IAQ Glossary
(source: AEROTECH P & K)

$A_w$ ........................................... $A_w$ is an abbreviation for water activity or equilibrium relative humidity (%ERH). Water activity is defined as the partial pressure of water relative to the vapor pressure of pure water at the same temperature or a measurement of the water that is available for biological and chemical reactions. The $A_w$ scale starts from 0 (dry) and goes to 1.0 (pure water). Microbial growth can start as low as 0.6 $A_w$, which includes halophilic (live on substrates with high concentrations of salt) bacteria, osmophilic or osmotolerant (live on substrates with high osmotic pressure) yeasts, and xerophilic or xerotolerant (live on arid or dry substrates) fungi.

Acute .............................................. Refers to any disease which has a rapid onset and persists a relatively short period of time. (e.g. days, weeks), terminating either in recovery or death. The term is also used for exceptionally severe or painful conditions.

Acute Toxicity ............................... The concentration of a compound required to cause a poisonous effect (e.g. lethality) on a target organism, organ, or cell-type.

Adsorption ..................................... The removal of gasses or liquids in specialized filters whereby the gas or liquid adheres as a thin film to the surface of a solid substance.

Aerobe .......................................... Any organism that grows in the presence of oxygen. Obligate aerobes are organisms that require molecular oxygen to grow. Facultative organisms can grow with or without oxygen, and they shift in its presence to a respiratory metabolism.

Aerosol ........................................... Material finely divided and suspended in air or other gaseous environment, with compositions as varied as itself.

Aerosol Sampler .............................. Device used to collect air samples to test hypothesis about indoor environments. Air samplers are used to detect and quantify bioaerosol presence, to identify aerosol release from sources, to assess human exposure to biological agents, and to monitor the effectiveness of control measures. Types of bioaerosol samplers include -
gravitational sampler (collect by settling onto a collection surface); inertial or non-inertial samplers (impactors, impingers or centrifugal).

**Aerotech 6 Sampler**
Viable particle sampler, aluminum device held together by three spring clamps and sealed with o-ring gaskets. This single stage impactor contains 400 precision-drilled holes. Airborne particles are impacted onto the surface of an agar plate via a vacuum pump.

**Agar**
A gelatin-like material obtained from seaweed and used to prepare culture media on which microorganisms are grown. Also used for electrophoresis of DNA and RNA.

**Air Contaminant**
An unwanted airborne constituent that may reduce acceptability of the air.

**Air-O-Cell**
A popular spore trap collection method.

**Airborne Microorganisms**
Biologically active contaminants suspended in the air either as free-floating particles surrounded by a film of organic or inorganic material, or attached to the surface of other suspended particulates.

**Algae**
A heterogeneous group of eukaryotic, photosynthetic, unicellular or multicellular organisms.

**Allergen**
Any substance or agent that causes an allergic reaction.

**Allergic Dermatitis**
Rash that occurs when the skin is exposed to certain allergens.

**Allergic Rhinitis**
Inflammation of the lining of the nose caused by allergies. Term used for hay fever and/or allergy to pollen, dust mites, and mold spores.

**Allergy**
An abnormal immune-mediated hypersensitive response to chemical and/or physical stimuli. Typical allergy symptoms can include any or all of the following hypersensitive responses - inflammation, rhinitis, sinusitis, dermatitis, hypersensitive pneumonitis, conjunctivitis and/or asthma. Allergic manifestations of major importance occur in about 10 percent of the population.

**Alveoli**
The inside end of the airway tree, consisting of tiny air sacs within the lungs, formed at the ends of bronchioles; through the thin walls of the alveoli, the blood takes in
oxygen and gives up its carbon dioxide in the process of respiration.

**Anaerobe**
Obligate anaerobes are organisms that can grow only in the absence of oxygen. Facultative organisms can grow with or without oxygen, and they shift in its presence to a respiratory metabolism.

**Andersen N-6/Aerotech 6**
Viable particle sampler, aluminum device held together by three spring clamps and sealed with o-ring gaskets. This single stage impactor contains 400 precision-drilled holes. Airborne particles are impacted onto the surface of an agar plate via a vacuum pump.

**Antibiotic**
A chemical substance, of microbial origin or synthetically produced, that has the capacity to inhibit or kill bacteria when applied in dilute solutions.

**Antibody**
An immune-response protein produced in warm-blooded animals in response to an injected foreign antigen and capable of reacting specifically with that antigen.

**Antigen**
Any substance, often proteins but occasionally complex lipids, carbohydrates, or some nucleic acids, (usually foreign) that, when introduced into the body of a warm-blooded animal, has the capacity to stimulate the formation of the corresponding antibodies; and the ability to react specifically with these antibodies.

