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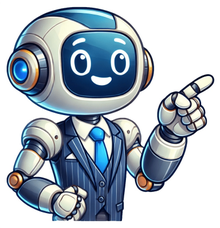

Back to top Canada has aligned the Workplace Hazardous Materials Information System (WHMIS) with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).This document discusses the WHMIS supplier requirements as regulated by federal legislation – the Hazardous Products Act and the Hazardous Products Regulations (HPR). This document reflects the Hazardous Products Regulations requirements as of December 15, 2022. The changes introduced in December 2022 are in force. Suppliers are granted a 3-year transition period (to December 15, 2025) to bring product classifications, safety data sheets and labels into compliance with the amendments. For most workplaces, the most notable impact will be seen in the changes to the flammable gases class and the new class of chemicals under pressure. Health Canada is the government body responsible for the overall WHMIS supplier-related laws. Note that WHMIS is also regulated in the workplace by the provinces, territories and federal (for federally regulated workplaces) governments under their occupational health and safety legislation. While these jurisdictions based their WHMIS regulations on a common model, small variations between jurisdictions may exist.Suppliers and employers must use and follow the WHMIS requirements for labels and safety data sheets (SDSs) for hazardous products sold, distributed, or imported into Canada.Please refer to the following OSH Answers documents for information about WHMIS: Back to top Suppliers must determine if their products meet the various physical and health properties that are regulated by the Hazardous Products Act and regulations. The specific criteria is listed in the Hazardous Products Regulations. If the product meets any of the criteria for a hazard class, it is considered to be a WHMIS hazardous product. The official definition of a “hazardous product” is "any product, mixture, material or substance that is classified in accordance with the regulations made under subsection 15(1) in a category or subcategory of a hazard class listed in Schedule 2; (produit dangereux)."All hazardous products must be labelled according to the Hazardous Products Regulations and must have a corresponding safety data sheet provided to the purchaser at the time of sale. Employers who produce hazardous products for use in their own workplaces have the duty to assess the hazards, classify the hazards of the products, and provide appropriate labels and safety data sheets to their workers.Tools to help with classification, such as the Technical Decision Trees and guidance for classification, are available from whmis.org and Health Canada.Please see the OSH Answers on “WHMIS – Labels” and “WHMIS – Safety Data Sheets (SDSs) for more information. Back to top WHMIS applies to two major groups of hazards: physical and health. Each hazard group includes hazard classes that have specific hazardous properties.Physical hazards group: based on the product's physical or chemical properties, such as flammability, reactivity, or corrosivity to metals.Health hazards group: based on the ability of the product to cause a health effect, such as eye irritation, respiratory sensitization (may cause allergy or asthma symptoms or breathing difficulties if inhaled), or carcinogenicity (may cause cancer).The Globally Harmonized System of Classification and Labelling of Chemicals (GHS) also defines an Environmental hazards group. This group (and its classes) was not adopted in WHMIS. However, you may see the environmental classes listed on labels and Safety Data Sheets (SDSs). Including information about environmental hazards is allowed by WHMIS. Back to top Hazard classes are a way of grouping together products that have similar properties. Most of the hazard classes are common to GHS and will be used worldwide by all countries that have adopted GHS. Some hazard classes are specific to WHMIS.List of Hazard ClassesPhysical Hazard ClassesFlammable gases (including pyrophoric gases and chemically unstable gases) AerosolsOxidizing gasesGases under pressureFlammable liquidsFlammable solidsSelf-reactive substances and mixturesPyrophoric liquidsPyrophoric solidsSelf-heating substances and mixturesSubstances and mixtures which, in contact with water, emit flammable gasesOxidizing liquidsOxidizing solidsOrganic peroxidesCorrosive to metalsCombustible dustsSimple asphyxiantsPhysical hazards not otherwise classifiedChemicals under pressureHealth Hazard ClassesAcute toxicitySkin corrosion/irritationSerious eye damage/eye irritationRespiratory or skin sensitizationGerm cell mutagenicityCarcinogenicityReproductive toxicitySpecific target organ toxicity – single exposureSpecific target organ toxicity – repeated exposureAspiration hazardBiohazardous infectious materialsHealth hazards not otherwise classifiedNote: GHS also defines an Explosive class and the Environmental Hazards group (not mandatory). The WHMIS regulations do not currently include the Explosives hazard class. Explosives are covered by other legislation in Canada. Back to top Each hazard class contains at least one category. The hazard categories are assigned a number (e.g., 1, 2, etc.). Categories may also be called "types". Types are assigned an alphabetical letter (e.g., A, B, etc.). In a few cases, sub-categories are also specified. Subcategories are identified with a number and a letter (e.g., 1A and 1B).Some hazard classes have only one category (e.g., corrosive to metals). Others may have two categories (e.g., carcinogenicity (cancer)) or three categories (e.g., oxidizing liquids). There are a few hazard classes