



## GLOSSARY OF TERMS

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<b>abiotic</b>	This is a term used to describe anything which is characterized by the absence of life or incompatible with life. In toxicology and ecotoxicology it refers to physical (e.g. heat, sunlight) or chemical processes (e.g. hydrolysis) that are capable of modifying chemical structures.
<b>abiotic transformation</b>	Any process in which a chemical in the environment is modified by non-biological mechanisms (see also biotransformation) (WHO, 1979).
<b>absorbed dose (in toxicology)</b>	The amount of a chemical absorbed into the body or into organs and tissues of interest (WHO, 1978a).
<b>absorbed dose (in radiation)</b>	The energy imparted to matter in a suitably small element of volume by ionizing radiation divided by the mass of that element of volume (ISO, 1972). The SI unit for absorbed dose is joule per kilogram (J kg <sup>-1</sup> ) and its special name is gray (Gy) (ISO, 1972).
<b>Absorption</b>	1) A mechanical phenomenon wherein one substance penetrates into the inner structure of another, as in absorbent cotton or a sponge. 2) An optical phenomenon wherein atoms or molecules block or attenuate the transmission of a beam of electromagnetic radiation.
<b>absorption (in colloid and surface chemistry)</b>	A process whereby, when two phases are brought into contact, a given component is transferred from one phase to the other (after IUPAC, 1972). Experimental differentiation of absorption and adsorption (q.v.) may be difficult, and sometimes the two processes occur simultaneously; in such cases the term "sorption" is used (WHO, 1979).
<b>absorption (in radiation)</b>	A phenomenon in which radiation transfers to matter which it traverses some or all of its energy (ISO, 1972).
<b>Accelerant</b>	Any material used to initiate or promote the spread of a fire. The most common accelerants are flammable or combustible liquids. Whether a substance is an accelerant depends not on its chemical structure, but on its use
<b>acceptable daily intake</b>	This is an estimate of the amount of substance in the food that can be ingested daily over a lifetime by humans without appreciable health risk. The concept of the ADI has been developed principally by WHO and FAO and is relevant to chemicals such as additives to foodstuffs, residues of pesticides and veterinary drugs in foods. ADIs are derived from laboratory toxicity data, and from human experiences of such chemicals when this is available, and incorporate the safety factor.

<b>acceptable daily intake for man (ADI) (food additives)</b>	<p>The acceptable daily intake (ADI) for man, expressed on a body weight basis (mg/kg body weight) is the amount of a food additive that can be taken daily in the diet, even over a lifetime, without risk. It is allocated only to substances for which the available data include either the results of adequate short-term and long-term toxicological investigations, or satisfactory information on the biochemistry and metabolic fate of the compound, or both (Vettorazzi, 1980).</p>
<b>acceptable daily intake (pesticide residues)</b>	<p>The acceptable daily intake of a chemical is the daily intake which, during an entire life time, appears to be without appreciable risk to the health of the consumer on the basis of all the known facts at the time when a toxicological assessment is carried out. It is expressed in milligrams of the chemical per kilogram of body weight (Vettorazzi, 1980).</p>
<b>acceptable daily intake not specified</b>	<p>An ADI without an explicit indication of the upper limit of intake may be assigned to substances of very low toxicity, especially those that are food constituents or that may be considered as foods or normal metabolites in man. This expression was adopted as a more suitable expression than "ADI not limited", which was previously used. An additive having an "ADI not specified" must meet the criteria of good manufacturing practices. For example, it should have proved technological efficacy and be used at the minimum level of technological efficacy, it should not conceal inferior food quality or adulteration, and it should not create a nutritional imbalance. The above expression means that, on the basis of available data (chemical, biochemical, and toxicological), the total daily intake of the substance arising from its use or uses at levels necessary to achieve the desired effect and from its acceptable background in food, does not represent a hazard to health. For this reason, and for reasons stated in the individual evaluations, the establishment of an acceptable daily intake expressed in mg/kg body weight is not deemed necessary (Vettorazzi, 1980).</p>
<b>(no) acceptable daily intake allocated</b>	<p>This expression is applicable to substances for which the available information is not sufficient to establish their safety or when the specifications for identity and purity are not adequate. The fact that an ADI for an additive was not established should not be interpreted as casting doubt on its safety nor should it be considered for its withdrawal for use (Vettorazzi, 1980).</p>
<b>acceptable daily intake not specified (pesticide residues)</b>	<p>An ADI without an explicit indication of the upper limit of intake may be assigned to substances of very low toxicity, especially those that are food constituents or that may be considered as foods or normal metabolites in man. This expression was adopted as a more suitable expression than "ADI not limited" which was previously used. An additive having an "ADI not specified" must meet the criteria of good manufacturing practices, for example, it should have proved technological efficacy and be used at the minimum level of technological efficacy, it should not conceal inferior food quality or adulteration, and it should not create a nutritional imbalance. The above expression means that, on the basis of available data (chemical, biochemical, and toxicological), the total daily intake of the substance arising from its use or uses at levels necessary to achieve the desired effect and from its acceptable background in food, does not represent a hazard to health. For this reason, and for reasons stated in the individual evaluations, the establishment of an acceptable daily intake expressed in mg/kg body weight is not deemed necessary (Vettorazzi, 1980).</p>
<b>acceptable level of treatment</b>	<p>Acceptable daily intakes are usually expressed as milligrams of the substance in question per kilogram of body weight. There are, however, certain food additives</p>

	that are more appropriately limited in terms of levels of treatment applied (Vettorazzi, 1980).
<b>acceptable residue</b>	Acceptable residues in human food that have been established for antibiotics found in foods (Vettorazzi, 1980).
<b>acceptable risk</b>	This concept relates to the probability of suffering disease or injury that will be tolerated by an individual, group or society. Acceptability of risk depends on the scientific data, social, economic and political factors, and on the perceived benefits arising from the a chemical or process
<b>accumulation</b>	Successive additions of a substance to a target organism, or organ, or to part of the environment, resulting in an increasing quantity or concentration of the substance in the organism, organ, or environment.
<b>accuracy</b>	(i) The closeness of agreement between the ``true" value and the measured values (ISO, 1981); (ii) the degree to which a measurement, or an estimate based on measurements, represents the true value of the attribute that is being measured (Last, 1988).
<b>Acetone</b>	The simplest ketone. A highly flammable, water soluble solvent. Flash point of 0°F. Explosive limits of 2.6% to 12.8%.
<b>acid</b>	any substance capable of giving up a proton; a substance that ionizes in solution to give the positive ion of the solvent; a solution with a pH measurement less than 7.
<b>acid rain</b>	The deposition of acids (sulphuric and nitric) in rain. An environmental problem resulting from certain industrial activities and the burning of petroleum based fuels (traffic exhaust gases).
<b>acidity</b>	the quantitative capacity of aqueous solutions to react with hydroxyl ions. It is measured by titration with a standard solution of base to a specified end point.
<b>acre-foot</b>	the volume of water, 43,560 cubic feet, that will cover an area of one acre to a depth of one foot; a term used in sewage treatment in measuring the volume of material in a trickling filter.
<b>action level</b>	(i) The level of a pollutant at which specified emergency countermeasures, such as the seizure and destruction of contaminated materials, evacuation of the local population or closing down the sources of pollution, are to be taken (UN, 1972); (ii) the level at which some kind of preventive action (not necessarily of an emergency nature) is to be taken; (iii) a level of exposure of workers to airborne harmful substances in workrooms to be determined by the competent authority; it is distinctly below the exposure limit and consequently such exposures below the action level do not usually necessitate application of all the preventive measures, especially of a medical nature, foreseen for exposures exceeding the action level. This level may lie between a third and a half of the exposure limit (ILO, 1977).
<b>activated sludge process</b>	removes organic matter from sewage by saturating it with air and microbial organisms.
<b>activation</b>	treatment of a substance by heat, radiation, or activating reagent to produce a more complete or rapid chemical or physical change.
<b>acute effects</b>	Effects that occur rapidly following exposure and are of short duration (WHO, 1979).
<b>acute toxicity</b>	The adverse effects occurring within a short time of administration of a single

		dose or multiple doses given within 24 hours (Hagan, 1959).
<b>acute toxicity test</b>		An experimental animal study in which the adverse effects occur in a short time (from 1-7 days) following the administration of a single or multiple doses of a chemical. The most frequently used acute toxicity test involves determination of the median lethal dose (LD50) of the compound. The LD50 has been defined as "a statistically derived expression of a single administered dose of a material that can be expected to kill 50% of the animals" (WHO, 1978a).
<b>additive effect</b>		An additive effect is the overall consequence which is the result of two chemicals acting together and which is the simple sum of the effects of the chemicals acting independently. See also antagonistic effect, synergistic effect
<b>Adsorption</b>		1. The adherence of atoms, ions or molecules of a gas or liquid to the surface of another substance. Finely divided or microporous materials having a large active surface area are strong adsorbents. Examples include activated carbon, activated alumina and silica gel. 2. the adhesion of an extremely thin layer solid, liquid, or vapor molecules to the surface of a solid or liquid.
<b>advanced treatment</b>	<b>waste</b>	any treatment method or process employed following biological treatment (1) to reduce pollution load (2) to remove substances that may be harmful to receiving waters or the environment (3) to produce a high-quality effluent suitable for reuse in any specific manner or for discharge under critical conditions. The term tertiary treatment is commonly used to denote advanced waste treatment methods.
<b>adverse effect</b>		This is abnormal, undesirable or harmful effect to an organism, indicated by some result such as mortality, altered food consumption, altered body and organ weights, altered enzyme levels or visible (pathological) change. An effect may be classed as adverse effect if it causes functional or anatomical damage, causes irreversible changes or increases the susceptibility of the organism to other chemical or biological stress. A non-adverse effect will usually be reversed when exposure to the chemical ceases.
<b>aerobic</b>		living or occurring only in the presence of oxygen.
<b>aerobic oxidation</b>	<b>biological</b>	any waste treatment process or other process utilizing aerobic organisms, in the presence of air or oxygen, as the agent for reducing pollution load, oxygen demand, or the amount of organic substance in waste. The term is used in reference to secondary treatment of wastes.
<b>aerodynamic diameter of a particle</b>		The diameter of a spherical particle of unit density that has the same settling velocity in air as the particle in question (IAEA, 1978).
<b>aerosol</b>		This is a very broad term applied to any suspension of solid or liquid particles in a gas. They are fine enough in the particle size (0.001 to 100 micrometers) to remain dispersed for a period of the time.
<b>air pollution</b>		The presence of substances in the atmosphere resulting either from human activity or natural processes, present in sufficient concentration, for a sufficient time and under circumstances such as to interfere with the comfort, health, or welfare of persons or the environment (ISO, 1980).
<b>alcohol</b>		1. Any class of organic compounds containing the hydroxyl group, OH. Specifically, the term is applied to ethyl alcohol (C <sub>2</sub> H <sub>5</sub> OH). 2. An organic compound having a hydroxyl (-OH) group attached. The lower molecular weight alcohols, methanol (CH <sub>3</sub> OH), ethanol (C <sub>2</sub> H <sub>5</sub> OH), and propanol