**ASHRAE**
American Society of Heating, Refrigerating, and Air-conditioning Engineers, Inc.

**Aspergillosis**
One of a group of diseases of animals and humans caused by various species of Aspergillus.

**Asthma**
A lung disorder characterized by attacks of breathing difficulty, wheezing, coughing, and thick mucus coming from the lungs. Asthma attacks can be caused by breathing foreign substances (allergens) or pollutants, infection, vigorous exercise, or by emotional stress. Treatment includes eliminating the cause if possible. Sprays or wideners of the bronchi taken by mouth, and steroid drugs are also used. Repeated attacks often result in shortness of breath (emphysema) and permanent obstructive lung disease. Also called bronchial asthma.
AWARENESS GUIDE FOR MOLD

**Asthma Promoters**
Conditions and substances, such as allergies, tobacco smoke, colds and respiratory infections, that can lead to lasting inflammation in the airways and leave them prone to react faster or more severely to an asthma trigger.

**Bacteria**
Microscopic organisms living in soil, water, organic matter, plants and animals. These prokaryotic organisms do not have a distinct nucleus, are single-celled, and lack photosynthetic abilities.

**Bactericide**
Any agent (chemical or physical) that is able to kill bacteria.

**Bacteriocidal**
Able to kill bacteria.

**Bioaerosol**
An aerosol comprised of particles of biological origin/activity or is itself a living organism, which may affect living things causing infection, allergies, toxicity, or other. Particle sizes may range from aerodynamic diameters of ca. 0.5 to 100 microns. Examples of bioaerosols are fungi, bacteria, viruses, protozoa, pollen, animal dander, insect emanations, microbial endotoxins, and human skin scales.

**Biohazard**
A combination of the words, biological and hazard meaning organisms or products of organisms that present a risk to humans.

**Bronchitis**
Inflammation of the mucous membranes of the large (bronchia) airways, characterized by cough.

**Building Related Illness**
An identifiable illness or disease caused by conditions in or nearby to a facility.

**CARPETCHEK**
A .8 micron MCE filter cassette uses to collect dust from carpeting for the analyses of microbial contaminants.

**Chain of Custody**
Written form that contains fields for reporting, billing (optional), sample identification and analysis request. This form must be accompanying samples to be analyzed by a laboratory. This form is particularly important if litigation becomes involved.

**Colony**
A number of individual cells or organisms of a given species growing on the surface of a solid medium that usually can be seen with the naked eye.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td>Conditioned Space</td>
<td>The portion of a facility being heated, cooled, humidified, dehumidified, or otherwise controlled to maintain desired conditions.</td>
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<tr>
<td>Conidia</td>
<td>Asexual spores of fungi that form at the tips and the sides of hyphae. Conidia are not unusually resistant to adverse environmental conditions and serve to promote aerial dissemination.</td>
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<tr>
<td>Conjunctivitis</td>
<td>Inflammation of the surface of the eye, characterized by redness, itching, soreness, and tearing.</td>
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<tr>
<td>Contaminant</td>
<td>An undesirable substance that pollutes the quality of the air.</td>
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<tr>
<td>Cubic Centimeters (cc)</td>
<td>A volumetric measurement that is also equal to one milliliter (ml).</td>
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<tr>
<td>Cubic Meter (m³)</td>
<td>A measure of volume in the metric system.</td>
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<tr>
<td>Dander</td>
<td>Tiny scales of animal skin.</td>
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<tr>
<td>Dermatitis</td>
<td>Inflammation of the skin characterized by redness, itching, and/or formation of a rash.</td>
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<tr>
<td>Dimorphic Fungus</td>
<td>Fungus that can grow either as mold (mycelial form) or as yeast depending on the environment.</td>
</tr>
<tr>
<td>Disinfectant</td>
<td>Chemical agents used for disinfection. Disinfectants for general use should be active against a range of common microorganisms and should be biocidal rather than biostatic.</td>
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<tr>
<td>Dust</td>
<td>An air suspension (aerosol) of particles of any solid material, usually with particle size less than 100 micrometers (µm).</td>
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<tr>
<td>Dust Mites</td>
<td>Tiny insects that live in dust, and that are a common asthma trigger.</td>
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<tr>
<td>DUSTCHEK</td>
<td>A filter collection bag used in conjunction with a standard vacuum cleaner to collect dust samples to be analyzed for microbial contamination or allergens.</td>
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<tr>
<td>Economizer</td>
<td>An HVAC design that uses outdoor air conditions to obtain as much cooling or warming as possible before heat is added or removed from the conditioned space.</td>
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</table>
Electrostatic Precipitator: A device that removes particles from airflow by using the attractive properties of opposite electric charges.