with five or more categories (e.g., organic peroxides).The category tells you about how hazardous the product is (that is, the severity of the hazard).Category 1 is always the greatest level of hazard (that is, it is the most hazardous within that class). If Category 1 is further divided, Category 1A within the same hazard class is a greater hazard than category 1B.Category 2 within the same hazard class is more hazardous than category 3, and so on.There are a few exceptions to this rule. For example, for the Gases under pressure hazard class, the hazard categories are "Compressed gas", "Liquefied gas", "Refrigerated liquefied gas" and "Dissolved gas". These classes relate to the physical state of the gas when packaged and do not describe the degree of hazard.In addition, the Reproductive Toxicity hazard class has a separate category called "Effects on or via lactation". "Effects on or via lactation" was not assigned a specific numbered category. Reproductive toxicity also has Categories 1 and 2, which relate to effects on fertility or on the unborn child. Effects on or via lactation are considered a different but related hazard within the Reproductive toxicity class. Back to top The key changes in the December 2022 amendments of the Hazardous Products Regulations include:Adoption of a new physical hazard class: Chemicals Under PressureA change in the name of the physical hazard class “Flammable Aerosols” to “Aerosols”A new hazard category for non-flammable aerosols (Aerosols – Category 3)A split in the hazard category Flammable Gases – Category 1 into Categories 1A and 1B Inclusion of Pyrophoric gases under Flammable gases – Category 1A instead of being its own hazard class.Inclusion of Chemically Unstable Gases into the new Flammable gases – Category 1AMixtures that are classified in one of the health hazard classes that include both categories and subcategories may be classified in an applicable subcategory when there is sufficient data available to do so.The classification criteria for water-activated toxicants have changed to be based on the acute inhalation toxicity of the substance or mixture as sold or imported.The classification criteria for Reproductive Toxicity – Category 2 has been corrected to specify that adverse effects observed in humans or animals must not be considered as a secondary non-specific consequence of other toxic effects. Back to top Hazard ClassGeneral DescriptionFlammable gases Aerosols Flammable liquids Flammable solidsThese four classes cover products that can ignite (catch fire) easily. The main hazards are fire or explosion.Note:The hazard class under Flammable gases – Category 1A includes Pyrophoric gases and Chemically Unstable Gases. The hazard class Aerosols also includes a category for non-flammable aerosols (for products that may be a hazard if they burst when heated).Oxidizing gases Oxidizing liquids Oxidizing solidsThese three classes cover oxidizers, which may cause or intensify a fire or cause a fire or explosion.Gases under pressureThis class includes compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases.Compressed gases, liquefied gases and dissolved gases are hazardous because of the high pressure inside the cylinder or container. The cylinder or container may explode if heated. Refrigerated liquefied gases are very cold and can cause severe cold (cryogenic) burns or injury.Self-reactive substances and mixturesThese products may react on their own to cause a fire or explosion or may cause a fire or explosion if heated.Pyrophoric liquids Pyrophoric solids These products can catch fire very quickly (spontaneously) if exposed to air.Note: Pyrophoric gases are now included in the hazard category Flammable gases – Category 1ASelf-heating substances and mixturesThese products may catch fire if exposed to air. These products differ from pyrophoric liquids or solids in that they will ignite only after a longer period of time or when in large amounts.Substances and mixtures which, in contact with water, emit flammable gasesThese products react with water to release flammable gases. In some cases, the flammable gases may ignite very quickly (spontaneously).Organic peroxidesThese products may cause a fire or explosion if heated.Corrosive to metalsThese products may be corrosive (chemically damage or destroy) to metals.Combustible dustsThis class is used to warn of products that are finely divided solid particles. If dispersed in air, the particles may catch fire or explode if ignited.Simple asphyxiantsThese products are gases that may displace oxygen in the air and cause rapid suffocation.Physical hazards not otherwise classifiedThis class is meant to cover any physical hazards that are not covered in any other physical hazard class. These hazards must have the characteristic of occurring by chemical reaction and result in the serious injury or death of a person at the time the reaction occurs. If a product is classified in this class, the hazard statement on the label and SDS will describe the nature of the hazard.Chemicals under pressureThis class includes liquids or solids that are packaged in a receptacle - other than an aerosol dispenser - and that are pressurized with a gas at a gauge pressure of 200 kPa or more at 20°C but excludes any Gasunder pressure as defined by the Hazardous Products Regulations. Back to top Hazard ClassGeneral DescriptionAcute toxicityProducts classified in this hazard class are fatal, toxic or harmful if inhaled, following skin contact, or if swallowed. Acute toxicity refers to effects occurring following skin contact or ingestion exposure to a single dose, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours. Acute