal pressure at which a system operates.

OPERATING PRESSURE, CRITICAL: Pressure above the normal or design limits which may cause damage or rupture.

OPERATING PRESSURE, MAXIMUM: The maximum pressure allowed in the system.

OUTER SHELL: Outer covering of element, usually perforated or screen.

OUTER WRAP: Outside covering of an element.

OUTSIDE IN: Flow of product from outside to inside of an element.

PAPER: Medium used in many elements. A very general term applied to resin impregnated cellulose. Many types of paper or cellulose are used as filter media made to specifications.

PARTIAL FLOW: See "by-pass installation" - a system that diverts part of the main flow and passes it through a filter.

PARTICLE COUNT: A practice of counting particles of solid matter in groups based on relative size. Frequently used in engineering, a filter to a specific task or to evaluate the performance of a filter under specific operating conditions. When used as data to engineer a filter, proper consideration can be given to the type of media to be used, expected life of the media, and the true cost of operation.

PARTICLE SIZE DISTRIBUTION: A tabulation resulting from a particle count of solids grouped by specified micron sizes to determine the condition of either the influent or effluent stream. Usually expressed in percentage of total solids to the specific group. Example: 31% in the 6 to 10 micron group. See particle count.

PERCENT FREE AREA: Quantitatively, proportion of an element's surface area.

Permeability: Ability of a cake or medium to pass liquids; or the rate of flow of fluid under a differential pressure through a material. Air permeability measurement provides a convenient comparison for various media and indicates the construction requirements for specific particle size retention. As a rule of thumb, lower permeability values indicate finer particle receptivity.

PHENOLIC RESINS: Synthetic thermosetting resins obtained by the condensation of phenol or substitute phenols with aldehydes. Used as a binder in cellulose and glass fibers to form filter media.

PLAIN: A filter element whose medium is not pleated or otherwise extended, and has the geometric shape of a cylinder, cone disc, plate, etc.

PLEATED: A filter element whose medium consists of a series of uniform folds and has the geometric shape of a cylinder, cone, disc, plate, etc.

PLASTISOL: A suspension of thermosetting plastic which can be molded into any desired shape. Used as a combination end cap and gasket on element.

PLUGGED: Condition of a filter when it has collected its full capacity of contaminants and will not pass any more fluid.

POROSITY: The ratio of void volume to total cake volume. Also describes filter media which may have larger pores than other media.

PORES: The openings in a medium. Also referred to as interstices. Size and shape of openings in cellulose are closely controlled in manufacture.

POTABLE: Drinkable (water).

POUR POINT: The lowest temperature at which a liquid will pour or flow when chilled without disturbance under specified conditions.

PRECOAT: A filter medium in loose powder form, such as Fuller's or Diatomaceous earth, introduced into the upstream fluid to condition a filter element.

PREFILTER: Filter for removing gross contaminate before the product stream enters a separator/filter.

PRESSURE: The force exerted per unit area of a fluid.

PRESSURE ABSOLUTE: Gage pressure plus 14.7 psi.

PRESSURE ATMOSPHERIC: The force exerted by the atmosphere at sea level, which is equivalent to 14.7 psi.

PRESSURE DIFFERENTIAL: The difference in pressure between two points.

PRESSURE DROP: The difference in pressure between two points, generally at the inlet and outlet of a filter or a separator/filter. Measured in pounds per square inch gage, or inches of mercury.

PRESSURE DROP, CLEAN: The differential pressure (drop) across a vessel, measured in pounds per square inch at rated flow on new elements with clean product.

PRESSURE RATING, OPERATING: The normal pressure at which a filter housing is capable of operating at specific operating conditions.

PRESSURE RELIEF: Valve which permits enough liquid or gas to escape from the vessel to prevent extreme pressure build up within the vessel.

PSI: Pounds per Square Inch.

PSIA: Pounds per Square Inch Absolute.

PSID: Pounds per Square Inch Differential.

PSIG: Pounds per Square Inch Gage.

RATE OF FLOW: The rate at which a product is passed through a vessel or system; generally expressed as gallons per minute, barrels per hour, barrels per day, actual or standard cubic feet per minute, hour, day, etc. Same as flow rate.

RATED FLOW: Normal operating flow rate at which a product is passed through a vessel; flow rate which a vessel and media are designed to accommodate.

REPLACEABLE: Describes element which is to be discarded after use and replaced with an identical element. Same as disposable. Opposite of reusable.

REPLACEMENT ELEMENT: An element or a cartridge used to replace a disposable which has been loaded to its capacity with (cartridge) contaminants.

REUSABLE: Describes element which may be cleaned and used again. Opposite of disposable or replaceable.

RESIN IMPREGNATED: Treatment of cellulose used in paper elements. Impregnation is carefully controlled in the manufacture of cellulose and provides a binder for the fibers which must be cured to specification during cartridge manufacture to preserve all the properties of the original specification for the cellulose.

RESISTANCE: Air passing under pressure through an air handling system must be directed through a number of ducts, the filter bank, and other obstacles which tend to restrict its flow because of friction. This restriction of the rate of flow is referred to as resistance. There is a total resistance related to the entire system as well as the resistance caused by the filter media itself. The general reference to resistance is that provided by the filter media, measured in inches of water.