	(C <sub>3</sub> H <sub>7</sub> OH) are water soluble
<b>algaeicide</b>	chemical agent added to water to destroy algae.
<b>Aliphatic</b>	<p>One of the main groups of hydrocarbons characterised by the straight or branched chain arrangement of constituent atoms. Aliphatic hydrocarbons belong to three subgroups:</p> <ol style="list-style-type: none"> <li>1. alkanes or paraffins, all of which are saturated and comparatively unreactive,</li> <li>2. the alkenes or alkadienes which are unsaturated (containing double [C=C] bonds) and more reactive, and</li> <li>3. alkynes, such as acetylene (which contain a triple [C≡C] bond).</li> </ol>
<b>Alkane</b>	<p>An aliphatic hydrocarbon having the chemical formula C<sub>n</sub>H<sub>2n+2</sub>. A normal alkane, or n-alkane is one which does not have a branched carbon backbone. An iso-alkane has a branched, rather than a straight chain, carbon backbone. Alkanes are also known as paraffins. The simplest alkanes are named as follows:</p> <ul style="list-style-type: none"> <li>• CH<sub>4</sub> methane</li> <li>• C<sub>6</sub>H<sub>14</sub> hexane</li> <li>• C<sub>2</sub>H<sub>6</sub> ethane</li> <li>• C<sub>7</sub>H<sub>16</sub> heptane</li> <li>• C<sub>3</sub>H<sub>8</sub> propane</li> <li>• C<sub>8</sub>H<sub>18</sub> octane</li> <li>• C<sub>4</sub>H<sub>10</sub> butane</li> <li>• C<sub>9</sub>H<sub>20</sub> nonane</li> <li>• C<sub>5</sub>H<sub>12</sub> pentane</li> <li>• C<sub>10</sub>H<sub>22</sub> decane</li> </ul>
<b>alkalinity</b>	the capacity of water to neutralize acids, a property imparted by the water's content of carbonate, bicarbonate, hydroxide, and on occasion borate, silicate, and phosphate. It is expressed in milligrams per liter of equivalent calcium carbonate (mg/l CaCO <sub>3</sub> ).
<b>Alkene</b>	A straight chain, unsaturated compound of the olefin series which has the generic formula ..., having at least one double [C=C] bond
<b>Alkyl Group</b>	A functional group having the formula ... which may be attached to certain elements such as lead, silicon, or to other organic chemicals
<b>Alkyne</b>	An unsaturated aliphatic hydrocarbon characterised by the presence of a triple [C≡C] bond. The generic formula for an alkyne is .... The most important member of this group is acetylene, HCCH, the first member of the series
<b>allergen</b>	This descriptor may be used to any substance which produces an allergic reaction.
<b>allergy</b>	A broad term applied to disease symptoms following exposure to a previously encountered substance (allergen), often one which would otherwise be classified as harmless. Essentially it is a malfunction of the immune system. See sensitization
<b>Alloy</b>	A solid or liquid mixture of two or more metals, or of one or more metals with certain nonmetallic elements, as in brass, bronze or carbon steel

<b>alternating current (ac)</b>	current that reverses its direction at regular intervals, such as a common 115 volt circuit.
<b>alum</b>	technically, a double sulfate of ammonium or a univalent or trivalent metal but commonly used to denote aluminum sulfate (Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> ).
<b>Ambient</b>	Pre-existing or normal environment
<b>amines</b>	a class of organic compounds of nitrogen that may be considered as derived from ammonia (NH <sub>3</sub> ) by replacing one or more of the hydrogen atoms by organic radicals, such as CH <sub>3</sub> or C <sub>6</sub> H <sub>5</sub> , as in methylamine and aniline. The former is a gas at ordinary temperature and pressure, but other amines are liquids or solids. All amines are basic in nature and usually combine readily with hydrochloric or other strong acids to form salts.
<b>anaerobic</b>	living or occurring only in the absence of free oxygen.
<b>anaerobic treatment</b>	<b>biological</b> any waste treatment process utilizing anaerobic or facultative organisms in the absence of air to reduce the organic matter in water.
<b>anaerobic treatment</b>	<b>waste</b> (sludge processing) waste stabilization brought about through the action of microorganisms in the absence of air or elemental oxygen.
<b>analytic study</b>	A hypothesis-testing method of investigating the association between a given disease or health state or other dependent variable and possible causative factors. In an analytic study, individuals in the study population may be classified according to absence or presence (or future development) of specific disease and according to "attributes" that may influence disease occurrence. Attributes may include age, race, sex, other disease(s), genetic, biochemical, and physiological characteristics, economic status, occupation, residence, and various aspects of the environment or personal behaviour. Three types of analytic study are cross-sectional (prevalence), cohort (prospective), and case control (retrospective) (Last, 1983).
<b>anhydrous</b>	a term meaning without water.
<b>angstrom</b>	a unit of length, used especially in expressing the length of light waves, equal to one ten-thousandth of a micron, or one hundredth-millionth of a centimeter (1 x 10 <sup>-8</sup> cm).
<b>anion</b>	ion having a negative charge; an atom with extra electrons. Atoms of non-metals, in solution, become anions.
<b>antagonistic effect</b>	This is the consequence of one chemical (or a group of chemicals) interacting: the situation in which the combined effect of two or more chemicals is less than the simple sum of their independent effects. In bioassay, the term may be used to refer to the situation when a specified response is produced by exposure to either of two factors but not by exposure to both together (Last, 1983).
<b>antibody</b>	A protein produced in body in response, and specific for, a foreign substance or antigen.
<b>antigen</b>	The descriptor applied to any substance that produces a specific immune response and is recognised as foreign by the immune system when it enters the tissue of an animal or human
<b>aquifer</b>	a subsurface geological structure that contains water.
<b>Aromatic</b>	An organic compound having as part of its structure a benzene ring. (See Benzene). The term 'aromatic' as used in the fragrance industry is used to describe

	essential oils, which are not necessarily aromatic in the chemical sense.
<b>Arson</b>	The crime of intentionally setting fire to a building or other property. This is a legal definition which may vary depending on the laws of a specific state or country
<b>asbestosis</b>	The damage to the the lungs caused specifically by exposure to, and inhalation of, asbestos fibres.
<b>assay</b>	The quantitative or quantitative evaluation of a hazardous substance; the results of such an evaluation (Last, 1988).
<b>atom</b>	the smallest particle of an element which can exist alone or enter into a chemical combination.
<b>atomic absorption</b>	1. quantitative chemical method used for the analysis of elemental constituents. 2. An analytical technique, used to determine the elemental composition and concentration of many metals and other inorganic elements. The material being analysed, generally in solution, is atomised, or broken up into individual atoms, usually by the action of extreme heat in a flame or small furnace. The ability of the atomised material to absorb characteristic wavelengths of visible or ultraviolet light is then measured using a spectrophotometer.
<b>atomic mass</b>	the mass of an atom expressed in atomic mass units (amu); the total number of protons and neutrons in the nucleus.
<b>atomic mass unit (amu)</b>	a unit of mass equal to 1/12 the mass of the carbon isotope with mass number 12, approximately $1.6604 \times 10^{-24}$ gram.
<b>atomic number</b>	the number of protons in the nucleus of an atom.
<b>atomic weight</b>	the average weight of an atom of an element, usually expressed relative to one atom of the carbon isotope taken to have a standard weight of 12.
<b>Atomise</b>	1) To break down into discrete atoms, usually by the application of extreme heat, as in atomic absorption, 2) To break a liquid into tiny droplets, as occurs in fuel injected engines or in the production of aerosol sprays.
<b>atrophy</b>	The process which is observed during the wasting of a tissue or an organ.
<b>autooxidation</b>	oxidation caused by the atmosphere; an oxidation reaction that is self-catalyzed and spontaneous; an oxidation reaction begun only by an inductor.
<b>Attenuation</b>	An adjustment of the signal amplifier response which results in the reduction of the electronic signal.
<b>Azeotrope</b>	A mixture of two or more compounds which has a constant boiling point. The composition of the vapour above the azeotropic mixture has the same relative concentrations of compounds as does the boiling liquid. Azeotropic mixtures cannot be separated by fractional distillation
<b>backflow prevention</b>	a system designed to protect potable water from wastewater contamination which could occur if wastewater pressure exceeds potable water pressure over a cross-connection where one or more check valves fail.
<b>backsiphonage</b>	the backflow of contaminated or polluted water, from a plumbing fixture or cross-connection into a water supply line, due to a lowering of the pressure in the line.
<b>backwashing</b>	the process of cleaning a rapid sand or mechanical filter by reversing the flow of

	water.
<b>bacteria</b>	any of numerous unicellular microorganisms of the class Schizomycetes, occurring in a wide variety of forms, existing either as free-living organisms or parasites, and having a wide range of biochemical, often pathogenic properties. Some bacteria are capable of causing human, animal or plant diseases; others are essential in pollution control because they break-down organic matter in air and water.
<b>bacterial examination</b>	the examination of water and wastewater to determine the presence, number, and identification of bacteria. Also called bacterial analysis.
<b>banks, sludge</b>	accumulations of solid, sewage, or industrial waste deposits on the bed of a waterway.
<b>base</b>	any substance which contains hydroxyl (OH) groups and furnishes hydroxide ions in solution; a molecular or ionic substance capable of combining with a proton to form a new substance; a substance that provides a pair of electrons for a covalent bond with an acid; a solution with a pH of greater than 7.
<b>benign</b>	This adjective is applied to any growth which does not invade surrounding tissue. See malignant, tumour
<b>Benzene</b>	A hexagonal organic molecule having a carbon atom at each point of the hexagon and a hydrogen atom attached to each carbon atom. Molecules which contain a benzene ring are known as aromatic. Benzene boils at 80°C and has a flash point of 12°F (-11°C). The explosive limits are 1.5% to 8% by volume in air.
<b>bias</b>	<p>Deviation of results or inferences from the truth, or processes leading to such deviation. Any trend in the collection, analysis, interpretation, publication, or review of data that can lead to conclusions that are systematically different from the truth. Among the ways in which deviation from the truth can occur, are the following:</p> <ol style="list-style-type: none"> <li>1. Systematic (one-sided) variation of measurements from the true values (synonym: <u>systematic</u> error).</li> <li>2. Variation of statistical summary measures (means, rates, measures of association, etc.) from their true values as a result of systematic variation of measurements, other flaws in data collection, or flaws in study design or analysis.</li> <li>3. Deviation of inferences from the truth as a result of flaws in study design, data collection, or the analysis or interpretation of results.</li> <li>4. A tendency of procedures (in study design, data collection, analysis, interpretation, review or publication) to yield results or conclusions that depart from the truth.</li> <li>5. Prejudice leading to the conscious or unconscious selection of study procedures that depart from the truth in a particular direction, or to one-sidedness in the interpretation of results.</li> </ol> <p>(from Last, 1988).</p>
<b>bioassay</b>	an assay method using a change in biological activity as a qualitative or