toxicity could result from exposure to the product itself, or to a product that, upon contact with water, releases a gaseous substance that is able to cause acute toxicity.Skin corrosion / irritationThis class covers products that cause severe skin burns (i.e., corrosion, ulcers, bleeding, bloody scabs, etc.) or products that cause skin irritation (reversible damage).Serious eye damage / eye irritationThis class covers products that cause serious eye damage (i.e., tissue damage in the eye or serious physical decay of vision) or products that cause eye irritation (reversible damage).Respiratory or skin sensitizationA respiratory sensitizer is a product that may cause allergy or asthma symptoms or breathing difficulties if inhaled (hypersensitivity). Skin sensitizer is a product that may cause an allergic response after skin contact.Germ cell mutagenicityThis hazard class includes products that may cause or are suspected of causing heritable gene mutations (permanent changes (mutations) to body cells that can be passed on to future generations).CarcinogenicityThis hazard class includes products that may lead to cancer or may increase the incidence of cancer. Reproductive toxicityThis hazard class includes products that may damage or are suspected of damaging sexual function and fertility, have adverse effects on the unborn child (embryo, fetus, or offspring), or may have an effect on or through lactation (such as to cause harm to breast-fed children). Specific target organ toxicity – single exposureThis hazard class covers products that cause or may cause damage to organs (e.g., liver, kidneys, or blood) following a single exposure. This class also includes a category for products that cause respiratory irritation or drowsiness or dizziness.Specific target organ toxicity – repeated exposureThis hazard class covers products that cause or may cause damage to organs (e.g., liver, kidneys, or blood) following prolonged or repeated exposure.Aspiration hazardAspiration is defined as the entry of a liquid or solid into the trachea or lower respiratory system directly though the oral or nasal cavity, or indirectly by vomiting. In other words, aspiration occurs when instead of something going from your mouth or nose to your stomach (other than air), it enters the lungs. Serious health effects can occur such as chemical pneumonia, injury to the lungs, and death.Biohazardous infectious materialsThese materials are microorganisms, nucleic acids or proteins that cause or are a probable cause of infection, with or without toxicity, in humans or animals.Health hazards not otherwise classifiedThis class covers hazards that are not included in any other health hazard class. These hazards occur following acute or repeated exposure and have an adverse effect on the health of a person exposed to them. The adverse effects include injuries or death of that person. If a product is classified in this class, the hazard statement will describe the nature of the hazard. Back to top All hazardous products must be labelled according to the regulations, and must have a corresponding Safety Data Sheet (SDS). The hazard class and category will be provided in Section 2 (Hazard Identification) of the SDS. Each hazard class or category must use specific pictograms and other label elements to indicate the hazard that is present and what precautionary measures must be taken. Use the information provided by the label and SDS to be informed and to know how to safely use, handle, store and dispose of the hazardous product. Fact sheet last revised: 2025-06-02 Back to top The purpose of the Transportation of Dangerous Goods (TDG) Act and Regulations is to promote public safety when dangerous goods are being imported, offered for transport, handled, or transported by road, rail, air, or water (marine). TDG also establishes safety requirements.Note: The information below is provided as guidance only and is for the transportation of dangerous goods by road. Always check the TDG Act and Regulations to ensure compliance.Please also see the following documents in this series: Back to top Dangerous goods are classified into 9 classes, based on the substance’s characteristics and properties. These criteria are outlined in the TDG Regulations.Assigning a substance into a hazard class is usually done by the consignor. The person deciding the classification must be competent, meaning they have the education, training, and experience required for the task. Some substances have been assigned classes in the TDG Regulations.For more information on how classification works, please see OSH Answers include. Back to top Always consult the TDG Regulations for full details on classes, divisions, and exemptions. This table provides a general overview of each class.ClassHazardExamplesClass 1 ExplosivesThere are six divisions in this category. To be included, the substance or article has the ability to be a mass explosion, fragment projection, fire hazard (along with a minor blast or projection hazard), may ignite or initiate during transport, be very insensitive with a mass explosion hazard, or extremely insensitive with no mass explosion hazard.Ammonium picrateCartridges for weapons (with specific characteristics)Ammunition, Smoke, White PhosphorusPyrotechnic substances (e.g., Safety Devices, Pyrotechnic)Signals, Distress Class 2 GasesThere are three divisions: flammable gases, non-flammable and non-toxic gases, and toxic gases.Aerosols under UN 1950, AEROSOLS may be transported as flammable or non-flammable or non-toxic gases, depending on the properties of the aerosol. PropaneNitrogen, compressed Nitrogen, refrigerated liquidCarbon dioxideAir, compressedSulfur