Hazardous Substances

Revised July 2024

Purpose

This section is intended to provide an overview of safe practices when working with hazardous substances.

A hazardous substance is defined as a substance that has been determined to be a carcinogen, a toxic or highly toxic agent, a reproductive toxin, irritant, corrosive, sensitizer, hepatotoxin, nephrotoxic, neurotoxin, an agent that acts on the hematopoietic system, or an agent that damages the lungs, skin, eyes, or mucous membranes.

This section should be used in conjunction with the *Flammable/Combustible Material Handling and Storage section* and the *Lifting, Moving and Storing Materials* section of this manual.

Applicability

All District employees whose position potentially and/or requires exposure to hazardous substances including asbestos, lead, explosives, compressed gases, fuels, lubricants, PCBs, acid, chlorine gas, herbicides, crystalline silica, or other hazardous substance as defined above.

Responsibilities

Managers must ensure the following:

- Employees are fully trained in current safety practices as it relates to hazardous substances.
- Personal Protective Equipment (PPE) is used properly.

Employees must:

- Comply with all training requirements, including staying current on all trainings.
- Properly use all PPE

Requirements

Explosives

WAC 296-52 Safety Standards for Possession, Handling, and Use of Explosives

- The transportation, handling, storage, and use of dynamite and other explosives, including blasting agents, shall be directed, and supervised by persons of proven experience and competency in blasting and use of explosives.
- A blaster shall be qualified, by reason of training, knowledge, or experience, in the field of transporting, storing, handling, and use of explosives, and have a working knowledge of state and local laws and regulations which pertain to explosives. Blasters shall be required to furnish satisfactory evidence of competency in handling explosives and performing, in a safe manner, the type of blasting that will be required. In addition, blasters shall be able to give and understand written and verbal orders; shall be in good physical condition; and not addicted to, or under the influence of, intoxicants, narcotics, and similar drugs. (Similar drugs may include certain prescription drugs if such drugs diminish the physical ability or mental capacity of the blaster.
- Notification shall be made before explosives or blasting agents are brought on the jobsite. Such notification should accompany a comprehensive detailed blasting program. The required program must, as a minimum, show proposed methods and procedures for conforming to these and referenced standards and regulations, including the following:
    - Method and equipment for transporting explosives and detonators.
    - Type and location of storage facilities.
    - Type and quantity of explosives and detonators.
    - Primer assembly procedure and location.
    - Employee training programs.
    - Provisions for protecting persons, structures, and private property.
    - Provisions for developing and distributing a daily blasting plan covering hole diameter, spacing, loading, and delay patterns.
    - Provisions for disposal of explosives, blasting agents, and associated materials.
- The contractor shall provide such reasonable and adequate security as is necessary to prevent loss or theft of explosives. Maintain an inventory of all explosives on the jobsite, including a record of explosives received and withdrawn from the magazines.
- Blasting operations in the immediate vicinity of buildings, public roads, overhead power lines, utility services, or similar facilities shall not be undertaken until the owners and/or the operators have been notified, and all necessary precautions taken for safe control of the blasting operations.
- Explosives are intentionally manufactured to explode, and when supplied with sufficient initiating energy, will do so. Furthermore, explosives will not distinguish between initiating energy supplied purposely and initiating energy supplied accidentally. Therefore, the burden of protecting explosives from accidental sources of initiating energy must rest with those who handle and use explosives.
- Only persons authorized by the District to do so shall use explosives or explosive material. These persons shall be qualified by training and experience in the safe handling, transporting, storing, and use of explosives and shall have a working knowledge of applicable federal, state, and local laws. Many jurisdictions require the qualified person to hold a license. These persons shall be a minimum of 21 years of

age; not addicted to narcotics, intoxicants, or similar types of drugs; and able to understand and give written and verbal orders.

