PARAGON Ventilation Ltd.
Our Name Stands For Excellence

Codes of Practice & Safe Work Practices

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Asbestos

Purpose

To outline the procedures required when working with asbestos containing materials (ACM) in order to provide protection and safeguards from asbestos exposure to employees/contractors and the environment as required by jurisdictional occupational legislation.

Definitions

Asbestos – The generic name for a group of naturally occurring fibrous minerals. Asbestos color may range from white to a pale yellow, green or blue. Asbestos fibres are very harmful to the lungs. They may cause lung scarring (Asbestosis), lung lining scarring (Pleural Scarring), cancer of the lung lining (Mesothelioma), and lung cancer.

Asbestos Containing Material (ACM) – Any manufactured article or other material which contains 1% or more asbestos by weight at the time of manufacture.

Clean Room – A room in a high risk decontamination facility which is used by employees to change from street clothes into protective work clothing and equipment prior to entering the designated work area.

Crocidolite Asbestos – Also known as "blue" asbestos. Crocidolite fibres are somewhat brittle but are generally flexible enough to bend beyond 90 degrees before breaking, though not nearly as flexible as chrysotile. Also harder than the other amphibole varieties, crocidolite gets its "blue" nickname because it often ranges in color from slate gray to a very deep blue. Crocidolite fibres are finely textured and hair-like, occurring in naturally formed bundles, and are long and straight. These straight, needle-like fibers are easy to inhale and will remain in the lungs indefinitely. Crocidolite is the most hazardous of the amphibole asbestos family.

Exposed Worker – A worker who may reasonably be expected to work in a restricted area at least thirty (30) workdays in a 12-month period.

Friable Material – Material which, when dry, can be easily crumbled or powdered by hand pressure or a material that is crumbled or powdered.

High Risk Work Activity – Work activity involving the handling of asbestos containing material or working in proximity to friable asbestos containing material, where there is a high level of control necessary to prevent exposure to excessive concentrations of airborne asbestos fiber.

Low Risk Work Activity – Work activity in proximity to friable asbestos containing material, where the material is not disturbed and there is no significant release of asbestos fiber.

Moderate Risk Work Activity – Work activity involving the handling of asbestos containing material or working in proximity to friable asbestos containing material, not otherwise classified as low or high risk work activities.

Regulated Area – An area established to clearly identify areas where ACM exceed or can reasonably be expected to exceed, the permissible exposure limit. It is these areas where there is reasonable likelihood that airborne concentrations of asbestos will exceed their occupational exposure limits.

Paragon Ventilation Ltd Responsibilities

Paragon Ventilation Ltd shall ensure that personnel who may be exposed to asbestos at a work site are:

- Informed of the health hazards associated with exposure to asbestos,
- Educated in the identification of asbestos containing materials,
- Informed of measurements made of airborne concentrations of asbestos at the work site,
- Given and instructed on the use of the appropriate PPE,
- Trained in Paragon Ventilation Ltd procedures which have been developed to minimize the personnel's exposure,
- Have successfully completed a course of instruction approved by a Director of Occupational Hygiene,
- Hold a valid, original certificate of completion of same and
- Are aware of the purpose and significance of any required health monitoring.

Hazard Inventory

Paragon Ventilation Ltd shall ensure that a Hazard Inventory of all asbestos containing materials is prepared and kept current. This inventory shall be identified with signs, labels or other means.

Assessment and Classification

A Hazard Assessment and Control shall be conducted by a competent person with due regard for the condition of the material, its friability, accessibility and likelihood of damage, and the potential for fibre release and exposure of employees/contractors. The work activity must be classified as low, moderate or high risk.

The Hazard Assessment and Control shall take place prior to any demolition, alteration, or repair of machinery, equipment or structures where asbestos may be disturbed. In the case of demolition, materials with the potential to release asbestos fibres are to be removed first. If a structure is being altered and/or renovated where there is a potential for release of asbestos fibres, fibres are to be encapsulated, enclosed or removed.

Control of Friable Asbestos

Friable asbestos containing material shall be controlled by removal, enclosure or encapsulation so as to prevent the release of airborne asbestos fiber.

Work that would disturb friable asbestos containing material will not be conducted until all the necessary precautions have been taken to protect Paragon Ventilation Ltd employees and contractors.

Exposure

Properties of asbestos are high tensile strength, the ability to be woven, and resistance to heat and most chemicals. Asbestos fibers have been used in a wide range of manufactured goods including roofing shingles, ceiling and floor tiles, paper and cement products, textiles, coatings and friction products such as automobile clutch, brake and transmission parts. Employees and contractors can also be exposed to asbestos in a wide spread use of electrical insulation applications. A good measure of the hazard posed by asbestos is its friability – the ease with which it can be crumbled or pulverized.

Paragon Ventilation Ltd. will ensure that through Hazard Assessment and Control, exposure to personnel is kept as low as reasonably achievable, and that personnel shall not be exposed to asbestos, such that the exposure to a concentration of asbestos exceeds its ceiling limit.

Atmospheric testing shall be conducted before any personnel enter an area where possible asbestos exposure exists. Signs, labels, warnings and posted instructions shall be provided to protect, inform and warn employees and contractors of the hazards from asbestos exposure.

Permissible Exposure Limit (PEL)

Hazard controls shall be implemented sufficient enough that an employee/contractor will not be exposed to an airborne concentration of asbestos in excess of 0.1 f/cc in an 8-hour exposure limit. When employees/contractors are exposed to asbestos, air quality breathing samples will be taken by a designated competent person during the 8-hour occupational exposure limit.

Exposure Controls

Supplied air will be provided to, and exhaust air from, the designated work area to maintain a negative pressure of at least 0.02 inch of water. The ventilation system shall operate on a 24-hour basis throughout the abatement process through the second wet cleaning. The ventilation system will be in accordance with EPA recommendations included in the Guidance for Controlling Friable Asbestos Containing Materials.

Paragon Ventilation Ltd will ensure that if its employees/contractors have the potential to enter any area where demolition occurred, the materials that have a potential to release asbestos fibres are removed first. All steps will be taken to prevent asbestos from being released into the air.

Before starting work where exposed, friable asbestos containing material is present or asbestos containing material has been handled, Paragon Ventilation Ltd must remove all asbestos dust from contaminated work surfaces with a damp cloth or similar material, or with a vacuum cleaner equipped with a HEPA filtered exhaust.

Work surfaces in the work area must be kept as free as practicable from accumulations of asbestos dust. Work surfaces in a designated work area must, with due regard for the level of risk be covered with plastic sheets, tarpaulins or similar materials to help control the spread of asbestos containing material.

Monitoring

During a high risk work activity, except where glove bags are used as the containment, Paragon Ventilation Ltd must sample for airborne asbestos fibre in:

- Areas outside of the designated work area but in its vicinity, at least daily if there are unprotected employees/contractors in the area,
- The clean room, at least daily during removal and cleanup operations, and
- Contaminated areas inside the designated work area, as necessary during removal and cleanup to ensure that employees and contractors are adequately protected.

The results of all air samples taken during a high risk activity shall be made available to the employees/ contractors involved, within 24 hours of completing the collection of the samples.

Except where glove bags are used as the containment, prior to dismantling a containment used in a high risk work activity and after all asbestos waste has been cleaned up, removed or otherwise controlled, Paragon Ventilation Ltd will ensure that:

- Clearance air sampling is conducted in previously contaminated areas inside designated work area, and
- The airborne asbestos fibre levels in these areas do not exceed 0.02 f/ml.

Prohibitions

- Crocidolite asbestos, or material containing crocidolite asbestos, shall not be brought into or used in the workplace.
- Spraying of asbestos or asbestos containing material is not permitted.
- Pressure spraying equipment of any type must not be used to remove asbestos insulation or other asbestos containing material from buildings or structures.
- The use of compressed air to clean up or remove asbestos containing dust or debris, or dry sweeping or dry mopping of asbestos containing waste is not permitted.

Substitution

- Paragon Ventilation Ltd shall substitute material less hazardous than asbestos when practicable.
- If such substitution is not practicable, Paragon Ventilation Ltd must document the reasons why less hazardous material cannot be substituted for asbestos containing material, and make this documentation available to employees, contractors and the joint committee, or the worker health and safety representative, as applicable.

Restricted/Regulated Area

- Before starting work with asbestos containing material Paragon Ventilation Ltd shall, with due regard for the level of risk,
  – Identify and mark the boundary of the designated work area by barricades, fences or Similar means.

  - Ensure that the immediate work area is cleared of objects, materials and equipment other than that required to do the work, and
  - Ensure that windows, doorways and all other openings are adequately secured to prevent the release of asbestos fibre into other work areas.

- Only a person authorized by Paragon Ventilation Ltd or by jurisdictional law to do so enters a restricted area.
- Warning signs will be erected around the controlled area and at every point of potential entry from the outside. These signs will be in accordance with Occupational Safety and Health Administration *(OSHA) Standard 29 CFR 1910.1001*.
- Posted signs at the boundaries of the designated work area must clearly indicate that:
  - Work is in progress,
  - Asbestos, silica, coal dust or lead are present in the area,
  - Only authorized persons may enter the area, and
  - Eating, drinking and smoking are prohibited in the area.
- Signs posted must:
  - Be in a conspicuous location at the entrances to and on the periphery of each restricted area, as appropriate, and
  - Remain posted until the area is no longer a restricted area.
- Tight security on a 24-hour basis preventing unauthorized entry into a controlled work area.

All personnel entering and leaving the designated work area shall comply with the following procedures:

- Entering from the outside: Change from street clothes into protective clothing and wear clean protective gear. Go through shower room into dirty equipment room, pick-up equipment and tools and enter the designated work area.
- Exiting from the designated work area: Before an employee/contractor removes their PPE, the gear shall be cleaned with a damp cloth or a vacuum cleaner equipped with a HEPA filtered exhaust. Dispose of all protective clothing into labelled plastic bags for asbestos waste. Do not take off the respirator, but still wearing the respirator, enter the shower room and shower thoroughly. Remove the respirator and wash and wipe thoroughly to decontaminate the respirator. After drying, enter the clean room, store the decontaminated respirator in the assigned space, and dress into street clothes.
- Written procedures shall be posted in the designated work area. All personnel will be trained in procedures for evacuation of the injured and the handling of potential fires. Aid will be provided to a seriously injured employee/contractor without delay for decontamination. Make provisions to minimize exposure of rescue workers and to minimize spreading of contamination during evacuations and fire procedures.

When asbestos containing material in the workplace is controlled by a permanent enclosure, the enclosure must be airtight, and if practicable, that electrical, plumbing, ventilation and similar services are located outside the enclosure.

Personal Protective Equipment

Employees and contractors working within a designated work area must wear protective clothing which is made of material resistant to penetration by asbestos fibres, and must fit snugly at the neck, wrists and ankles, and as necessary, to protect against the risk. Appropriate PPE shall cover the head and feet as well as the body. Damaged or torn protective clothing shall be replaced or repaired immediately.

Before re-use, asbestos contaminated protective clothing must be cleaned with a vacuum cleaner equipped with a HEPA filtered exhaust, and placed in a water-soluble plastic bag which is sealed and labelled before being sent to an acceptable laundry facility.

Respiratory Protection

Employees and contractors within a designated work area shall wear marked respiratory protection (approved by NIOSH and OH&S/OSHA), which is adequate for the anticipated level of exposure. A single use respirator shall not be used for protection against asbestos. When respirators with disposable filters are employed, sufficient replacement filters shall be supplied.

All personnel will be instructed on the proper care of their personally issued respiratory equipment including daily maintenance, sanitizing procedures, etc.

When Type C Respirators are employed, the air supply system shall provide Grade D breathing air in accordance with *OH&S/OSHA 29 CFR 1910.134, OH&S and ANSI Z88.2-1980* and the Compressed Gas Association Commodity Specification G7.1 for Grade D breathing air.

The compressed air system for the Type C respirators shall be high pressure, with a compressor capacity to satisfy the respirator manufacturer's recommendations. The receiver shall have sufficient capacity to allow a 15-minute escape time for the respiratory wearers in the event of compressor failure or malfunction. The compressed air system shall have compressor failure alarm, carbon monoxide alarm, and suitable in-line air purifying sorbent beds and filters to assure Grade D breathing air.

The minimum respiratory protection required is as follows:

- Use on-half face air purifying respirators equipped with HEPA filters for the following:
  - Decontamination of removable including furniture, draperies, carpeting, etc.
  - Pre-construction sealing of walls, floors and openings with appropriate plastic sheeting.
  - Loading drums on truck for transportation and unloading bags at landfill.
  - Final wipe down of controlled work area if air sample shows exposure in the area is below 0.01 f/cc.
- Use Type C respirators for the following:
  - Removing the cleaning of contaminated electrical fixtures, mechanical equipment and suspended ceilings.
  - Asbestos removal operations.
  - Asbestos encapsulation and enclosure operations prior to plastic sheathing removal (if required).
  - Gross cleanup and plastic sheeting removal.
  - Loading bags and drums, cleaning drums prior to loading on trucks.
  - Vacuuming of dirt in pipe crawl spaces and pipe basements.

Type C respirators shall be worn with a belt to minimize the possibility of dislodging the face mask if the hose is snagged in the work area.

A minimum of two spare hoses will be available at any time to authorized personnel to connect to their assigned Type C respirator without having to wait for the removal of employees/contractors from the working area to obtain hose connections.

Decontamination Facilities/Ventilation

Decontamination facilities shall be provided for each abatement area. The decontamination facilities shall include a decontamination enclosure system for personnel, and decontamination enclosure system for loading of asbestos into trucks for transportation to the landfill.

The decontamination enclosure system for personnel shall consist of three rooms that serve as three air locks as follows:

- Clean room at the entrance followed by,
- A shower room, followed by,
- An equipment room leading to the work area.

The decontamination enclosure system for loading of asbestos into trucks shall consist of an air lock from the work area leading into the drum wash and wipe room, and another air lock leading to the open loading platform and the truck.

An air lock is a system permitting ingress and egress without permitting air movement. It consists of two curtained doorways at least eight feet apart. Each curtained doorway shall be constructed by placing three overlapping sheets of plastic over a framed doorway, securing each along the top of the doorway. The first and third sheet shall be secured on one side of the doorway and the middle sheet shall be secured on the other side of the doorway. Proper heating and ventilation will be provided through the entire decontamination system so that air flow will be from the outside towards the designated work area.

Lockers shall be provided for the storage of street clothes of employees/contractors in the clean room. Uncontaminated disposable protective clothing and equipment shall be located in the same room. This room shall be used by personnel to change from street clothes to disposable protective clothing and gear prior to entering into the contaminated area and to dress into street clothing after they have showered and dried in the shower room as they exit from the contaminated area.

The shower room provides showering facilities with hot and cold water, arranged to provide complete showering of personnel as they exit from the contaminated area. Provisions shall be made to prevent any contaminated run-off from the shower room. The shower room facilities and size shall be adequate to allow decontamination and thorough washing of all the personnel within the 15 minute escape time allowed under air compressor failure. A portable unit that meets EPA and OH&S/OSHA specifications for decontamination can be used.

The equipment room will provide storage for contaminated clothing and equipment. In this room, personnel dispose of their disposable clothing, except their respirator, as they prepare to enter the shower room.

The drum wash and wipe room shall be equipped with the facilities to wash and wipe the outside of the drum prior to the loading into the trucks for transportation to a landfill. Provisions shall be made to prevent any contaminated run-off from the drum wash room.

Adequate nearby toilet facilities will be provided to permit personnel easy access near, but outside, the designated work area.

With the exception of a glove bag, designated work areas will be ventilated to ensure that:

- The air flows only from clean outside areas into the contaminated area,
- Exhaust air from the containment ventilation system is directed to the outdoors through an effective HEPA filter, and
- There is an inward airflow through the decontamination facility into the designated work area.
- Paragon Ventilation Ltd must assess the effectiveness of HEPA filters by DOP (dioctyl phthalate) testing or similar means at least annually, after a HEPA filter is replaced in a vacuum cleaner or ventilation system, and before use in high risk work activity.