SAE: Society of Automotive Engineers.

SAE NUMBER: A classification of lubricating oils for crankcase and transmissions in terms of viscosity as standardized by the Society of Automotive Engineers.

SAYBOLD SECONDS UNIVERSAL (SSU): Units of viscosity as measured by observing the time in seconds required for 60 ml. of a fluid to drain through a tubular orifice 0.483 inches long by 0.0695 inches in diameter at stated conditions of temperature, and pressure.

SCFD: Standard Cubic Feet per Day.

SCFH: Standard Cubic Feet per Hour.

SCFM: Standard Cubic Feet per Minute.

SCREEN: Covering for element for physical protection; also used as a basic material for a separator element or the basket in a basket strainer. May have special coating such as teflon.

SEAL: Any device which serves the purpose of sealing; examples are center seal, gaskets, "O" rings, and mounting caps. May also include two precision machined surfaces that seal, which is referred to as a metal to metal seal.

SELF CLEANING: A filter element designed to be cleaned without removing it from the filter assembly, or interrupting flow.

SEPARATION: The action of separating solids or liquids from fluids. May be accomplished by impingement, filtration, or by coalescing. The term "separation" is used in some circles when referring to the separation of liquids. Also used to describe the action in the second stage of two-stage separation.

SEPARATOR: A device whose primary function is to isolate contaminants by physical properties other than size.

SEPARATOR/FILTER: Vessel which removes solids and entrained liquids from another liquid or gas. Uses some combination of a baffle and/or coalescer, filter, or separator element. May be single stage, two stage, or single or two stage with prefilter section for gross solids removal. Common application is the removal of water from gas or another immiscible liquid. General reference to term applies the equipment is capable of both separation and filtration to specific degrees of efficiencies.

SEPTUM: The porous material mounted on a plate or frame which separates the solids from the liquids in filtering. Also referred to as filter cloth, filter medium, or filter plate.

SERVICE LIFE: The length of time an element operates before reaching the maximum allowable pressure drop.

SHELL: Outer wall of a vessel. Also referred to as body.

SHUNT INSTALATION: A system with a filter paralleled by a metering device both in the main supply line.

SINTERED: A metallic or non-metallic filter processed to cause diffusion bonds at all contacting points.

SKID MOUNTED: Describes one or more vessels with pump and motor, all mounted on a portable platform.

SLOT AREA: Sum of the area of all the fluid path openings in a metal - edge filter element.

SLUDGE: Dirt, carbon, water and chemical compounds as found in oils.

SOLID SUSPENSION: A mixture of solids suspended in a fluid.

SOLIDS: A mass, or matter, contained in a stream which is considered undesirable and should be removed.

SOLUTION: A single phase combination of liquid and nonliquid substances, or two or more liquids.

SPACING: The distance between adjacent surfaces of stacked discs, edge wound ribbons, or single layer filaments. This dimension determines the smallest dimension of solid particles to be retained.

SPECIFIC GRAVITY: Ratio of substance's density (or specific weight) to that of some standard substance.

SURFACE: A filter medium which primarily retains contaminant on the influent face.

SURFACE AREA: Total area of an element that is exposed to approaching flow. See "percent free area".

SURFACTANTS: Coined expression for surface active agents which are sometimes called emulsifiers or wetting agents. First appeared in hydrocarbons with the advent of the catalytic cracking process in refining. Caused by the forming of sodium sulfonate and sodium naphthanate molecules. Affects liquid/liquid separation by reducing interfacial tension and forming into a slime which binds off the fibers used in coalescing media.

SURGE: The peak system pressure measured as a function of restricting or blocking fluid flow.

SUSPENSION: Solids or liquids held in other liquids.

SUSPENDED SOLIDS: Non-settled particles in feed.

SWING BOLT: A type of vessel closure which reduces service time. Opposite of thru-bolt flange where studs and nuts are used, such as with ASA type flanges.

THIXOTROPIC: A liquid which shows a marked reduction in viscosity as the rate of shear, agitation, or flow rate is increased.

THRU-BOLT: A type of vessel closure using studs and nuts.

TORTUOSITY: The ratio of the average effective flow path length to minimum theoretical flow path length (thickness) of a filter medium.

TORTUOUS PATH: Crooked, twisting, or winding path which tends to trap or stop solid particulate matter.

TUBE SHEET: A cartridge mounting plate.

TURBID METRIC EFFICIENCY: Filter inlet turbidity - Outlet turbidity/by Inlet turbidity.

TURBIDITY: Stirred up sediment or contaminant in a fluid.

TURN-OVER: Number of times the contents of the system pass through a filter per unit time.

ULTRAFILTER: Membrane type to remove very fine suspended submicronic particles as well as some dissolved solids.

UNLOADING: Release downstream of trapped contaminate, due to change in flow rate, mechanical shock and vibration, or as excessive pressure builds up, or media failure.

UPSTREAM: The air entering the side of a filter or that area of the air handling system ahead of the filter bank.

VACUUM: Reference to pressure below atmospheric.