

Smart Brief

Glossary of Dust Collection Terms

ACFM

Actual cubic feet of gas per minute; the volume of the gas flowing per minute at the operating temperature, pressure, moisture, and composition.

The metric equivalent is expressed in terms of m³/min. at actual pressure, temperature, and moisture.

Agglomeration

Multiple particles joining or clustering together by surface tension to form larger particles, usually held by moisture, static charge or particle architecture.

Air-To-Cloth (A/C) Ratio

The ratio between ACFM flowing through a filter and the sq. ft. of filter area available. This can also be thought of as the velocity of the gas passing through the filter in feet per minute (FPM).

Note: In the metric system the term used is “filtration velocity,” defined as the relation between the m³/min. of air flowing through a filter and the m² of filter area available.

Typical A/C ratios and filtration velocities for various types of systems are:

Cleaning Type	Air-to-Cloth Ratio	Filtration Velocity (m/min.)
Shaker	2.5-3.0 : 1	0.76-0.91
Reverse-Air	1.5-2.5 : 1	0.61-0.76
Plenum Pulse	3.5-4.0 : 1	1.07-1.22
Pulse Jet with Filter Bags		
Nuisance Venting	4.5–5.5:1	1.37–1.67
Process Equipment	3.5–4.5:1	1.07–1.37
High Dust Load (> 50 grains/ACF)	3.0–4.5:1	0.91–1.37
Hot Gas Applications (350°F–500°F)	3.0–4.5:1	0.91–1.37
Pulse Jet with Pleated Filters		
Nuisance Venting	3.0–3.5:1	0.91–1.07
Process Equipment	2.5–3.0:1	0.76–0.91
High Dust Load (> 50 grains/ACF)	2.0–2.5:1	0.61–0.76
Hot Gas Applications (350°F–500°F)	2.5–3.0:1	0.76–0.91

Bleedthrough

Particulate migration completely through the interstices of the filter.

Blinding

Fabric blockage by dust, fume or liquid not being discharged by the cleaning mechanism, resulting in a reduced gas flow because of the increased pressure drop across the filter media.

Can Velocity

The upward air stream speed passing between the filters in a dust collector with the filter elements suspended from the tubesheet, calculated at the horizontal cross-sectional plane of the collector housing at the bottom of the filters.

Capture Velocity

The minimum hood-induced air velocity necessary to capture and convey a dust particle into the hood.

Cell Plate (Tubesheet)

A steel plate to which the open end of the filter bag is connected; separates the clean air and dirty air plenums of the baghouse.

Cloth Area

Diameter of the filter bag x height x π for each filter bag. For total cloth area of the baghouse, multiply the cloth area of each filter bag x total number of bags.

Conveying Velocity

The gas velocity required to keep a dust particle entrained in the gas stream. The conveying velocity varies based on the particulate in the gas stream.

Depth Filtration

Refers to particulate passing the surface of a filter and then being captured in the “depth” of the filter. Typically applies to felt filters.

Differential Pressure (Δp)

The pressure drop across a component or device located within the gas stream; the difference between static pressures measured at the inlet and outlet of a component, compartment or device (i.e., between the dirty and clean sides of filter bag and tubesheet).

Dust Cake

Buildup on the filtration side of the fabric that is required to improve the filtration efficiency. (Filters with PTFE membrane do not require a dust cake to provide efficient filtration.)



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Filter Drag

The ratio of differential pressure across the filters (in inches WC) to velocity through the filters (FPM).

Grain Loading

The amount of particulate by weight in a given volume of air, expressed in grains/ft.³. 1 lb. or 0.454 kg = 7,000 grains.

Inches Of Mercury

A measurement defined as the pressure exerted by a column of mercury one inch in height at 32°F (0°C) at the standard acceleration of gravity.

Inches Of Water

A unit of pressure equal to the pressure exerted by a column of liquid water one inch high at standard conditions (70°F or 21°C @ sea level); 27.7 inches of water (703 mm WC) = 1 PSA (69 mbar); usually expressed as INCHES WATER GAUGE (WG) or INCHES WATER COLUMN (WC).

Magnehelic** Gauge

An instrument used to measure the differential pressure drop in a baghouse.

Manometer

A U-shaped tube filled with a specific liquid, used to measure differential pressure. The difference in height between the liquid in each leg of the tube indicates the difference in pressure on each leg.

Micron

A unit of length, 1/25,000 of an inch (1/1,000 of one millimeter). Typically used as a measurement of the diameter of particles in the inlet gas of a baghouse.

Photohelic** Gauge

An instrument used to measure differential pressure and control it with adjustable set points.

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Pulse Duration/On Time

The length of time a pulse lasts, generally described as the length of time the electrical signal holds the solenoid pilot valve open. However, due to mechanical losses, the time the diaphragm is actually open will vary.

Pulse Frequency/Off Time

The time between pulses in a pulse-jet baghouse.

PSI

Pounds per square inch; a unit of pressure; 1 PSI equals 27.7 in. WG or 2.04 in. mercury (Hg); can be actual or gauge pressure. In the metric system, this is measured as kg/cm². (The conversion is kg/cm² x 14.22 = PSI.)

Re-Entrainment

The phenomenon whereby dust that has been removed from the gas stream is returned to the gas stream. It occurs as a result of excessive velocity or cleaning problems.

SCFM

Standard cubic feet per minute. The volume of dry gas flow per minute at standard temperature and pressure conditions (70°F @ sea level). The metric equivalent is NORMAL VOLUME—Actual gas volume corrected to 0°C, 1 atmosphere; generally excludes moisture.

Static Pressure

The negative or positive pressure on the components of a system. Static pressure is generally stated in inches of water (or, in high-pressure systems, inches of mercury). Sometimes referred to as the “suction” (negative) or “bursting” (positive) pressure.

Surface Filtration

Capturing particulate on the surface of the filter, such as with filters that have a PTFE membrane laminated to the filter surface.

Total Pressure

The sum of the static pressure and the velocity pressure at the same point in a system.

Velocity Pressure

The pressure required to accelerate air or gas from zero velocity to a given velocity.

Venturi

A cone-shaped device located at the top of each filter in pulse-jet dust collectors into which compressed air is blown. A negative pressure at the top of the venturi is created during pulsing to help pull additional air volume into the filter element.