Storage, Handling and Disposal

It is the responsibility of Paragon Ventilation Ltd to determine and comply with current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill as per jurisdictional legislation requirements.

Asbestos waste shall be stored, transported and disposed of in sealed containers promptly to prevent the accumulation of large amounts of asbestos waste. The asbestos product must be clearly labeled to identify the contents as carcinogenic and to warn the handlers that the dust must not be inhaled. Label all plastic bags and drums utilized to transport contaminated material to the landfill.

When a prefabricated glove bag is used for the removal of asbestos insulation from pipes, ducts and similar structures:

- The glove bag must be sealed to prevent the release of asbestos fibres into the work area outside the bag,
- Waste materials on surfaces are washed to the bottom of the glove bag and all exposed asbestos insulation is encapsulated while inside the glove bag enclosure,
- All glove bags are evacuated through a HEPA vacuum to remove the air inside the bag, prior to removal of the bag, and
- After removing the glove bag, all exposed surfaces are cleaned again.

Paragon Ventilation Ltd will document actual disposal of the waste at the designated landfill by completing a Disposal Certificate and forwarding the original to the customer.

The exterior of a container of asbestos waste must be cleaned with a damp cloth or a vacuum cleaner equipped with a HEPA filtered exhaust before being removed from a designated work area. Reusable tools and equipment contaminated with asbestos must be cleaned after work is completed.

All asbestos dust and debris from the work area must be removed with a vacuum cleaner equipped with a HEPA filtered exhaust, or by other means acceptable to the Board, while the work is in progress, at the end of each work shift, and at the completion of work involving asbestos.

Uncontrolled Release of Asbestos Fibres

Should damage occur to a highly fibrous material that contains asbestos:

- All personnel must evacuate the area immediately.
- Management/supervision shall be notified immediately, who will then:
  - Assess the situation.
  - Seal off the area to reduce the risk of spreading asbestos fibres, as well as prevent personnel from entering the area.
  - Designate a competent qualified person to enter the area and remove the asbestos containing material as deemed necessary.
  - Conduct air sample testing.
  - Personnel are not permitted to enter an area where asbestos fibres have been released, until such time as levels are within permissible exposure limits.

Health Assessment for Personnel Exposed to Asbestos

When hiring an employee to perform work involving exposure to these substances, Paragon Ventilation Ltd is responsible for knowing if the employee has received a health assessment in the last two years.

It is the employee's responsibility to inform Paragon Ventilation Ltd of the date of that assessment.

An employee exposed to asbestos must have a health assessment within thirty (30) days of becoming an "exposed worker".

Health assessments must be done every two years after the first assessment as long as the employee continues to be an "exposed worker". If at any time during the preceding two years, an employee performed work that qualified him or her to be an "exposed worker", Paragon Ventilation Ltd must ensure that the employee undergoes a health assessment, unless the employee provides the company with a written statement refusing it.

It is the worker's employer, at the time the worker becomes an "exposed worker", who is responsible for ensuring that the health assessment is done.

The purpose of the health assessment is to provide the employee with a baseline health evaluation, providing an opportunity to detect early changes to the lungs. Periodic health assessments serve as a means of documenting changes that, compared to the baseline evaluation, may have occurred over time. This permits the early detection of changes and provides an opportunity to investigate the cause of the changes.

The health assessment for exposure to asbestos consists of health history information, a chest x-ray, a radiologist's report, a lung function test and a copy of the physician's interpretation and explanation of the health assessment. The history includes identifying the employee, employer, the employee's previous

work and non-work exposures to asbestos, or other indications of any respiratory disease, smoking history and the date on which the employee had their most recent chest x-ray and lung function test.

The physician reviewing the health assessment must give a written interpretation of the results to the employee within 60 days of the health assessment. Physicians must keep the health assessment records for thirty (30) years.

The information obtained during a health assessment is confidential. The person having custody of the health assessment records is responsible for ensuring that the information is kept confidential. Only the employee and the health professionals who conducted the assessment have access to the information. If others require the information, including the employee's family physician, the employee must give written consent indicating to whom the information is to be given and the specific information that can be provided.

Training

All employees and contractors who are involved with work concerning asbestos must have successfully completed a course of instruction approved by a Director of Occupational Hygiene, and hold a valid, original certificate of completion of same.

Employees/contractors shall be thoroughly familiar with the:

- Hazards of asbestos,
- Means of identifying asbestos containing material at the work site,
- Work procedures to be followed as set forth by Paragon Ventilation Ltd,
- Correct use of the required PPE and operation of the requiring engineering controls,
- Use and care of respirators (required to undergo fit testing), and
- Purpose and significance of any required health monitoring.

Records

Paragon Ventilation Ltd must maintain for at least ten (10) years, records of asbestos containing materials inventories and Hazard Assessment and Controls, inspections and air monitoring results.

Records of corrective actions to control fibre release, training and instruction of employees/contractors, written work procedures and written notification of the Board will be retained for at least three (3) years.

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Confined Space

Purpose

This Code of Practice establishes the minimum requirements for working safely in confined/restricted spaces.

Entry into confined/restricted spaces presents personnel with special hazards associated with areas that are potentially deficient in oxygen, contain toxic or flammable vapours, and have restricted access or egress in the event of an emergency.

Definitions

Competent – Personnel, who are adequately qualified, suitably trained and have sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

Confined Space – An enclosed or partially enclosed space, not designed or intended for continuous human occupancy, that has a restricted, limited or impeded means of entry or exit because of its construction, and may become hazardous to a worker entering it due to:

a. An atmosphere that is or may be injurious by reason of oxygen deficiency or enrichment, flammability, explosivity or toxicity.
b. A condition or changing set of circumstances within the space that can result in the potential for injury or illness.
c. The potential or fundamental characteristics of an activity that can produce negative or harmful consequences within the space.

Entry Permit – The written or printed document that controls who enters into a confined/restricted space

Lower Explosive Limit (LEL) – The lower value of the range of concentrations of a substance, in a mixture with air, at which a substance may ignite.

Occupational Exposure Limit (OEL) – The maximum concentration of a substance to which a person can be exposed for specific lengths of time as defined by the OH&S.

Restricted Space – An enclosed or partially enclosed space, not intended for continuous human occupancy that has a restricted, limited or impeded means of entry or exit because of its construction. It can be thought of as a work area in which the only hazard is the difficulty of getting into or out of the space. All other hazards are either non-existent or have been eliminated or controlled through the Hazard Assessment and Control process.

Upper Explosive Limit (UEL) – The higher value of a range of concentrations of a substance, in a mixture of air, at which the substance may ignite.

Roles and Responsibilities

Supervisor

Supervisor's responsibilities within the Confined Space Code of Practice include, but are not limited to:

- Verify that prior to the confined space entry that procedures are in place based on pre-entry testing and inspection of the confined/restricted space area.
- Verify prior to the confined space entry that written Hazard Assessment and Controls are in place to protect the health and safety of workers.
- Ensure a process is in place to only allow authorized personnel to enter the confined/restricted space.
- Verify that prior to the confined space entry that personal protective equipment is available for the confined space entry and confined space rescue.
- Workers in the confined space is attended by and is in visual range or communication with a worker at or near the entrance to the confined/restricted space.
- All work activities are coordinated to ensure:
  - Ventilation, lighting, and rescue equipment are adequate for the number of workers in the confined space,
  - All workers (even those working nearby) are informed of any hazards associated with the confined space
  - Workers are trained and competent to perform the confined space entry.
  - Tests or measurements are done to determine the presence of harmful substances or oxygen deficiencies before entry is allowed.
  - The rescue of a possibly injured worker is not hampered by the size of the access or exit or blockage of these areas.

Safety Watch

Safety Watcher's responsibilities within the Confined Space Code of Practice include, but are not limited to:

- Maintain visual, verbal and/or tactile communication with workers inside the confined space at all times.
- Initiate evacuation if necessary, and summon rescue personnel.
- Never abandon the confined space entry point with workers inside, unless properly relieved by another competent person.
- Never enter the confined space for any reason.
- Post correct signage prior to leaving the confined space entrance unattended, after verifying all personnel have exited the confined space (i.e., breaks and end of shift).
- Hold a valid Confined Space Monitor or Confined Space Entry/Rescue certificate.
- Test the atmosphere intervals prescribed on the permit (as required by Hazard Assessment).
- Monitor the number of personnel entering the confined space, as identified by the hazard assessment and confined space permit.

- Maintain a Confined Space Entry and Exit log for the duration of the job (Entry and exit logs must be safely stored for record retention purposes.)
- Ensure Entry and Exit points are kept clear and clean of debris.
- Maintain awareness of potential hazards in the vicinity of the confined space that may affect the health and safety of the worker(s) inside.
- Do not allow unauthorized personnel to enter the confined space

Confined Space Entry Permit

The Hazard Assessment and Control, confined space rescue plan and initial gas test results will be utilized by the permit issuer to create a Confined Space Entry Permit for the confined space/restricted space.

A valid Confined Space Entry Permit and Confined Space Entry Log must be completed before entering any confined space or restricted space. A Hazard Assessment and Control completed for an identical confined/restricted spaces may show the hazards and control methods are identical. In that case, a single permit may be issued for these spaces and any additional identical spaces.

Confined/restricted space entry cannot take place until the space is isolated from all sources of energy. Ensure that energy sources and hazardous substances are prevented from entering the confined/restricted space by:

- Disconnecting, blanking or blinding, or equivalent engineered system.
- Using a double block and bleed system, if the adjacent piping contains a harmful substance that is not a gas or a vapour, nor a liquid of sufficient volatility to produce a hazardous concentration of an air contaminant in the discharge of the piping.
- Locking out and tagging.

An entry permit shall be completed and signed by the responsible permit issuer before any worker enters any confined/restricted space, such as but not limited to, confined/restricted spaces:

- With a high hazard atmosphere.
- That requires lockout or isolation procedures to be followed.
- In which there is a hazard identified of drowning, entrapment or engulfment.

The Confined Space Entry Permit must identify:

- A list of the name(s) of personnel who enter the confined space and the reason for their involvement.
- The location of the confined space.
- The time during which the entry permit is valid.
- The work being done in the confined space.

The supervisor is responsible for ensuring that the Confined Space Entry Permit is completed properly, signed by a competent person, and a copy of the permit is retained and kept readily available. Once issued, the information on an entry permit may be changed only by:

- The responsible permit issuer who signed the permit initially,

- The safety watch is to update the list of workers inside the confined/restricted space, or
- The atmosphere tester to record test results.

Completed permits must be readily available and posted at each entry point into the space.

Suspended Permits

Permits should be treated as expired sooner than the stated expiry time if one of the following occurs:

- The confined space is returned to service
- The consistency of responsible supervision of the confined space is broken
- The task or project is interrupted for a significant time because of an emergency that affects the confined space (i.e.: an incident, rescue, or breakdown of engineering equipment)
- Activities outside the scope of work specified on the permit are performed in the confined space
- Changing work conditions or work activities introduce new hazards into the confined space
- Atmosphere monitoring results are outside acceptable limits
- Hazard controls have failed (i.e.. respiratory equipment)

Hazard Assessment and Control

A Hazard Assessment and Control identifies all hazards to be controlled within a confined/restricted space. The supervisors/workers conducting this Hazard Assessment must have adequate experience and training.

The hazard assessment must take into account not only the existing hazards, but the potential for hazards present in the surroundings that may affect the worker performing the work inside the confined/restricted space (i.e.: movement of vehicles, upset of stored materials, collapse of unsecured structures, collapse of earthen piles, surrounding processes, adjacent activities, changes in processes or conditions, etc.).

A hazard assessment conducted for a specific activity within a particular space or group of similar spaces may provide the basis for entry requirements for every occasion when workers enter those spaces. In these circumstances and before each entry, an individual must ensure the basis criteria or conditions of the Hazard Assessment and Control have not changed. Any change to the basis criteria of the original Hazard Assessment and Control requires an additional hazard assessment to be conducted. The Hazard Assessment and Control must consider:

- The work activities planned to take place near or in the confined/restricted space.
- The current and past uses of the confined space that present or have presented hazards to workers entering the confined/restricted space or others working nearby.
- The assessment of hazards that workers are likely to be exposed to while in the confined/ restricted space.
- Specifications of the type and frequency of inspection and tests necessary to determine the likelihood of work exposure to any of the identified hazards.
- Performing inspection and tests specified.
- PPE required to perform the work.

- PPE and emergency equipment to be used by an individual who undertakes rescue operations in the event of an incident or other emergency.
- The potential for oxygen enrichment and deficiency, flammable gas, vapour or mist, combustible dust, and other hazardous atmospheres.
- Hazardous substances or energy requiring lockout, isolation, or other controls.
- The potential for engulfment or entrapment by material inside or near the confined/restricted space.
- Physical hazards including, but not limited to:
  - Extreme temperatures
  - Humidity
  - Lighting
  - Noise
  - Vibration
  - The internal design features of the space (i.e.: water boots, weirs, and vortex breakers)

Pre-Job Meeting

Review the safety controls set out in the Hazard Assessment and Control, Confined Space Rescue Plan, and Confined Space Entry Permit with all workers who will be involved in the confined/restricted space entry, including the gas tester and safety watch. At minimum, the review and discussion shall identify and assess:

- Codes of Practice review
- Hazards of the entry
- Work to be undertaken
- Legislation
- Entry authorization
- Documentation requirements
- MSDS (if applicable)
- Cleaning/neutralizing the space
- Purging, ventilation and atmospheric testing
- PPE requirements
- Communication systems
- Confined/restricted space entry plan/permit/ monitor
- Identified First Aiders/Emergency Rescue Personnel
- Confined Space Entry Rescue Plan

Hazard Control of the Confined Space

Remove any solid, liquid and gaseous materials from the space that may present hazards if they remain. Drain, purge, flush and/or wash down the space to remove residual materials. Every effort should be made to ensure that individuals will be safe from hazardous contents through these techniques. PPE should be considered a last resort. How effective the purging is can be determined by atmospheric testing.

When removing contents, be sure the contents are removed to a place where they will not create additional hazards. Also, to avoid structural damage, be careful not to place the confined space under excessive positive or negative pressure.

Reduce the temperature in the confined space to below 50 degrees Celsius by means of purging, flushing, washing down or simply providing sufficient time for heat to dissipate. Working in very hot environments may require the use of cooling vests, depending on the duration of exposure and strenuousness of the work. To avoid damage to equipment, do not cool the space too rapidly.

Communication

Workers inside the confined/restricted space must be able to communicate effectively. Communication equipment may be required to enable contact between the workers and the safety watch outside the space. This communication equipment must be capable of safely functioning in the presence of hazardous atmospheres, if the potential for such hazard exists. Normal verbal communication is also acceptable, if effective.

Atmospheric Testing

Before entering a confined/restricted space that may contain a hazardous atmosphere, a qualified competent individual must conduct an initial atmospheric testing in the presence of the permit issuer (equipment owner). This pre-entry testing ensures that oxygen levels are adequate (between 19.5% and 23.0% by volume), that any explosive or flammable substance identified in the atmosphere is in a concentration that is less than 20% of the substance's lower explosive limit (LEL), and it identifies any hazardous substance as being within safe limits. Identification of the amount of toxic, flammable or explosive substances that may be present must occur. The potential for unpredictable atmospheric changes after an individual enters a confined space may need to be continuously monitored if determined by the Hazard Assessment and Control. This testing is conducted with suitable atmospheric testing equipment that is properly calibrated, used and maintained in accordance with the manufacturer's specifications.

After the initial test, and while workers are working within the space, periodic testing must be done and recorded as prescribed on the safe work permit to ensure the health and safety of workers working in the confined space. How often this additional atmospheric monitoring occurs depends on the results of the Hazard Assessment and Control, the work performed in the space and the likelihood of substantial changes to the atmosphere.

Ventilation and Purging

Before workers enter a confined space where atmospheric testing identifies that a hazardous atmosphere exists or may exist, the space must be ventilated, purged or both. The terms "venting" and "purging" are often used interchangeably but are two very different and distinct processes.

"Purging" is the method by which gases, vapours and other impurities are displaced from a confined space, by means of blowing air into the space to reduce the concentration of the toxic gas below the appropriate atmospheric exposure level. After the contaminants have been removed by purging, the confined space may be ventilated.

