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Filtration Dictionary

ABSORPTION:

The process by which a liquid or a gas is taken into the filter media substance and held there.

AEROSOL:

An assemblage of small particles, solid or liquid, suspended in air. The diameter of the particles may vary from 100 microns down to 0.01 microns. Examples: dust, smoke, fog.

AEROSOL PHOTOMETER:

A light-scattering mass concentration indicator.

AEROSOL SPECTROMETER:

A device for measuring particle size distribution in air.

AGGLOMERATION:

The formation of a larger airborne particle by the collision of two or more smaller particles. Agglomeration takes place when the attractive forces between the particles is greater than the kinetic energy of collision.

AIR CHANGE:

A measure of the amount of air moving into and out of a space because of leakage or mechanical ventilation. One air change is a volumetric flow of air equal to the cubic content of the space. Example: If a space has a cubical content of 1 0,000 cubic feet and the ventilation rate is 1 000 cfm, 0.1 (1 000/1 0,000) air change is occurring every minute, or 6 (60 x 0.1) air changes are occurring per hour.

AIR FILTER:

A device for removing particulate material from an airstream.

AMBIENT AIR:

Air which surrounds the occupant or process in a space.

ARRESTANCE:

A measure of the ability of an air filtration device to remove a synthetic dust from the air. ASHRAE arrestance is a measure of the ability of a device to remove ASHRAE dust from test air.

ASHRAE:

American Society of Heating, Refrigerating, and Air-Conditioning Engineers.

ATMOSPHERIC PRESSURE:

The pressure exerted upon the earth's surface by the weight of the atmosphere above it.

BLOWER:

A fan used to move air under pressure.

BROWNIAN MOVEMENT:

The continuous zig-zag motion of particles (aerosols) in suspension. The motion is caused by the impact of the molecules of the fluid (air) upon the particles.

CFM:

Cubic feet per minute.

Delta P:

See pressure drop. Delta is the Greek symbol for change.

DIFFERENTIAL PRESSURE:

(See pressure drop.)

DIN:

The German Institute for Standardization (Deutsches Institut für Normung e.V.). This institute establishes standards for testing and classifying air filters.

DOP:

Diocetylphthalate (diethylhexylphosphate), an oily liquid used in an aerosol form as a challenge for efficiency and leak testing HEPA filters.

DUST:

An aerosol of particles of any solid material, usually with particle size less than 100 microns.

DUST SPOT EFFICIENCY:

(See efficiency.)

EFFICIENCY:

The ability of a device to remove particulate or gaseous material from an air stream by measuring the concentration of the material upstream and downstream of the device. In the ASHRAE 52.1 Standard test method, it is a measure of the ability of a filter to remove the staining portion of atmospheric dust from the test air. This is officially termed Atmospheric Dust Spot Efficiency.

FACE AREA:

The area of an air filter or other air treatment device normal to the flow of air through it.

FILTER MEDIA:

Material that makes up the filter element. Glass fibers and polyester fibers are examples of filter media. ("Media" is the plural of "medium." Common practice allows it to be used as the singular form and "medias" as the plural.)

FOG:

An aerosol of fine water droplets in a gas.

FPM:

Feet per minute.

FUME:

An aerosol of fine particles formed by the condensation of vapors of solid materials.

GASKET (FILTER):

Material used to prevent air leakage between filter media surface and its holding device.

HEPA:

High Efficiency Particulate Air (filter).

HOUSING:

Device used to hold filter.

IMPINGEMENT:

The process in which particles are removed from an airstream because of their inertia. As air containing a particle flows toward a filter fiber or other collecting surface, the particle does not follow the air streamlines because of its inertia. Instead it moves in a straight line colliding with the filter fiber or surface to which it may become attached.

INERTIA:

The tendency of a body in motion to move in the same straight line unless acted upon by some external force.

INCHES OF WATER GAUGE (IN. W.G.):

A unit used in measuring pressures. The equivalent measurement in SI is Pascal's, 1 in, w.g. = 248.8 Pascals (Pa).

INTERCEPTION:

The process in which a particle is removed from an air stream as it follows the streamlines around a fiber. The particle comes in contact with a fiber and stays attached to it.

LASER PARTICLE COUNTER:

A device for measuring the size and quantity of aerosols in the airstream. It depends on the measurement of the amount of light reflected by individual particles. The strength and the coherent nature of light emitted by a laser result in more light being reflected by particles and so allow for the accurate sizing of very small particles.

MAGNEHELIC:

Registered trade name for a diaphragm-activated dial gauge for measuring resistance.

MEDIA AREA:

Gross: The total area of media used in the production of a filter.

Net effective: The measure of usable media in a filter.

MEDIAN EFFICIENCY:

In a series of efficiency tests, the median efficiency is the one which has an equal number of test results higher and lower than it.

MICRON:

One millionth of a meter. A micron is more correctly known as a micrometre (μ m).

PARTICLE COUNTER:

A device for measuring the number and size distribution of particles in a fluid.

PENETRATION:

A measure, in percent, of the material passing through a filter. Mathematically penetration is $100 - \text{Efficiency (percent)}$. If a filter is 98% efficient, its penetration is 2% ($100 - 98$). Penetration is used to measure the performance of very high efficiency filters.

PHOTOMETER:

A device which measures the mass concentration of an aerosol by the amount of light the aerosol scatters.

PITOT TUBE:

A device used to measure the velocity pressure of an air stream by simultaneously measuring its static and total pressures. Velocity pressure is the total pressure minus the static pressure. Velocity of air at standard conditions can be calculated by using the formula $V \text{ (fpm)} = 4005 \sqrt{VP \text{ (in. wg.)}}$ where: V = velocity of air and VP = velocity pressure from pilot tube readings.

PLENUM CHAMBER:

An air compartment maintained under positive or negative pressure and connected to one or more distributing ducts.

PPM:

Parts per million.

PRESSURE DROP:

The resistance of a device to the flow of a fluid through it. The pressure drop of a filter is a measure of its resistance to airflow through it. Resistance is measured in inches w.g. in the Inch-Pound system of measurement. It is measured in Pascals in the SI system.

RATED FILTER CAPACITY:

The specific quantity of air recommended by a filter manufacturer to be handled by a filter.

RESISTANCE:

(See pressure drop.)

STATIC PRESSURE:

The potential pressure exerted in all directions by a fluid. For a fluid in motion it is measured in the direction normal to the direction of flow. It has the potential to either burst or collapse a duct or other enclosure.

TACKIFIER:

A substance applied to filter media to increase the retention of dust. It can be applied to the surface of media or throughout its depth. It may be an oil, a pressure-sensitive resin, or a solvent which imparts a tacky surface to the media.

VAN DER WAALS FORCES:

The forces of attraction between molecules.

VELOCITY:

The distance traveled in a given time. Air velocity is measured in feet per minute (fpm) or meters per second (m/s).

"W.G.":

(See Inches Water Gauge.)