hexafluorideLiquefied petroleum gasHydrogen sulfide Class 3 Flammable LiquidsBased on a liquid’s flash point and other properties, substances are included in this class if they are expected to be able to catch fire at common temperatures.GasolineDieselKeroseneEthanol solutionClass 4 Substances/ Products include: Flammable Solids; Substances Liable to Spontaneous Combustion; Substances That on Contact with Water Emit Flammable Gases (Water-reactive Substances)Class 4 has three divisions: flammable solids, substances liable to spontaneous combustion, and water reactive substances.These substances may cause fire (through friction), become explosive when in contact with water, become explosive even with contact with oxygen (air), or undergo a reaction that will result in a stronger exothermic reaction (a reaction that releases heat). For example, Class 4.2 Substances liable to spontaneous combustion includes substances that will ignite within 5 minutes of coming into contact with air.SulphurSafety matchesNaphthalene, crude Naphthalene, refinedCarbon, activatedCalcium carbideClass 5 Oxidizing Substances including Organic PeroxidesThe two divisions are oxidizing substances and organic peroxides.These substances may explosively decompose, burn rapidly, be sensitive to impact or friction, react dangerously with other substances, or cause damage to the eyes. Ammonium nitrate-based fertilizerCalcium peroxideOrganic Peroxide Type C, LiquidClass 6 Toxic and Infectious SubstancesThe two divisions are toxic substances and infectious substances.Substances are included in class 6 if they can cause death or serious injury or harm to human health if swallowed, inhaled, or in contact with skin.Medical or clinical waste may also be classified as an infectious substance if they contain regulated properties. Toxic substances examples:StrychnineArsenicChloroformPhenol, solidInfectious substances examples:Bacteria such as Anthracis•Viruses such as HantavirusClass 7 Radioactive MaterialsCategory I – WhiteCategory II – YellowCategory III - YellowFissile MaterialRadioactive materials are classified in accordance with the Packaging and Transport of Nuclear Substances Regulations 2015.Class 7 Radioactive material has no divisions or packing groups. Instead, there are three categories based on the maximum radiation dose exposure from the packages. The three categories are identified with the following labels: Radioactive White-I – low hazard Radioactive Yellow-II – moderate hazard Radioactive Yellow-III – high hazard Radioactive materials emit invisible radiation that can cause serious health effects. High radiation levels can cause reduced blood count, nausea, fatigue, hair loss, etc. Small amounts of radiation received over a long period may cause long-term health effects such as cancer and genetic mutations.Radioactive material, Type B(M) Package, Fissile Class 8 Corrosive SubstancesThere are no divisions in this class. Substances are included in Class 8 if they are known to cause injury to the skin such as burns, destruction (thickness), or lesions. Substances that cause corrosion of steel or aluminum surfaces are also included in this TDG class.Acetic acid, solution (10 to 50%)Sulphuric acid, spentBattery fluid, acidBattery fluid, alkaliClass 9 Miscellaneous Products, Substances or OrganismsClass 9 Lithium batteriesSubstances are considered Class 9 when they are listed in column 3 of Schedule 1 in the TDG Regulation, or by other inclusions and exclusions as defined in the regulations.Substances include those that present a danger sufficient to be included in the TDG regulations, but which cannot be assigned to any other class. Carbon dioxide, solid (Dry Ice)Lithium cells and batteriesLiquid substances transported at or above 100 degrees CSolid substances transported at or above above 240 degrees C Back to top Recently, the TDG Regulations were amended. The definition of “dangerous goods safety mark” was withdrawn from the TDG Regulations. However, the TDG regulations and many Transport Canada publications still refer to the former terminology of “dangerous goods safety marks.” Thus, we include both terms in our OSH Answers fact sheet. The TDG Act defines a “dangerous goods mark” as a symbol, device, sign, label, placard, letter, word, number or abbreviation, or any combination of those things, that is to be displayed to indicate the presence or nature of danger on dangerous goods, or on a means of containment or means of transport used in importing, offering for transport, handling or transporting dangerous goods. The size, shape and colour of the required dangerous goods marks or dangerous goods safety marks are outlined in the TDG Regulations.The following table shows common dangerous goods marks or dangerous goods safety marks for each class. To view all the required dangerous goods marks or dangerous goods safety marks, please see the Appendix in Part 4 of the TDG Regulations. ClassSample Dangerous Goods Mark(s) or Dangerous Goods Safety Mark(s)Class 1 ExplosivesSample shows: Class 1.1., 1.2 and 1.3Class 2 GasesSamples show: Class 2.1 Flammable gases; Class 2.2 Non-flammable and non-toxic gases; Class 2.3 Toxic gases, and Class 2 dangerous goods mark with yellow background for oxidizing gases Class 3 Flammable LiquidsSample shows: Class 3 Flammable liquidsClass 4 Substances/Products include: Flammable Solids; Substances Liable to Spontaneous Combustion; Substances That on Contact with Water Emit Flammable Gases (Water-reactive Substances)Sample shows: Class 4.1 Flammable solidsClass 5 Oxidizing Substances, including Organic PeroxidesSample shows: Glass 5.1 Oxidizing substancesClass 6 Toxic and