"Ventilation" means the continuous supply of fresh air into the confined space by mechanical means to maintain acceptable atmospheric levels. It much be continuous while work is being carried out within the confined space to maintain acceptable oxygen concentration, to provide protection in case of accidental release of chemicals, to remove contaminants generated by the work performed, and to cool the enclosure. To ensure adequate ventilation, the points of air supply and exhaust should be separated as far as possible. Openings must be provided for the entry of clean replacement air or to allow the exhaust of air.

Warning: Do not ventilate if the introduction of fresh air has the potential to create an explosive atmosphere.

If ventilating or purging a confined space is impractical or ineffective in eliminating a hazardous atmosphere, individuals who enter the confined space must use PPE appropriate for the conditions within the confined space.

Where mechanical ventilation is used to maintain a safe work atmosphere within the space, the safety watch outside the access point to the space will alert workers within the space if the system fails. Workers are to immediately vacate the confined space should the ventilation system fail.

The space or vessel must be sufficiently ventilated to maintain the oxygen content of 19.5% to 23% of volume (positive pressure) and prevent build-up of harmful substances. The piping containing harmful substances under pressure can be isolated by blanking or blinding or by double valves with adequate bleed-off capability.

- If valves are used to isolate piping, the bleed off valve is locked in the open position and valves in the flow lines are locked in the closed position.
- Atmosphere tests will be taken to ensure there is no build-up of hazardous gases.

Inerting

Inerting is a special form of purging and ventilating. Inerting involves purging oxygen from a confined space using an inert gas (such as nitrogen, carbon dioxide, or argon) to remove the hazard of fire or explosion.

Nitrogen is a non-reactive gas used to inert any confined spaces that contain an explosive atmosphere to completely displace all oxygen. This eliminates the explosive atmosphere but replaces it with an oxygen-deficient atmosphere.

Paragon Ventilation Ltd will ensure that a confined/restricted space is inerted if it is not reasonably practical to eliminate an explosive or flammable atmosphere within the confined/restricted space through another means. If a confined space is inerted Paragon Ventilation Ltd will ensure that:

- Every person entering the confined space is equipped with PPE specially designed for inert entry procedures, including supplied breathing air equipment with a redundant back up system.
- All ignition sources are controlled, and
- The atmosphere within the confined/restricted space remains inert while persons are inside.
- Before entry is allowed the confined space must be purged with inert gas and the oxygen content less than 5% and the LEL reading at the entry point must be less than 10%.

The following are general requirements based on API 2217A Ed. 4 (2009) Guidelines for Safe Work in Inert Confined Spaces in the Petroleum and Petrochemical Industries:

- Two independent sources of air must be provided to a locking “Clam Type” helmet supplying positive pressure to a full-face piece, using a pressure demand airline system. The second air supply shall cut-in automatically on loss of the primary air supply pressure. An audible alarm set no lower than 500 psi for both primary and secondary air supply. This alarm should be loud enough to be heard within 4’ for the air console during all working conditions.
- The entrants must wear full auxiliary escape air bottle. (5-10 minute)
- An Emergency Egress Line (EEL) shall be supplied for each entrant for emergency egress and within reach at all times. Breathing Air for these EEL lines shall be supplied from an independent source.

- The helmet must be sufficiently secure to prevent inadvertent removal. (Entrants shall use a special locking "Clam Shell" type helmet with integral breathing apparatus and communication system, which cannot be accidentally removed or dislodged).
- The umbilical cord (breathing air lines) containing the breathing air hoses must be non-kinking and adequately sheathed to protect the hoses and designed so that the hoses cannot be detached, should the umbilical cord be pulled or snagged (i.e.: attached wire hooked to the harness and anchored to a secure point outside the vessel).
- A trained person (Safety Watch/Bottle Watch), located outside the confined space, must continuously monitor the air supply and ensure the umbilicals do not crimp. An alarm, audible or visible, shall be provided to warn of low air pressure.
- If for any reason the primary communication link fails, the personnel working inside the inert vessel must be evacuated.

Entry and Exit

There must be a safe means of entering and exiting a confined/restricted space. The area must not be blocked and must be free of all hazards.

Unauthorized Entry and Traffic Hazards

Only authorized workers are permitted to enter a confined/restricted space.

Workers within a confined/restricted space must be protected from hazards such as exhaust fumes from idling vehicles near the space. No idling vehicles or equipment are allowed outside the access points to confined/restricted spaces. Traffic in the immediate area that may interfere with personnel safety must be controlled.

Personal Protective Equipment (PPE)

PPE must be worn by all persons in accordance with the following minimum requirements:

Hazard	Required PPE
Residual hazardous liquid or solid materials	Tyvek coveralls or chemical suit; chemical resistant gloves (as per hazard assessment)
Toxic gases/vapours (> 50% TLV – TWA)	Respirator with appropriate cartridge/Supplied breathing air (dependent on gas/vapour present)
Dust	Respirator with HEPA filter
Oxygen (< 19.5% or > 23%)	Supplied air breathing apparatus with 5-minute escape bottle
Noise (> 85 dBA / >95 dBA)	Ear plugs or muffs / Dual hearing protection
Temperature (> 35°C)	Cooling vests

Tools and Equipment

- Identify and record all tools and equipment to be taken into a confined space or restricted space to ensure their removal can be accounted for when the space is closed.

- Provide ground fault circuit interrupters for use on all portable electrical tools and lighting taken into a space.
- Temporary lighting must be explosion-proof and/or intrinsically safe.
- If welding is to take place in the space, use the following controls:
  - Hot Work Procedure/Permit
  - Locate all compressed gas cylinders and welding machines outside the space and secure them properly.
  - Inspect all fittings, regulators, etc., to ensure no leakage.
  - When not in use, completely shut off compressed gas cylinders and where practicable, remove hoses and torches from the confined/restricted space.
- When workers leave the general area and the welding equipment is unattended, remove oxygen/acetylene cylinder hoses from the confined/restricted space or disconnect them.
- Remove all combustible and flammable substances or protect them from fire or slag during welding operations.
- Fire extinguishing equipment must be kept at the jobsite where it is readily accessible to the work crew.

Entry into Confined/Restricted Space

Open up the access ways to the confined/restricted space. Crack the openings slowly in case there is residual pressure or hazardous materials. If possible, at least two access ways should be opened to provide alternate routes of egress.

Entrance ways will provide a staging area directly at the access point. The access to elevated access ways should be provided by scaffolding rather than ladders.

When a confined/restricted space is unoccupied, the openings to the spaces are to be re-sealed or marked with either a sign or danger tape that identifies the space.

Ensure that portable power equipment, tools, and extension cords are grounded. Battery-powered lighting must not be more than 12 volts.

Ongoing Monitoring

- Workers are responsible for continuously observing the work environment and being alert to any adverse changes in the working conditions.
- In the event of dizziness or any other unusual sensations, stop work immediately, leave the area and evaluate the situation.

Confined Space Housekeeping

- Collect all scrap, cutting, insulation, wrappings, rags and other waste materials for proper disposal.
- Clean up all dirt, absorbents, spilled oil and other materials that contaminate the work area.
- Replace all guards, insulation and other protective barriers removed during the course of the work.

- Re-mount removed warning signs.
- Repair any holes cut into floor gratings.
- If any new hazards have been introduced as a result of the work, ensure that workers will be protected.
- Flag the hazards and report them so that protective measures can be taken.
- Return all tools and equipment to their proper storage locations. Collect all hoses and cords and return them to their storage locations.

Closing Out Confined Space Entry

Conducting Work and Leaving

Complete the work and ensure all workers leave the confined/restricted space. Every worker must sign the Confined Space Entry Log to indicate that he/she has exited the space and ensure all personnel are accounted for.

Compare the tools and equipment removed from the space with the list of tools and equipment taken into the space and make sure all tools and equipment are accounted for.

Secure Confined Space from Entry

Contact operations and arrange to have someone take part in the closure process. Close and secure all access ports used to enter or ventilate the space. If the vessel is used to contain liquids or gases, ensure that the hatches are properly sealed and well secured.

Sign-Off and Return Permit

Once the confined space or restricted space is satisfactorily closed and the work area is clean and safe, sign-off the Confined Space Entry Permit and Confined Space Entry Log and return it to the permit issuer. Sign-off and return all other permits and clearances (if the work covered by them is complete as well).

Confine Space Procedure

1. Each individual entering the space must wear the required PPE and sign the Confined Space Entry Log. Each person must also sign the log each time he/she leaves the space.
2. Prior to entering the space, examine the gas testing results to verify that the atmospheric conditions are within the range of expectations used to establish the permit. If they are within the expected range, proceed with the entry. If they are outside the range, stop the entry, investigate the cause and rectify the problem.
3. Where the space contains a hazardous substance, the individual must attach himself/herself to a lifeline that extends outside the confined space. If a lifeline is required in a confined space, it must be used in a manner that does not create an additional hazard.
4. While an worker is occupying a confined space and a flammable or explosive substance reaches or becomes greater than 20% of its LEL, the individual must exit the confined space.
5. Work is to be carried out according to the established work plan. If there are changes to the work plan, the additional work must not proceed until the Hazard Assessment and Control and all applicable permits/logs have been reviewed, modified as necessary, and any additional controls implemented.

Confined Space Entry Rescue

The confined space entry rescue plan must be developed to provide guidance on actions to be taken under various possible emergency. The confined space entry rescue plan is a plan to safely and effectively perform a rescue or clear the confined or restricted space in the event:

- An alarm is activated,
- The concentration of oxygen inside the confined/restricted space drops below 19.5% by volume or exceeds 23.0% by volume,
- If there is a significant change in the amount of hazardous substances inside the confined space.
  - Other events as per site specific requirements.

NOTE: All participants involved in a confined or restricted space entry shall review the confined space entry rescue plan.

Training of Rescue Personnel

All personnel involved with confined/restricted space entry must review the approved confined space entry rescue plan. Trained rescue personnel must be able to effectively carry out a rescue with adequate rescue equipment and PPE. Emergency response personnel must be competent in:

- Administering first aid.
- Properly conducting the confined/restricted space rescue plan.
- Competent in the use of appropriate emergency response equipment.

Rescue Equipment

- Where the space contains hazardous materials, position extraction equipment at the access way(s) to assist in the event of a rescue.
- Where the entry involves work at heights, appropriate fall protection must also be used.
- Position portable battery-powered explosion-proof lighting at each access way for emergency use. Each unit must have the capacity to provide continuous light for one hour.
- Position adequate fire extinguishing equipment at readily accessible locations at or near the work site.
- All PPE and rescue equipment must be inspected before entering any confined/restricted space.

General Confined Space Rescue Procedures

Any evacuation order issued by the gas tester or safety watch attendant is to be followed immediately, without question. If the gas tester or safety watch attendant decides an evacuation is necessary:

1. An air horn is sounded.
2. All work is stopped immediately.
3. Equipment is made safe.
4. Workers go to the nearest access route; everyone will exit in an orderly manner and will go to their designated muster point to be accounted for.

5. The main control room shall be notified, along with the supervisor and the project coordinator.
6. At this point, the Confined Space Entry Permit is suspended, and under no circumstances will re-entry be allowed until the situation is rectified and both the gas tester and safety watch attendant indicate it is safe to re-enter and the Confined Space Entry Permit has been re-issued.

Any time an evacuation is ordered:

1. Suspend the Confined Space Entry Permit.
2. Implement the required controls.
3. Communicate relevant controls to entry workers.
4. Conduct gas testing prior to re-entry to ensure re-entry can be done safely.
5. Re-assess the safety measures to identify how to eliminate the cause of the evacuation.
6. Re-issue the Confined Space Entry Permit.

Conduct a final inspection of the confined/restricted space to ensure that no workers, tools, equipment or wastes remain inside.

Training

Confined space entry training is mandatory for workers who work within confined spaces or restricted spaces. Competent personnel will be able to recognize hazards associated with working in confined or restricted spaces and will perform their work in a safe and healthy manner. Such personnel include supervisors, workers or subcontractors.

Rescue personnel must be trained in the proper methods of emergency response/rescue involving a confined/restricted space emergency. This includes first aid, the use of appropriate emergency response equipment, as well as procedures appropriate to the confined/restricted space.

Confined/restricted space entry training must be:

- Provided by a competent trainer,
- A valid certificate of completion must be available for review.

Record Retention

Paragon Ventilation Ltd will retain records of all applicable information related to each confined/restricted space entry, including hazard assessments, entry permits, entry records, air monitoring data, personnel training certificates, all PPE and inspection records, meeting minutes, and other related information. Records will be retained for a minimum period of two (2) years.

Fall Protection

Purpose

This code of practice provides guidelines for fall protection and prevention.

All fall hazards should be identified at work sites that have the potential for elevated work. Once an elevated fall hazard has been recognized, an appropriate control measure must be selected.

The first line of defence is to identify and eliminate the hazard. If a fall hazard cannot be eliminated, the workplace must be assessed and a process developed and implemented that is a permanent means of providing fall protection.

If a fall hazard cannot be eliminated and changes to the workplace cannot adequately ensure the prevention of falls, the last line of defence should be to control the fall.

Fall protection refers to the use of lifelines, harnesses, barricades, guardrails, scaffolding, anchors, lanyards and safety netting. One or more of these systems may be required when working at elevations of 1.2m or more.

Definitions

Active Fall Protection – A system that requires workers to take specific actions, including wearing (or otherwise using) personal fall protection equipment and following the prescribed procedures. Examples of active fall protection include travel restraint and fall arrest systems.

Passive Fall Protection – A system that does not require workers to wear or otherwise use fall protection equipment, or to have any special knowledge or skills related to the system. Examples include a guardrail system and scaffolding.

Fall Prevention

Paragon Ventilation Ltd must try to limit workers exposure to fall hazards by use of travel restraint systems. These travel restraint systems may include a control zone, barriers, guardrails, or safety belt and lifeline to restrict access to the area of a potential fall hazard.

Where workers are regularly exposed to a fall hazard at a more permanent work site, guardrails at a height of 1.8m (minimum) are required on all structures where a fall of 1.2m or more may occur. If these measures cannot fully protect workers, a fall arrest system connected to an approved anchor point shall be used.

These fall arrest standards apply to any work where a fall of 3m or more may occur, or any work taking place at a lesser height that involves an unusual risk of injury, an opening in the work surface or the risk of falling on a hazardous substance or object.

Fall Protection Plan

A Fall Protection Plan is required to be developed when workers are exposed to work activity where:

- Work is to be completed at heights of 3m or greater at a temporary work location.
- Work is to occur at 1.2m without a guardrail at a permanent work location.
- The plan must be kept on the work site throughout the life of the work. A Hazard Assessment and Control will be conducted before work begins to identify those specific hazards associated with the work.

The fall plan must specify:

- Hazards at the work site.
- Elevated Work Rescue Plan to be used if a worker is suspended by a personal fall arrest system or safety net, and needs to be rescued.
- The anchors to be used.
- The clearance distances have been confirmed as sufficient.
- The procedures to be followed to inspect, assemble, maintain and disassemble the equipment.
- Workers are to complete the Fall Protection (Harness) Checklist before starting work.

Fall Protection Equipment Inspection and Preventative Maintenance

All fall protection equipment must meet current CSA Standards. Additionally, equipment must be inspected prior to each use and must be kept free from conditions or substances that could contribute to the deterioration of the devices. Paragon Ventilation Ltdwill specify how often the equipment will be re-certified by the manufacturer.

Fall protection equipment will be removed from service if it is considered defective or is at risk of wear. Wear can be caused from excessive heat or chemical exposure which can corrode the surface and damage the fall protection system.

Requirement to use Fall Protection System

Workers must use a fall protection system when:

- A worker could fall 3m, or if an individual could fall less than 3m and there is an unusual potential for injury.
- Work is to occur above or near a surface or condition that could cause injury to the person upon contact.
- Work takes place in an aerial lift platform.
- In confined spaces where an elevated hazard and/or difficult rescue may occur.
- If there is water that poses a drowning threat.

Fall Arrest Anchor Points

- Maximum free fall is restricted to 1.2 m for workers connect lanyards.

