Industrial Ventilation – Glossary of Common Terms – Fact Sheet

WHAT ARE SOME COMMON TERMS USED WHEN DISCUSSING VENTILATION?

ACGIH – American Conference of Governmental Industrial Hygienists; publishes a guidebook for industrial ventilation: Industrial Ventilation Manual, A manual of Recommended Practice.

Aerosol – Particles (solid or liquid) that remain suspended in air for a period of time. Aerosols include mists, smokes, fumes, and dusts.

Air Changes Per Hour – The number of times indoor air is theoretically replaced by outdoor air during an hour.

Air Cleaner – A device to separate contaminants from an air stream. Examples include filters, scrubbers, electrostatic precipitators and cyclones.

Air Horsepower (ahp) – The power required to move air through a ventilation system against a specific pressure.

Air, Standard – Dry air [Oxygen (20.95% by volume), Nitrogen (78.09% by volume) Carbon dioxide (0.03% by volume)] at 70°F and 29.92 in (Hg) barometric pressure. This is substantially equivalent to 0.0757 lb/ft3. Specific heat of dry air = 0.24 btu/lb/F.

Anemometer – A device used to measure air velocity. Common types of anemometers include the rotating vane, the swinging vane, and the hot.

ANSI – American National Standards Institute; publishes consensus standards on ventilation, e.g. ANSI/AIHA Z9.7-2007 for Recirculation of Air for Industrial Process Exhaust Systems.

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

Baseline – Measurements from the Local Exhaust Ventilation (LEV) duct network static pressures and airflow measurements that prove all points on the network are within design parameters. This is the reference point where the system must be returned to when the network gets unbalanced. The information is recorded on

the system drawing when the system is installed and started up.

Blast Gate – A sliding sheet metal valve used in ducts to create additional pressure loss in the duct and restrict flow.

Brake Horsepower (bhp) – The actual horsepower required to move air through a ventilation system against a fixed total pressure plus the losses in the fan.

CFM – An abbreviation for cubic feet per minute.

Capture Velocity – The air velocity required to capture suspended dusts or aerosols and draw them into an exhaust hood.

Carcinogen – A physical, chemical or biological agent that is capable of inducing cancer in humans or animals.

Coefficient of Entry (Ce) – The hood captures, contains, or receives contaminants generated at an emission source by converting static air pressure to velocity pressure. Coefficient of Entry (Ce) is a measure of the efficiency of a hood's ability to convert static pressure to velocity pressure.

Confined Space – An enclosure such as a storage tank, process vessel, boiler, silo, tank car, pipeline, tube, duct, sewer, underground utility vault, tunnel, or pit that has limited means of egress and poor natural ventilation and that may contain hazardous contaminants or be oxygen deficient.

Contaminant – A harmful, irritating, or nuisance material that is foreign to the normal atmosphere.

Density – Density is the weight of a unit volume of a substance:

- Air = 0.075 pounds per cubic foot (1.2 kg/cubic meter)
- Water = 62.3 pounds per cubic foot (1 kg/liter)

Diffuser – An air outlet; sometimes associated with an inlet air register; constructed of louvered or perforated metal plates to discharge and mix supply air with ambient room air.

Dilution ventilation – A form of ventilation, which relies on mixing uncontaminated air with contaminated air in such quantities that the resultant mixture in the breathing zone will not exceed the allowable exposure limit specified for any contaminant.

Duct – A thin walled pipe for conveying air.

Dust – Mechanically produced solid particles (e.g. from crushing, drilling, grinding, sweeping, or handling of solid materials).

Entry Loss – The loss in static pressure caused by air flowing into a duct or hood. It is usually expressed in inches of water gauge.

Evase (Eh-va-say) – A gradual enlargement (tapered section) at the outlet of the exhaust system with the role to decrease velocity and to convert kinetic energy to static pressure. It is used to ensure smooth and undisturbed airflow in and out of the fan.

Fan – A mechanical device which causes air movement.

Flammable Liquid – A substance which meets the criterion for WHMIS 2015 Class Flammable Liquid: a flash point of no more than 93°C (199.4°F).

Friction Loss – The static pressure loss in a ventilation system due to friction between moving air and the duct wall; expressed as inches w.g. (water gauge) per 100 feet of duct.

Fume – Solid particles generated by condensation from the gaseous state, generally after volatilization from melted substance (e.g. welding), and often accompanied by a chemical reaction such as oxidation. Gases and vapours are not fumes.

Gas – A substance that is in the gaseous state at room temperature and pressure.

General ventilation – Ventilation system designed to maintain an acceptable indoor air by mixing the contaminated indoor air with fresh outdoor air and by controlling the temperature and humidity of the indoor air.

Hazardous Atmosphere – Any atmosphere that is oxygen-deficient or that contains a toxic or disease-producing contaminant. The atmosphere may or may not be IDLH (immediately dangerous to life or health).