Infectious SubstancesSamples show: Class 6.1 Toxic substances; Class 6.2 Infectious substancesClass 7 Radioactive MaterialsCategory I – WhiteCategory II – YellowCategory III - YellowFissile MaterialSample shows: Class 7 Radioactive materials,Category I WhiteClass 8 Corrosive SubstancesSample shows: Class 8 CorrosivesClass 9 Miscellaneous Products, Substances or OrganismsSamples show: Class 9 Miscellaneous Products, Substances or Organisms; Class 9 Lithium Batteries Fact sheet first published: 2021-02-15 Fact sheet last revised: 2025-01-21 Back to top CAS Registry No.: 124-38-9Other Names: CO2, Liquefied carbon dioxide, Refrigerated carbon dioxideMain Uses: Manufacture of other chemicals, food processing, numerous other usesAppearance: Colourless gas.Odour: OdourlessCanadian TDG: UN1013, UN2187 Back to top According to the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) carbon dioxide (gas) can be classified as: Gases under pressure - Compressed gasThe signal word is warning.Hazard statement includes:Contains gas under pressure; may explode if heatedNote: Carbon dioxide has been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as an asphyxiant. Please note that this classification was retrieved from the CNESST site on December 5, 2023 and was established by CNESST personnel to the best of their knowledge based on data obtained from scientific literature, and it incorporates the criteria contained in the Hazardous Products Regulations (SOR/2015-17). It does not replace the supplier’s classification which can be found on its Safety Data Sheet. Back to top Emergency Overview: Colourless gas. Odourless. Will not burn. COMPRESSED GAS. Contains refrigerated gas. May explode if heated. CONFINED SPACE HAZARD. Can accumulate in hazardous amounts in low-lying areas especially inside confined spaces. ASPHYXIANT. High concentrations can displace oxygen in air and cause suffocation. May cause frostbite. Back to top Main Routes of Exposure: InhalationInhalation: Low concentrations are not harmful. Higher concentrations can affect respiratory function and cause excitation followed by depression of the central nervous system. A high concentration can displace oxygen in the air. If less oxygen is available to breathe, symptoms such as headache, rapid breathing, rapid heart rate, clumsiness, emotional upsets and fatigue can result. As less oxygen becomes available, nausea and vomiting, collapse, convulsions, coma and death can occur. Symptoms occur more quickly with physical effort. Lack of oxygen can cause permanent damage to organs including the brain and heart.Skin Contact: Not irritating. Direct contact with the liquefied gas can chill or freeze the skin (frostbite). Symptoms of mild frostbite include numbness, prickling and itching. Symptoms of more severe frostbite include a burning sensation and stiffness. The skin may become waxy white or yellow. Blistering, tissue death and infection may develop in severe cases.Eye Contact: May cause mild irritation. Direct contact with the liquefied gas can freeze the eye. Permanent eye damage or blindness can result.Ingestion: Not a relevant route of exposure (gas).Effects of Long-Term (Chronic) Exposure: Not harmful.Carcinogenicity: Not known to cause cancer.International Agency for Research on Cancer (IARC): Not specifically evaluated.American Conference for Governmental Industrial Hygienists (ACGIH): Not specifically designated.Teratogenicity / Embryotoxicity: Not known to harm the unborn child.Reproductive Toxicity: Not known to be a reproductive hazard.Mutagenicity: Not known to be a mutagen. Back to top Inhalation: In case of oxygen deficiency: take precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). If breathing is difficult, trained personnel should administer emergency oxygen. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Get medical attention immediately. Treatment is urgently required. Transport to a hospital.Skin Contact: Not applicable (gas). Liquefied gas: quickly remove victim from source of contamination. DO NOT attempt to rewarm the affected area on site. DO NOT rub area, flush with water, or apply direct heat. Carefully cut around clothing that sticks to the skin and remove the rest of the garment. Do not remove frozen clothing from frostbitten areas. Loosely cover the affected area with a sterile dressing. DO NOT allow victim to drink alcohol or smoke. Get medical attention immediately.Eye Contact: Not applicable (gas). Liquefied gas: immediately and flush with large amounts of gently flowing water for at least 15 minutes, occasionally lifting the upper and lower eyelids. DO NOT attempt to rewarm. Cover both eyes with a sterile dressing. DO NOT allow victim to drink alcohol or smoke. Get medical attention immediately. Treatment is urgently required. Transport to a hospital.Ingestion: Not applicable (gas).First Aid Comments: Some of the first aid procedures recommended here require advanced first aid training. All first aid procedures should be periodically reviewed by a medical professional familiar with the chemical and its conditions of use in the workplace. Back to top Flammable Properties: Does not burn.Suitable Extinguishing Media: Not combustible. Use extinguishing agent suitable for surrounding fire.Specific Hazards Arising from the Chemical: Can displace oxygen in the air, causing suffocation. Gas may accumulate in hazardous amounts in low-lying areas especially inside confined spaces, resulting in a health hazard. Closed containers may rupture violently when heated releasing contents. In a fire, the following hazardous materials may be generated: very toxic carbon monoxide, carbon dioxide. Back to top Chemical Stability: Normally stable.Conditions to Avoid: High temperatures. Temperatures above 52.0 °C (125.6 °F)Incompatible Materials: Increased risk of fire and explosion on contact with: metal powder or dusts. Not corrosive to metals.Hazardous Decomposition Products: None known.Possibility of Hazardous Reactions: None known. Back to top Personal Precautions: Increase ventilation to area or move leaking container to a well-ventilated and secure area. Vapour or gas may accumulate in hazardous amounts in low-lying areas especially inside confined spaces, if ventilation is not sufficient.Methods for Containment and Clean-up: Stop or reduce leak if safe to do so. Ventilate the area to prevent the gas from accumulating, especially in confined spaces. Back to top Handling: Prevent unintentional contact with incompatible chemicals. Use the pressure regulator appropriate for cylinder pressure and contents. Secure cylinder in an up-right position. Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. If used in a confined space, check for oxygen deficiency before worker entry and during work.Storage: Store in an area that is: cool, dry, well-ventilated, out of direct sunlight and away from heat and ignition sources, temperature-controlled, secure and separate from work areas, on the ground floor or preferably, if storing in large volumes, in an isolated, detached building. Always secure (e.g. chain) cylinders in an upright position to a wall, rack or other solid structure. Back to top ACGIH® TLV® - TWA: 5000 ppmACGIH® TLV® - STEL [C]: 30000 ppmExposure Guideline Comments: TLV® = Threshold Limit Value. TWA = Time-Weighted Average. STEL = Short-term Exposure Limit. C = Ceiling limit.Adapted from: 2022 TLVs® and BEIs® - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH)NOTE: In many (but not all) Canadian jurisdictions, the exposure limits are similar to the ACGIH® TLVs®. Since legislation varies by jurisdiction, contact your local jurisdiction for exact details. A list is available in the OSH Answers on Canadian Governmental Occupational Health & Safety Departments.A list of which acts and regulations that cover exposure limits to chemical and biological agents is available on our website. Please note that while you can see the list of legislation for free, you will need a subscription to view the actual documentation. Back to top Engineering Controls: Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. Back to top Eye/Face Protection: Wear chemical safety goggles. (frost bite).Skin Protection: Always wear insulated protective clothing, if contact with refrigerated gas is possible.Respiratory Protection:Up to 40000 ppm: (APF = 10) Any supplied-air respirator.(APF = 50) Any self-contained breathing apparatus with a full facepiece.APF = Assigned Protection FactorRecommendations apply only to National Institute for Occupational Safety and Health (NIOSH) approved respirators. Refer to the NIOSH Pocket Guide to Chemical Hazards for more information. Fact sheet last revised: 2024-01-16 Back to top To understand how to prevent fires, it is important to know how a fire can occur. Four elements must be present at the same time for a fire to take place:Fuel or combustible material - something to burn, such as paper or wood.Heat - to raise the material to its ignition (burning) temperature.Oxygen - to sustain combustion (the fire).Chemical reaction - the process of burning.If you remove any of these four elements, the fire will not be able to burn. Back to top Never fight a fire if:You do not know what material is burning.You do not know what type of fire extinguisher to use.You do not know how to use the fire extinguisher.The fire is spreading beyond the spot where it started.Your instincts tell you not to.If you are not confident about your ability to handle the situation (even if you are trained in fire fighting), or if you do not have the correct type of fire extinguisher, do not fight the fire. Pull the fire alarm, evacuate the area, and then call the fire department. Back to top Fires are grouped into classes which depend on the material or substance that is present.Class A - Fires involving ordinary combustibles such as paper, wood, cloth, rubber, or plastics.Class B - Fires involving flammable liquids, gases, oil, paints, or lacquer.Class C - Fires involving energized (live) electrical equipment such as motors, appliances, or power tools.Class D - Fires involving combustible metals such as magnesium, titanium, sodium, and potassium.Class K - Fires involving combustible cooking oils, or fats in cooking appliances. Back to top To fight the different classes of fires, there are different types of fire extinguishers. Each has its own characteristics, capabilities, and limitations.Three main types of portable fire extinguishers include:Water extinguishers: Water extinguishers are filled about two-thirds with water and then pressurized with air. When used for Class A fires, these extinguishers remove the heat from the burning materials.Do not use water to extinguish an electrical fire. Water is a good conductor and can increase the possibility of electrocution.Do not use water to extinguish flammable liquid or cooking oil fires. Water is ineffective as it helps to spread the liquid and the fire.Carbon Dioxide (CO2) extinguishers: The extinguishing media is pressurized CO2. When used for Class B and C fires, the CO2 covers the fuel by blanketing it, and stops the reaction at the surface by displacing oxygen. Be thorough when using a CO2 extinguisher. It has a moderate spray range and last only 10 to 30 seconds. A hard horn attached to the end of the spray tube helps to contain and aim the spray at the target area.Do not