	quantitative means of analyzing a material response to industrial waste and other wastewater by using viable organisms or live fish as test organisms.
<b>bioaccumulation</b>	The process by which the amount of a substance in a living organism (or its parts) increases with time (WHO, 1979).
<b>bioavailability</b>	(synonym: <b>biological availability, physiological availability</b> ): The extent to which a chemical substance to which the body is exposed (by ingestion, inhalation, injection, or skin contact) reaches the systemic circulation, and the rate at which this occurs. It is recognized that the bioavailability (for gastrointestinal absorption) of, for example, both essential and non-essential metals, depends on various factors including the composition of the diet and the type of the chemical compound and its state of dispersion. For instance, the absorption of lead and cadmium is increased if the food is deficient in calcium or iron (WHO, 1979).
<b>biochemical mechanism</b>	This is the general term for any chemical reaction or series of reactions, usually enzyme catalysed, which produces a given physiological effect in a living organism.
<b>biochemical demand (BOD)</b>	<b>oxygen</b> the quantity of oxygen used in the biochemical oxidation of organic matter in a specified time, at a specified temperature, and under specified conditions; standard test used in assessing wastewater biological oxygen demand.
<b>biocides</b>	chemical agents with the capacity to kill biological life forms. Bactericides, insecticides, pesticides, etc. are examples.
<b>bioconcentration</b>	A process leading to a higher concentration of a chemical in the organism relative to its environment (WHO, 1979).
<b>biodegradability</b>	the susceptibility of a substance to decomposition by microorganisms; specifically, the rate at which compounds may be chemically broken down by bacteria and/or natural environmental factors.
<b>biological assessment of exposure</b>	Exposure to chemicals may be assessed by the analysis of specimens taken in the environment (air, water, food, etc.) or of specimens of biological material. Most often, urine and blood are analyzed, but other materials such as expired air, faeces, saliva, bile, hair, and biopsy or autopsy material are sometimes analyzed. In these samples, the content of the xenobiotic(s) or its metabolite(s) is determined and, on this basis, the exposure level (concentration in the air, absorbed amount of the substance) or the probability of health impairment due to exposure is derived. Biochemical changes in the components of an organism can also be used for this purpose (e.g., changes in enzyme activity or in the excretion of metabolic intermediates) if they show a relationship to the exposure (WHO, 1979).
<b>biological assessment of exposure</b>	Mainly used for hygienic evaluation of workplaces (deducing from the analytical results the level of exposure, sometimes even correlations with the concentration in the air, the possible absorption by other routes than inhalation, etc.) and for medical prevention or diagnostics (probability of health impairment at certain values of the exposure test). The definition of biological assessment of exposure should include only the chemical and haematological analyses already mentioned and should not be extended to include indicators of general health or sickness, or functional tests (WHO, 1979).
<b>biological cycle</b>	The process through which a chemical substance passes in the biosphere. It may involve transport through the various media (air, water, soil), followed by environmental transformation, and carriage through various ecosystems.

	Chemical compounds that occur naturally have a natural biological cycle (WHO, 1979).
<b>biological half-life</b>	(synonym: <b>biological half-time</b> ): The time required for the amount of a particular substance in a biological system to be reduced to one-half of its value by biological processes when the rate of removal is approximately exponential (ISO, 1972). For a one-compartment system describing an exponential biological process, biological half-life = $\log 2/f$ where $f$ = elimination or decay constant.
<b>biological monitoring</b>	The periodic examination of biological specimens (in accordance with the definition of monitoring). It is usually applied to exposure monitoring but can also apply to effect monitoring (WHO, 1979).
<b>biological wastewater treatment</b>	forms of wastewater treatment in which bacterial or biochemical action is intensified to stabilize, oxidize, and nitrify the unstable organic matter present. Intermittent sand filters, contact beds, trickling filters, and activated sludge processes are examples.
<b>biomagnification</b>	(or <b>ecological magnification</b> ): A sequence of processes in an ecosystem by which higher concentrations are attained in organisms of higher trophic level, i.e., of higher levels in the food chain (Dustman & Stickel, 1969).
<b>biomass</b>	The total amount of biotic material, usually expressed per unit surface area or volume of a medium such as water (WHO, 1979).
<b>biomonitoring</b>	the use of living organisms to test the suitability of effluent for discharge into receiving waters and to test the quality of such waters downstream from a discharge.
<b>biota</b>	Living organisms (WHO, 1979).
<b>biotransformation</b>	A process in which a chemical is modified by a living organism (WHO, 1979).
<b>blowdown</b>	removal of liquids and/or solids from a process vessel or storage vessel or line by the use of pressure; often used to remove materials which, in high concentrations, could cause damage to the vessel or line, or exceed limits established by best engineering practices.
<b>blowoff</b>	a controlled outlet on a pipeline, tank, or conduit which is used to discharge water or accumulations of material carried by the water.
<b>BOD (Biochemical Oxygen Demand)</b>	This is defined as the mass of dissolved oxygen required by a specific volume of solution of the substance for process of biochemical oxidation under prescribed conditions. The measurement of BOD indicates the ability of micro-organisms to metabolise an organic substance in the presence of oxygen and thus indicates the potential for depletion of oxygen by the substance. Refers to degradation.
<b>breakdown</b>	failure of insulator or insulating medium to prevent discharge or current flow.
<b>british thermal unit (btu)</b>	British Thermal Unit. The amount of heat energy required to raise the temperature of one pound of water one degree Fahrenheit. This is the accepted standard for the comparison of heating values of different fuels. One BTU equals 252 calories
<b>buffer</b>	a solution selected or prepared to minimize changes in hydrogen ion concentration which would otherwise occur as a result of a chemical reaction..
<b>bulking agent</b>	a fine, solid material which is sometimes added to a wastewater stream to produce clarification or coagulation by adding bulk to the solids.
<b>Burning</b>	Normal combustion in which the oxident is molecular oxygen

<b>Burning Rate</b>	The rate at which combustion proceeds across a fuel. A specialised use of this term, describes the rate at which the surface of a pool or burning liquid recedes. For gasoline, this rate is reported to be approximately ¼ inch per minute
<b>Butane</b>	A fuel gas having the formula C <sub>4</sub> H <sub>10</sub> . A constituent of LP gas. One pound of liquid butane produces 6.4 cubic feet of gas. One gallon of liquid butane weighs 4.87 pounds and produces 31 cubic feet of gas. One cubic foot of butane gas produces 3266 BTUs
<b>cake, sludge</b>	the material resulting from air drying or dehydrating sludge.
<b>calibration</b>	the checking, adjusting, or systematic standardizing of the graduations of a quantitative measuring instrument.
<b>calorie</b>	the quantity of heat necessary to raise the temperature of 1 gram of water 1 oC at 1 atmosphere pressure.
<b>cancer</b>	Cancer is a disease which results from the development of a malignant tumour and its spread into the surrounding tissues. See tumour.
<b>Capillary</b>	A narrow bore glass tube. Capillary column gas chromatography employs glass tubes having an inside diameter of approximately .2 to .5 millimetres and a length of 3 to 300 metres. The walls of a capillary column are coated with an adsorbent medium (a liquid phase in which the sample dissolves).
<b>Carbon</b>	The element upon which all organic molecules are based. Carbon has an atomic weight of 12.00, and occurs elementally in these forms: diamond, graphite and amorphous carbon such as coal or carbon black
<b>Carbon Dioxide</b>	A molecule consisting of one atom of carbon and two atoms of oxygen which is a major combustion product of the burning of organic materials. Carbon Dioxide (CO <sub>2</sub> ) is the result of complete combustion of carbon. In the gaseous form, CO <sub>2</sub> is used as a fire extinguisher. In the solid form, CO <sub>2</sub> is known as dry ice. CO <sub>2</sub> is heavier than air, with a vapour density if 1.53 (air = 1.00).
<b>Carbon Disulfide</b>	A highly flammable nonpetroleum solvent used for gas chromatography because of its relatively low signal generated in a flame ionisation detector. Carbon disulfide has the formula CS <sub>2</sub> . Reagent grade CS <sub>2</sub> has an odour similar to rotten broccoli and can be ignited by contact with boiling water. It burns with a blue flame, providing CO <sub>2</sub> and SO <sub>2</sub> (sulfur dioxide). The explosive limits of CS <sub>2</sub> are 1 to 50%. CS <sub>2</sub> has a flash point of -22°F.
<b>Carbon Monoxide</b>	A gaseous molecule having the formula CO, which is the product of incomplete combustion of organic materials. Carbon monoxide has an affinity for haemoglobin approximately 200 times stronger than oxygens and is highly poisonous. CO is a flammable gas which burns with a blue flame and has explosive limits of 12% to 75%. Carbon monoxide has approximately the same vapour density as air, 0.97 air (air = 100).
<b>Carbon Tetrachloride</b>	A nonflammable liquid having the formula CCl <sub>4</sub> , formerly used as a fire extinguisher, and still used as a solvent and cleaning agent. Carbon tetrachloride boils at 77°C.
<b>carcinogen</b>	An agent, chemical, physical or biological, that can act on living tissue in such a way as to cause a malignant neoplasm (WHO, 1980).
<b>carcinogenesis</b>	The induction by chemical, physical, or biological agents, of neoplasms that are usually not observed, an earlier induction of neoplasms that are usually observed, and/or the induction of more neoplasms than are usually found although

	fundamental differences in the mechanisms may be involved (IARC, 1977).
<b>catalyst</b>	a substance that alters the velocity of a chemical reaction and may be recovered essentially unaltered in form and amount at the end of the reaction.
<b>cation</b>	a positively charged atom or group of atoms, or a radical which moves to the negative pole (cathode) during electrolysis.
<b>caustic</b>	capable of destroying or eating away by chemical action; a hydroxide of a light metal.
<b>caustic soda</b>	sodium hydroxide, NaOH.
<b>ceiling value (CV)</b>	The maximum permissible airborne concentration of a potentially toxic substance and is a concentration that should never be exceeded in the breathing zone.
<b>Chain Reaction</b>	A self-propagating chemical reaction in which activation of one molecule leads successfully to activation of many others. Most, perhaps all, combustion reactions are of this kind.
<b>chemical analysis</b>	the use of a standard chemical analytical procedures to determine the concentration of a specific analyte in a sample, or qualitatively or quantitatively measure a specific parameter of a sample.
<b>chemical coagulation</b>	the destabilization and initial aggregation of colloidal and finely divided suspended matter by the addition of a floc-forming chemical.
<b>Chemical Change</b>	Rearrangement of the atoms, ions or radicals or one or more substances, resulting in the formation of new substances, often having entirely different properties. Also known as a chemical reaction
<b>chemical oxygen demand</b>	the amount of oxygen required for the chemical oxidation of organics in a liquid; a chemical test that determines the oxygen equivalent of the amount of organic matter oxidizable by potassium dichromate in a 50% sulfuric acid solution.
<b>chemical precipitation</b>	(1) the process of utilizing chemicals to produce a separable solid phase within a liquid medium; in analytical chemistry, precipitation is used to separate a solid phase in an aqueous solution. (2) the process of softening water by the addition of lime and soda ash as the precipitants.
<b>Chemistry</b>	A basic science concerned with <ol style="list-style-type: none"> <li>1. the structure and behaviour of atoms (elements);</li> <li>2. the composition and properties of compounds;</li> <li>3. the reactions that occur between substances and the resultant energy exchange and</li> <li>4. the laws that unite these phenomena into a comprehensive system.</li> </ol>
<b>chemobiokinetics</b>	The process of the uptake of chemical substances by the body, the biotransformation they undergo, the distribution of the substances and their metabolites in the tissues, and the elimination of the substances and their metabolites from the body. Both the amounts and the concentrations of the substances and their metabolites are studied. The term has essentially the same meaning as pharmaco-kinetics, but the latter term should be restricted to the study of pharmaceutical substances (WHO, 1979).
<b>chlorination</b>	the addition of chlorine to water or wastewater, generally for the purpose of disinfecting, but frequently done to achieve other biological or chemical results.

