Glossary for Filtration

Abrasion: Wear which reduces the integrity of structure. This can be due to a number of causes including direct impact abrasion; bag-to-bag abrasion, bag-to-structure abrasion, misdirected pulse air abrasion, and abrasion from uneven gas distribution.

Abrasion Resistance: Ability of a bag filter to withstand surface wear.

Acid Dew Point: The temperature at which an acidic liquid condenses to gas.

Acid Gas Scrubber: Equipment that introduces a fine spray of alkaline liquid into a gas stream. The alkaline reacts with the gas creating neutralized particles, which in turn absorbs the acids and can be collected.

ACFM: Stands for actual cubic feet of gas per minute; measured by volume, relative to operating temperature, pressure, and the materials physical properties.

Acrylic: Synthetically polymerized polymer. Co-polymer acrylic contains up to 85% acrylonitrile, whereas homo-polymer acrylic contains more than 97% acrylonitrile. See Polymer Properties or Filtration.

Agglomeration, particulate: Many particles joining together by tension to form larger particles, usually held by moisture, static charge or particle composition. ***Air horsepower:*** Horsepower required to drive a fan at 100% efficiency.

Air standard conditions: Dry air at 21oC and 101.3kPa pressure.

Air-to-cloth ratio: The volume of process gas entering the baghouse divided by the surface area of filter media.

Antistatic: fibre or yarn with electrically conductive properties to dissipate static electricity.

Aspect ratio: The ratio of width to length. AR = W / L

Baffle Plate: An obstructing device, usually a wall or screen to hold back or turn aside the flow of liquids, gases, or dust. In a dust collector, a device that keeps evenly distributes dust around the filters.

Baghouse: An air filtration device that contains filters for removing particles from the gas stream. Also called dust collector.

Beaded Tape Cuff: A type of filter bag cuff which uses internal components to form a connection with the cell plate orifice.

Bleed: Particles of dust or fume that are able to migrate through filter media.

Blinding: Closing or clogging of the filter media pores resulting in reduced gas flow rate at constant pressure, or increased pressure drop across the filter media for the same gas flow rate.

Blowpipe: A pipe that is connected to a pulsing system, which has holes lined up over a row of filters. This allows clean air to distribute throughout the bags for cleaning purposes. Found in pulse-jet units.

Broken Bag Monitor: This type of instrument, often called a monitor continuously monitors the emissions from the stack, by measuring the actual concentration of dust.

Brake horsepower: Horsepower actually required to drive a fan or motor. This includes intrinsic energy losses in the fan and can be determined only by an actual fan test.

Bridging: Blockage by dust accumulating over an opening or a pathway. Examples include hopper bridging or cartridge filter pleat bridging.

Burst Strength: The amount of force required to rupture a fabric by exposing it to stress under specific

conditions. Usually expressed in pounds per square inch or kilopascals.

Cake: The dust layer formation on the surface of the filter media during the filtration process.

Calendaring: Process in which fabric passes between cold or heated rolls under high pressure to give it an appropriate finish. This processes densities the media as it pushes the surface fibers down onto the body of the filter medium. It also imparts a smooth glossy surface.

Can velocity: the theoretical speed of dust laden gas as it passes upwards between the filter bags. The critical area for calculating can velocity is at the base of the filter bags where can velocity is the greatest. Can velocity is calculated by dividing the actual gas volumetric flow rate by the open area at the base of the filter bags. This open area is the area of the cell plate (length x width) minus the area occupied by the base of the filter bags (for a round bag is _r2 x the number of bags, where r = the radius of the filter bag). High can velocity will result in dust reentrainment.

Cap Top: the closed end of a woven shaker bag which is clamped to a metal cap which hangs from a hook at the top of a mechanical shake dust collector.

Capture velocity: The gas velocity at any point in front of the hood or at the hood opening necessary to overcome opposing gas currents to enable capture of the dust laden gas at that point by causing it to flow into the hood.