- Workers fall arrest system anchors must have a top load capacity of at least 16 Kilonewtons or double the maximum arresting force in any direction in which the load may be applied.
- No more than one worker will be attached to a single anchor point unless the anchor point is manufactured and designed for more than one person.
- Workers shall not attach their personal fall arrest system to an anchor that is used to support or suspend a platform.
- Anchors for horizontal lifeline systems must be designed, installed and used in accordance with the manufacturer's instructions, or specifications certified by a competent qualified engineer.

Fall protection Rescue Plan

When a worker falls and is restrained or suspended by the personal fall protection equipment or safety nets, the supervisor on the job site is to either be trained in rescue or have a designated competent personnel (assigned by the client) rescue the suspended worker. If necessary, the supervisor or designated competent person will start first aid procedures and initiate the rescue plan.

In case of rescue:

1. Lower the injured workers to the ground, where possible.
2. Use a secondary belay rescuer but make sure it does not interfere with the process of the rescue.
3. Workers must ensure their own protection and the protection of other workers taking part in the rescue.
4. Ensure a physician examines the rescued workers before the person returns to work.

Training

Only adequately trained and competent workers are allowed to be assigned tasks where a fall protection plan is required by applicable legislation.

Fall protection training shall include, but not limited, to:

- Review of applicable provincial legislation.
- Description and identification of fall hazards involved in fall protection and safe work methods.
- Anchor selection and use.
- Proper techniques for connecting hardware.
- Physical effects to the body in the event of a fall, including:
  - Maximum arresting force
  - Shock and energy absorbers
  - Swing fall
  - Free fall
  - Pre-use inspection
- Emergency response procedures specific to the work site.
- Practice in inspecting, fitting adjusting and connecting fall protection equipment .

Fall protection training is to be provided by a competent trainer and training certificate will be retained by Paragon Ventilation Ltd.

PARAGON Ventilation Ltd.
Our Name Stands For Excellence

Hydrogen Sulphide (H_2S)

Purpose

This practice establishes guidelines for working in conditions where the potential for exposure to hydrogen sulphide (H_2S) exists.

Employees and contractors are exposed to hydrogen sulphide (H_2S) most often during drilling and production of natural gas, crude oil and petroleum products. Hydrogen sulphide can also accumulate in sewers, sewage treatment plants or hide storage pits in the tanning industry. Well drillers, tunnel workers and miners may be exposed when underground pockets of hydrogen sulphide are encountered.

Paragon Ventilation Ltd will take steps to eliminate or reduce the risks associated with working in surroundings where H_2S may be encountered.

Definition

Hydrogen Sulphide (H_2S)– This is a naturally occurring gas composed of a mixture of hydrogen and sulphur; it is often found in hydrocarbon fuels such as coal, oil and natural gas.

Characteristics of Hydrogen Sulphide

- Usually a colourless gas.
- Smells like rotten eggs in small concentrations, but quickly deadens sense of smell.
- Is slightly heavier than air. If mixed with a gas that is lighter than air, the gas may rise. If there is a temperature difference between the gas and the ambient temperature, the gas will also rise.
- It is flammable/explosive if mixed with air.
- Burning H_2S gives off sulphur dioxide, which is hazardous and irritates the respiratory system and eyes.
- H_2S dissolves in fluids like water, oil, molten sulphur or sludge, and heating, de-pressurizing or mixing the fluids will release the H_2S. The odour of rotten eggs can be smelled clearly at 1 ppm or 0.0001%. The TLV (Threshold Limit Value) is 10ppm or 0.001% which is the allowable 8hr exposure limit. Over the allowable concentration, protective equipment is necessary.
- 500ppm or 0.05% is lethal; the individual loses his/her sense of reasoning and balance (disorientated) which will cause him/her to extend exposure time.
- A small quantity of H_2S in the atmosphere (1,000ppm, or 0.1%) is enough to knock a victim unconscious and cause death if rescue does not take place quickly. H_2S normally enters the body by inhalation, but it may also enter through an open wound or sore.
- The effects of H_2S on the respiratory system are rapid, and effective rescue action is vital if the victim is to recover satisfactorily.

To check for H_2S, use either a Self-Contained Breathing Apparatus (SCBA) or a Supplied Air Breathing Apparatus (SABA) with an escape cylinder. The best policy is zero exposure to H_2S. Industry standards require the use of breathing apparatus at 10ppm/8 hr.

Occupational Exposure Limits

The potential for employee/contractor exposure to hydrogen sulphide will be determined through the Hazard Assessment and Control process, which will take place before work is undertaken.

Paragon Ventilation Ltd will ensure that an individual's exposure to H_2S is kept as low as reasonably practical and does not exceed the Occupational Exposure Limits (OEL) for the substance. This is based on the principle that for each substance there is a safe or tolerable level of exposure (below) where no significant adverse health effects are likely to occur. Atmospheric testing shall be conducted before personnel are allowed to enter any area where the hazard for H_2S exists. If employees and contractors are required to work in areas where H_2S may be present 10 ppm, exposure within the 8hr Occupational Exposure Limit will not be exceeded.

Personnel exposure, measured over any 15min period, must not exceed the 15min OEL. Exposure to H_2S, measured over successive 15min periods at a concentration above its 8hr OEL, but at or below its 15min OEL, must not occur more than four times per day. If the work requires exposure that exceeds this level/ timing, respiratory equipment is required. Paragon Ventilation Ltd will ensure that at no time will the worker be exposed to levels above 15 ppm.

Hydrogen Sulphide – 8hr. Occupational Exposure Limit – 10ppm
15min. or Ceiling Occupational Exposure Limit – 15ppm

Health Hazards When Exposed to H_2S

The three main routes H_2S enters into the body are:

1. **Inhalation** – by being inhaled.
2. **Dermal** – absorbed through skin.
3. **Oral** – by being swallowed.
   - 10ppm (8 hr. OEL) – no known health effects.
   - 100ppm is immediately dangerous to life and health (IDLH). Exposure may be fatal or adverse health effects may be suffered.

If there is a Release of H_2S

1. Evacuate the area immediately and go to a pre-determined safe area.
2. Sound the alarm for others to evacuate the area. All personnel must be familiar with the sound of the alarm.
3. Assess the situation and do a head count. Is anyone missing or are there other dangers (explosion, etc.)?
4. Personnel undertaking a rescue must be adequately protected, including using a breathing apparatus. Note that 25% of deaths are rescuers.
5. Rescue and remove the victim to a safe area before removing your breathing apparatus.
6. Revive the victim using artificial respiration and, if necessary, CPR.
7. Medical aid is required for anyone who has been made unconscious by H_2S. Make sure medical staff is aware that H_2S was the cause of the emergency.

Storage, Handling, Use and Disposal

For purposes of the company, Paragon Ventilation Ltd does not allow the storage, handling, use and disposal of a substance listed in *Schedule 1, Table 11* at any of its facilities or jobsite locations.

Training

Employers must inform employees at risk of exposure of the health hazards, measurements and procedures associated with H_2S. Employees and contractors are required to take H_2S Alive training before working on any jobsite where hydrogen sulphide may be encountered.

[1] Alberta Occupational Health and Safety Act, Regulation and Code effective July 1, 2009

Respiratory Protective Equipment

Purpose

This code of practice establishes guidelines for selection, use and care of respiratory protective equipment.

Federal and local government agencies require that an employer establish a respiratory protection program to protect personnel from respiratory hazards in the workplace. The following program is based on the requirements established by the C*SA Z94.4-02, Selection, Use and Care of Respirators*.

The primary objective is to prevent excessive exposure to dusts, fumes, fibres, mists, gases and vapours. As far as possible, this is accomplished by accepted engineering and work control measures. When effective engineering controls are not possible, or while they are being implemented or evaluated or in emergency conditions, respiratory protection may be required.

Definitions

Air Line Breathing Apparatus – A unit with a full-face piece and equipped with an auxiliary self-contained air cylinder for escape purposes, capable of operating in the positive pressure/pressure demand mode.

Air Purifying Respirator – A unit that absorbs or filters dusts, fibres, mists, vapours or gas from the ambient air.

Hazardous Atmosphere – An atmosphere that contains greater than the threshold limit value of a gas, vapour or particulate established by the American Conference of Governmental Industrial Hygienists or the appropriate Occupational Exposure Standard established by government regulations.

Respirable Air – Compressed breathing air that meets the requirements of *CSA Z180.1-00, Compressed Breathing Air and Systems.*

Respiratory Protective Equipment (RPE) – Equipment whose function is to supply breathable air or remove contaminants from the air.

Self-Contained Breathing Apparatus (SCBA) – A unit with an air cylinder that contains at least a nominal 30 minute supply of respirable air with a full-face piece, operating in the positive pressure/pressure demand mode.

General Requirements

The respiratory equipment must be appropriate to the specific hazards identified through the Hazard Assessment and Control process. Appropriate PPE shall be made readily available to all persons at the work site. Personnel are required to wear respirators or Personal Protective Equipment (PPE) when the following situations exist:

- There is or may be an exposure to air contaminants or a mixture of air contaminants in a concentration exceeding their occupational exposure limits, or the atmosphere has or may have an oxygen concentration of less than 19.5% by volume.

- If respiratory hazards cannot be controlled using ventilation which is designed, constructed, installed, operated and maintained to keep airborne hazardous substances below exposure levels.
- If respirators or PPE are necessary to protect the individual's health.
- During specific routine work practices, processes or tasks identified as requiring the use of respiratory PPE or equipment.
- During some non-routine or emergency operations.

Hazard Assessment and Control

A Hazard Assessment and Control of the work area shall be performed by a competent qualified person on a periodic basis to determine the respiratory hazards present, and to assist in the selection of an appropriate respirator where required. The nature of the hazard shall be determined as follows:

- Identify contaminants present in the workplace.
- Identify the physical state of airborne contaminants.
- Identify an appropriate occupational exposure limit for each airborne contaminant.
- Measure or estimate the contaminant concentration.
- Determine if the atmosphere is potentially oxygen deficient (less than 19.5%).
- Determine if substance specific hazards or bio-hazardous materials exist.
- Determine the toxicity levels and need for emergency escape.
- Determine if an immediately danger to life or health (IDLH) atmosphere is present. If a worker is required to work in an area that is considered IDLH or oxygen deficient, the individual must wear a full-face positive pressure respirator. The respirator must be either a SCBA, or an airline respirator with an auxiliary self-contained air cylinder of sufficient capacity to permit the individual to escape unassisted from the contaminated area if the air supply fails.
- When an individual enters into an IDLH or oxygen-deficient atmosphere,Paragon Ventilation Ltd will ensure the person will be assisted by at least one worker. The assisting person must be stationed at or near the entrance to the contaminated area, and be similarly equipped and capable of performing a rescue if needed.

Respirator Selection

The selection process includes a detailed review of workplace conditions, hazardous material and exposures and relevant standards. The purpose of respirator selection is to specify a range of appropriate respiratory protection, and shall be carried out for both non-emergency and emergency use. The respirator selected in both instances may be the same, but respirators approved for escape only shall not be used for non-emergency applications.

Air used in a self-contained breathing apparatus or an airline respirator must be of a quality that meets the requirements of *CSA Standard Z94.4-02 Compressed Breathing Air and Systems* and does not contain a substance in a concentration that exceeds 10% of its occupational exposure limits.

IDLH Conditions

Should Hazard Assessment and Control determine that breathing conditions at a worksite are or may become Immediately Dangerous to Life or Health (IDLH), management/supervisor must ensure the individual wears a self-contained breathing apparatus or an airline respirator that:

- Is of a type that will maintain positive pressure in the face piece.
- Has a capacity of at least 30 minutes unless the Hazard Assessment and Control indicates the need for a greater capacity.
- Provides full face protection in situations where contaminants may irritate or damage the eyes.
- In the case of an air line respirator, is fitted with an auxiliary supply of respirable air of sufficient quantity to enable the individual to escape from the area in an emergency.
- In the case of a self-contained breathing apparatus, has an alarm warning of low pressure.

Change-Out Schedule

A competent qualified person shall establish a change-out schedule for the replacement of air purifying elements of respirators before their useful service is ended.

Individuals wearing an air-purifying respirator for protection against gases or vapours must change their cartridges when breakthrough is experienced via detection of the warning properties. For contaminants with poor warning properties, an atmosphere-supplying respirator shall be selected, unless the selection of air-purifying respirators includes a change-out schedule calculated by a competent qualified person.

Individuals wearing an air-purifying respirator for protection against particulates protection must change their filters/respirator when they experience increased breathing resistance.

Removing Cartridges or Canisters

- All cartridges and canisters will be replaced if they become damaged or unhygienic.
- Cartridges and canisters will be equipped with an end of service life indicator and replaced when the indicator indicates.
- Not equipped with an end of service life indicator – will be taken out of service and replaced.
- Contaminants with good warning properties can be detected at concentrations below the exposure limit; therefore, warning properties can be used as the basis for a change-out schedule.
- For contaminants with poor warning properties – an atmosphere-supplying respirator will be selected unless the selection of air-purifying respirators includes a change-out schedule.

Respirator Fit Testing

The results of a fit test shall be used to select the specific model and size of face piece for individual users. Items such as hair, beards, cloth, tissue, straps, jewellery or other PPE shall not pass between the face and the sealing surface of the face piece or interfere with the seal of the tight-fitting face piece to the face. The user of the respirator shall check the seal of the face piece immediately after donning the respirator and periodically during use. No other respirator can be used unless a fit test has been completed.

A fit test shall be carried out:

- Prior to initial use and after completing the health surveillance evaluation.
- On an annual basis (during the worker's annual medical examination).
- Whenever there is a change in respirator face piece.
- Whenever changes to the user's physical condition may affect the fit.

The person conducting the fit test shall only perform a fit test on a clean-shaven user. Tight fitting respirator face pieces shall be tested only in the negative pressure mode regardless of the mode of operation in which the respirator is used. When other PPE is required to be worn, they shall be worn during the fit test to ensure compatibility.

The person conducting the fit testing shall address the following topics with the user:

- The procedure, the reasons it is required, and the importance of using a respirator that provides an effective, reproducible face-to-face piece seal.
- The importance of the test to convince the user to cooperate fully.
- Description of the challenge agent used and how to identify it (qualitative only).
- Selection by the user of a properly fitting and comfortable respirator from those that are appropriate to the application.
- The respirator being equipped with the appropriate filters and/or chemical cartridges for the challenge agent being used.
- The necessity for the user to successfully complete the positive or negative pressure user seal check with the selected respirator before proceeding with the test.
- Correct placement of the respirator in accordance with manufacturer instructions.
- The necessity, during the test for the user to wear other PPE that may be required in the workplace and which may affect the face-to-face piece seal.
- The test exercises and how to perform them during the test.
- The importance of using in the workplace, the specific brand, model and size of face piece that was used to pass the test.
- The necessity to always inspect a respirator before using it to ensure it is in proper working condition.

A qualitative or quantitative fit test shall be used to determine the ability of a user to obtain a satisfactory fit and an effective seal when using a tight-fitting face piece. Fit testing shall be conducted as per the protocols in the *CSA Standard Z94.4-02, Selection, Use and Care of Respirators*, Appendices B (qualitative) and C (quantitative), or another approved method. The air quality being provided must meet the requirements of *Table 1 of CSA Standard Z180.1-00 (R2005) Compressed Breathing Air and Systems.* The air must not contain a concentrated substance that exceeds 10% of its occupational exposure limit. A user seal check shall not be used as a substitute for a qualitative or quantitative fit test. Under no circumstances shall a person use a tight-fitting respirator until a satisfactory fit test has been achieved.

Qualitative fit testing protocols are provided for:

- Isoamyl acetate

- Saccharin solution
- Bitter aerosol
- Irritant smoke

Respirator Use

Before assigning any task to personnel that requires the use of a respirator, the individual shall complete all the health screening, fit testing and training requirements of this program.

Workers must vacate the respirator use area for the following reasons:

- If vapour or gas breakthrough is detected,
- If there is a change in breathing resistance,
- If there is face piece leakage, or
- To replace the respirator/filter or change the cartridge.