<b>chlorination break point</b>	the addition of chlorine to water, sewage, or industrial waste containing free ammonia to the point where free residual chlorine is available.
<b>chlorination, free residual</b>	the addition of chlorine to water, sewage or industrial wastes to produce, directly or through the destruction of ammonia or certain organic nitrogenous compounds, a free available chlorine residual.
<b>chlorine, available</b>	the quantity of chlorine released by a bleaching powder when treated with acid.
<b>chlorine, combined available residual</b>	that portion of the total residual chlorine remaining in water, sewage or industrial waste at the end of a specified contact period, which will react chemically and biologically as chloramines or organic chloramines.
<b>chlorine demand</b>	the quantity of chlorine absorbed by wastewater (or water) in a given length of time.
<b>chlorine, total residual</b>	free residual chlorine plus combined residual chlorine.
<b>cholinesterase and pseudocholinesterase inhibitors</b>	These are substances which inhibit the cholinesterase-enzyme activity and thus enhance and subsequently prevent transmission of nerve impulses from one nerve cell to another or to a muscle.
<b>Chromatogram</b>	A series of peaks and valleys printed or written on a paper chart where each peak represents a component or mixture of two or more unresolved components in a mixture separated by gas or liquid chromatography
<b>Chromatography</b>	A chemical separation procedure which separates compounds according to their affinity for an adsorbent or absorbent material. Chromatography includes Thin Layer Chromatography (TLC), Liquid Chromatography (LC), Gas Chromatography (GC), (sometimes called Gas Liquid Chromatography or GLC) and High Performance Liquid Chromatography (HPLC).
<b>chromosomal aberration:</b>	Any abnormality of chromosome number or structure may be described as an aberration
<b>chronic effects</b>	Effects that develop slowly and have a long duration. They are often, but not always, irreversible. Some irreversible effects may appear a long time after the chemical substance was present in the sensitive tissue. For such delayed or late effects, the latent period (or the "time to occurrence" of an observable effect) may be very long, particularly if the level of exposure is low (WHO, 1979).
<b>chronic toxicity test</b>	A study in which animals are observed during the whole life span (or the major part of the life span) and in which exposure to the test material takes place over the whole observation time or a substantial part thereof. The term "long-term toxicity study" is sometimes used as a synonym for "chronic toxicity study" and sometimes to signify a study that falls in between subacute (short-term toxicity studies) and chronic toxicity studies (WHO, 1978a).
<b>circuit</b>	a path through which an electrical current can flow when the path is complete.
<b>clarification</b>	the composite wastewater treatment process consisting of flash mixing of coagulants, pH adjusting chemicals, and/or polyelectrolytes, flocculation, and sedimentation.
<b>clarifier</b>	a unit which provides for settling and removal of solids from wastewater.
<b>clastogen</b>	A clastogen is any substance which causes chromosomal breaks.
<b>coagulation</b>	the clumping of particles in order to settle out impurities; often induced by chemicals such as lime or alum.

<b>COD (Chemical Oxygen Demand)</b>	The amount of oxygen required to oxidize the substance chemically. Refers to degradation
<b>coliform organisms</b>	any of a number of organisms whose presence in wastewater is an indicator of pollution and of potentially dangerous bacterial contamination.
<b>Combustible Liquid</b>	A liquid which is capable of forming a flammable vapour/air mixture. All flammable liquids are combustible. Whether a liquid is flammable or combustible depends on its flash point and on the agency definition relied upon. The US Coast Guard classifies all liquid having a flash point over 80°F as combustible and liquids with a flash point below 80°F as flammable. The NFPA uses 100°F.
<b>Combustion</b>	An exothermic chain reaction between oxidising and reducing agents, or between oxygen and fuel. combustion may occur with any organic compound, or with certain combustible elements such as hydrogen, sulfur and finely divided metals
<b>complexing</b>	the use of chelating or sequestering agents to form relatively loose chemical bonding as a means of treating certain pollutants such as nickel, copper, and cobalt.
<b>compound</b>	1. two or more elements combined; a substance having different properties than of the elements used. 2. A chemical combination of two or more elements, or two or more different atoms arranged in the same proportions and in the same structure throughout the substance. A compound is different from a mixture in that the components of a mixture are not chemically bonded together. For example, a flask may contain two volumes of hydrogen (H <sub>2</sub> ) gas and one volume of oxygen gas (O <sub>2</sub> ). A different glass might contain only water vapour (H <sub>2</sub> O). In the first case, two gases are mixed. In the second case, only one gas is present.
<b>concentrated</b>	being of full strength, or undiluted.
<b>concentration</b>	1. in solutions, the mass, volume, or number of moles of solute present in proportion to the amount of solvent or total solution Common measures are; molarity, normality, percent, molality, and by specific gravity scales. 2. A general term referring to the quantity of a material or substance contained in unit quantity of a given medium. When the term concentration is used without further qualification, it now means amount of substance concentration (WHO, 1979).
<b>condensate</b>	water obtained by evaporation or a product that has changed from a gaseous or vaporous form to a liquid form.
<b>conditional acceptable daily intake</b>	A conditional acceptable daily intake is one that is established for a pesticide in order to limit its use to those situations where no satisfactory substitutes are available. This definition will be the subject of further discussion. The allocation of conditional ADIs for intentional food additives has been superseded (Vettorazzi, 1980).
<b>conductance</b>	a measure of the conducting power of a solution equal to the reciprocal of the resistance. The resistance is expressed in ohms.
<b>conductivity</b>	ability of a material to carry current or heat.
<b>contact coagulation</b>	a water clarification process which involves the addition of a coagulant with appropriate mixing for the purpose of floc formation within a filter media, which will be periodically back-flushed to permit the separation of the resulting solids from the main wastewater stream.

<b>contaminant</b>	In some contexts (e.g., in relation to gas cleaning equipment), used as a synonym for pollutant (ISO, 1979).
<b>contamination</b>	a general term signifying the introduction into water of microorganisms, chemicals, wastes or sewage which renders the water unfit for its intended use.
<b>cooling tower</b>	a device for cooling water through a combination of sensible and evaporative heat transfer. Water passes over a number of wooden or plastic racks known as "fill", that act as a heat-transfer surface.
<b>Convection</b>	Transfer of heat by the movement of molecules in a gas or liquid with the less dense fluid rising. The majority of heat transfer in a fire is by convection.
<b>corrosive of tissue</b>	The descriptor applied to any substance which destroys tissues on direct contact.
<b>Corrosion</b>	The degradation of metals or alloys due to reaction with their environment. It is accelerated by acids, bases or heats
<b>Cracking</b>	A refining process involving decomposition and molecular recombination of organic compounds, especially hydrocarbons obtained by distillation of petroleum, by means of heat, to form molecules suitable for various uses such as motor fuels, solvent or plastics. Cracking takes place in the absence of oxygen
<b>current</b>	a movement of electrons through a conductor. Measured in amperes.
<b>decant</b>	to remove the liquid portion of a settled mixture without disturbing the sediment.
<b>dechlorination process</b>	a process by which excess chlorine is removed from water to a desired level. Usually accomplished by chemical reduction, by passage through carbon beds or by aeration at a suitable pH.
<b>Deflagration</b>	Vigorous burning with subsonic flame propagation
<b>degradable</b>	that which can be reduced, broken down or chemically separated.
<b>degreasing</b>	the process of removing greases and oils from sewage, waste, and sludge.
<b>demineralization</b>	removal from water of mineral contaminants. Methods include ion exchange, flash distillation, electrodialysis, or reverse osmosis.
<b>Desorption</b>	the process of removing an adsorbed material from the solid on which it is adsorbed
<b>detention time</b>	the time allowed for solids to collect in a settling tank. Theoretically detention time is equal to the volume of the tank divided by the flow rate.
<b>Detonation:</b>	An exothermic chemical reaction which propagates through reactive material at supersonic speed
<b>dew point</b>	the temperature at which the condensation of a vapor begins; the term is usually applied to condensation of moisture from the water vapor in the atmosphere.
<b>dialysis</b>	the separation of a colloid from a substance in solution by allowing the solution to diffuse through a semipermeable membrane.
<b>diatomaceous earth</b>	a filter medium used for filtration of effluents from secondary and tertiary treatments, particularly when a very high grade of water for reuse in certain industrial purposes is required; used as an absorbant for oils and oily emulsions in some wastewater treatment designs; also used historically in preparing standard suspensions for turbidity measurements.
<b>Diesel Fuel</b>	Diesel Fuel consists mostly of hydrocarbons ranging from C10 to C24. The composition of diesel fuel may vary with changes in latitude or changes in season.