Cascaded Media: filter media blended with finer fibres on the filtration surface graduated down to courser fibres on the back of the media.

Cell Plate (tubesheet): The barrier which separates the clean side of the collector from the dirty side. Bags generally hang from the tubesheet which has many holes from which to hang them.

Cell Plate Orifice: The diameter of the holes in the cell plate into which the filter bags are fitted.

Cell Plate Thickness: the thickness of the cell plate into which the filter bags are fitted

Clean Air Plenum: The portion of the dust collector where gases are directed, located on the clean side of the bags above the tubesheet in a pulse-jet baghouse.

Collection Efficiency: A measure of dust collector ability to remove product from the air expressed in percent.

Degradation: The loss of desirable physical properties of a filter due to a physical, chemical or thermal process.

Denier: The sizing of yarns (weight-per-unit length measure - typically grams per 9000 metres) used in woven fabrics including scrims are designated by denier.

Diaphragm Valve: A compressed air valve operated by an electrical solenoid used to clean the filters in pulse-jet collectors.

Differential Pressure: The difference between pressures measured at the clean side of a collector and the dirty side. Typically measured as the pressure drop across the cell plate or tubesheet.

Dimensional Stability: Ability of a fabric to maintain its size in hot or moist conditions. This ability is brought upon to a fabric by either chemical, mechanical, or construction means.

Door Seal: A gasket used on a door to prevent any leakage of outside air by creating an air-tight connection of the door and housing.

Dust Collector: An air filtration device that contains filters for removing particles from the gas stream. Also called a baghouse.

Dust Loading: The weight of solid particles suspended in an air (gas) stream, usually expressed in terms of grams per cubic metre.

Elongation: A deformation or increase in the length of a fiber due to stretching or tensile load.

Emissions: Product and/or chemicals leaving a process. Emissions are the particles that escape through or

around a dust collector and are exposed to the atmosphere.

Epitropic Fibre: A carbon coated polyester fibre or yarn with electrically conductive properties to dissipate static electricity.

ePTFE: an expanded porous membrane of PTFE.

External Felt Seal: A non-woven seal sewn to the outside of the filter bag cuff which is used as a locator in filter bag installation.

Face velocity: the lineal velocity of gas impacting on the face of the filter media.

Fan: A device used to push or pull air through a system. If the fan is pushing product through the system, it is referred to as a positive system. On the other hand, if the fan is pulling product through the system, it is known as a negative system.

Felt: A fabric produced by using barbed needles to interlock carded fibers or a woven base fabric. This interlocks fibers without spinning, weaving or knitting.

Fill (weft): Crosswise threads woven by a loom.

Flat width: a measurement of a filter bag used to calculate the bag diameter. A bag is pressed flat and the cross direction measurement s equated to half the circumference.

Fluorocarbon: a hydrocarbon chemical compound which contains Fluorine atoms.

Fly-ash: Airborne bits of unburnable ash. Created by burning fuels such as coal or coke.

Glazed surface: A smooth, shiny surface applied with a hot roller on fabrics for the purpose of better dust cake release. If overdone it may be detrimental to filtration.

Heat setting: A heat finishing treatment that stabilizes many man-made fibers so its shape and size will remain as reasonably constant with exposure to heat.

Hood: A device that captures heated air, gases, or smoke and product located at a pick-up-point.

Hopper: A section located under the bags in a dust collector. It is used for collecting the product from the incoming airstream once cleaned off the filters prior to transport to the next process.

Hydrolysis: A chemical reaction in which a substance reacts with water as to be changed into one or more other substances.

Hydrophilic Media: Filter media that attracts moisture from its surroundings.

Hydrophobic Media: Filter media that repels moisture to its surroundings.

Impaction: The process by which particulate product is carried by a gas stream and collides with a fiber and has enough force so it does not deflect and continue along with the air stream.