use CO2 extinguishers in confined spaces as CO2 can displace the oxygen in the air, making breathing difficult. Only use in a confined space if workers have appropriate respiratory protection.Do not use CO2 extinguishers for Class A fires because the fire may continue to smolder and re-ignite after the CO2 disperses.Dry Chemical extinguishers: Dry chemical extinguishers are the most common and available in few types. These extinguishers will be marked for the classes they are designed to extinguish (e.g., ABC type extinguisher will put out Class A, B and C fires). The extinguishers discharge a blanket of fine powder which creates a break between the fuel and the oxygen in the air. The powder also works to break the chemical reaction. Be accurate when using as they have a short to moderate spray range and last only 10 to 25 seconds.Be cautious of the residue after using dry chemical extinguishers. The residue can damage motors, computers and other electrical equipment.Below is a summary of these and other common extinguishers.Extinguisher Comparison TableExtinguisherClassRangeEmptiesOtherWaterALong60 secFights re-ignitionCO2B and CShort10-20 secMay make breathing difficult in enclosed areasDry ChemicalB and C Some AModerate10-25 secLeaves residueLiquid GasB and CSome AShort10 secMay make breathing difficult in enclosed areasChemical FoamA and BModerate10-30 secLeaves residueBucket of Sand / Dry PowderD Check with your supervisor regarding equipment for Class D firefightingMedia designed to extinguish combustible metals such as magnesium, sodium, titanium, and potassium.DModerate(quickly)Use a Class D extinguisher that is compatible with the metals presentWet ChemicalK Prevents re-ignition Back to top Portable fire extinguisher may use the following markings to indicate which class of fire they are designed to fight. These symbols are recommended by the National Fire Protection Association (NFPA) in the USA. The symbols may be shown using colours. Back to top Always:Be sure that you are trained to use a fire extinguisher before you try to fight a fire.Know what type and class of material is burning.Use the correct fire extinguisher type to fight the fire.Remember, if you feel that you cannot safely extinguish the fire using the portable extinguisher available and if you have not already done so, pull the fire alarm, evacuate the area, and then call the fire department.When using an extinguisher, use the PASS system - Pull, Aim, Squeeze, Sweep.Pull the pin on the extinguisher.Aim the extinguisher.Squeeze the trigger or top handle.Sweep the fire area with the extinguisher's spray until the fire is completely out.For floor fires, sweep from the edges in. For wall fires, sweep from the bottom up.Never walk away from a fire, even if you think it is out. The residue may reignite.Always stand between the escape route and the fire so you can leave safely if the fire grows.If the fire grows too large, leave the area. Activate the fire alarm to evacuate the area. Back to top As an employer or contractor, you must:Use the proper size of the extinguisher.Install extinguishers according to the height requirements stated in your jurisdiction's Fire Code.Locate extinguishers so they are readily accessible to employees for immediate use.Make sure that extinguishers are clearly visible, and any location signs are clear.Mark or label all fire extinguishers clearly with the class of fire it is to be used for.Make sure that the operating instructions always face outward.Maintain extinguishers in a fully charged and operable condition.Keep extinguishers in the designated places at all times (except during use).Visually inspect portable fire extinguishers monthly.Use a tag on each extinguisher that shows the dates of inspection, recharging or servicing, the name of the servicing agency, and the name of the person who did the service.Service portable fire extinguishers at least once a year, or when the monthly inspection indicates servicing is necessary.Keep written records showing maintenance items such as serial number and type of extinguishers, location, inspection date, description of tests, date of next inspection, date of annual servicing, comments and inspector's signature.Only allow service by trained persons with suitable testing equipment and facilities. Back to top Portable fire extinguishers should be inspected at least monthly. Visually check for the following items. Customize this list for your workplace.Are the fire extinguishers well supported and hangers are fastened solidly?Are the fire extinguishers accessible?Can be easily reachedThere are no obstructionsLocation signs are clearClass markings are clearOperating instructions are clearAre the extinguishers in good working condition?Discharge opening is clearIt is fully chargedIt has not been damaged or tampered withHydrostatic testing has been doneIs the ring pin in place?Is the seal intact? Back to top Extinguishers with the following conditions should be removed from service:When the cylinder or shell threads are damagedWhere there is corrosion that has caused pitting, including corrosion under removable name plate assembliesWhen the extinguisher has been burned in a fireAlways check with the supplier or manufacturer if you are not sure about the serviceability of the fire extinguisher. Back to top Depending on the type of extinguisher, it may be classified as a hazardous product under WHMIS. Many extinguishers will meet the compressed gas criteria and will therefore require a WHMIS label. Other extinguishers may also be classified in other WHMIS classes due to the physical or health effects of the extinguishing media. Fact sheet last revised: 