	this variability is provided by the refinery to control the volatility of the product. In order to be identified as diesel fuel, a sample extract must exhibit a homologous series of five or more consecutive normal alkanes ranging from C12 through C22. Diesel fuel has a flash point of 120 to 160°F and explosive limits of 0.7% to 5%. Many states specify a minimum flash point for diesel fuel.
<b>digestion</b>	the biochemical decomposition of organic matter which results in the formation of mineral compounds and simple organic compounds.
<b>DI water</b>	deionized water, having had all the ions removed.
<b>diluent</b>	the thinning agent used to dilute a fluid, usually water.
<b>dilute</b>	to thin out, or having been thinned out; less than full strength.
<b>diode</b>	a component that readily passes current in one direction but opposes current flow in the opposite direction.
<b>direct current (dc)</b>	a non-oscillating current that flows continually in one direction through a circuit
<b>disinfection</b>	effective killing by chemical or physical processes of all organisms capable of causing infectious disease. Chlorination is the disinfection method commonly employed in sewage-treatment processes.
<b>dissolved oxygen (DO)</b>	the oxygen dissolved in sewage, water, or other liquid, usually expressed in milligrams per liter or percent of saturation. It is the test used in BOD determination. dissolved solids
<b>distillation</b>	the process of heating a liquid to its boiling point, removing the vapors through a cooling and condensing apparatus, and finally collecting the condensed liquid in a separate receiver. It is commonly used for the separation of two or more liquids in a mixture, or for the separation of the solvent from dissolved substances.
<b>distilled water</b>	water that has been purified by distillation (boiling the water off as steam and condensing it back to a liquid, leaving the impurities behind). Having been boiled, it is also sterile.
<b>Drying Oil</b>	An organic liquid which, when applied as a thin film, readily absorbs oxygen from the air and polymerises to form a tough elastic film. Linseed, tung, soybean and castor oils are drying oils. Under certain conditions, usually involving large surface areas and insulation, such as a pile of rags soaked with drying oils, spontaneous heating may occur.
<b>edta titration (edta)</b>	ethylenediaminetetraacetic acid (or its salts). A standard method of measuring the hardness of a solution.
<b>effluent</b>	a liquid that has passed through a processing operation.
<b>effluent limitation</b>	any restriction (including schedules of compliance) established by a state or EPA on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable water, the waters of the contiguous zone, or the ocean.
<b>electron</b>	the sub-atomic particle, with a negative charge, that orbits the nucleus of an atom.
<b>Electron Capture Detector (ECD):</b>	A type of gas chromatographic detector which is sensitive to halogenated hydrocarbons and other molecules capable of easily gaining an electron. Electron capture is not generally used for hydrocarbon detection.
<b>element</b>	1. a substance that cannot be resolved into two or more other substances; a

	substance made up of atoms with the same atomic number. 2. One of 106 presently known kinds of substances that comprise all matter at and above the atomic level
<b>Elution</b>	the process of removing absorbed materials from the surface of an adsorbent such as activated charcoal. the solvent in this process is called the eluant
<b>Emission Spectroscopy</b>	The study of the composition of substances and identification of elements by observation of the wavelengths of radiation emitted by the substance as it returns to a normal state after excitation by an external source. Generally used for elemental analysis
<b>emulsion</b>	a liquid system in which one liquid is finely dispersed in another liquid in such a manner that the two will not separate through the action of gravity alone.
<b>end point</b>	that stage in the titration at which an effect, such as a color change, occurs, indicating that a desired point in the titration has been reached.
<b>Endothermic Reaction</b>	A chemical reaction which absorbs heat
<b>enrichment</b>	the addition of nitrogen, phosphorous, and carbonaceous compounds, or other nutrients into a lake or other waterway that greatly increases the growth potential for algae and other aquatic plants. Most frequently, enrichment results from the inflow of sewage effluents or from agricultural runoff.
<b>Ethane</b>	A simple alkane having the formula C <sub>2</sub> H <sub>6</sub> . A minor component of natural gas. Its explosive range is 3% to 12.5%. Ethane has approximately the same vapour density as air
<b>Ethanol</b>	Ethyl alcohol. Grain alcohol. Flammable, water soluble alcohol. Flash point of 55°F. Explosive limits of 3.3% to 19%
<b>Ether</b>	Diethyl ether, ethyl ether. A highly flammable solvent which can form explosive peroxides when exposed to air. Flash point of -49°F. Explosive range of 1.85% to 48%.
<b>Ethylbenzene</b>	A component of gasoline, but also a major breakdown product or pyrolysis product given off when certain polymers are heated
<b>Eutetic</b>	the lowest melting point of an alloy or solution of two or more substances (usually metals) that is obtainable by varying the percentage of the components. Eutetic melting sometimes occurs when molten aluminium or molten zinc comes in contact with solid steel or copper.
<b>Evaporation</b>	Conversion of a liquid to the vapour state. See also vaporisation
<b>Evaporation Rate</b>	A measure of the quantity of a liquid converted to vapour in a unit of time. Among single component liquids, the rate varies directly with the surface area, the temperature and the vapour pressure, and inversely with the latent heat of vaporisation of the liquid.
<b>Exothermic Reaction:</b>	A chemical reaction which evolves heat. Combustion reactions are exothermic
<b>Explosion</b>	The sudden conversion of chemical energy into kinetic energy with the release of heat, light and mechanical shock
<b>Explosive Limit</b>	Flammability limit. The highest or lowest concentration of a flammable gas or vapour in air that will explode or burn readily when ignited. The limit is usually expressed as a volume percent of gas or vapour in air.
<b>Explosive Range</b>	Flammability range. The set of all concentrations between the upper and lower

	explosive limits of a particular gas or vapour
<b>Extraction</b>	A chemical procedure for removing one type of material from another. Extraction is generally carried out by immersing a solid in a liquid, or by shaking two immiscible liquids together, resulting in the transfer of a dissolved substance from one liquid to another. Solvent extraction is one of the primary methods of sample preparation in arson debris analysis
<b>facultative</b>	having the power to live under different conditions either with or without oxygen.
<b>Falcon Spill Absorbents (FSA)</b>	FSA, are leaders in Spill absorbents. We supply worldwide and our products are appreciate for all kind of spills. Info: <a href="mailto:sales@falconspllabsorbents.com">sales@falconspllabsorbents.com</a> or <a href="http://www.falconspllabsorbents.com">www.falconspllabsorbents.com</a>
<b>filtration</b>	the process of separating solids from a liquid by means of a porous substance through which only the liquid can pass.
<b>filter backwash</b>	the reversal of flow though a filter to wash clogged material out of the filter medium and reduce conditions causing loss in flow through the filter.
<b>Fire</b>	The light and heat manifested by the rapid oxidation of combustible materials. A flame may be manifested but is not required
<b>Fire Point</b>	The temperature, generally a few degrees above the flash point, at which burning is self-sustaining after removal of an ignition source
<b>Fire Tetrahedron</b>	Fuel, heat, oxygen and a chemical chain reaction
<b>Fire Triangle</b>	Fuel, heat and oxygen
<b>Flame</b>	A rapid gas phase combustion process characterised by self-propagation
<b>Flame Ionisation Detector (FID)</b>	A nearly universal gas chromatographic detector. It responds to almost all organic compounds. An FID does not respond to nitrogen, hydrogen, helium, oxygen, carbon monoxide or water. This detector ionises compounds as they reach the end of the chromatographic column by burning them in an air/hydrogen flame. As the compounds pass through the flame, the conductivity of the flame changes, generating a signal. The is the most commonly used detector in arson debris analysis.
<b>Flame Propagation:</b>	Travel of a flame through a combustible gas/air or vapour/air mixture
<b>Flammable Liquid</b>	A combustible liquid that has a flash point below 80°F according to the Coast Guard, 100°F according to the NFPA. Liquids having a vapour pressure over 40 pounds per square inch at 100°F are classified as flammable gases. Flammable liquids are a special group of combustible liquids
<b>Flammable Vapour</b>	A vapour/air mixture of any concentration within the flammability range of that vapour.
<b>Flash Fire</b>	A fire that spreads with unusual speed, as one that races over flammable liquid of through combustible gases
<b>Flash Point</b>	The temperature at which a pool of liquid will generate sufficient vapours to form an ignitable vapour/air mixture. The temperature at which a liquid will produce its lower explosive limit in air. Flash point describes one of several specific laboratory tests. Frequently materials can be made to burn below their flash point if increased surface area or mechanical activity raise the concentration of vapour in air above the lower explosive limit

<b>floatation</b>	the process of removing finely divided particles from a liquid suspension by agitating the liquid with gas bubbles thus increasing the buoyancy of the particles, and concentrating them at the surface of the liquid medium.
<b>floc</b>	a very fine, fluffy mass formed by the aggregation of fine suspended particles.
<b>flocculation</b>	the process of separating suspended solids from wastewater by chemical creation of a coagulated, or flocculent masses.
<b>flowrate</b>	usually expressed as liters/minute (gallons/minute) or liters/day. Design flowrate is that used to size the wastewater treatment process. Peak flowrate is 1.5 to 2.5 times design and relates to the hydraulic flow limit and is specified for each plant.
<b>fluid</b>	a substance which yields readily to any force which tends to alter its shape; fluids possess no definite shape; the term includes both liquids and gases.
<b>flux</b>	a material used to promote joining of metals in soldering.
<b>formazin</b>	a polymer suspension used as the standard for turbidity.
<b>formazin nephelometric unit (FNU)</b>	an industry standard unit measurement used in the European Union, equivalent to NTU.
<b>formazin turbidity unit (FTU)</b>	a measure of water turbidity equivalent, but not equal, to Jackson Turbidity Units (JTU).
<b>formula</b>	an expression of chemical composition, using symbols and figures.
<b>Fractionation</b>	The separation of one group of compounds in a mixture from another, generally by distillation
<b>Fuel Oil</b>	A heavy petroleum distillate ranging from #1 (kerosene or range oil), #2 (diesel fuel), up through #6 (heavy bunker fuels). To be identified as fuel oil, a sample must exhibit a homologous series of normal alkanes ranging from C9 upward.
<b>FNU</b>	see formazin nephelometric unit.
<b>FTU</b>	see formazin turbidity unit.
<b>fuse</b>	a protective device containing a short piece of wire that melts and breaks when current through it exceeds a rated value, thus de-energizing the circuit.
<b>gas</b>	a fluid having neither independent shape nor volume, but tending to expand indefinitely. The word is often used to denote anesthetics, combustibles (gasoline), poisonous materials, etc., whether liquid or solids at ordinary temperatures.
<b>Gas Chromatography</b>	also known as Gas Liquid Chromatography): The separation of organic liquids or gases into discrete components or compounds seen as peaks on a chromatogram. Separation is done in a column which is enclosed in an oven held at a specific temperature, or programmed to change temperature at a reproducible rate. The column separates the compounds according to their affinity for the material inside the column (stationary phase). Columns can be either packed or capillary. Packed columns employ a powdery substance which may be coated with a nonvolatile liquid phase. A capillary column is a glass or quartz tube coated with a nonvolatile liquid. Gas Chromatography (GC) is the accepted method for identification of hydrocarbon mixtures normally used as accelerants, and must be performed in order to have a valid identification of petroleum distillates.
<b>Gasoline</b>	A mixture more than 200 volatile hydrocarbons in the range of C4 to C12, suitable for use in spark ignited internal combustion engine. Regular automotive