Emphysema: A respiratory condition in humans characterized by a loss of elasticity in the alveoli or lung sacs.

Endotoxins: Harmful substances (toxins) that are produced by many Gram-negative bacteria. Endotoxins are characterized for being contained within the cell wall that produce them, or are integral constituents of cellular structure and are not released until the cell disintegrates.

Environmental Tobacco Smoke (ETS): A mixture of smoke both exhaled by smokers and released from burning cigarettes, cigars or pipes. Also known as secondhand smoke or passive smoking.

Epidemic: A sudden increase in frequency of a disease, above the normal expectancy, in a population of human beings.

Epidemiology: The field of science that analyzes the distribution in human populations of events affecting health.

Epidermis: The outer layer of human skin, composed of a thin layer of epithelial cells.

Etiological: Pertaining to the cause of a disease or abnormal condition.

Etiological Agent: Organism or substance that causes a disease.

Exotoxin: Diffusible toxins produced by certain Gram-positive bacteria. Exotoxins are present in the filtrates of growing cultures in which no appreciable autolysis has occurred.

Filter Efficiency: The efficiency of various filters can be established on the basis of entrapped particles; i.e., collection efficiency, or on the basis of particles passed through the filter, i.e., penetration efficiency.

Filter, HEPA: High Efficiency Particulate Air filter that is at least 99.97 percent efficient in removing particles and allergens of 0.3 microns or greater diameter from the air. (NIOSH = P100)

Filtration: The trapping of particles in a filtering medium.

Fungicide: Chemical agent that kills fungi.

Fungistat: Chemical agent that inhibits the growth and reproduction of fungi.
Gasses ........................................... Individual atoms of molecules spread evenly through the air. They cannot be trapped by ordinary filters. See adsorption.

Germ ............................................ A microorganism usually thought of as a pathogenic organism.

Germicide .................................... An agent capable of killing germs.

Heat, Total (ENTHALPY) ............. The sum of sensible and latent heat between an arbitrary datum point and the temperature and state under consideration. HUMIDIFIER FEVER - Inhalation fever (see definition below) obtained from exposure to a humidifier.

HEPA ............................................. High efficiency particulate filter.

HVAC ............................................ Heating, ventilating, and air conditioning.

HVACR .......................................... Heating, ventilating, air conditioning, and refrigeration.

Hypersensitivity ......................... Condition of a primed individual who tends to give an exaggerated immune response upon further exposure to the relevant antigen; a hypersensitive reaction that may cause varying degrees of damage to the subject’s tissues and may even be fatal.

Hypersensitivity Pneumonitis ....... A swelling form of pneumonia that is caused by an immune reaction in an allergic patient. The reaction may be brought about by a variety of inhaled organic dusts, often those containing fungal spores. A wide variety of symptoms may occur, including difficulty breathing, fever, chills, malaise, muscle aches, and cough. The symptoms usually occur 4 to 6 hours after exposure and take up to 48 hrs to be resolved.

Hyphae ........................................... The principal element of the growing or vegetative form of a mold (filamentous fungi), characterized by branching tube-like growth.

IAQ .............................................. Indoor air quality.

Immuno-Compromised .......... A swelling form of pneumonia that is caused by Patients that are susceptible to opportunistic pathogens such as those in the genera Aspergillus, Fusarium, Mucor and Rhizopus. Examples of immuno-compromised people are those that have been subjected to organ or tissue transplant procedures, people infected with the human
immunodeficiency virus (HIV), and people that have been treated for malignant diseases with agents that suppress the immune system.

**Impingement**  
To strike with a sharp collision.

**Inertial Bioaerosol Sampler**  
Allows the collection of particles by size-selective sampling. See non-inertial bioaerosol sampler.

**Infection**  
The establishment of a pathogenic microorganism within the tissues of a host.

**Inhalation Fever**  
Flu-like illness following exposure to certain chemical or biological agents (bacteria, fungi, amebae, endotoxin) from an environmental source. Characterized by fever, chills, muscle aches, malaise, and respiratory symptoms. (See Humidifier fever and Pontiac Fever).

**IPM**  
Integrated pest management.

**Legionnaires Disease**  
A progressive and potentially fatal atypical pneumonia caused by the inhalation of water aerosols containing Legionella bacteria deep into the lung. The onset is relatively abrupt with high fever, malaise, myalgia, headache, nonproductive cough, inflammation of the membrane covering the lungs (pleurisy), and sometimes diarrhea.