- Explosives and blasting caps (detonators) shall not be transported on the same vehicle, except by permission of the authority having jurisdiction. Blasting supplies shall not be transported with other materials or cargoes.
- Explosives and detonators shall be carried and transported in the original manufacturer's container or other approved container.
- Vehicle transporting explosives, detonators, and other blasting supplies shall have any exposed spark-producing metal on the inside of the body covered with non-sparking material; be marked or placarded on both sides, the front, and the rear with approved "explosives" signs; be equipped with fire extinguishers in good mechanical condition; and be driven by an appropriately licensed driver.
- Motor vehicles or conveyances containing explosives, blasting agents, or blasting supplies shall not be taken inside a garage or shop. No repairs shall be performed on a motor vehicle or conveyance loaded with explosives, blasting agents, or blasting supplies.
- Motor vehicles or conveyances containing explosives or blasting agents shall always be attended.
- Because electric blasting caps, when not shielded by a closed metal box, have been known to be detonated by the operations of two-way radios in vehicles as well as by regular radio transmitter stations, no vehicle equipped with a radio transmitter shall be allowed within 100 feet of blasting operations or exposed electric caps, while the transmitter is in operation.
- When electric blasting caps are used, adequate signs warning against the use of mobile radio transmitters shall be prominently displayed.
- The blaster, prior to connecting the charge or initiating the explosives, shall ensure the protection of both the public and District employees through the use of warning signs and/or personnel stationed around the perimeter of the danger area.
- Electrical connections shall be made only after the hole has been charged and the area is clear.
- Before the blast is fired, a loud signal shall be given by the blaster who shall have made certain the area is clear of persons and extraneous materials. Blasting signals shall be posted as follows:
    - Warning signal: A 1 minute series of long blasts given 5 minutes prior to the blast signal.
    - Blast signal: A short signal of blasts 1 minute prior to the shot.
    - All Clear Signal: A prolonged blast following the inspection of the blast area.
- In cases of misfires, no person shall return to the blast area until permitted to do so by the blaster. Misfires shall not be inspected until a sufficient waiting period has elapsed. For nonelectric blasting, the minimum waiting period is 1 hour; for electric blasting, the minimum waiting period is 30 minutes.
- Blasting cap leg wires shall be kept short-circuited (shunted) until they are connected into the circuit for firing.

Compressed Gases

WAC 296-24-68203 Cylinders and containers

- Care shall be exercised in handling all compressed gas cylinders. They shall not be dropped, jarred, or exposed to temperature extremes.
- Cylinders shall have the valve cap or valve protection device in place at all times, except when in actual use or connected to a welding set.
- Cylinders shall not be rolled and shall not be lifted by the valve or valve cap; a suitable cradle or other device shall be used.
- Cylinders shall have their components properly identified.
- Cylinders not having fixed hand wheels shall have keys, handles, or nonadjustable wrenches on the valve stems while the cylinders are in service.
- Compressed gas cylinders, whether full or empty, shall be stored in an upright position and chained or otherwise secured so that they cannot fall or be upset.
- When cylinders are transported by powered vehicles, they shall be secured in a vertical upright position with the valve cap or valve protection device in place.
- Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease) by a minimum distance of 20 feet or by a 5-foot-high noncombustible barrier.
- Cylinders shall not be placed where they might become part of an electric circuit or within 5 feet of an electrical outlet.
- Inside a building, hydrogen and fuel-gas cylinders, except those in actual use or attached ready for use, shall be limited to a total gas capacity of 2,000 cubic feet (56m³) or 300 pounds (135.9 kg) of liquefied petroleum.
- Employees shall never force connections that do not fit, nor shall they tamper with the safety relief devices of a cylinder valves.
- Before the regulator is removed from a cylinder, the valve shall be closed, and all pressure released from the regulator.
- A leaking cylinder shall not be used. Such cylinders shall be taken outdoors away from sources of ignition. The supervisor shall be notified.
- A flame shall never be used to detect gas leaks.
- The recessed top of cylinders shall not be used as a place for tools.
- No attempt shall be made to mix gases in a cylinder or to transfer gas from one cylinder to another.
- A sign “Danger—No Smoking, Matches, or Open Lights” or one with equivalent wording shall be conspicuously posted in rooms or at entrances to areas where fuel gas is used and/or stored.
- Hydrogen: Special precautions shall be taken when using hydrogen to avoid the possibility of fire and explosion. “Danger—No Smoking” signs shall be posted where hydrogen is used and/or stored.
- Oxygen: Oil, grease, or similar materials shall not be allowed to come in contact with any valve, fitting, regulator, or gauge of oxygen cylinders:
    - Oxygen shall never be used as a substitute for compressed air.
    - When an oxygen cylinder is in use, the valve should be opened fully to prevent leakage around the valve stem.

- Acetylene: Acetylene cylinders shall be properly secured and always used, transported, or stored in a vertical position. Cylinders shall be protected from sparks, flames, and contact with electrical equipment:
  - An acetylene cylinder valve shall not be opened more than one and one-half turns of the spindle and preferably no more than three-fourths of a turn.
  - Employees shall not use acetylene in a free state at pressures higher than 15 psi.
- Chlorine: Also refer to Chlorine gas section:
  - Chlorine containers shall be stored and properly secured in a cool place protected from moisture.
  - Every precaution shall be taken to prevent accidental discharge of the gas, and protective equipment shall be readily available for use in an emergency.
  - Only employees who have been properly trained and provided with the necessary protective equipment shall attempt to stop cylinder leaks.
  - Should a chlorine lead develop, the cylinder shall be placed so that only “gas” escaped. (An ammonia swab may be used to detect leaks.) Water should not be sprayed or poured on chlorine leaks.
  - Chlorine cylinders shall never be used or stored near flammable materials.
  - Dry chlorine shall be stored in an isolated area as mixing it with anything, but water could cause a fire or explosion.