	gasoline has a flash point of -40°F
<b>grab sample</b>	a single sample of wastewater taken at neither set time nor flow.
<b>group</b>	a family of elements with similar chemical properties, represented by a vertical column in the periodic table.
<b>ground wire</b>	a conductor leading from electrical equipment to a low resistance connection with the earth.
<b>hardness</b>	a characteristic of water, imparted by salts of calcium, magnesium, and iron, such as bicarbonates, carbonates, sulfates, chlorides, and nitrates that cause curdling of soap, deposition of scale in boilers, damage in some industrial process, and sometimes objectionable taste. It may be determined by a standard laboratory procedure or computed from the amounts of calcium and magnesium as well as iron, aluminum, manganese, barium, strontium, and zinc; expressed as equivalent parts per million of calcium carbonate.
<b>Headspace Concentration</b>	A technique for concentrating all or most of the flammable or combustible liquid vapours in a sample onto a tube of charcoal, a wire coated with charcoal, a charcoal coated polymer, or some other adsorbing material which will later be desorbed in order to analyse the concentrated vapours. This is a primary form of sample preparation in arson debris analysis. This is also known as adsorption/elution, vapour concentration, or total headspace.
<b>Heat</b>	A mode of energy associated with and proportional to molecular motion that may be transferred from one body to another by conduction, convection or radiation.
<b>heavy metals</b>	a general term given to the ions of metallic elements such as copper, zinc, chromium, and aluminum. They are removed from wastewater by forming an insoluble precipitate (usually a metallic hydroxide).
<b>Heptane</b>	An alkane having the formula C <sub>7</sub> H <sub>16</sub> , flash point of 25°F and explosive limits of 1.2% to 6.7%.
<b>hertz (Hz)</b>	in electrical/electronic applications with alternating current, a unit of frequency where 1 Hz equals one cycle per second.
<b>Hexane</b>	An alkane having the formula C <sub>6</sub> H <sub>14</sub> . Flash point -9°F. Explosive limits of 1.2% to 7.5%.
<b>Homologous Series</b>	A series of similar organic compounds, differing only in that the next higher member of the series has an additional CH <sub>2</sub> group (one carbon atom and two hydrogen atoms) in its molecular structure. Fuel oils are characterised by the presence of an identifiable homologous series of normal alkanes.
<b>hot (circuit)</b>	connected, alive, energized.
<b>hydrocarbon</b>	a chemical compound containing only hydrogen and carbon; the largest source of hydrocarbons comes from petroleum crude oil.
<b>Hydrogen</b>	The simplest element. Atomic Number 1. Hydrogen gas has a specific gravity of 0.0694 (air = 1), so it is much lighter than air. Hydrogen is highly flammable, forming water upon combustion. Explosive limits are 4% to 75%.
<b>hydrogenation</b>	the infusing of unsaturated or impure hydrocarbons with hydrogen gas at controlled temperatures and pressures for the purpose of obtaining saturated hydrocarbons and/or removing various impurities such as sulfur and nitrogen.
<b>hydrogen concentration</b>	<b>ion</b> the normality of a solution with respect to hydrogen ions, H <sup>+</sup> ; it is related to acidity measurements in most cases by the equation $pH = \log \frac{1}{2} [1/(H^+)]$ where

	H <sup>+</sup> is the hydrogen ion concentration in gram equivalents per liter of solution.
<b>hydroxyl radical</b>	an oxygen and hydrogen atom occurring as a group (OH <sup>-</sup> ).
<b>impedance</b>	total opposition to flow of current, measured in ohms; combined effort of resistance, inductance, and capacitance.
<b>incineration</b>	the combustion of organic matter in wastewater sludge solids after water evaporation from the solids.
<b>indicator</b>	a compound that changes color at a particular pH, or over a particular narrow range of pH, used to show titration end points.
<b>influent</b>	sewage, water or other liquid, either raw or partly treated, flowing into a reservoir basin, or treatment plant or any part thereof.
<b>Ignition</b>	The means by which burning is started
<b>Ignition Temperature</b>	The minimum temperature to which a fuel must be heated in order to initiate of cause self sustained combustion independent of another heat source.
<b>Immiscible</b>	Describes substances of the same phase or state of matter (usually liquids) that cannot be uniformly mixed or blended
<b>Incendiaries</b>	Substances or mixtures of substances consisting of a fuel and an oxidiser used to initiate a fire.
<b>Incidental Accelerants</b>	Flammable or combustible liquids which are usual and incidental to an area where they are detected. Gasoline is incidental to an area where gasoline powered appliances are kept. Kerosene is incidental to an area where a kerosene heater is kept. Flammable liquids may also comprise a part of a product such as insecticide, furniture polish, or paint. Additionally certain ----- containing building materials may yield ----- of fuel oil components
<b>Infrared Spectrophotometry (IR)</b>	An analytical technique which utilises an instrument which passes infrared radiation through a sample or which bounces infrared radiation off the surface of a sample. A very sensitive heat detecting device measures the amount of infrared radiation absorbed as the wavelength of the radiation reaching the detector is changed. IR can give useful information about the type of compounds present in a sample, but it is not capable of precisely identifying a complex mixture. Infrared is very useful in identifying single solvent accelerants.
<b>ion</b>	an isolated electron or positron; an atom or molecule which by loss or gain of one or more electrons has acquired a net electric charge.
<b>ion exchange</b>	a chemical reaction in which mobile hydrated ions of a solid are exchanged, equivalent for equivalent, for ions of like charge in solution. The process can be used to remove ionic pollutants from wastewater.
<b>ionization</b>	a process by which a neutral atom or molecule loses or gains electrons, thereby acquiring a net charge and becoming an ion; occurs as the result of the dissociation of the atoms of a molecule in solution or of a gas in an electric field.
<b>isomer</b>	chemical compound that has the same number, and kinds of atoms as another compound, but a different structural arrangement of the atoms.
<b>Isoparaffins</b>	A mixture of branched alkanes usually available as a narrow 'cut' of a distillation. Exxon manufactures a group of products known as 'Isopars' ranging from Isopar A through Isopar J. These solvent mixtures have a variety of uses. Gulf Oil manufactures a similar series of solvents, the most commonly available of which is Gulf Life Charcoal Starter Fluid which is roughly equivalent to Exxon's Isopar

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<b>Isothermal</b>	A type of gas chromatographic analysis wherein the column is maintained at a uniform temperature throughout the analysis
<b>Jackson turbidity unit (JTU)</b>	a measure of the turbidity of water, proportional to the ppm silica, where 100 ppm silica equals 21.5 JTU. This method was the standard for turbidity for many years; it applied the use of a candle, measuring tube, and the human eye for determining the value. This method has since been replaced by the use of a known turbidity standard, Formazin, and the use of analytical instruments that will detect forward-scattered light and light scattered at 90 degrees.
<b>JTU</b>	see Jackson turbidity unit.
<b>Kerosene</b>	(#1 Fuel Oil): Flash point generally between 100 and 150 degrees F. Explosive limits of 0.7% to 5.0%. Kerosene consists mostly of C9 through C17 hydrocarbons. In order to be identified as kerosene, a sample extract must exhibit a homologous series five consecutive normal alkanes between C9 and C17. Kerosene is the most common 'incidental' accelerant, as it is used in numerous household products ranging from charcoal lighter fluid to lamp oil to paint thinner to insecticide carriers. It is also used as jet fuel. K-1 kerosene has a low sulfur content required for use in portable space heaters.
<b>Ketone</b>	A type of organic compound having a carbonyl functional group (C=O) attached to two alkyl groups. Acetone is the simplest example of a ketone.
<b>lagoon</b>	in wastewater treatment, a shallow pond where sunlight, bacterial action, and oxygen interact to restore wastewater to a reasonable state of purity.
<b>lime</b>	any of a family of chemicals consisting essentially of calcium hydroxide made from limestone (calcite) which is composed mostly of calcium carbonate or a mixture of calcium carbonate and magnesium carbonate.
<b>limnology</b>	the study of the physical, chemical, meteorological and biological aspects of fresh water.
<b>Magnesium</b>	A silvery metal used in some metal incendiaries. The dust is highly explosive. Ignition point of 650°F
<b>manometer</b>	an instrument for measuring pressure liquids and gasses. It usually consists of a U-shaped tube containing a liquid, the surface of which is in one end of the tube; moves proportionally with changes in pressure on the liquid in the other end. Also, a tube type differential pressure gauge.
<b>mass</b>	the quantity of matter in a body as measured by its resistance to a change in acceleration; different but proportional to weight.
<b>mass number</b>	the total number of protons and neutrons in an atomic nucleus.
<b>Mass Spectrometry</b>	A method of chemical analysis which vaporises, then ionises the substance to be analysed and then accelerates the ions through a magnetic field to separate the ions by molecular weight. Mass spectrometry can result in the exact identification of an unknown compound, and is a very powerful analytical technique, especially when combined with chromatography
<b>meniscus</b>	the curved upper surface of a non-turbulent liquid in a container; it is concave (curves upward) if it wets the container walls, and convex (curves downward) if it does not. For accurate measurements, readings should be taken at the flat center of the meniscus.

<b>Meta-ethyltoluene (m-ethyltoluene)</b>	A component of gasoline
<b>Methane</b>	The simplest hydrocarbon and the first member of the paraffin (alkane) series, having a formula CH <sub>4</sub> . Methane is the major constituent of natural gas. Methane has a heating value of 1009 BTU/cubic foot. Its explosive limits are 5% to 15%.
<b>Methanol</b>	Methyl alcohol. Wood alcohol. The simplest alcohol. Methanol is water soluble and has a flash point of 54°F and explosive limits of 6% to 36.5%
<b>Methyl Silicone</b>	A nonvolatile oily liquid used in gas chromatography to separate nonpolar compounds. Methyl silicone columns typically separate compounds according to their boiling point
<b>Methylstyrene</b>	A common polymer pyrolysis product
<b>micro</b>	a prefix meaning one-millionth of a unit.
<b>microorganism</b>	organisms (microbes) observable only through a microscope; larger, visible types are called macroorganisms.
<b>milligrams per liter (mg/l)</b>	this is a weight per volume designation used in water and wastewater analysis. 1mg/L = 1ppm.
<b>Mineral Spirits</b>	A medium petroleum distillate ranging from C <sub>8</sub> to C <sub>12</sub> . The flash point of mineral spirits is generally around 100°F. Mineral spirits, sometimes known as mineral turps, is commonly known as a solvent in insecticides and certain other household products. Many charcoal lighter fluids are composed almost entirely of mineral spirits.
<b>molal</b>	a solution concentration having a mole of solute per 1,000 grams of solvent, usually water.
<b>molality</b>	a measure of solution concentration expressed in moles of solute per 1,000 grams of solvent.
<b>molar</b>	a solution concentration having one mole of solute per liter of solution.
<b>molarity</b>	a measure of solution concentration expressed in moles of solute per liter of solution.
<b>mole</b>	an amount of a substance weighing the number of grams equal to the total atomic weight in one molecule (or atom). Equivalent to gram-atomic, gram-molecular, and gram-formula weights.
<b>molecular weight</b>	the sum of the atomic weights of all the atoms in a molecule.
<b>molecule</b>	the simplest structural unit of a substance that retains the properties of the substance, and is composed of one or more atoms.
<b>Monomer</b>	The simplest unit of a polymer. Ethylene is the smallest unit of polyethylene. Styrene is the smallest unit of polystyrene
<b>most probable number (MPN)</b>	that number of organisms per unit volume that, in accordance with statistical theory, would be more likely than any other number to be yielded with the greatest frequency in a specific test. Expressed as density of organisms per 100 ml. Results are computed from the number of positive findings of coliform-group organisms resulting from multiple-portion decimal-dilution plantings.
<b>Naphtha</b>	Am ambiguous term which may mean high flash naphtha (mineral spirits), or low flash naphtha (petroleum, ether, low boiling ligroin) or something altogether different. Flash point and explosive limits vary. The term naphtha is so