Persons using positive pressure or negative pressure respirators must be clean-shaven where the face piece seals to the skin.

Corrective Eyewear

Wearing contact lenses may be permitted after considering factors both inside and outside the respirator that could affect the eyes of the user.

Side arms on eyeglasses must not pass between the face and the sealing surface of the face piece or interfere with the seal of the tight-fitting face piece to the face.

Cleaning, Inspection, Maintenance, Repair and Storage

Respirators shall be:

- Properly maintained to retain its original effectiveness.
- Respirators designed not to be cleaned shall be disposed of after use.
- When a respirator is not assigned to a single individual, it must be cleaned and sanitized before its next use.
- Cleaning is as follows:
  - Before every use with manufacturer cleaning wipes or mild dish detergent and warm water.
  - Per manufacturer cleaning procedures.
- Sanitized/disinfected is as per manufacturer specifications.
- Stored in a readily accessible location and in a manner that prevents its contamination. Respirators are to be protected from dust, ozone, sunlight, heat, extreme cold, excessive moisture, vermin, damaging chemicals, oils, grease or any other potential hazard. They must also be stored in a manner that will prevent deformation of rubber or other elastomeric parts.
- Chemical cartridges or canisters shall be stored in an airtight container.

- Workers shall inspect their respirator before and after each use to ensure it is in satisfactory working condition. Respirator inspection shall include the following, as applicable:
  - Condition of component parts including the face piece, helmet, hood, suit, head harness, valves, connecting tubes, harness assemblies, filters, cartridges, canisters and cylinders.
  - Tightness of connections.
  - End-of-service-life indicator.
  - Shelf life dates.
  - Proper functioning of regulators, alarms and other warning systems.
- Respiratory equipment that is not used routinely other than for emergency use will be inspected monthly by a competent qualified person to ensure that it is in good working condition in case of an emergency.

Respirators must be serviced and used in accordance with manufacturer specifications. Only competent qualified persons shall complete repairs.

Respirator Record Keeping

Appropriate records shall be kept of all utilization of respiratory equipment as required by applicable legislation. Records shall include:

- List of individuals fulfilling the roles and responsibilities
- Hazard Assessment and Control including periodic monitoring of the workplace atmosphere
- Selection of the appropriate respirator
- Respirator fir testing
- Training
- Cleaning, inspection, maintenance and storage of respiratory equipment
- Health surveillance of respirator users
- Program evaluation

Records of Respiratory Fit Testing

Fit test records shall be retained for respirator users until the next fit test is administered. These records shall consist of the following:

- Name of the person tested
- Date of fit test
- Specific make, model and size of respirator
- Type of fit test and test agent used
- Pass/fail criteria and results of the fit test
- List of additional PPE worn during the fit test
- Comments on unusual facial features, dentures, corrective eyewear, facial jewellery, facial hair, cosmetics, or any particular fitting difficulties
- Name of the person conducting the fit test

Records of Training

Training and review of the user's qualification records shall be maintained. Records shall be kept of the type of training each person has received and the dates on which the training occurred. Training records shall be retained for a least the duration of employment of the person trained.

Records of Health Surveillance

Records confirming the user's ability to use a respirator shall be retained. All additional health information shall be treated as medically confidential.

Records of Inspection, Maintenance and Storage

Records shall be maintained as required by manufacturer instructions. Records for repair and calibration of respirator maintenance tools shall also be retained.

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Aerial Work Platform

Purpose

To provide guidelines for the safe use of Aerial Work Platforms (AWPs) and necessary Personal Protective Equipment (PPE) and training required to prevent employee exposure to hazards associated with working at heights and the use of mobile equipment. All AWPs supplied by Paragon Ventilation Ltd will be maintained and inspected in accordance with the manufacturer's recommendations.

Definitions

Aerial Work Platform (AWP – A mobile or manually propelled device that has an adjustable position platform, supported from ground level by a structure.

Manufacturer – A person or entity who makes, builds, or produces an aerial platform.

Operator – A qualified person who controls the movement of an aerial platform.

Owner – A person or entity who has possession of an aerial platform by virtue of proof of purchase.

Qualified Person – One who, by possession of a recognized degree, certificate, or professional standing, or by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

User – A person(s) or entity who has care, control and custody of the aerial platform. This person or entity may also be the employer of the operator, a dealer, owner, or operator.

Familiarization – Providing information regarding the control functions and safety devices for the aerial platform(s) to a qualified person or operator who controls the movement of the aerial platform(s) being delivered.

General Training – Instruction to enable the trainee to become a qualified person regarding the task to be performed, including knowledge regarding potential hazards.

Safe Work Practices

- Read and follow the manufacturer's instructions and warning labels.
- Wear appropriate personal protective equipment such as safety footwear, safety glasses, head protection and fall protection equipment.
- Workers must be properly trained in how to safely operate the specific elevating work platform they will be using.
- Ensure there is adequate lighting in the work area to perform tasks safely.
- Operate the platform on firm and level surfaces as per manufacturer specifications.
- Operate the platform smoothly when starting, stopping, raising and lowering.

- All workers on an elevating work platform must wear fall protection equipment that is properly secured to an anchorage point that is approved by the manufacturer or a professional engineer at all times while in basket.
- The equipment manufacturer's operating and maintenance manuals must be available at the workplace with the platform.
- The elevating work platform must meet the requirements of the applicable CSA or ANSI standards.
- Ensure that a safe means is provided to get on and off the platform.
- Use cordless power tools where possible. If extension cords are required, ensure they are long enough for the full platform height and won't get pinched or severed by the scissor mechanism.
- Do not transport workers on an elevated work platform unless the transport is in accordance with the manufacturer's instructions.
- Do not operate any equipment if you feel drowsy or unwell.
- Do not operate a platform if the operating and maintenance manuals are not available.
- Do not operate a platform if the rated capacity is not clearly marked on the platform.
- Do not exceed the rated load capacity of the platform.
- Do not use a platform without guardrails in place.
- Do not use ladders or other devices on the platform to gain extra height.
- Do not stand or climb on guardrails.
- Do not overreach or lean over guardrails.
- Do not use an unsafe or defective platform.
- Do not climb up or down the extension or scissor area.
- Do not use the platform as a jack.
- Do not use the platform for pulling, pushing or dragging materials.
- Do not lift loads that overhang from the platform.
- Do not work outdoors on a platform during a storm or high winds.
- Do not permit workers or other persons near the base of the platform while it is being raised, lowered or moved.
- Do not throw or drop materials, tools or objects from heights.
- Do not enter or leave a platform when it is elevated.
- Do not use guardrails to carry materials unless designed for this purpose.
- Do not remove guardrails while the platform is raised.
- Do not hang items over the outside of the platform.
- Do not place the platform against any structure to steady either the structure or the platform.
- Do not leave the machine unattended without locking it or otherwise preventing unauthorized use.
- Do not charge a leaky battery.
- Do not disarm any safety features such as tilt or level warnings.
- Never operate equipment on which you have not been trained.

Inspection

- Wear appropriate personal protective equipment.
- Inspect the platform before use on each shift. Ensure it is in good working condition and suitable for the job. Any condition that could endanger workers must be remedied before the platform can be used.
- Check the following;
  - Overall frame condition
  - Uncontrolled motion
  - Loose connections or missing fasteners
  - Improper adjustments
  - Broken or frayed wire ropes
  - Damaged electrical wires, or hydraulic or pneumatic lines
  - Cracked welds
  - Inefficient brakes
  - Poor tire condition or pressure
  - Missing load capacity posting
  - Leaky batteries
- Ensure that guardrails are secure and gate(s) can close.
- Ensure that barriers on scissor type lifts are in place to prevent entry.
- Ensure that the lifting mechanism is adequately guarded or identified with appropriate hazard warning labels/signs.
- Ensure that ropes, electrical cords and hoses will not become entangled in the platform.
- Ensure the operating and maintenance manuals are available with the equipment.
- Inspect the work location for ditches, drop-offs, holes, bumps, obstructions, slopes, debris, untamped earth, overhead obstructions, electrical wires and conductors, hazardous atmosphere, wind and weather conditions.
- Ensure the operating controls are clearly marked to indicate their function, are the continuous pressure type and are protected against inadvertent operation.
- Ensure the operating controls have an emergency stop device that is within easy reach of the operator, is labeled “STOP” and is red in colour.
- Ensure that a clearly marked overriding lowering control is provided at the lower controls to stop and lower the platform in the event of an emergency.

Operation

- Set up barricades and warning signs wherever necessary.
- Ensure the carrier vehicle of the platform is secured against inadvertent movement before a worker occupies the work platform.

- Load the platform evenly according to the manufacturer's instructions.
- Ensure the load is properly stacked and stable before lifting or moving.
- Maintain three-point contact and use proper climbing techniques when getting on and off the platform.
- Attach your fall protection equipment to the approved anchor point.
- Maintain a firm footing and balance on the platform.
- Ensure the gate is securely closed before moving the platform.
- Check for overhead obstructions before raising the platform.
- Maintain a safe clearance from electrical wires.
- Keep your hands, arms, feet, legs and head inside the work platform at all times when the lift is raising, lowering or moving.
- Ensure that the warning system (both the intermittent back up horn and flashing light) automatically activate when the platform is in motion if applicable.
- Path is clear, and the ground is firm and level.
- If the manufacturer permits the platform to be elevated on sloped ground then ensure the wheels are secured according to the manufacturer’s instructions.

Charging Batteries

- Charge batteries in a dry and well ventilated area free from sparks, flames and ignition sources.

Backing Up Vehicles and Equipment

Purpose

The purpose of this Safe Work Practice is to outline the safe methods for backing up a Vehicle or Equipment. Due to the high number of incidents historically associated with Backing up, it is critical that the proper time be taken to assess the hazards prior to backing up.

Definitions

Spotter – A person designated to observe and direct equipment operators and drivers in order to maintain a safe working area. A spotter can have no other job duties while working as a spotter.

Hazards

- Backing over persons or objects
- Crushing against object
- Pinch points on Equipment
- Striking persons or objects
- Falling debris
- Electrical shock

General Guidelines

- Whenever possible, plan the work to allow for drive-through operations that will limit the need for vehicles or equipment to backup.
- Have a spotter to help you back up whenever possible.
- Roll down window to allow for emergency voice commands.
- Spotter is to stay in view of driver at all times.
- Driver is to stop immediately if spotter is out of sight.
- If ever in doubt of the spotter's instructions, the driver is to stop the vehicle and confirm the directions with the spotter.
- Spotter is to wear high-visibility clothing.
- Always ensure that nothing or no one behind you will be harmed by your movement. Prior to putting the equipment/vehicle into reverse gear, take all precautions necessary, including a visual check, mirror checks, and a walk around, recognize all blind spots.
- Never assume that you know the conditions behind you, as they may change quickly. Always do adequate checks. If someone does enter the vicinity of your working area, make eye contact and ensure you have properly communicated your intentions. However, be prepared to stop immediately, as they may unexpectedly move.
- Continually watch for pedestrians or ground workers. Backup alarms are not always sufficient as ground workers may hear more than one at a time, and may not notice yours.
- Never stop or backup on a railway line.

Training

- Driver Training
- Equipment Specific Training
- Hand Signals Training
- Hand Signals

Personal Protective Equipment

- Hard Hat
- CSA Boots
- Safety Eyewear
- Hearing Protection
- High-Visibility Clothing

Battery (Charging and Servicing)

Purpose

The charging of lead-acid batteries can be hazardous even though many workers do not see it that way since it is such a common activity in many workplaces. The purpose of this practice and procedure is to provide guidelines on both charging and servicing batteries.

Definitions

Electrolyte – a general term used to describe a non-metallic substance like acids such as sulfuric acid or salts that can conduct electricity when dissolved in water.

Battery Acid – Is any acid that can be used in a chemical cell or battery.

Hazards

- Direct exposure to battery acid (spilling and splashing).
- Explosion.

General Guidelines

Charging a Battery

- Charge batteries in a designated, well-ventilated area.
- Do not attempt to recharge a frozen or damaged battery.
- Follow the manufacturer's recommendations for charging rates and connections.
- Unplug or turn the charger off before attaching or removing the clamp connections.
- Rinse off batteries and clean terminals before recharging.
- Fill sulfuric acid (electrolyte) to the prescribed level before charging to reduce the possibility of the electrolyte heating up excessively.
- If water is added use distilled water not tap water.
- Turn off the charger before disconnecting the cables from the battery.

Servicing a Battery

- Keep metal tools and other metallic objects away from batteries.
- Inspect for defective cables, loose connections, corrosion, cracked cases or loose hold-downs/ terminal posts.
- Replace worn or non-serviceable parts.
- Tighten cable clamp nuts with the proper size wrench to avoid subjecting battery terminals to excessive twisting forces.
- If possible use a cable puller to remove a cable clamp from the battery terminal.
- Use a tapered brush to remove corrosion on the terminal posts and cable clamps.
- Use a battery carrier to lift a battery, or place hands at opposite corners.
- Do not lean over a battery.

Battery (Charging and Servicing)

Battery Charging Area

- Have good ventilation to diffuse gases and prevent explosions.
- Battery charging station should be constructed with acid-resistant materials.
- Have face shields (with safety goggles), aprons and gloves of the appropriate chemical-resistant materials readily available.
- Have unobstructed emergency eyewash or shower stations close by.
- Have equipment and supplies for flushing, neutralizing, and cleaning spilled chemicals, acid and electrolyte solutions near the charging.

Training

- Only work with batteries if you have been trained to do so.

Personal Protective Equipment

- Eye Protection
- Protective clothing (Gloves)

Blood Borne Pathogens

Scope

The purpose of the Blood Borne Pathogens Code of Practice is to provide workers with information of risk exposures, and appropriate precautionary measures when administering first aid.

Blood borne diseases such as HIV, hepatitis B, and hepatitis C are caused by viruses that are carried in the bloodstream and in other bodily fluids. People who carry these viruses may show no signs of illness, and may not be aware that they are infected. For this reason, treat all body fluids as potentially infectious when administering first aid.

Universal precautions, such as disposable gloves and barrier masks, are designed for use in all emergency situations where there is a risk of exposure to blood borne diseases. Always protect yourself by minimizing direct contact with blood and body fluids.

General Guidelines

- Disposable gloves should be worn when it is likely that there will be contact with blood or other body fluids, non-intact skin and items or surfaces soiled with blood or other bodily fluids.
- Open sores, wounds or irritated skin on caregivers' hands should be covered by wearing gloves.
- Barrier masks or a ventilation device should be made readily available for use in resuscitation.
- Wash hands or other skin surfaces as soon as possible after any contact with blood or other body fluids.
- All spills and surfaces contaminated with blood or other bodily fluids should be cleaned with soap and water first, using disposable towels, and then disinfected with a solution of one part household bleach to nine parts water.
- Clothing soiled with blood or other body fluids should be removed as soon as possible, handled as little as possible, and washed in a normal laundry cycle, using laundry detergent.

Waste contaminated with blood or other body fluids should be placed in a sturdy plastic bag, which should be secured with a twist tie and disposed with regular garbage.

Responsibilities

Employer

- Must make available the appropriate gloves and barrier masks in Company first aid kits.
- Provide first aid training as per Occupational Health and Safety Regulations.

Workers

- Workers must participate in first aid training at employer's request and arrangement.
- Use personal protective equipment and follow procedures as required when administering first aid.
- Record first aid information in the work site treatment book. Advise supervisor of all exposure incidents.

Personal Protective Equipment

Disposable Gloves

- Disposable gloves are intended for one-time use. They are to be worn when there is a risk of direct contact with blood, body fluids, open wounds or sores.

Barrier Masks

- Barrier masks reduce the risk of disease exposure during artificial respiration without altering approved resuscitation techniques.

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BTU Heaters (Propane and Natural Gas)

Purpose

The purpose of this practice is to provide proper instruction into the safe use of BTU Heaters utilized on all Paragon Ventilation Ltd projects.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper instruction and training in the safe use of related equipment and PPE prior to performing this type of activity.

