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Classification of dangerous substances[1]

PHYSICAL HAZARDS

Explosive: an explosive substance (or mixture) is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings.

Flammable gas: a flammable gas is a gas having a flammable range with air at 20 °C and a standard pressure of 101.3 kPa.

Flammable liquid: a flammable liquid means a liquid having a *flash point* of not more than 93 °C.

Flash point: the flash point of a flammable liquid is the lowest temperature at which it can form an ignitable mixture in air.

Flammable solid: A flammable solid is a solid which is readily combustible, or may cause or contribute to fire through friction. Readily combustible solids are powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly.

Flammable aerosol: *aerosols* should be considered for classification as flammable if they contain any component which is classified as flammable i.e.: Flammable liquids, Flammable gases or Flammable solids.

Aerosols: aerosols, this means aerosol dispensers, are any non-refillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.

[1] According to the new GHS – Globally Harmonized System of classification and labelling of chemicals

PHYSICAL HAZARDS

Oxidizing gas: an oxidizing gas is any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.

Oxidizing liquid: an oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.

Oxidizing solid: an oxidizing solid is a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.

Gas under pressure: gases under pressure are gases which are contained in a receptacle at a pressure not less than 280 kPa (2.8bar) at 20 °C or as a refrigerated liquid. They comprise compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases.

- Compressed gas: a gas which when packaged under pressure is entirely gaseous at -50 °C; including all gases with a *critical temperature* □ -50 °C (e.g. nitrogen in a 200bar cylinder).
- Liquefied gas: a gas which when packaged under pressure, is partially liquid at temperatures above -50 °C (e.g.: LPG).
- Refrigerated liquefied gas: A gas which when packaged is made partially liquid because of its low temperature (e.g.: liquid oxygen).
- Dissolved gas: a gas which when packaged under pressure is dissolved in a liquid phase solvent (e.g. acetylene).

Critical temperature: temperature below of which gases can be liquefied at a certain pressure.

Self-reactive substances and mixture: self-reactive substances or mixtures are thermally unstable liquid or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances and mixtures classified as explosives, organic peroxides or as oxidizing.

PHYSICAL HAZARDS

Pyrophoric liquid: a pyrophoric liquid is a liquid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.

Pyrophoric solid: a pyrophoric solid is a solid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.

Self-heating substances and mixture: a self-heating substance or mixture is a solid or liquid substance or mixture, other than a pyrophoric liquid or solid, which, by reaction with air and without energy supply, is liable to self-heat; this substance or mixture differs from a pyrophoric liquid or solid in that it will ignite only when in large amounts (kilograms) and after long periods of time (hours or days).

Substances and mixtures which, in contact with water, emit flammable gases: substances or mixtures which, in contact with water, emit flammable gases are solid or liquid substances or mixtures which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

Organic peroxides: organic peroxides are liquid or solid organic substances which contain the bivalent -0-0- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures, which may undergo exothermic self accelerating decomposition. In addition, they may have one or more of the following properties:
(a) be liable to explosive decomposition;
(b) burn rapidly;
(c) be sensitive to impact or friction;
(d) reacts dangerously with other substances.

Corrosive to metals: a substance or a mixture that is corrosive to metal is a substance or a mixture which by chemical action will materially damage, or even destroy, metals.

HEALTH HAZARDS

Acute toxicity: acute toxicity refers to those adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours.

Skin corrosion/irritation: skin corrosion is the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis, following the application of a test substance for up to 4 hours. Corrosive reactions are typified by ulcers, bleeding, bloody scabs, and, by the end of observation at 14 days, by discolouration due to blanching of the skin, complete areas of alopecia, and scars. Histopathology should be considered to evaluate questionable lesions.

Serious eye damage /eye irritation: serious eye damage is the production of tissue damage in the eye, or serious physical decay of vision, following application of a test substance to the anterior surface of the eye, which is not fully reversible within 21 days of application.

Respiratory or skin sensitization: a respiratory sensitizer is a substance that will induce hypersensitivity of the airways following inhalation of the substance. A skin sensitizer is a substance that will induce an allergic response following skin contact.

HEALTH HAZARDS

Germ cell mutagenicity: this hazard class is primarily concerned with chemicals that may cause mutations in the germ cells of humans that can be transmitted to the progeny. However, mutagenicity/genotoxicity tests in vitro and in mammalian somatic cells in vivo are also considered in classifying substances and mixtures within this hazard class. The term mutagenic and mutagen will be used for agents giving rise to an increased occurrence of mutations in populations of cells and/or organisms. The more general terms genotoxic and genotoxicity apply to agents or processes which alter the structure, information content, or segregation of DNA, including those which cause DNA damage by interfering with normal replication processes, or which in a non-physiological manner (temporarily) alter its replication. Genotoxicity test results are usually taken as indicators for mutagenic effects.

Carcinogenicity: the term carcinogen denotes a chemical substance or a mixture of chemical substances which induce cancer or increase its incidence. Substances which have induced benign and malignant tumours in well performed experimental studies on animals are considered also to be presumed or suspected human carcinogens unless there is strong evidence that the mechanism of tumour formation is not relevant for humans. Classification of a chemical as posing a carcinogenic hazard is based on the inherent properties of the substance and does not provide information on the level of the human cancer risk which the use of the chemical may represent.

Reproductive toxicity: reproductive toxicity includes adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in the offspring. Reproductive toxicity is subdivided under two main headings:
(a) Adverse effects on sexual function and fertility;
(b) Adverse effects on development of the offspring.
Some reproductive toxic effects cannot be clearly assigned to either impairment of sexual function and fertility or to developmental toxicity. Nonetheless, chemicals with these effects would be classified as reproductive toxicants with a general hazard statement.

HEALTH HAZARDS

Specific target organ systemic toxicity (single exposure/repeated exposure): classification identifies the chemical substance as being a specific target organ/systemic toxicant and, as such, it may present a potential for adverse health effects in people who are exposed to it.

Aspiration hazard: aspiration toxicity includes severe acute effects such as chemical pneumonia, varying degrees of pulmonary injury or death following aspiration. Aspiration means the entry of a liquid or solid chemical product directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea and lower respiratory system.

ENVIRONMENTAL HAZARDS

Hazardous to the aquatic environment: acute aquatic toxicity means the intrinsic property of a substance to be injurious to an organism in a short-term exposure to that substance. Chronic aquatic toxicity means potential or actual properties of a substance to cause adverse effects to aquatic organisms during exposures which are determined in relation to the life-cycle of the organism.