	ambiguous that it should not be used.
<b>Natural Gas</b>	A mixture of low-molecular weight hydrocarbons obtained in petroleum bearing regions throughout the world. Natural gas consists of approximately 85% methane, 10% ethane and the balance propanes, butanes and nitrogen. since it is nearly odourless, an odouring agent is added to most natural gas prior to final sale.
<b>Nebulize</b>	To form a mist of fine droplets from a liquid. To atomise
<b>nephelometer</b>	an instrument that measures scattered light in a liquid.
<b>nephelometric turbidity unit (NTU)</b>	a standard unit of turbidity measurement, equivalent to FNU.
<b>neutralization</b>	chemical addition of either acid or base to a solution such that the pH is adjusted to 7.
<b>neutron</b>	an uncharged sub-atomic particle, with a mass nearly equal to that of a proton. Present in the nucleus of all atoms except hydrogen.
<b>nitrification</b>	the conversion of nitrogenous matter or free nitrogen into nitrates and ammonia by bacteria.
<b>Nitrogen</b>	A gaseous element which makes up approximately 80% of the earth's atmosphere. Nitrogen is relatively inert and does not support either combustion or life. Nitrogen is usually found in the molecular N <sub>2</sub> form
<b>non-ionic surfactants</b>	a general family of surfactants so called because in solution the entire molecule remains associated. Non-ionic molecules orient themselves at surfaces not by an electrical charge, but through separate grease-solubilizing and water-soluble groups within the molecule.
<b>nonsettleable matter</b>	the suspended matter which neither settles nor floats to the surface of water in a period of one hour.
<b>nonsettleable solids</b>	wastewater matter that will stay in suspension for an extended period of time. Such period may be arbitrarily taken for testing purposes as one hour.
<b>normal</b>	a solution concentration of one gram equivalent per liter of solution.
<b>normality</b>	a measure of solution concentration expressed in equivalent weights of solute per liter of solution.
<b>NTU</b>	see nephelometric turbidity unit.
<b>nutrients</b>	materials which are considered essential to the support of biological life.
<b>Octane</b>	(1) An alkane having the formula C <sub>8</sub> H <sub>18</sub> . Flash point 56°F. Explosive limits of 1% to 3.2%. (2) A measure of the resistance of a sample of gasoline to premature ignition (knocking). 100 octane fuel has the knocking resistance of 100% iso-octane (2, 2, 4-trimethyl pentane). Zero octane fuel has the knocking resistance of a mixture of 89% iso-octane and 11% n-heptane.
<b>ohm</b>	a unit of electrical resistance equal to that of a conductor in which a current of one ampere is produced by a potential of one volt across its terminals.
<b>Olefin</b>	An alkene. An organic compound similar to an alkane, but containing at least one double bond. Olefins have the formula C <sub>n</sub> H <sub>2n</sub> . The simplest olefin is ethylene, C <sub>2</sub> H <sub>4</sub>
<b>Organic Chemistry</b>	the study of the carbon atom and the compounds it forms, mainly with the 20

	lightest elements, especially hydrogen, oxygen and nitrogen. Some 3 million organic compounds have been identified and named.
<b>organic matter</b>	chemical compounds based on carbon chains or rings, and also containing hydrogen with or without oxygen, nitrogen, or other compounds.
<b>organic nitrogen</b>	nitrogen combined in organic molecules such as protein, amines, and amino acids.
<b>orthophosphate</b>	an acid or salt containing phosphorus as PO <sub>4</sub> , such as K <sub>3</sub> PO <sub>4</sub> (potassium phosphate).
<b>oxidant</b>	a chemical agent that oxidizes.
<b>oxidation</b>	in a broad sense oxidation is the increase in positive valence of any element in a substance. On the basis of the electron theory, oxidation is a process in which an element losses electrons. In a narrow sense, oxidation means the chemical addition of oxygen to a substance.
<b>Oxygen</b>	A gaseous element which makes up approximately 20% of the earths atmosphere. It is usually found in the molecular ... form. Oxygen is the most abundant element on earth
<b>ozone</b>	oxygen in molecular form with three atoms of oxygen forming each molecule (O <sub>3</sub> ). Atmospheric oxygen is molecular in form but each molecule contains only two atoms of oxygen. Ozone is formed by passing high voltage electric charges through dry air. The third atom of oxygen in each molecule of ozone is loosely bound and is easily released, thus making it a powerful oxidant; used to purify water and treat industrial wastes.
<b>parts per million (ppm)</b>	the unit commonly used to represent the degree of pollutant concentration where the concentrations are small. Larger concentrations are given in percentages. 1ppm = 1mg/L. In BOD analysis, the results are expressed in ppm, whereas in the suspended solids test, the values are expressed in percents. In air, ppm is usually a volume/volume ratio; in water, ppm represents a weight/volume ratio.
<b>pathogenic bacteria</b>	bacteria which may cause disease in the organisms by their parasitic growth.
<b>Pentane</b>	An alkane having the formula C <sub>5</sub> H <sub>12</sub> , flash point of -40°F, and explosive limits of 1.4% to 8%. Pentane is frequently used to extract flammable or combustible liquid residues from fire debris samples
<b>period</b>	a series of elements, arranged in order of atomic number represented by a horizontal row on the Periodic Table.
<b>periodic table</b>	a table in which the elements are commonly arranged in order of increasing atomic number. Elements of similar properties are placed one under the other, yielding eight families or groups of elements. Within each group there is a gradation of chemical and physical properties, but in general a similarity of chemical behavior. From group to group, however, there is a progressive shift of chemical behavior from one end of the table to the other.
<b>Petroleum Distillates</b>	By-products of the refining of crude oil. Low boiling or light petroleum distillates (LPD) are highly volatile mixtures of hydrocarbons. These mixtures are sometimes called ligroin, petroleum ether, or naphtha. LPDs are used as cigarette lighter fluid, as copier fluid, and as solvents. Medium boiling petroleum distillates (MPD) are sometimes known as mineral spirits, and are used as charcoal starters, as paint thinners, as solvents for insecticides and other products, and as lamp oils. High Boiling or Heavy petroleum distillates (HPD) are combustible liquids such

	as kerosene and diesel fuel. pH: A number used to represent the acidity or alkalinity of an aqueous solution. pH 7 is neutral. Acids have a pH below 7, the lower the pH, the more acidic the solution. Bases have a pH above 7. The higher the pH, the more basic of alkaline the solution.
<b>pH</b>	the negative logarithm of the hydrogen ion concentration ( $-\log_{10}[\text{H}^+]$ ) where $\text{H}^+$ is the hydrogen-ion concentration in moles per liter. Neutral water has a pH value of 7.
<b>pH adjustment</b>	a means of maintaining the optimum pH through the use of chemical additives.
<b>phenolphthalein alkalinity</b>	a measure of the hydroxides plus one-half of the normal carbonates in aqueous suspension. Measured by the amount of sulfuric acid required to bring the water to a pH value of 8.3, as indicated by a change in color of phenolphthalein. It is expressed in ppm of calcium carbonate ( $\text{CaCO}_3$ ).
<b>Photoionisation Detector (PID):</b>	A type of detector used in chromatography which employs ultraviolet radiation rather than a flame to ionise compounds as they pass through a detector. Photoionisation detectors are particularly sensitive to aromatic compounds
<b>Polarity</b>	The measure of an electrical charge on a molecule. Most flammable or combustible liquids are nonpolar. Many water soluble compounds, including alcohols and acetone, are polar.
<b>Polymer</b>	A large molecule consisting of repeating units of a monomer. Polymers may be natural, such as cellulose or synthetic such as most plastics
<b>potable water</b>	water suitable for drinking or cooking purposes from both health and aesthetic considerations.
<b>prechlorination</b>	chlorination of water prior to filtration, or chlorination of sewage prior to treatment.
<b>precipitant</b>	a chemical or chemicals that cause a precipitate to form when added to a solution.
<b>precipitate</b>	the discrete particles of material separate from the liquid solution.
<b>precipitation, chemical</b>	to cause a solid substance to be separated (precipitate out) of a solution by the addition of chemical additives; the process of softening water by the addition of lime and soda ash as the precipitants.
<b>pretreatment</b>	any wastewater treatment process used to partially reduce pollution load before the wastewater is introduced into a main sewer system or delivered to a treatment plant; a substantial reduction of the pollution load.
<b>process, biological</b>	the process by which the life activities of bacteria, and other microorganisms in the search for food, break down complex organic material into simple, more stable substances. Self-purification of sewage, polluted streams, sludge digestion, and all so-called secondary sewage treatments result from this process. Also called biochemical process.
<b>process, oxidation</b>	any method of sewage treatment for the oxidation of the decomposable organic matter that brings about the decomposition of such matter. The usual methods are biological filtration, and activated sludge processes.
<b>Propane</b>	An alkane having the formula $\text{C}_3\text{H}_8$ . Propane is the major constituent of LP gas. Explosive limits of 2.4% to 9%. One cubic foot of propane has a heating value of 2500 BTUs.
<b>proton</b>	a sub-atomic particle, positively charged, in the nucleus of atoms.

<b>Pseudocumene</b>	(1, 2, 4 - trimethyl benzene) A component of gasoline
<b>putrefaction</b>	biological decomposition of organic matter accompanied by the production of a foul smell associated with anaerobic condition.
<b>Pyrolysis</b>	The transformation of a substance into one or more other substances by heat alone without oxidation
<b>Pyrophoric Distillation</b>	The slow drying and passive pyrolysis of wood materials
<b>quantitative analysis</b>	chemical determination of the amounts or proportions of constituents in a substance.
<b>Radiation</b>	(1) Transfer of heat through electromagnetic waves from hot to cold. (2) Electromagnetic waves of energy having frequency and wavelength. The shorter wavelengths (higher frequencies) are more energetic. The electromagnetic spectrum is comprised of a) cosmic rays, b) gamma rays, c) x-rays, d) ultraviolet rays, e) visible light rays, f) infrared, g) microwaves and h) radio waves
<b>radical</b>	an atom or group of atoms with at least one unpaired electrons.
<b>reagent</b>	a chemical substance used to cause a reaction for the purpose of chemical analysis.
<b>recorder</b>	a device that makes a graph or other automatic record of the stage, pressure, depth, velocity, or the movement or position of water controlling devices, usually as a function of time.
<b>reduction</b>	chemical reaction in which an atom or molecule gains an electron; decrease in positive valence; addition of hydrogen to a molecule.
<b>reduction treatment</b>	the opposite of oxidation treatment wherein a reductant is used to lower the valence state of a pollutant to a less toxic form; e.g. the use of SO <sub>2</sub> to reduce Cr <sup>6+</sup> to Cr <sup>3+</sup> in an acidic solution.
<b>residual chlorine</b>	chlorine remaining in water or wastewater at the end of specified contact period as combined or free chlorine.
<b>resistance</b>	the opposition which a device or material offers to the flow of current; measured in ohms.
<b>resistor</b>	a component of an electrical circuit intended to offer resistance to electrical current flow.
<b>Resolution</b>	1) In chromatography, a measure of the separation of components, 2) in spectroscopy, a measure of the ability of the instrument to detect individual absorbance peaks
<b>Retention Time</b>	The length of time required for a compound or component of a mixture to pass through a chromatographic column
<b>salinity</b>	(1) the relative concentration of salts, usually sodium chloride, in a given water. It is usually expressed in terms of the number of ppm of chloride. (2) a measure of the concentration of dissolved mineral substances in water.
<b>salt</b>	any compound formed by combination of any negative ion (except hydroxide) with any positive ion (except hydrogen or hydronium); the precipitate produced as the result of neutralization of an acid with a base.
<b>saturated</b>	(1) in organics, a chemical compound with all carbon bonds satisfied; it does not contain double or triple bonds and thus cannot add elements or compounds.