**Medium**  
(pl. Media). A balanced chemical composition employed in the laboratory for growing microorganisms; media may be used in the liquid state or solidified with agar, gelatin or other solidifying agents.

**Mesophile**  
An organism that grows optimally within the temperature range of 77°F to 104°F (25°C to 40°C).

**Micron**  
One millionth of a meter. Also called a micrometer.

**Microorganism**  
A minute organism; bacteria, viruses, molds, parasites, etc., are microorganisms.

**Mitigate**  
To alleviate or relieve.

**Mold**  
Any profuse or woolly fungal growth on damp or decaying matter or on surfaces of organic materials. Many molds are capable of causing asthma and allergy attacks.

**MSDS**  
Material safety data sheets.
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<tr>
<td>Mucous Membranes</td>
<td>Lining of the hollow organs of the body, notably the nose, mouth, stomach, intestines, bronchial tubes, and urinary tract.</td>
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<tr>
<td>Multiple Chemical Sensitivity (MCS)</td>
<td>A wide variety of conditions that individuals may believe to be caused by low levels of exposure to a wide variety of chemicals.</td>
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<tr>
<td>Mutagen</td>
<td>Any chemical or physical agent that causes a genetic change (mutation) or speeds up the rate of mutation.</td>
</tr>
<tr>
<td>Mutagenic Agent</td>
<td>Any chemical substance or physical agent that is capable of enhancing the frequency of detectable mutants within a population of organisms or cells.</td>
</tr>
<tr>
<td>Mutant</td>
<td>Any organism that differs from the wild type as the result of one or more mutations.</td>
</tr>
<tr>
<td>Mutation</td>
<td>A sudden, usually rare, change in the genetic code of an organism which results in the appearance of a new characteristic in an individual that is heritable.</td>
</tr>
<tr>
<td>Mycelial Fragment</td>
<td>Piece of mycelium.</td>
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<tr>
<td>Mycelium</td>
<td>The branching tube-like hypha or mass of hyphae constituting the body of a fungus. Mycelium can be a form of reproduction of the fungus.</td>
</tr>
<tr>
<td>Mycovirus</td>
<td>Viruses with a host-range specificity limited to the fungi.</td>
</tr>
<tr>
<td>Nephrotoxin</td>
<td>A chemical that has a primary toxic effect on the kidneys.</td>
</tr>
<tr>
<td>NIOSH</td>
<td>A federal agency, the National Institute for Occupational Safety and Health. It conducts research on health and safety concerns, tests and certifies respirators, and trains occupational health and safety professionals.</td>
</tr>
<tr>
<td>Nosocomial Infections</td>
<td>Infections that are acquired in a hospital.</td>
</tr>
<tr>
<td>Nuisance Dust</td>
<td>Have a long history of little adverse effect on the lungs and do not produce significant organic disease or toxic effect when exposures are kept under reasonable control.</td>
</tr>
<tr>
<td>Odor</td>
<td>A characteristic of gases, vapors, or particles that stimulate the olfactory organs; typically in an unpleasant or objectionable manner.</td>
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</tbody>
</table>
Organic Dust Toxic Syndrome (ODTS)  
Fever characterized by rapid onset after exposure to high organic dust levels. It is not well understood but thought to be too rapid to be an immune response.

OSHA  
Occupational Safety and Health Administration.

Ozone  
An unstable gas consisting of three oxygen atoms. It acts as an oxidizer of organic matter and is considered harmful to humans at levels exceeding 0.12 ppm.

Parasite  
Organism that lives on or within the tissues of another living organism from which it obtains nutrients.

Particulates  
Solids or liquids light enough to be suspended in the air.

Pathogen  
Any microorganism capable of causing disease in an animal, plant, or microorganism.

Pathogenic  
Having the ability to produce or cause a disease.

Pontiac Fever  
Inhalation fever (see definition above) caused by exposure to airborne Legionella bacteria. Milder disease than Legionnaires' disease.

PPM  
Parts per million.

Psychrophilic  
Microorganisms that thrive at relatively low temperatures; their optimum temperatures for growth are below 20°C, but they multiply at a substantial rate even at 0°C. Thriving at relatively low temperatures.

Pure Culture  
A culture of microorganisms in which all cells are of a single type.

Re-circulated Air  
Indoor air that is taken in from the conditioned space and sent through the HVAC system. It must be mixed with sufficient outdoor air to prevent the build-up of IAQ contaminants.

Relative Humidity  
The amount of moisture the air can hold at any given temperature compared to the amount of moisture it could hold at any given temperature.