Fuels and Lubricants

- For fuel storage see Flammable/Combustible Liquids section of this manual.
- When draining containers on vehicles and equipment, special procedures shall be used to prevent explosions. Inert gases may be required to purge fuel containers when work is being performed on them.
- Fuel tanks on vehicles and equipment shall be secured to prevent vapors from escaping during welding or cutting operations in the area.
- Sorbent materials shall be maintained in the immediate area where bulk containers of fuels and/or lubricants are stored and in use.
- Areas where fuels or lubricants are spilled shall be cleaned up immediately and materials shall be disposed of properly.
- Waste fuels shall not be stored in open containers.

Asbestos

Chapter 46.29 RCW Health & Safety - Asbestos

WAC 296-62-077 Asbestos, tremolite, anthophyllite, and actinolite, WAC 296-65 Asbestos Removal and Encapsulation

As per Labor and Industries, the District has conducted a “good faith” inspection on buildings and properties to determine if asbestos is present for construction and maintenance activities. Areas containing asbestos or assumed to contain asbestos are communicated to employees whose job duties may put them at risk of exposure.

Potential areas for exposure:

- Floor tile, insulation, pipe insulation
- Building material
- ACM used in water pipe
- Wire insulation
- Transite pipe

If potential for asbestos exposure is suspected or exposure has occurred **Stop Work Authority** should be used. DO NOT DISTURB materials suspected of containing asbestos.

Precautions:

- Only those employees who have been properly trained and equipped with the necessary personal protective equipment shall handle asbestos.
    - Employees are to report materials suspected of containing asbestos to a certified employees for assessment.
    - ***Water Workers*** *are to maintain certification to be able to work with water pipes containing asbestos*
- Insofar as practicable, asbestos shall be handled mixed, applied, removed, cut, scored, or otherwise worked in a wet state unless this procedure would render the product useless. (i.e., wet mop floors, dust with damp cloth)
    - dry sweeping, shoveling, or other dry clean-up of dust where suspected asbestos materials exist should be avoided.
- Asbestos cement, mortar, coating, plaster, etc., shall not be removed unless it is wet, enclosed, or ventilated.
- Negative air enclosures or other engineering controls (e.g., glove bags) that reduce the concentration of airborne asbestos fibers shall always be used when working with asbestos.
- Personal Protective Equipment: Proper protective equipment, including clothing, must be worn when working in an area where there is a significant amount of airborne asbestos fibers:
    - Respirators: Approved respirators shall be worn when there is a possibility of airborne concentrations of asbestos fibers. The type of respirator required shall be based on the airborne concentrations of asbestos fibers. At no time shall less than a half mask air-purifying respirator with a high efficiency filter be used. Refer to the District's Respiratory Protection Program (see Appendix F) for additional information.
    - Special Clothing: Employees who are exposed to airborne concentrations of asbestos fibers that exceed the action level shall use special clothing such as coveralls, head coverings, gloves, and foot coverings. Clothing shall be changed only in the designated location and shall be kept separate from street clothes. Contaminated clothing shall be properly cared for or disposed of and kept separate from other laundry or disposed materials; it shall be transported in sealed, impermeable bags or similar containers and properly labeled to identify the possible hazard.
- Housekeeping:
    - All external surfaces shall be maintained free of accumulation of asbestos fibers.
    - HEPA-filtered vacuum(s) rated for asbestos may be used for cleaning suspected asbestos areas, surfaces, and/or materials.
    - Asbestos waste and materials contaminated with asbestos, which may produce airborne concentrations, shall be collected and disposed of in sealed impermeable bags at least 6 mils thick, or similar containers. Bags or containers shall be double bagged and properly labeled.

Polychlorinated Biphenyls (PCBs)

- Only properly trained employees shall handle material containing PCBs.
- Full protective gear must be worn (respirator, goggles, coveralls, gloves, and boots) when cleaning up after a rupture of a capacitor or transformer containing PCBs. PPE as noted in SDS must be worn.
- Before entering a confined space (such as a transformer vault) after the failure of equipment containing PCBs, the space shall be purged by forced ventilation, and employees entering the space shall wear proper auxiliary breathing equipment until tests indicate the space is free of fumes.
- All materials such as rags, solvents, dirt, etc., contaminated by PCBs shall be disposed of according to all federal, state, and local regulations. Refer to the Hazard Communication Standards (HCS aka: HAZCOM) and the Globally Harmonized System (GHS) section of this manual for more information.