Integral Cuff: a type of filter bag cuff which is formed using the body of the filter bag.

Loop Top: the closed end of a woven shaker bag which forms a loop which hangs from a hook at the top of a mechanical shake dust collector.

Magnahelic Gauge: A gauge used to measure the differential pressure drop in a dust collector.

Manometer: An instrument for measuring the pressure of gases or liquids.

Maximum Operating Temperature: The continuous operating temperature at which a filter will perform without deteriorating prematurely.

Membrane: A thin, pliable layer of permeable material. Typically applied as a final step in the filter media manufacture. Such membranes typically have a lower permeability than the base filter media.

Meta-aramid: a lightweight, flame-resistant, nylon derivative fibre. An aromatic polyamide fiber.

Micron: A unit of linear measure equal to one millionth of a meter, or one thousandth of a millimeter.

Monofilament: A single untwisted strand of synthetic material.

Mullen Burst: Pressure necessary to rupture a specimen of cloth: usually expressed in psi or kPa.

Multifilament: A yarn that is made of many continuous strands.

Needle Felt: A felt made by the use of needles moving up and down, pushing and pulling the fibers to lock fibers. Typically most quality needle felts are scrim supported.

Negative Pressure Baghouse: A system in which product and air is pulled through the clean air side of a dust collector by a fan.

Net Air-to-cloth ratio: Air volume divided by the surface area of all on-line filters.

Nomex: Trademark (registered by DuPont) for a lightweight, flame-resistant, nylon derivative fibre. An aromatic polyamide fiber.

NOx: All oxides of Nitrogen.

Nylon: Any of a group of synthetic long-chain polymeric amides with recurring amide groups, made into fiber or yarn that have great strength and elasticity.

OEM: Original Equipment Manufacturer.

Oleophobic: a characteristic of a product or treatment which repels organic oils.

On-demand cleaning: Pulse cleaning in a baghouse that is triggered by preprogrammed differential pressure set points.

Opacity: The visibility amount of a stack plume. A perfectly clear plume (100% light transmission) has zero opacity. A plume that transmits no light at all has 100% opacity.

P84: See polyimide

Particulate: Any solid, liquid material, dust particles or liquid deposits in a gas stream.

Particle Size Distribution: The particle size distribution (PSD) of a powder, or granular material, or particles dispersed in fluid, is a list of values or a mathematical function that defines the relative amounts of particles present, sorted according to size. The method used to determine PSD is called particle size analysis, and the apparatus a particle size analyzer.

Permeability: A measure of volumetric gas flow though a medium at a constant pressure. Permeability is expressed in many units, see Filtration Units Conversion Chart.

pH: A symbol for the degree of acidity or alkalinity of a solution. A pH of 7 is pure distilled water (neutral). pH values from 0 to 7 indicate acidity and from 7 to 14 indicate alkalinity.

Photohelic Gauge: A gauge used to measure differential pressure and control it with adjustable set points tied into the cleaning system for the desired operational differential pressure, typically used in “on-demand” cleaning systems.

Pitot Tube: A small, L- shaped tube which, when inserted vertically into a flowing gas with its open end facing upstream, measures the total pressure of the gas and hence, indirectly, the velocity of its flow.

Polyester: Synthetically polymerized polymer manufactured as polyethylene teraphthalate. See Polymer Properties or Filtration.

Polyimide: a synthetic fibre used in high temperature filtration. Manufactured and trademarked by Degussa as P84. See Polymer Properties or Filtration.

Polyphenylene Sulphide: Also known as PPS. A synthetically manufactured polymer used in hot gas filtration. Used predominantly in coal fired boilers or power stations.

Polypropylene: a synthetic polymer derived from petroleum refining which is highly chemically resistant but has low thermal resistance. See Polymer Properties or Filtration.

PPS: See polyphenylene sulphide.

Pre-coat: An agent added to the dust collector, while running at startup, which aids in establishing an initial dust cake on the filter bags.