	(2) in liquids, a solution that contains enough of a dissolved solid, liquid, or gas so that no more will dissolve into the solution at a given temperature and pressure.
<b>Saturation</b>	The state in which all available bonds of an atom are attached to other atoms. Alkanes are saturated. Olefins are unsaturated.
<b>scale</b>	the precipitate that forms on surfaces in contact with water as the results of a physical or chemical change, often due to the presence of calcium carbonate (CaCO <sub>3</sub> ) or magnesium carbonate (MgCO <sub>3</sub> ).
<b>sedimentation</b>	the deposition of suspended matter carried by water, wastewater, or other liquids, by gravity. It is usually accomplished by reducing the velocity of the liquid below the point at which it can transport the suspended material. Also called settling.
<b>settleable solids</b>	particles of debris and fine matter heavy enough to settle out of wastewater.
<b>sewage</b>	the total of organic waste and wastewater generated by residential and commercial establishments.
<b>sewage, combined</b>	a sewage containing both sanitary sewage and surface or storm water with or without industrial wastes.
<b>sewage, dilute</b>	sewage containing less than 150 ppm of suspended solids and BOD (weak sewage).
<b>sewage, industrial</b>	sewage in which industrial wastes predominate.
<b>sewage, raw</b>	sewage prior to receiving any treatment.
<b>sewage, settled</b>	sewage from which most of the settleable solids have been removed by sedimentation.
<b>sewage, storm</b>	liquid flowing in sewers during or following a period of heavy rainfall.
<b>sludge</b>	the solids (and accompanying water and organic matter) which are separated from sewage or industrial wastewater in treatment plant facilities. Sludge separation and disposal is one of the major expenses in wastewater treatment operations.
<b>sludge conditioning</b>	a process employed to prepare sludge for final disposal, e.g., thickening, digesting, heat treatment or other procedures.
<b>sludge digestion</b>	the process by which organic or volatile matter in sludge is gasified, liquefied, mineralized, or converted into more stable organic matter through the activities of either anaerobic or aerobic organisms.
<b>sludge disposal</b>	the final disposal of solid wastes including the use of sewage sludge as fertilizers and soil builders, and fill for low-lying lands.
<b>sludge thickening</b>	the increase in solids concentrations of sludge in the sedimentation of digestion tank.
<b>slurry</b>	a watery mixture or suspension of solids.
<b>soda ash</b>	a common water treating chemical, sodium carbonate.
<b>softening</b>	the removal of hardness—calcium and magnesium—from water.
<b>solder</b>	an alloy of lead/tin used for making permanent electrical connections between parts and wire.
<b>solute</b>	the substance that is dissolved to form a solution.
<b>solution</b>	a liquid (solvent) that contains a dissolved substance (solute).

<b>solvent</b>	a liquid used to dissolve another substance.
<b>Spalling</b>	Destruction of a surface by frost, heat, corrosion, or mechanical causes. Concrete exposed to intense heat may spall explosively. Expansion and contraction of the concrete as well as vaporising moisture contained in the concrete contribute to this effect. It does not necessarily mean an accelerant was used
<b>specific gravity</b>	a comparison by weight to an equal volume of pure water, at a standard temperature.
<b>Spectrophotometer</b>	A light measuring device which incorporates a monochromator to isolate and project particular wavelengths of electromagnetic radiation through a sample, and a detector to measure the amount of radiation which has passed through the sample.
<b>Spectroscopy</b>	An analytical technique devoted to the identification of the elements and the elucidation of atomic and molecular structure by measurement of the radiant energy absorbed or emitted by a substance in any of the wavelengths of the electromagnetic spectrum in response to excitation by an external energy source.
<b>Spontaneous Heating</b>	Also known as Spontaneous combustion. Initially, a slow, exothermic reaction at ambient temperatures. Liberated heat, if undissipated (insulated), accumulates at an increasing rate and may lead to spontaneous ignition of any combustibles present. Spontaneous ignition occurs sometimes in haystacks, coal piles, warm moist cotton waste, and in stacks of rags coated with drying oils such as cottonseed or linseed oil
<b>standard (or standardized solution)</b>	a solution containing a known, precise concentration of an element or chemical compound, often used to calibrate analytical chemistry measurement devices.
<b>Styrene</b>	Vinylbenzene. An aromatic compound having the formula $C_6H_5C_2H_3$ . The monomer of polystyrene plastic. A common product of polymer pyrolysis
<b>Sulfur</b>	A nonmetallic yellow element. A constituent of black powder, sulfur burns readily when in powdered form.
<b>surface tension</b>	the property, due to molecular forces in the surface film, that tends to contract the liquid into a form having the least surface/volume ratio.
<b>surfactant</b>	a surface-active substance, such as a detergent or soap, that lowers the surface tension of a solvent (usually water).
<b>suspended matter</b>	(1) solids in suspension in water, wastewater or effluent. (2) solids in suspension that can be removed readily by standard filtering procedures in a laboratory.
<b>suspended solids</b>	(1) solids that either float on the surface of, or are in suspension in, water, wastewater, or other liquids, and which are largely removable by laboratory filtering. (2) the quantity of material removed from wastewater in a laboratory test, as prescribed in "Standard Methods" and referred to as nonfilterable residue.
<b>tertiary treatment</b>	process utilized to remove practically all solids and organic matter from wastewater. Granular activated carbon filtration is a tertiary treatment process. Phosphate removal by chemical coagulation is also regarded as a step in tertiary treatment.
<b>thermistor</b>	a semiconductor whose resistance will vary with temperature.
<b>titration</b>	a method of analyzing the composition of a solution by adding known amounts of a standardized solution until a given reaction (color change, precipitation, or conductivity change) is produced.

<b>tracer</b>	(1) a foreign substance mixed with or attached to a given substance for the determination of the location or distribution of the substance. (2) an element or compound that has been made radioactive so that it can be easily followed (traced) in biological and industrial processes. Radiation emitted by the radioisotope pinpoints its location.
<b>treatment efficiency</b>	usually refers to the percentage reduction of a specific or group of pollutants by a specific wastewater treatment step or treatment plant.
<b>turbidimeter</b>	an instrument for measurement of turbidity in which a standard suspension is used for reference.
<b>turbidity</b>	(1) a condition in water or wastewater caused by the presence of suspended matter, resulting in the scattering and absorption of light rays. (2) a measure of fine suspended matter in liquids. (3) an analytical quantity usually reported in turbidity units (NTU/FNU, FTU, JTU) determined by measurements of light diffraction.
<b>Terpenes</b>	Volatile hydrocarbons which are normal constituents of wood.
<b>Thermal Conductivity Detector</b>	A type of gas chromatographic detector which is sensitive to the change in the ability of the gases emerging from the column to conduct heat. A thermal conductivity (TC) detector is not as sensitive as a flame ionisation detector, but it is capable of detecting some molecules, such as water, which give no signal in FID.
<b>Thin Layer Chromatography (TLC)</b>	A procedure for separating compounds by spotting them on a glass plate coated with a thin (about 0.01 inch) layer of silica or alumina, and 'developing' the plate by allowing a solvent to move upward by capillary action. TLC is especially used for identifying and comparing materials which are highly coloured or which fluoresce under ultraviolet light. TLC is used extensively in explosive analysis and in the comparison of gasoline dyes
<b>Toluene</b>	Methylbenzene. An aromatic compound having the formula $C_6H_5CH_3$ . A major component of gasoline. Toluene has a flash point of 40°F and explosive limits of 1.2% to 7%.
<b>Turpentine</b>	1) Gum. The pitch obtained from living pine trees. A sticky viscous liquid. 2) Oil. A volatile liquid obtained by steam distillation of gum turpentine, consisting mainly of pinene and diterpene. Turpentine is frequently identified in debris samples containing burned wood.
<b>unsaturated</b>	any chemical compound with more than one bond between adjacent atoms, usually carbon, and thus reactive toward the addition of other atoms at that point; for example
<b>valence</b>	the relative ability of a biological substance to react or combine; a positive number that characterizes the combining power of an element for other elements, as measured by the number of bonds to other atoms which one atom of the given element forms upon chemical combination – hydrogen is assigned valence 1, and the valence is the number of hydrogen atoms, or their equivalent, with which an atom of the given element combines.
<b>Vaporisation</b>	The physical change of going from a solid or a liquid into a gaseous state
<b>viscosity</b>	the resistance offered by a fluid (liquid or gas) to flow. The viscosity is a characteristic property and is a measure of the combined effects of adhesion and cohesion.

<b>volatile solids</b>	the quantity of solid in water, wastewater or other liquids, lost on ignition of the dry solids at 600 oC.
<b>voltage</b>	the electrical pressure (electromotive force) that makes current flow through a conductor.
<b>volume</b>	the space occupied in three dimensions.
<b>washdown</b>	water resulting from cleaning of equipment, walls, floors, etc., within a plant.
<b>watt</b>	the practical unit of electrical power.
<b>wire gauge</b>	wire size, measured in diameter.
<b>Xylene</b>	Dimethylbenzene. An aromatic compound having the formula C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> ) <sub>2</sub> . Xylene is a major component of gasoline. A mixture of toluene and xylene is frequently used as an automotive paint thinner. Xylene is actually a mixture of three isomers, ortho, meta and para xylene, which have the methyl groups in different positions relative to each other on the benzene ring. The flash points of these isomers range from 81° to 115°F, is used to calibrate flash point testers. The explosive limits of xylene are 1.0% to 7.0%.
<b>zeolite process</b>	an ion-exchange process for softening water. The zeolite exchanges sodium ions for hardness constituents (calcium, magnesium, etc.) in the water.

Refences: International Occupational Safety and Health Information Centre (CIS): IAAI Forensic Science Committee: HACH

### **IMPORTANT : PLEASE READ**

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