Worker

It will be the responsibility of the worker(s) to adhere to the safety and requirements regarding this specific task. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equipment Required

1. PPE (Hardhat, CSA/ANSI footwear, eye protection, hearing protection, gloves)
2. Heaters and fuel tanks
3. Ignition striker

Practice

1. When setting up portable heaters, ensure the following:
   - Heaters must be set up on a level surface.
   - Build fire treated plywood enclosure when heaters penetrate tarps (for fire safety).
   - 1 & 2 million BTU heaters must have fresh air supply (all heaters should have fresh air supply when possible).
   - Review power cord size and length from source of power.
   - Gas lines and wherever possible (propane lines) must be hung up out of the way.
   - Soap test all hose connections and joints made.
   - Cap all unused valves (i.e. vaporizers).

- All threaded joints must have the proper pipe dope.
- Fire extinguishers must be near all portable heaters.

2. The following safety hazards should always be identified and rectified prior to placing the heater:
   - High temperature
   - Risk of flammable materials in area (i.e. tarps, etc.)
3. Shall any of the following issues be observed during the use of the equipment, have someone who is knowledgeable with the equipment inspect it prior to continuing its use:
   - Lack of power
   - Malfunction of the equipment
   - Pressure loss in natural gas lines
   - Lack of fresh air supply
   - Improper connections of hoses

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Care and Handling of Propane Cylinders

Purpose

The purpose of this practice is to provide guidelines on the care and handling of propane cylinders.

Definitions

Asphyxiation – To cause to die or lose consciousness by impairing normal breathing. (choke, suffocate, smother).

Certification

No person shall handle propane cylinders or use propane cylinders until they are fully aware of the potential hazards and the precautions necessary to handle propane safely. All personnel working with propane must be certified or trained in:

- Transportation of Dangerous Goods (TDG) (as required by legislation)
- Legislation
- Workplace Hazardous Materials Information System (WHMIS)
- Proper maintenance and use of Personal Protective Equipment (PPE)
- Emergency Response Plan (ERP)

General Guidelines

- Ensure WHMIS and TDG labels are appropriately attached and visible.
- Cylinders must be transported and secured in an upright position in a well-ventilated area.
- Cylinders will not be stored inside building or inside closed canopies or vehicles.
- Transportation of cylinders must follow applicable legislation.
- A regulator must be installed on cylinder prior to use.
- When checking for connection leaks use a soapy water solution.
- Tanks are not to be hooked up and used without proper sized regulators.
- When not in use cylinders are to be secured in upright position, valve closed and regulator removed.
- Ensure cylinders that are in storage or transit are equipped with valve cap or collar and regulator is removed.
- Cylinders should not be used if shoulder label or stamp is not legible.
- Cylinder must not to be painted.
- Suppliers delivering propane or setting up the equipment on site must be under the direction of a company representative and must adhere to all safe work practice.
- Nylon slings must be used in a “choker” fashion when loading or off-loading or lifting propane tanks. “Lifting lugs” provided on tanks are not to be used. Slings are to be wrapped around the shell of the tank.

- All trucks, cranes or equipment used to handle propane tanks must be equipped with a fire extinguisher appropriate for the size and type of tank being handled.
- Any movement or repositioning of tanks shall be performed by a competent worker.
- Tanks are never to be heated to increase flow.

Training

No person shall handle propane cylinders or use propane cylinders until they are fully aware of the potential hazards and the precautions necessary to handle propane safely. All personnel working with propane must be certified or trained in:

- Transportation of Dangerous Goods (TDG)
- Legislation
- Workplace Hazardous Materials Information System (WHMIS)
- Proper maintenance and use of Personal Protective Equipment (PPE)
- Emergency Response Plan (ERP)

Personal Protective Equipment

- Gloves

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Chop Saw (Miter Saw) – Operation

Purpose

The purpose of this practice is to provide general guidelines in the operation or use of a chop saw or miter saw.

Definitions

Rpm – Revolution per minute is a measure of frequency, specifically the number of rotations around a fixed axis in one minute.

Hazards

- Cuts
- Flying debris

General Guidelines

- Always use a full face shield and safety glasses when operating a chop saw (miter saw).
- Never wear loose clothing when operating a chop saw (miter saw).
- Long hair should be tied back when operating a chop saw.
- Jewelry and dangling object should be removed when operating a chop saw (miter saw).
- All guards must be in place when operating a chop saw (miter saw).
- Unplug or lock out chop saw (miter saw) when replacing blade, cleaning or conducting repairs.
- Keep hands and fingers clear of the path in which the blade travels.
- Clean guard frequently to help visibility and movement.
- Use only recommended Rpm blades as per manufacture specifications.
- Regularly check and tighten blades.
- When replacing blades makes sure all washers and fasteners are properly positioned and secured.
- Use a clamp to secure materials when possible.
- Never cut small pieces on a chop saw (miter saw).
- Long pieces should be supported at the same height as the saw.
- Never place fingers or hands in the path of blades or reach in to the back where the fence is.
- Never reach into cutting area until the blade has come to a full stop.
- Use the brake on chop saw or miter saw if one is provided.
- Do not use side of blade to grind material

Training

- Do not operate a chop saw unless fully trained to do so.

Personal Protective Equipment

- Face Shield
- Safety Glasses
- Gloves (only if necessary as they can get caught in rotating parts)

Compressed Air Power Tools (Pneumatic)

Purpose

This practice provides guidelines for the safe use of all compressed air power tools. Air powered tools in construction range from stapling guns to jack hammers. If not used as per manufacturer's specifications, these tools can cause extensive damage to the user.

Definitions

Pneumatic – Containing or operated by air or gas under pressure.

General Guidelines

- Review manufactures specifications prior to use.
- Keep tools clean and lubricated and maintain them according to manufacturing specifications.
- Before using a tool that requires a lot of movement, ensure the Hazard Assessment and Control has addressed the potential for injury to other personnel.
- Reduce physical fatigue by supporting heavy tools with a counter balance whenever possible.
- Do not use compressed air to blow debris or to clear dirt from any equipment, structure or worker clothing.
- Ensure the air pressure has been turned off and the line pressure relieved before disconnecting the hose or changing tools.
- For general shop use, keep air pressure at 30lbs.
- Ensure all hose connectors are of the quick disconnect pressure release type with a safety chain/ cable.
- Wear Personal Protective Equipment (PPE) such as eye protection and face shields. Ensure other employees and contractors in the area are made aware of, or have restricted access to the hazard area.
- Check hoses on a regular basis for cuts, bulges or other damage. Ensure that damaged or defective hoses are repaired or replaced.
- Make sure a proper pressure regulator and relief device is in the system to ensure the desired pressures are correctly maintained.
- Use only the correct air supply hoses for the tool or equipment being used. Follow the manufacturer's general instructions such as the maintenance procedure and comply with legislated safety requirements.
- Report all defective tools to the supervisor; all damaged equipment or tools will be tagged out of use and removed from service until repaired by a qualified competent person.
- Use screens or shields in areas where near by workers may be exposed to flying fragments.
- Use only attachments that are recommended by the manufacture.
- Blow out airline before connecting a tool.
- Keep tools out of duct, moisture or corrosive fumes as they can cause damage.

- Do not carry tool by the hose.
- Avoid laying hose across walkways.
- Do not operate a tool at a pressure above manufactures specification.

Training

- Do not operate any compressed air or Pneumatic tools unless properly trained and competent to do so.

Personal Protective Equipment

- Safety Glasses of Goggles
- Face Shield
- Hearing Protection
- Steel toed boots
- Gloves

Compressed Gas and Air

Purpose

This practice establishes a uniform set of guidelines for the use of compressed gas and air, as set forth by occupational legislation.

Definitions

Compressed Gas – A material that is a gas at normal room temperature and pressure, but is packaged as a pressurized gas, pressurized liquid or refrigerated liquid. Regardless of whether a compressed gas is packaged in an aerosol can, a pressurized cylinder or a refrigerated container, it must be stored and handled very carefully. Puncturing or damaging the container, or allowing the container to become hot, may result in an explosion.

Compressed Air – Air that has been reduced in volume and increased in pressure, and is at a pressure greater than that of the atmosphere. Compressed air is used to power machinery.

Responsibilities

Personnel are responsible for ensuring:

- The valve on a gas cylinder is kept closed when the cylinder is empty or not in use.
- They are not standing directly in front of the regulator when a valve is being opened.

Compressed Gas Cylinders

The following requirements are to be met:

- Gas cylinders are to be clearly identified as to contents in accordance with jurisdictional Workplace Hazardous Material Information System (WHMIS) legislation.
- Material Safety Data Sheets (MSDS) must be available and reviewed with employees and contractors using the product.
- Cylinders must be transported in accordance with Transportation of Dangerous Goods (TDG) legislation.
- Cylinders containing acetylene must be stored and transported in a secure and upright position.
- When not in use and during storage or transportation, cylinders must have gauges removed and protective caps in place.
- Cylinders must not be dropped or subjected to impact. Cylinders may only be hoisted when enclosed in an appropriate cylinder hoisting device or cradle in which they are securely fastened.
- Cylinder valves and gauges must be kept clean and free from oil, grease and other hydrocarbons.
- Any valve, regulator or fitting connected to a compressed gas cylinder must be a standard fitting which meets manufacturer's specifications and must include provisions for flashback arresters where necessary. Unless a compressed gas cylinder is equipped with an integral valve guard, the valve cover must be in position when the cylinder is not connected for use.

- Cylinders must not be exposed to excessive heat. Cylinders must not be placed in confined spaces or non-ventilated areas. Hoses from compressed gas cylinders will be removed from confined spaces when not in use.

Compressed Gas Cylinder Storage

The storage of compressed cylinder gas is outlined as follows:

- All compressed or liquefied gas containers must be used, handled, stored and transported in accordance with manufacturer's specifications.
- Oxygen cylinders will be stored in racks a minimum of 6 meters from occupied buildings. These cylinders will be separated from fuel gas cylinders, hydrocarbons or other combustible materials by a minimum of 6m, or by a non-combustible barrier at least 1.5m high that has a fire-resistant rating of 0.5hr.
- Cylinder storage areas will be identified as to contents of the cylinders (full or empty). "No Smoking" signs must be posted in the area.
- Compressed or liquefied gas cylinders, piping and fitting are protected from damage during handling, filling, transportation, and storage
- Compressed or liquefied gas cylinders are equipped with a valve protection cap if manufactured with a means of attachment.
- Oxygen cylinders or valves, regulators or other fittings of the oxygen using apparatus or oxygen distributing system are kept free of oil and grease.
- Fire extinguishers must be placed in the immediate storage area vicinity.
- Cylinders must not be stored in confined, non-ventilated areas or cabinets.
- The storage compartments on welding service vehicles must be solid-walled between compartments, with unobstructed vents to the outside air that are adequately sized.

Regulators and Hoses

The following procedures for regulators and hoses are noted:

- Install flashback devices at the regulator end of all oxygen-fuel system lines and install a back-flow prevention device at either the torch end or regulator end.
- Use leak-test regulators and hoses with flammable compressed gas cylinders immediately after connection to the cylinders.
- Slowly open the valve before connecting gauges to compressed cylinders to clear any debris from the valve nozzle and then close immediately. Ensure there are no sources of ignition in the area before opening the valve, and avoid debris by standing to one side.
- When disconnecting regulators and hoses, close the valve and bleed down the hose before removing it.
- During winter conditions, ensure that hoses are of sufficient quality to withstand extreme cold conditions.
- Inspect hoses before use for cracking or damage.

Cylinder Refilling

In accordance with applicable regulatory requirements, only authorized personnel will refill compressed gas cylinders.

Crane Operation

Purpose

The purpose of this practice is to establish crane operation guidelines for employees who operate or work in close proximity to cranes.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site hazards identified and rectified. The foreman is responsible to ensure workers have received proper training and instruction in the operation and safety measures associated with cranes.

Worker

It will be the responsibility of the worker(s) to take reasonable and practical measures to have site equipment serviced, maintained and operated in a professional and safe manner. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment and/or materials associated with cranes.

Equipment Required

1. CSA/ANSI approved safety footwear and approved safety headgear are required on all projects. Hi-visibility vests shall be used when working around mobile equipment or in other traffic solutions.
2. All workers should use PPE suitable and necessary for the hazards of the work being preformed.

Procedure

Operating Practices

1. Operators are in complete control of all hoisting operations and retain the right to cease any lifting practice that they determine is unsafe or detrimental to the integrity of a crane, its components, rigging devices or the safety of the people affected by its operations.
2. The operator shall not engage in any practice that will divert his/her attention while actually engaged in operating the crane.
3. When he/she is physically or mentally unfit, the operator shall not engage in the operation of this equipment.

4. The operator shall respond to signals only from the appointed signal person, but shall obey stop signal at any time, no matter who gives it.
5. The operator shall be responsible for those operations under his/her direct control. Whenever safety is in question, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.
6. No load is to be moved until the swing path and the landing site have been assured to be safe.
7. If a warning signal is furnished, it shall be sounded each time before travelling and intermittently during travel, particularly when approaching workmen.
8. Before leaving his crane unattended, the operator shall:
   - Land any attached load, bucket, or other device.
   - Disengage clutch.
   - Set travel, swing, boom brakes, and other locking devices.
   - Put controls in the OFF position.
   - Stop the engine.
   - Secure crane against accidental travel.
   - When wind alarm is given or on leaving crane overnight, set ground chocks on truck and crawler cranes.
   - Lower crane booms to ground level or otherwise fasten securely against displacement by wind loads or other outside forces.
   - If there is a lockout sign on the switch or engine starting controls, the operator shall not close the switch or start the engine until the warning or lock has been removed by the person placing it there.
   - Before closing the switch or starting the engine, the operator shall see that all controls are in the OFF position and all personnel are in the clear. If power fails during operation, the operator shall:
     - Set all brakes and locking devices.
     - Move all clutch or other power controls to the OFF position.
     - If practical, the suspended load should be landed under brake control.
9. The operator shall familiarize him/herself with the equipment and its proper care. If adjustments or repairs are necessary, or any defects are known, he/she shall report the same promptly to the appointed person and upon changing shifts shall also notify the next operator to the defects.
10. The operator, at the start of a new shift, shall test all controls. If any controls do not operate properly, they shall be adjusted or repaired before operations are begun.
11. Booms that are being assembled or disassembled on the ground with or without support of the boom harness should be securely blocked to prevent dropping of the boom and boom sections.
12. <u>Moving loads:</u>
    - Operators shall not pass loads overtop public people, city streets, walkways, or vehicles, and must ensure areas below all loads are secured to prevent inadvertent entry by people below.
    - Loads shall not pass overtop workers unless no practical alternative exists and only when workers have been warned by sounding an alarm or horn.

- Operators must ensure daily, weekly, or monthly limit device or general inspections for all cranes have been completed and documented as per manufacturers specifications and legislation/ regulations.
- The following procedures will be observed when moving loads:
  - The crane will be level and blocked if necessary.
  - The load will be properly secured and balanced.
  - The rope will be straight and balanced.
  - The rope will be straight, not kinked.
  - The hook will be brought over the load to prevent swinging.
  - The lifting action will be a smooth acceleration.
  - The load will clear all obstructions.
  - Side loading will be limited to freely suspended loads.
  - Cranes will not be used for dragging loads sideways.
  - No load will be used while employees are on the load or hook.
  - Employees will not work under loads.
  - The brakes will be tested prior to each lift when the weight approaches the maximum for the crane.
  - Outriggers will be used when necessary.
  - Loads will not be lowered below the point where less than three wraps of rope remain on their drums.

13. It is recommended that a person be designated as safety watch whenever the crane is used near high voltage power lines.
14. Before the commencement of operations near electrical lines, the person responsible for the job shall notify the local power authority, providing them with all information about the specific job and requesting their cooperation.
15. Any overhead wire must be considered energized unless the owner or the electrical utility representative gives positive indication that the line is not energized.
16. Mobile Cranes:
    - Operators must ensure daily, weekly or monthly inspections are preformed and documented as per the manufacturer's specifications and the Alberta OHS Act, Regulations & Code.
    - Log books must depict specific items relevant to a specific crane and must be completed daily with follow-up action on deficiencies or defects found.
    - Geotechnical data must be current and be available on site for mobile cranes situated close to excavations, structures, or other encumbrances which may be affected by the crane's operations and stresses imposed by them. Documentation must be available for review prior to the crane operations commencing.
    - Outriggers must be deployed to their fullest extent as per the manufacturer's specifications and/ or a Professional Engineers instruction and design, if applicable.
    - Components of a mobile crane, such as a boom, must be inspected annually (12 months) and certified safe for continued use as per a Profession Engineer, the crane manufacturer, or the

crane manufacturer's authorized representative. A decal or certificate of authorization and inspection must be readily available with the crane while it is in use.