PTFE: polytetrafluoroethylene, commonly known as the trademark Teflon. A highly chemically and temperature resistant polymer. See Polymer Properties or Filtration.

Pulse cycle: On a pulse-jet baghouse, the interval of time between the pulsing of the rows.

Pulse duration (on-time): The length of time a pulse lasts, generally described as the length of time the electrical signal holds the solenoid valve open. However due to mechanical losses, the time the diaphragm is open will vary.

Pulse-jet Dust Collector: A dust collector that uses short bursts of air to clean product from filters that are supported by cages. The product is collected on the outside of the filters.

Re-entrainment: The process whereby dust is collected from the air stream, cleaned off a filter, and then returned to the filter. This occurs when dust is cleaned from a bag and then caught again by the upward moving air which re-deposits it on a bag, typically more apparent with increasing can velocity.

Redundancy: Extra capacity whereby a dust collector is set up so that any devices attached to it can be removed from service for maintenance while normal operation is maintained.

Retro-fit: A change in design or construction of equipment already in operation.

Reverse Air Dust Collector: A dust collector where cleaning is done by stopping the air flow into a compartment and then backward flowing air into a compartment to clean the inside of filters.

Rotary Air-lock Valve: An air-sealed star wheel with buckets designed to provide an air tight seal between the inlet and discharge sides of the valve.

Ryton: Trademark name (registered by Amoco Fibres) for polyphenylene sulphide. See Polymer Properties or Filtration.

Screw Conveyor: A revolving screw operating in a fixed trough for conveying product through the system.

Scrim: A loosely woven media used as an essential structural core or backbone for needle felt filter media.

Separate Cuff: a filter bag cuff which is sewn on separately to the filter bag.

Shaker Dust Collector: A dust collector where cleaning is accomplished by manually or automatically shaking the bags. The product is collected on the inside of the bags.

Snap Cuff: a cuff design in a filter bag which contains a spring steel hoop to enable positive force in contact with the cell plate orifice.

Solenoid Valve: Often times referred to as a "pilot valve," it is coil of wire, usually wound in the form of a helix, that acts like a bar magnet when arraying a current. Allows for relief of air pressure. The solenoid valve is normally used to activate a compressed air device.

Sonic Cleaning: Energy from air-powered horns produces shock waves which aid in dust removal from fabrics and housing.

SOx: Oxides of Sulfur such as SO2 and SO3.

Spun Yarn: Yarn spun from cut staple fibers twisted and sometimes plied together.

Tab Top: the closed end of a woven shaker bag which forms a tab which hangs from a hook at the top of a mechanical shake dust collector.

Tensile Strength: The resistance to lengthwise stress, measured (in force per unit of crosssectional area) by the greatest load pulling in the direction of length that a given substance can bear without tearing apart.

Tex: The sizing of yarns (weight-per-unit length measure - typically grams per 1000 metres) used in woven fabrics including scrims are designated by Tex. Unit of weight where 1 Tex is equal to 9 denier.

Timed Cleaning: Timed interval cleaning used on a dust collector, regardless of process conditions. An electrical mechanism that activates the cleaning cycle; often referred to as the timer board. It can be a circuit board, a PLC or a cam timer.

Trickle Valve: Used for the removal of collected product where the hopper is under negative pressure. The valves gate is kept closed by a counterweight until enough material builds up weight to overcome the counterweight.

Tubesheet (Cell Plate): The barrier which separates the clean side of the collector from the dirty side. Bags generally hang from the tubesheet which has many holes from which to hang them.

Venturi: A short tube with a constricted, throat like passage that increases the velocity of gas pulsed through it. It also entrains other surrounding gases to further increase the volume of pulse air entering the filter bags.

Warp: Weaving the threads running lengthwise in the loom and crossed by the weft yarns.

Weft (fill): The yarns carried by the shuttle back and forth across the warp in weaving.