2024-08-23 Back to top CAS Registry No.: 7664-41-7Other Names: Anhydrous ammonia, Liquid ammoniaMain Uses: Used as a fertilizer, to make plastics, fibers and other chemicals, as a refrigerant, and in many other applications.Appearance: Colourless gas.Odour: Ammonia-like (pungent, suffocating)Canadian TDG: UN1005 Back to top According to the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST), ammonia can be classified as:Flammable gases - Category 1Gases under pressure - Liquefied gas Acute toxicity - inhalation - Category 3Skin corrosion/irritation - Category 1Serious eye damage/eye irritation - Category 1The signal word is danger.The hazard statements include:Extremely flammable gasContains gas under pressure; may explode if heatedToxic if inhaled; Corrosive to the respiratory tractCauses severe skin burns and eye damagePlease note that this classification was retrieved from the CNESST site on February 21, 2023 and was established by CNESST personnel to the best of their knowledge based on data obtained from scientific literature and it incorporates the criteria contained in the Hazardous Products Regulations (SOR/2015-17). It does not replace the supplier’s classification which can be found on its Safety Data Sheet. Back to top Emergency Overview: Colourless gas. Ammonia-like odour. COMPRESSED GAS. Contains gas under pressure. May explode if heated. FLAMMABLE GAS. High concentrations can be a fire and explosion hazard, especially in confined spaces. Can decompose at high temperatures forming very flammable hydrogen gas. VERY TOXIC. Fatal if inhaled. Corrosive to the respiratory tract. CORROSIVE. Causes severe skin burns and eye damage. May cause frostbite. Back to top Main Routes of Exposure: Inhalation. Skin contact. Eye contact.Inhalation: VERY TOXIC, can cause death. Can cause severe irritation of the nose and throat. Can cause life-threatening accumulation of fluid in the lungs (pulmonary edema). Symptoms may include coughing, shortness of breath, difficult breathing and tightness in the chest. Symptoms may develop hours after exposure and are made worse by physical effort. Long-term damage may result from a severe short-term exposure.Skin Contact: CORROSIVE. The gas irritates or burns the skin. Permanent scarring can result. Direct contact with the liquefied gas can chill or freeze the skin (frostbite). Symptoms of more severe frostbite include a burning sensation and stiffness. The skin may become waxy white or yellow. Blistering, tissue death and infection may develop in severe cases.Eye Contact: CORROSIVE. The gas irritates or burns the eyes. Permanent damage including blindness can result. Direct contact with the liquefied gas can freeze the eye. Permanent eye damage or blindness can result.Ingestion: Not a relevant route of exposure (gas).Effects of Long-Term (Chronic) Exposure: May harm the respiratory system. Can irritate and inflame the airways.Carcinogenicity: Not known to cause cancer.International Agency for Research on Cancer (IARC): Not specifically evaluated.American Conference for Governmental Industrial Hygienists (ACGIH): Not specifically designated.Teratogenicity / Embryotoxicity: Not known to harm the unborn child.Reproductive Toxicity: Not known to be a reproductive hazard.Mutagenicity: Not known to be a mutagen. Conclusions cannot be drawn from the limited studies available. Back to top Inhalation: Take precautions to ensure your own safety before attempting rescue (e.g., wear appropriate protective equipment). Move victim to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema may be delayed. Get medical attention immediately. Treatment is urgently required. Transport to a hospital.Skin Contact: Gas: flush with gently flowing water for 5 minutes. If irritation or pain persists, see a medical professional. Liquefied gas: quickly remove victim from source of contamination. DO NOT attempt to rewarm the affected area on site. DO NOT rub area, flush with water, or apply direct heat. Gently remove clothing or jewelry that may restrict circulation. Carefully cut around clothing that sticks to the skin and remove the rest of the garment. Loosely cover the affected area with a sterile dressing. Do not remove frozen clothing from frostbitten areas. If frostbite has NOT occurred, immediately and thoroughly wash contaminated skin with soap and water. DO NOT allow victim to drink alcohol or smoke. Get medical attention immediately. Treatment is urgently required. Transport to a hospital.Eye Contact: If eye tissue is frozen, get medical attention immediately. Gas: immediately flush the contaminated eye(s) with gently flowing water for 15 minutes, occasionally lifting the upper and lower eyelids. If irritation or pain persists, see a doctor. Liquefied gas: move victim to fresh air. Immediately flush with gently flowing water. DO NOT attempt to rewarm. Cover both eyes with a sterile dressing. DO NOT allow victim to drink alcohol or smoke. Get medical attention immediately.Ingestion: Not applicable (gas).First Aid Comments: Some of the first aid procedures recommended here require advanced first aid training. All first aid procedures should be periodically reviewed by a medical professional familiar with the chemical and its conditions of use in the workplace. Back to top Flammable Properties: FLAMMABLE GAS. High airborne concentrations can be ignited and pose a significant fire and explosion hazard, especially in a confined space. A large and intense energy source is necessary to ignite ammonia gas.Suitable Extinguishing Media: Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog.Specific Hazards Arising from the Chemical: Heat from fire can cause a rapid build-up of p