- Components of a mobile crane, such as a boom, must be inspected annually (12 months) and certified safe for continued use as per a Profession Engineer, the crane manufacturer, or the crane manufacturer's authorized representative. A decal or certificate of authorization and inspection must be readily available with the crane while it is in use.
- Operators of mobile crane shall not life workers unless no practical alternative exists. Where required, site specific safe work procedures must be developed and reviewed by all affected people. A "dry run" must commence prior to the actual procedure occurring and not include people in order to ensure that the crane, rigging and related components can safely carry out the procedure without placing the workers at risk. The job of a mobile crane used to lift workers must be equipped with an "anti-two-block" device.
- Lifting workers shall only be completed with an engineered basket meeting the requirements of Alberta's OHS Code (section 350).

Critical Lifts

- All lifts requiring multiple cranes shall be engineered and approved in writing by the management.
- All lifts approaching 70% of crane or other lifting device capacity are considered critical lifts.

Crane Signalling

Purpose

The purpose of this safe work practice is to outline the responsibilities and procedures associated with Crane Signalling. Each signaller must understand the limitations of the equipment, the load and the operator.

Hazards

- Pinch points on Equipment
- Striking persons or objects
- Falling load or debris

General Guidelines

At all times when an operator's view is obstructed a signal person must be employed. The signal person must not have any duties, other than prescribed signal duties, to perform.

The signal person must:

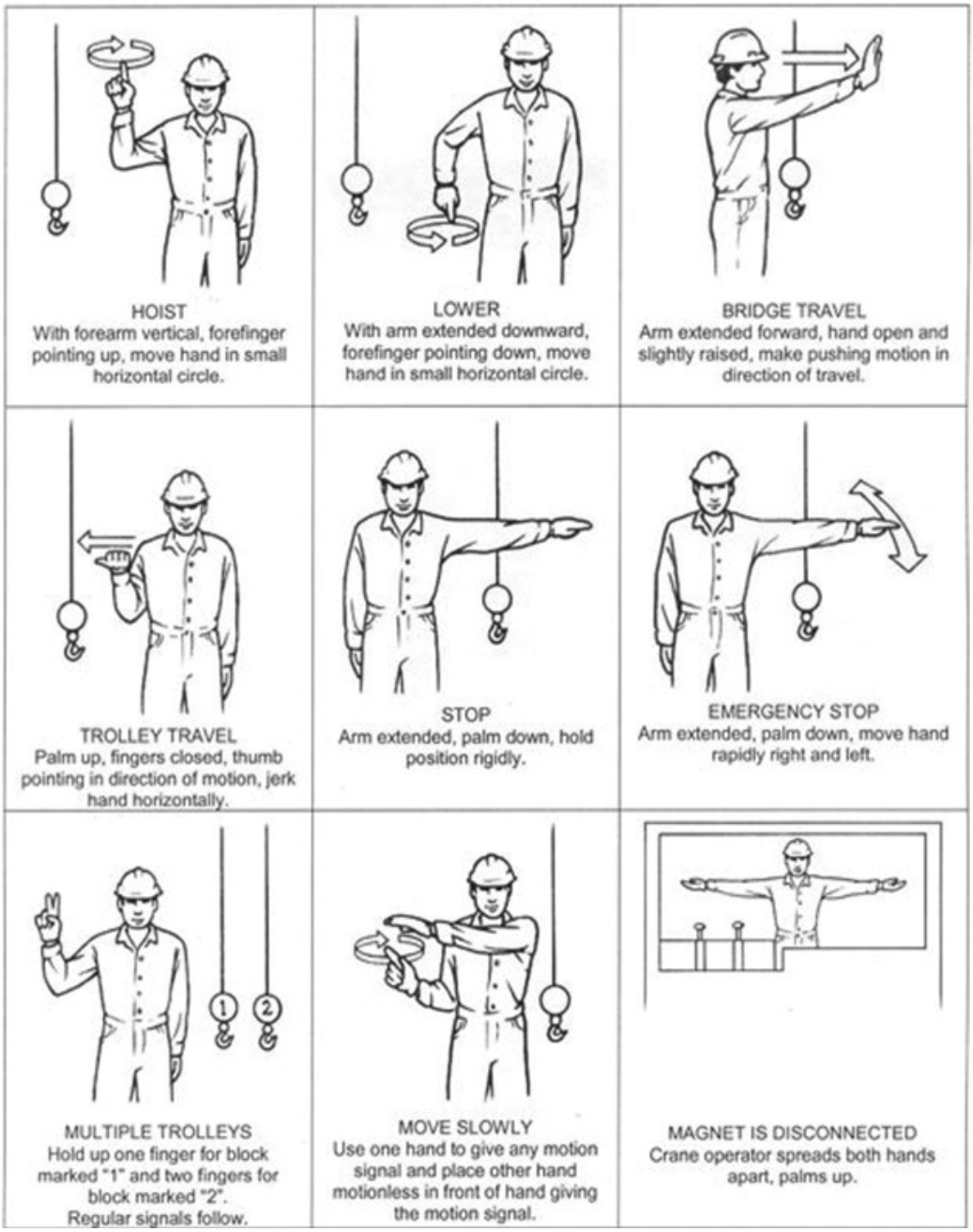
- Be fully qualified by experience with the operation and must know the standard hand signals for controlling operations.
- Only one designated signaller at a time may give signals to an equipment operator.
- When a signal operator is identified, an equipment operator must take signals only from the designated signaller, with the exception of a "STOP" signal. An equipment operator will stop all movement upon receiving a "STOP" signal from any worker.
- Before a designated signaller can give a signal to proceed with, a designated signaller must ensure that there are no uncontrolled hazards in the vicinity.
- Wear highly visible gloves and vest and remain in full view of the operator.
- Be responsible for keeping the public and all unauthorized personnel outside the radius of operation.
- Direct the load in such a manner that it does not pass over anyone.
- Be in constant, clear and complete communication with the operator either visually with hand signal or audible by radio throughout the operation. If this cannot be satisfied work cannot be performed.
- If the operator loses contact with a signaller for any reason, the equipment movement must be stopped until communication is restored.
- If it is necessary to clarify any signal to the operator, the operator must first be signalled to stop all movement.
- Adequate signalling and lighting arrangements must be available for night work and operations must cease when either is inadequate.

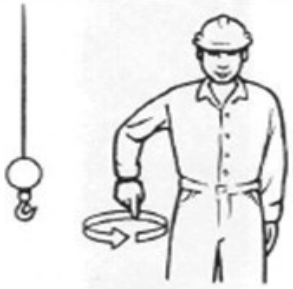
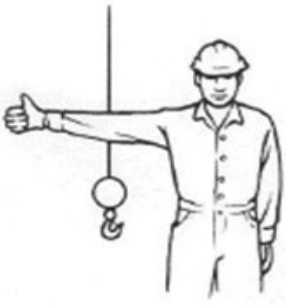
Crane Signalling

Hand signals

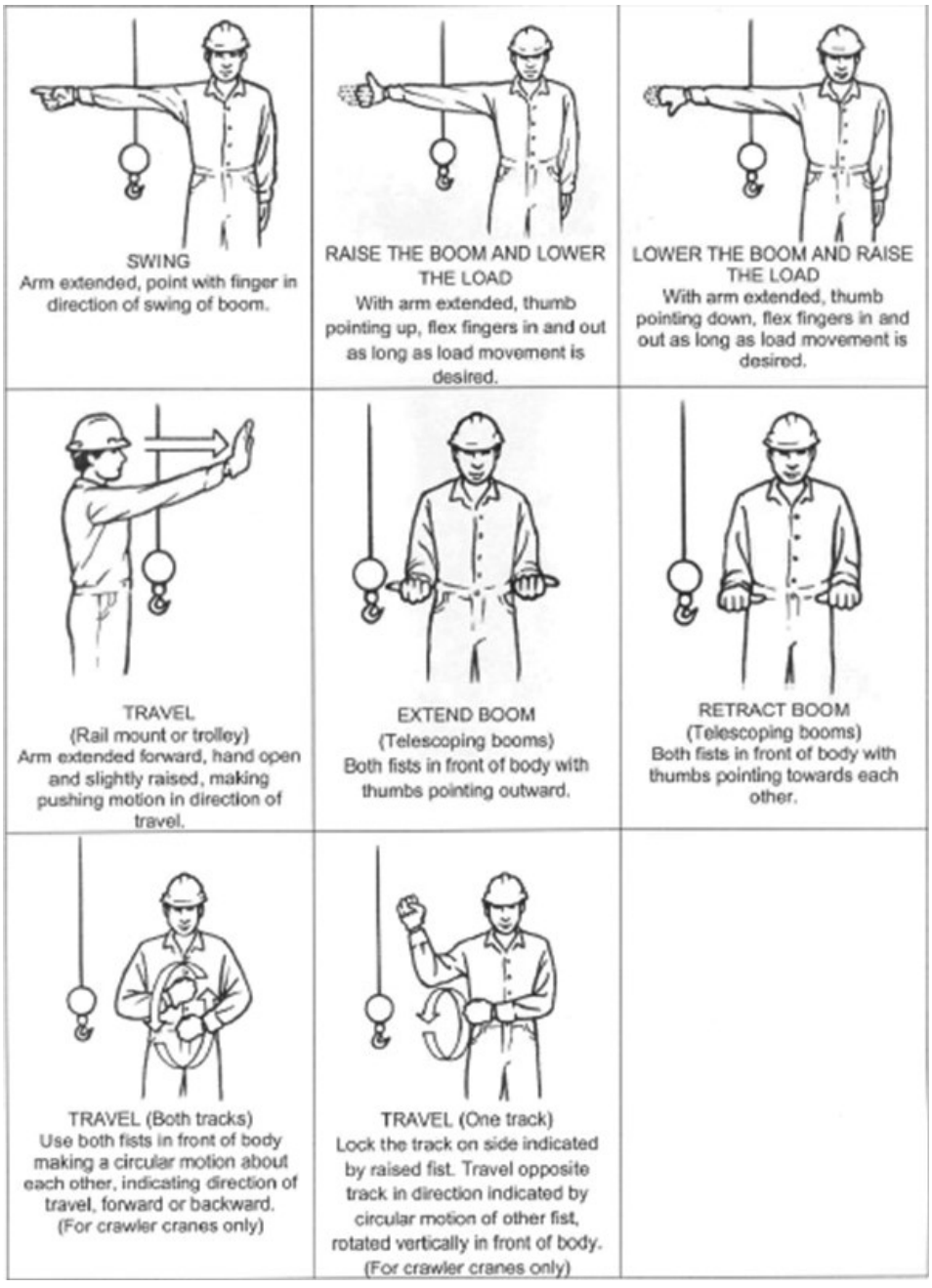
It is common in many hoisting operations to use portable two-way radios when directing the motion of a suspended load. Where this is not possible, hand signals by a designated signaler may be required. Management must designate signalers in accordance with Section 191 of the OHS Code.

All signals should be continuous and there should be no response to unclear signals.



 STOP Arm extended, palm down, move hand right and left.	 DOG EVERYTHING Clasp hands in front of body.	 MOVE SLOWLY Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly is shown as an example.)
 HOIST With forearm vertical, forefinger pointing up, move hand in small horizontal circles.	 LOWER With arm extended downward, forefinger pointing down, move hand in small horizontal circles.	 USE MAIN HOIST Tap fist on head, then use regular signals.
 USE WHIPLINE (Auxiliary hoist) Tap elbow with one hand, then use regular signals.	 RAISE BOOM Arm extended, fingers closed, thumb pointing upward.	 LOWER BOOM Arm extended, fingers closed, thumb pointing downward.

Crane Signalling



SWING
Arm extended, point with finger in direction of swing of boom.

RAISE THE BOOM AND LOWER THE LOAD
With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.

LOWER THE BOOM AND RAISE THE LOAD
With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.

TRAVEL
(Rail mount or trolley)
Arm extended forward, hand open and slightly raised, making pushing motion in direction of travel.

EXTEND BOOM
(Telescoping booms)
Both fists in front of body with thumbs pointing outward.

RETRACT BOOM
(Telescoping booms)
Both fists in front of body with thumbs pointing towards each other.

TRAVEL (Both tracks)
Use both fists in front of body making a circular motion about each other, indicating direction of travel, forward or backward.
(For crawler cranes only)

TRAVEL (One track)
Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body.
(For crawler cranes only)

Training

- Crane Operator Training
- Crane Signaller Training

Personal Protective Equipment

- Hard Hat
- CSA Boots
- Safety Eyewear
- Hearing Protection
- High-Visibility Clothing

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Defective Tools and Equipment

General

Defective tools can cause serious and painful injuries.

If a tool is defective in some way, **DO NOT USE IT, TAG IT OUT.**

Be aware of problems like:

- Power/Air tools not operating properly
- Chipped or broken drill bits
- Gas cylinders without regulators or flashback devices
- Wrenches with worn out jaws
- Power tools that have proper guards removed
- Ladders with cracks, splits, twisted or jammed parts, loose screws, rivets or rungs
- Broken or inoperative guards
- Using tools with frayed cords
- No ground wire (on plug) or cords of standard tools
- The on/off switch not in good working order
- Tool blade is cracked
- The wrong grinder wheel is being used

To ensure safe use of tools/equipment, remember:

- Never use a defective tool or piece of equipment
- Inspect and double check all tools/equipment prior to use
- Ensure defective tools/equipment are repaired or replaced
- If a defective tool or piece of equipment if discovered and cannot be repaired or replaced right away, it must be tagged out of service.
- Report defective tools/equipment to your immediate supervisor.
- Do not attempt to repair a defective tool or piece of equipment unless you have been trained and deemed competent to do so.

Air, gasoline or electric power tools, require skill and complete attention on the part of the user even when they are in good condition. Only use these tools if you are trained to do so and are able to recognize when they are not in good condition

Drill Press – Operation

Purpose

The purpose of this practice is to give general guidelines to the safe operation of a drill press.

Definitions

- No Definitions

Hazards

- Flying Debris

General Guidelines

- Read the owner manual prior to operating a drill press.
- Always wear safety glasses.
- Ensure the start stop button is within easy reach of operator.
- Use a vacuum, brush or rake to remove cuttings.
- Remove bures or chips from drilled holes.
- When making deep holes, clean out hole frequently.
- Use a clamp or vice to prevent work from spinning.
- Make sure bit is locked securely in the chuck.
- Remove the chuck key before starting the drill press.
- Lubricate the drill bit if drilling through metal.
- Shut power off before removing drill bit.
- Keep guards in place at all times.
- Reduce drill pressure when drilling begins.
- Keep drill bits clean and sharp.
- Keep floor clean around drill press.
- Keep working surface clean of debris, tools and materials.
- Do not wear any loose clothing, gloves, rings, watches or bracelets.
- Do not set speeds, adjust, or measure work until machine is fully stopped.
- Tie back loose hair.
- Do not force drill with extra pressure.
- Never leave the key in drill chuck.
- Do not hold work by hand.
- Do not leave drill press running unattended.
- Ensure that all stationary equipment is anchored to the floor.

Training

- Do not operate a drill press without proper training or competency assessment.