Acids and Caustics – Storage

- Acids, in any quantity, shall be kept in a container compatible with the chemical stored within and appropriately labeled. These containers shall not be used for any other purposes.
- Acids shall not be stored near heaters, steam pipes, or other sources of heat.
- Acid containers shall be securely stoppered or covered.
- Acids kept on shelves shall not be stored higher than waist level.
- Acids and caustics shall not be stored together.
- Storage areas for acids and caustics shall be posted with appropriate warning signs.

Acids and Caustics – Handling

- Only reliable, dependable, and properly trained employees or suppliers shall operate valves or other equipment that controls the movement of chemicals.
- Approved protective equipment and clothing shall be worn whenever acids or caustics in harmful quantities may spill, splash, fly, or drip upon the person handling them. The quantity of acid or caustic handled shall determine the kind and quantity of clothing and equipment. Minimum protection shall be chemical goggles, acid proof gloves, and apron.
- Should any acid, caustic, or other chemical come in contact with the eyes, they shall be thoroughly washed with large amounts of running water and a physician consulted a soon as possible. DO NOT RUB THE EYES.
- Employees shall not handle acids or caustics unless there is access to an adequate supply of water for quick drenching and flushing of the eyes and body.
- After handling large quantities of caustics, employees shall take a shower to avoid skin irritation.
- Before lifting a chemical container, it shall be examined carefully to see that it is not damaged or leaking and properly sealed. All movements shall be made slowly to avoid excessive agitation of the acid.
- If acids or caustics are spilled, they shall be appropriately contained and disposed of.
- Employees handling acids, caustics, or other corrosive, toxic chemicals shall wear chemical resistant gloves, aprons, and eye and face protection and shall take precautions to prevent personal injury.
- The use and toxic quality of new materials shall be investigated thoroughly, and personnel shall be advised of any hazards involved.
- Chemical pumps shall be washed externally before repacking of performing maintenance work.
- Areas where acid cleaning is to be done shall be barricaded by suitable means, and no smoking or open flames shall be permitted.
- Suitable procedures shall be established to avoid explosions from released hydrogen or injuries from the chemicals.
- Contact lenses shall not be worn when working in a laboratory or when handling acids, caustics, or other corrosive chemicals.
- Before starting to unload a tank car or tank truck of acid, the acid storage tank shall be gauged to see if there is adequate space inside the tank to contain the acid being added without overflowing.
- When tank cars or trucks are unloaded, warning signs shall be prominently posted, and barriers placed so as to warn all persons of the impending danger.
- Only approved methods, tools, and equipment shall be used to extract acids and caustics from a container.
- Acid in railroad tank cars or tank trucks shall be unloaded in accordance with the regulations of the Interstate Commerce Commission and the recommended practices of the Manufacturing Chemists Association.

Acid and Caustics – General

- When acid or caustic are mixed with water, the acid or caustic shall be poured into the water, not the water into the acid or caustic.
- When necessary to enter a tank, vessel, or similar structure, appropriate equipment, and confined space procedures (see Confined Space section of this manual) shall be used to minimize exposure to chemical hazards.
- Hydrazine and morpholine are highly toxic and caustic and shall never be handled without adequate ventilation. Skin or clothing contact and the breathing of fumes shall be avoided.
- All small containers such as bottles or jars shall be washed thoroughly when emptied. Chemical containers, steel drums, tank trucks, or tank cars shall not be washed but shall be completely drained of all acid before returning to the acid supplier.
- Open flames and smoking are prohibited when working with or near acid in metal containers, such as tanks, condensers, or boilers. Spark-proof tools shall always be used where there is a danger of accumulated hydrogen.
- Use of liquid chlorine bleach.
    - Only those properly trained and equipped with the necessary personal protective equipment shall handle liquid chlorine bleach.
    - First and foremost, all who will be handling and/or be exposed to liquid bleach shall refer to the specific SDS sheet for all pertinent handling, storage, and protective equipment information.
    - Every precaution will be taken to prevent accidental release of liquid bleach and appropriate clean-up material must be readily available for use in an emergency.
    - Spills or releases must be reported to Manager or other appropriate party as outlined in the *Hazard Communication Standards (HCS aka: HAZCOM) and the Globally Harmonized System (GHS)* section of this manual.