Respirable Particles  
Those particles in air, which penetrate into and are deposited in the non-ciliated portion of the lung.

Respirable Size Particulates  
Particulates in the size range that permits them to penetrate deep into the lungs upon inhalation.
Rhinitis ........................................ Inflammation of the mucosal lining of the nose characterized by nasal drainage, congestion, itching, and sneezing.

Saprophyte .................................. Any organism that requires and utilizes nutrients from dead or decaying organisms in the form of organic compounds in solution.

Serology ................................. The in vitro study of antigens and antibodies, and their interactions.

Sick Building ............................. A building is defined as sick if 20 percent or more of the building's occupants complain of such problems as headache, eye irritation, nausea, sore throats, dry or itchy skin, sinus congestion, nose irritation, fatigue and dizziness for more than two weeks; If the symptoms are relieved when the complainant leaves the building; and, if no specific cause of the problem can be identified. (ASHRAE Journal, July 1988, p.40)

Sinusitis ................................. A swelling of one or more nasal sinuses. It may be a complication of an upper respiratory infection, dental infection, allergy, a change in atmosphere, as in air travel or underwater swimming, or a defect of the nose. With swelling of nasal mucous membranes the openings from sinuses to the nose may be blocked, causing pressure, pain, headache, fever, and local tenderness. Complications include spread of infection to bone, brain, or meninges. Treatment includes steam inhalations, nasal decongestants, analgesics, and, if infection is present, antibiotics. Surgery to improve drainage may be done to treat chronic sinusitis.

Slime Layer ............................. The gelatinous outermost covering of certain bacteria; unlike capsules, which are tightly bound to cell walls.

Smoke ................................. An air suspension (aerosol) of particles, originating from combustion or sublimation. Carbon or soot particles less than 0.1 microns in size result from incomplete combustion of carbonaceous materials such as coal or oil. Smoke generally contains droplets as well as dry particles. Tobacco, for instance, produces a wet smoke composed of minute tar-containing droplets.

Spore ................................. A resistant and or disseminative form produced by certain bacteria or fungi (molds); spores are characteristically formed in response to particular (commonly adverse) environmental conditions. Mold (fungal) spores are
specifically unicellular sexual or asexual reproductive bodies.

**Teratogen**
A chemical or physical agent that causes birth defects if exposed to a developing embryo.

**Thermophilic**
Microorganisms that have an optimum temperature for growth as high as 50 to 55°C, with tolerance to 90°C. They are found especially in hot springs and compost heaps.

**Toxic Effect**
Reaction to a biological toxin; may involve death or dysfunction of specific organs or organ systems such as the liver, kidney, brain or immune suppression.

**Toxicity**
The degree to which something is poisonous. A condition that results from exposure to a poison or to poisonous amounts of a substance that does not cause side effects in small amounts.

**Toxigenic**
Organism that is able to produce a toxin, or toxins.

**Toxin**
A poisonous substance that is a specific product of the metabolic activities of a living organism and is usually very unstable, notably toxic when introduced into cells, tissues or the entire target organism.

**Tracer Gas**
Certain compounds which can be used to identify pollutant pathways in a building and to quantify ventilation rates.

**Variable Air Volume (VAV)**
An HVAC design that heats or cools a conditioned space by increasing or decreasing the amount of air entering a conditioned space.

**Ventilation**
Supplying sufficient air to a conditioned space to ensure occupant comfort and wellness.

**Virus**
An infectious agent that contains either RNA or DNA in its core surrounded by a protein shell, is able to alternate between intracellular and extra cellular states, and replicates only when present in living cells. Viruses depend entirely upon the living cells for biosynthetic machinery; some viruses can exchange genes with the host cell.

**VOC**
"Volatile Organic Compound", any organic chemical with a low boiling point that becomes gaseous at ambient
temperatures. This designation is not a reflection or indication of human health effects.

**WallChek** ......................... A device that works in conjunction with Air-O-Cell cassettes to take air samples from enclosed spaces such as wall cavities.

**Xerophile** ......................... An organism with enzyme systems that enable it to grow optimally under dry conditions.

**ZEFON Air-O-Cell** ............... A non-inertial sampling device produced by Zefon Corporation for collection and analysis of a wide range of airborne aerosols. These include mold spores, pollen, insect parts, skin cell fragments, fibers (e.g. asbestos, fiberglass, cellulose, clothing fibers) and inorganic particulate (e.g. ceramic, fly ash, combustion particles, copy toner). Airborne particles are impacted onto a glass microscope slide that is coated with a sticky substance. Particles deposited onto the slides can be observed directly under the microscope. The concentration of particles per unit volume of air can then be calculated.