HEPA – High-Efficiency Particulate Air Filter – A filter designed to remove 99.97% of specific type particulate material (0.3 micrometers in diameter) from air.

Hood – A device designed to contain and/or capture aerosols and direct them to the exhaust duct network.

IDLH Atmosphere – An atmosphere immediately dangerous to life or health (IDLH). An IDLH atmosphere poses an immediate hazard to life, such as being oxygen deficient (containing less than 19.5% oxygen), or produces an irreversible debilitating effect on health.

Inches of Water, "inch w.g." – A unit of pressure. One inch of water is equal to the pressure exerted by a column of water one inch (25.4mm) high. Atmospheric pressure at standard conditions is 407 inches w.g.

Industrial ventilation (IV) – The equipment or operation associated with the supply or exhaust of air, by natural or mechanical means, to control occupational hazards in the air in an industrial setting.

Local Exhaust Ventilation (LEV) – The mechanical removal of contaminated air from the point where the contaminant is being generated or liberated.

Make-up Air (also known as Replacement Air) – Air supplied to a space to replace exhausted air.

Manometer – An instrument that measures pressure; essentially it is an U-tube partially filled with liquid, usually water, mercury, or light oil. The difference in level of the liquid between the two sides of the tube indicates the pressure difference measured between the two sides of the U-tube.

Minimum Transport Velocity – The minimum velocity which will transport particles

in a duct with little settling (metric-m/s; U.S.-fpm).

Mist – An aerosol consisting of liquid particles generated by condensation of a substance from the gaseous to the liquid state.

NFPA – National Fire Protection Association.

NIOSH – National Institute for Occupational Safety and Health.

Nuisance Dust – Innocuous dust not causing a serious health condition.

Odour Threshold – The lowest concentration of an air contaminant that can be detected by smell.

OSHA – Occupational Safety and Health Administration – The U.S. Federal Agency that sets the minimum requirements for ventilation.

Oxygen Deficiency – Concentration of oxygen in the ambient air of less than 19.5% by volume.

Particulate Matter – A suspension of fine solid or liquid particles in air such as dust, fog, fume, mist, smoke, or sprays. Particulate matter suspended in air is commonly known as an aerosol.

PEL – Permissible Exposure Limit as established by the Occupational Safety & Health Administration (OSHA).

Pressure, Absolute – The total pressure measured in relation to a perfect vacuum. The sum of atmospheric and gauge pressures.

Pressure, Atmospheric – The force exerted by the weight of the atmosphere on a given area. It is measured in units of pascals (Pa) or torr (millimetres of mercury). The normal atmospheric pressure is 760 torr or 101 kilopascals (kPa).

Pressure Drop (Differential Pressure, *P) – Pressure drop is a term used to characterize the reduction in air pressure between any two points in the ventilation duct network. The pressure drop occurs as the compressed air travels through filters and ducts. In airflow system, the energy is measured as “pressure drop.”

Pressure, Gauge – Instruments used to measure pressure are called pressure gauges. Generally it gives air pressure relative to atmospheric pressure. It can show a negative pressure (less than atmosphere), or positive (greater than atmosphere.)

Pressure, Static (SP) – The potential pressure exerted by air at rest. Stated another way, it is the tendency of air to either burst or collapse a duct.

Pressure, Total (TP) – The sum of the velocity pressure and static pressure of air in a duct.

Pressure, Velocity (VP) – The kinetic pressure (resulting from movement) in the direction of flow necessary to cause air to flow at a given velocity.

Return Air – Air that is returned from the primary space to the fan for re-circulation.

Slot Velocity – Average velocity of air through a slot. It is calculated by dividing the total volume flow rate by the slot area.

Smoke – Aerosols, gases, and vapours resulting from incomplete combustion.

Specific Gravity – This is the ratio of the mass of a unit volume of a substance to the mass of the same volume of a standard substance. For example,

Specific Gravity of Air = 1.0 at sea level pressure and 20°C (68°F).

Specific Gravity of Water = 1.0 at 4°C (39.2°F).

Tempered makeup air – The make-up air that has been conditioned by heating or cooling to obtain a specific desired temperature.

TLV – Threshold Limit Value – A list published yearly by the American Conference of Governmental Industrial Hygienists (ACGIH) as a guide for exposure concentrations that a healthy individual normally can tolerate for eight hours a day, five days a week, without harmful effects. Airborne particulate concentrations are generally listed as milligrams per cubic meter of air (mg/m3). Gaseous concentrations are listed as parts per million (ppm) by volume.

Troubleshooting – Evaluation of visual and measured data to determine action to restore a LEV to Baseline or reference condition.

Vapour – The gaseous state of a substance that is solid or liquid at room temperature and pressure.

Velocity, Face – The speed at which air crosses the hood opening (metric-m/s; U.S.-fpm).

Velocity Pressure – See Pressure, Velocity.