Chlorine Gas

WAC 296-843 Hazardous Waste Operations

- Employees may be exposed to chlorine systems while performing work at industrial customer facilities. Employees must understand the hazards and emergency procedures related to chlorine.
- The District provides emergency escape respirators. These must be carried while working where a chlorine release is possible.
- In the event of a chlorine cylinder leak, only properly trained employees with the necessary PPE shall attempt to stop the leak and District Emergency Response plan enacted.
- Only those who have been properly trained can perform work on chlorine lines or equipment.
- A chlorine system enclosure or shelter will have available two units of approved, self-contained breathing apparatus and protective clothing. They must be located outside the shelter or enclosure at a sufficient distance to make them approachable in the event of a chlorine leak.
- Chlorine system enclosures shall be posted with signs restricting entry and warning of hazard to health and the hazards of fire and explosion.
- The number of employees will be limited to those necessary to complete the job.

Lead

WAC 296-24-71513 Lead, WAC 296-155-176 Lead, WAC 296-62-07521 Lead

- Permissible exposure limits shall not be exceeded.
- Monitoring for lead levels shall be conducted in compliance with existing regulations.
- Engineering and work practice controls shall be used to minimize lead exposure.
- Respiratory protective equipment and other personal protective equipment shall be used in accordance with existing regulations.
- Air monitoring during the splicing of lead-jacketed electrical lines has shown the potential for exposures to lead at or above the action level. Any soldering or heating of lead jacketed materials should be conducted using proper engineering controls (i.e., ventilation), personal hygiene, PPE, and personal monitoring.
- District employees involved in the disturbance of lead-containing materials or lead based paint as part of regular work activities should have at least a lead awareness training class.

Use of Herbicides and Other Chemicals

- Before using any herbicide or other chemical read the label carefully and follow the directions and precautions listed.
- Avoid skin contact or breathing mist of spray material.
- When working with toxic materials, proper respirator protection must be used.
- Spray equipment shall be cleansed daily when using oil solutions.
- Spraying/application of herbicides, pesticides and/or other chemicals shall not be done during windy conditions.
- When spraying near power lines maintain Minimum Approach Distance (MAD), including distance of spray from nozzle.
- Foliage and basal sprays shall not be used on wild cherry trees in areas where livestock may graze because of the poisonous acid that is generated.
- Oil and other liquids spilled on power spray equipment shall be removed as soon as possible to prevent falls from slippery surfaces.
- Walking and working surfaces of sprayers shall be covered with slip resistant material.
- Hose connections on hydraulic sprayers shall be checked before use to prevent rupture.
- No smoking on or around mist-spray equipment when oil solutions are being mixed or used.
- Herbicides and other chemicals shall never be left where they would create a hazard to persons or property.
- Empty containers shall be disposed of in a safe manner. They must never be thrown into ponds, lakes, or streams.
- Spray wastes must be disposed of in a safe manner and in accordance with federal, state, and local regulations.

Crystalline Silica

WAC 296-840 Respirable Crystalline Silica

- Crystalline silica is a mineral dust, mainly quartz, cristobalite, and/or tridymite created through mining and processing of mined minerals and construction activities. It is commonly found in concrete work, refractory, coal dust, railroad maintenance, etc.
- When applicable, it is the duty of the District to conduct sampling of the workplace activities to determine the presence of airborne crystalline silica.
    - This section applies when sampling or other relevant data indicates potential exposure to airborne crystalline silica above the OSHA time weighted average (TWA) indicated in Table Z-3 of OSHA 29 CFR 1910.1000.
- When an area is discovered with airborne concentrations of crystalline silica, the area shall be designated as a regulated location, signs erected to notify persons, and access to the location must be limited to qualified employees.
- The District shall utilize a hierarchy of controls to limit the generation of silica and exposure to employees.
- Hierarchy of controls shall include elimination of the silica or process that caused its generation, engineering controls to limit airborne dusts, policies, practices, and protective equipment that control exposure.
- Dry sweeping, brushing, or compressed air should not be used as that could result in airborne dusts.
- HEPA vacuuming and wet methods of dust control should be used whenever feasible.

Recordkeeping

The District shall maintain and make available records including:

- Air sampling results
- Medical Surveillance
- Objective data used in determination of risk.

Training & Resources

Additional information can be found in the *Hazard Communication Standards (HCS aka: HAZCOM) and the Globally Harmonized System (GHS)* section of this manual.

The following trainings are available through Learning Central:

- Asbestos Hazard Emergency Response*
- HAZWOPER
- Lead Awareness
- Compressed Gas Safety
- Hazardous Waste Management

*Custodial, Maintenance, and Water Workers must be have annual asbestos training.