Personal Protective Equipment

- Eye Protection

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Drilling Through Lead Paint Safe Work Practice:

1. **Prior to starting the project, ensure that a Job Hazard Analysis has been conducted. The analysis should include acknowledgement that the worker is aware of the hazards associated with lead painted materials**
2. **Ensure proper training specific to the task, including respirator use.**
3. **Perform pre-job equipment inspection and function test prior to use as per manual.**
4. **Place a drop sheet underneath the penetration area.**
5. **Seal the vac attachment or position the Hilti dust boot to form a seal around the penetration.**
6. **Start the Vacuum.**
7. **Don half mask respirator.**
8. **Drill the hole or install the anchor. For holes that penetrate through the wall to the other side, the opposing wall will require a polyethylene or similar seal with enough slack that the drill will not penetrate the seal.**
9. **After drilling the hole, wipe down the drill bit with a wet rag. Dispose of rag in a waste bag.**
10. **Remove the wall attachment and vacuum any debris that may have been dislodged. Remove the polyethylene sheet underneath. Vacuum any debris on the drop sheet. If a seal was placed on the opposing side of the wall, start the vacuum, remove the seal and vacuum any debris.**
11. **Tape the vacuum hose or dust boot end with duct tape and gather all tools and equipment.**

Verification:

1. **The contractor may provide verification air sampling to ensure the procedures are sufficient. This should be conducted at the start of the procedure and periodically throughout.**
2. **Other procedures may be deemed acceptable such as glovebag procedures.**

Tools/Equipment Required

- **HEPA Vac with HEPA Vacuum attachment or Hilti Drill with Dust Boot/HEPA Vac Attachment. No shop vacuums.**
- **New HEPA Vac Filter required every 30 days**
- **Drill Bits and anchors**
- **Polyethylene sheets, rags, waste bags and water**
- **Half Mask Respirator with P100 filters and a current FIT test record**

Personal Protective Equipment

- **Half Face Respirator with "Purple" P100 rated cartridges**
- **Safety Glasses**
- **Full Face Shield**
- **Gloves**

Electrical Lockout

Purpose

Control of hazardous energy is the purpose of the Lockout Program. This program establishes the requirements for isolation of electrical energy prior to equipment repair, adjustment it removal. Reference: Provincial Health and Safety Regulation OH&S Regulation Part 10-De-Energized and Lockout.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction prior to commencing with activities involving electrical lockout.

Worker

It will be the responsibility of the worker(s) to comply with the safe work practices set forth within this program. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Paragon Ventilation Ltd will use training and safe procedures to ensure that no worker is injured because of the inadvertent start-up of equipment or machinery or the unexpected release of energy.

Equipment Required

1. PPE (hard hat, CSA/ANSI footwear, eye and hearing protection when required, gloves).
2. Lockout devices (scissor clips, locks, etc.).

Practice

Electrical Lockout

The following guideline us generic in nature and is designed ti give basic direction regarding electrical lockout.

1. Identify all sources of power, which might allow for the operation of the equipment to be locked out.
2. Stop all drives and motors on the machine, by means of the STOP button.

3. Lock out the main power to the equipment, as well as any other power switch which may operate the equipment by placing a personal lock and identification tag on each power of disconnect switch while it is in the OFF position.
4. Test equipment to ensure power source has been removed by depressing the “start” or “on” switch. If required, return switch to the “stop” or “off” position.
5. Perform required operations.
6. Replace and guards removed for the operation.
7. Remove plug device and lock.
8. Inspect power cord and socket before plugging equipment into power source. Any defects must be repaired prior to placing equipment back into service.

Management Removal of Lock

Only the employee that locks out machinery, equipment or processes may remove his/her lock. However, should the employee leave the facility before removing his/her lock, the manager, in conjunction with a worker representative, may remove the lock.

The manager must be assured that all tools have been removed, all guards have been replaced and all employees are free from any hazard before the lock is removed and the machinery, equipment or process are returned to service.

Every reasonable effort must be made to find, or contact the owner of the lock prior to its removal

Note: If the power source for the equipment is a standard 100 volt or 220 volt breaker, the applicable breaker shall be turned off and an appropriate breaker lockout device installed. IT IS NOT APPROPRIATE TO CLOSE AND LOCK A BREAKER PANEL AS A LOCKOUT PROCESS.

1. Test the equipment, by pressing the START button, to ensure that it will not start.
2. Press the STOP button again before starting work.
3. Employees working on locked out equipment shall each place their own lock on the power source. Employee locks, other than the individual employees set, must never be keyed alike.

Electrical Plug-In Type Equipment

This procedure covers electrical plug-in type equipment, such as powered hand tools, office equipment, powered bench tools, small pumps, etc. When working on, repairing or adjusting plug-in type equipment, the following procedures must be utilized to prevent accidental or sudden start-up.

1. Unplug tool or device from the wall socket or in-line socket.
2. Place plug device and lock on end of power cord.

Note: The installation of a plug device and a lock is not required if the power cord in under the exclusive and immediate control of the worker at all times while working on the tool or device.

Electrical Safety

Purpose

This practice provides guidelines for protecting and educating personnel on electrical safe work procedures.

Definitions

Competent – Employee/contractor is qualified, suitably trained and either has enough experience to work safely without supervision or with only minimal supervision. Work that may pose a danger to the employee/contractor is to be completed by another employee/contractor who is more competent in that particular task. Training is to be continued until the employee/contractor meets the above definition of "competent." Employees/contractors are not allowed to operate equipment unless they have been identified as being competent.

Electrical Live Work – Work carried out on equipment and systems that are either energized, or in a situation where there is nothing to prevent them from being energized. Voltage may be present.

Electrical Work – The installation, alteration, repair, testing and/or maintenance of electrical equipment or system.

Flash Protection Boundary –The boundary around a piece of equipment beyond which electrical arc flash burns will be curable (80°C skin temperature). This boundary is determined by the system voltage, available fault level and the fault interrupting time. Depending on the system, the flash protection boundary may be inside or outside some or all of the approach boundaries.

Grounding (safety) –Making a direct, low-impedance, physical connection between the normally energized, but presently isolated parts of devices or systems and the ground. Before grounding, it must be verified that the device/system is de-energized.

Isolation (electrical) – Physically disconnecting a device or system from its energy source in such a way that it prevents accidental re-energization from occurring.

Lockout (electrical) – Placing locks on power isolating devices in the de-energized position to prevent these or other devices or systems from being operated and energized.

Low Risk Live Work – Electrical live work where there is minimal risk to the authorized person. Examples of low risk live work include checking energized control circuits in a motor starter, or performing infrared scanning on certain equipment. Generally, if an acceptable meter is used by a competent person on circuits below 750 V, the work is considered low risk; however, the use of tools is not low risk.

Minimum Safe Clearance – The minimum boundary for qualified electrical personnel around an exposed energized conductor is the innermost distance for shock hazard and the minimum air separation to avoid flashover between bare energized parts and adjacent grounded surfaces. It allows for reduced accidental movement. Crossing the minimum safe clearance is considered the same as making contact with the exposed energized conductors. This boundary shall not normally be crossed. To cross the minimum safe

clearance, a qualified electrical person shall have a work plan and wear the appropriate personal protective equipment.

Person in Charge – A qualified, certified electrical person who has been approved by the Chief Electrical Person to supervise specific work on electrical equipment and systems. Any work on a power system that operates at voltages above 750 V requires a Person in Charge and a work plan approved by the Chief Electrical Person. It is recommended that a Person in Charge be appointed for work on systems operating below 750 V, particularly if high arc flash energy is present.

Qualified Electrical Person – A journeyman electrician who has proven technical knowledge, competency and experience to avoid danger in order to carry out operations in power systems and work on electrical equipment.

Factors that shall determine qualification are:

- The degree of general training in electrical work (i.e., journeyman electrician, power system electrician, technologist or engineer) and legal requirements.
- Experience both in electrical work and on the present work site, first aid training and familiarity with and training on the particular equipment and system.

Qualified Electrical Testing Person – A person who has sufficient technical knowledge, competency and experience to avoid danger when using the particular equipment for carrying out operations in power systems and work on electrical equipment, specifically for purposes of maintenance and testing.

Racking Out/In – Physical movement of a circuit breaker or removable contactor from or to the connected position inside a switchgear cell.

Safe Limit of Approach – The boundary around an exposed energized conductor representing the outermost shock hazard distance from the conductor and is the line that may be crossed only by qualified electrical persons. It encompasses the working clearances around the conductors and provides space for qualified electrical persons to position their bodies.

Tagout (electrical – Attaching an identifying marker to a locking device that identifies the employee who attached the lock, the date and time of placing the lock, the purpose of the lock and a warning to other persons not to remove the lock.

Withdrawing/Inserting – Physical removal of a circuit breaker or removable contactor from a switchgear cell or replacement into a cell.

Hazards

Hazards Associated with Electrical Work

Paragon Ventilation Ltd ensures that a hazard assessment is conducted prior to commencing any electrical work or high voltage operations. Hazards associated with electrical work include:

- Electrocution
- Fire and toxic smoke

- Explosion – arc flash/extreme heat
- Injury from tools
- Injury from equipment
- Falling
- Slips/trips
- Confined space
- Noise from explosion or arc flash

Hazard Boundaries

Three significant hazards associated with working on or around energized electrical equipment are:

1. Electrical shock,
2. Electrical Arc Flash, and
3. Electrical Arc Blast (Ref: NFPA 70E).

Additional hazards arising out of arc flash may be pressure, noise, vaporized metals, shrapnel and various types of radiation.

NFPA 70# - 2004 Section 110.8(B) Working on or Near Exposed Electrical Conductors or Circuits Parts that are or Might Become Energized, requires that an electrical Hazard Assessment and Control be conducted prior to individuals working on or near exposed electrical conductors or circuit parts operating at 50 Vs or more, which have not been de-energized.

Personnel must be informed of the potential electrical hazards before being permitted to do any work in close proximity to energized electrical conductors or equipment.

Electric Shock

Even a very low value of current flowing through the human body can cause death or serious physical harm. There have been many studies performed in this area with different values of current causing different effects, as illustrated in the chart below:

Current	Effect
1 mA	Barely perceptible
1-3 mA	Perception threshold (most cases)
3-9 mA	Painful sensations
9-25 mA	Muscular contractions
25-60 mA	Respiratory paralysis
60 mA or more	Ventricular fibrillation
4 A or more	Heart paralysis
5 A or more	Tissue burning

Electrical Arc Flash

There are two different issues with this hazard – the arc temperature and the incident energy. The main concern with the arc temperature is the flash and ignition of clothing. At approximately 203°F, for one-tenth of a second (6 cycles), the skin is rendered incurable or third degree burns.

The main concern with the incident energy is the onset of a second degree burn which occurs at approximately 1.2 cal/cm2. It does not take a very high temperature or very much energy to cause severe tissue damage, extreme pain and discomfort and possible disability or death to the individual. PPE requirements within the arc flash boundary shall be determined by completing an arc flash hazard analysis. PPE must cover the entire body when working within the arc flash boundary. This may include, but is not limited to, arc flash suit with face shield, safety glasses, non-conductive head protection, and leather gloves and footwear. Rubber insulating gloves shall be worn for protection from electric shock due to inadvertent contact with an energized electrical conductor or circuit parts. For more information, please refer to *CSA Standard Z462*.

Electric Arc Blast

The pressures developed by an electrical arc can be extremely high. For example, copper expands at a factor of 67,000 times when vaporized, which acts similar to dynamite. Doors or covers must be securely latched before operating a switch or circuit breaker. Technicians must place their body in the safest position possible before operating the equipment. Electrical arc flash PPE will protect against the flash/flame and incident energy, but may not provide complete protection against the pressures of an arc blast.

General Guidelines

- The design, construction, installation and inspection of electrical equipment shall meet the standards of the Canadian Electrical Code.
- The operation and maintenance of electrical equipment will meet the standards of the Canadian Electrical Code.
- Plans and specifications for new electrical facilities and major alterations will require client review and approval.
- No personnel will install, modify, adjust, test or repair any electrical equipment unless the individual is a qualified electrician or an apprentice working under the direct supervision of a qualified electrician.
- Electrical equipment that is capable of becoming live will be isolated, locked out, tagged and tested before work is performed on the equipment. Low voltage and high voltage electrical must be completely disconnected and locked out before starting any work on it.
- When equipment cannot be locked out, a written Standard Operating Procedure (including tag out, testing and competent person standby) will be developed to provide a level of safety equivalent to that provided by a lockout procedure.
- The locations of power lines and cables will be determined before digging or drilling work starts.
- Energized parts of the electrical circuits and equipment will be guarded by approved cabinets or enclosures.

- Before completing installation and after energizing low voltage and high voltage electrical equipment, signs visible to all persons must be placed close to the equipment stating "Danger, Energized Equipment."
- Supervisors will appoint a safety watch when work must be done near live electrical equipment due to the nature of the work, the condition of the workplace or the location of the job.
- Paragon Ventilation Ltd will take measures to protect employees and contractors from injury when work must be performed near live electrical equipment.
- Electrical disconnect switches and circuit breakers will be labelled. Access to electrical switches, control devices and meters will be unobstructed for at least 1 m.
- Electrical equipment and appliances will be CSA approved.
- Ground fault interrupters (GFCI) will be installed on temporary circuits at construction sites or temporary facilities.
- Electrical tools and equipment used in damp or outdoor environments will be protected by GFCIs installed at the receptacle or panel.
- Persons who work regularly around energized electrical equipment will be qualified in Cardio-Pulmonary Resuscitation (CPR).
- All equipment will be used for the purpose it was designed for and will fit the specifications and rating suitable for that task.
- Paragon Ventilation Ltd will lockout, tag out, and remove from service all equipment (including power cords and plugs) which has defective or damaged electrical parts that may cause it to be unsafe for use.

Limits of Approach

Prior to any work being performed, Paragon Ventilation Ltd will accurately determine the voltage of any energized electrical equipment or conductor and the required associated distance from it.

The following minimum applicable distance must be maintained between exposed, energized high voltage electrical equipment and conductors and any person, work, tool, machine, equipment or material.

Voltage	Minimum Distance	
Phase to Phase	**Meters**	**Feet**
Over 750V to 75kV	3	10
Over 75kV to 250kV	4.5	15
Over 250kV to 550 kV	6	20

A qualified electrical worker may work closer than the above limits, provided the worker is authorized by the owner of the power system and uses acceptable procedures.

Training

Training and Competency

All Paragon Ventilation Ltd employees/contractors receive basic electrical training at orientation and then as required after that. Prior to being permitted to do work in proximity to energized electrical conductors or equipment, personnel are informed of the potential electrical hazard of a specific task through the Hazard Assessment and Control process. Employees should be provided training on working safely with electricity, recognition of electrical hazards, prevention of electrical shock and arc flash, and recognition of electrical shock and arc flash hazard labels.

All electricians must have the proper combination of experience, knowledge and education to perform the required work. Personnel must be competent when working with electricity.

If work must be performed near sources of high voltage, all involved employees and electricians must receive awareness training prior to beginning task. Only qualified electricians are permitted to perform high voltage work.

Paragon Ventilation Ltd shall permit only competent, qualified electrical workers to construct, install, alter, repair, or maintain electrical equipment. Only qualified electrical workers may enter electrical rooms and enclosures containing live parts.

Electrical Safety Equipment

Each piece of electrical equipment must have the following markings to identify the equipment and ensure it is suitable for the particular installation:

- The maker's name, trademark, or the recognized symbol of identification
- The catalogue number or type
- Voltage
- Rate of load amperes
- Watts, volts, amperes or horsepower
- Whether AC, DC, or both
- Number of phases
- Frequency in hertz
- Rated load speed in revolutions per minute
- Designation of terminals
- Whether for continuous or intermittent duty
- Evidence of approval
- Other markings necessary to ensure safe and proper operation

At the time of installation, each service box shall be marked in a very visible, legible and permanent manner to indicate clearly the maximum rating of the over-current device that may be used for this installation.

At each distribution point, the adjacent circuit breakers, fuses and switches shall be marked in a very visible and legible manner to indicate clearly which installation or portion of installation that they protect or control and the maximum rating of over-current device that is permitted.

The marking on electrical equipment shall not be added to or changed to indicate a use under the Canadian Electrical Code for which the equipment has been approved.

Passageways and working space around electrical equipment must be kept clear of obstructions. The equipment should be set up so authorized persons can readily access all parts requiring service or attention. The space around the electrical equipment must not be used for storage and flammable materials must not be stored or placed in close proximity to electrical equipment (electrical panels).

Portable Electrical Equipment

Portable electrical equipment having double insulation or equivalent protection does not need to be grounded, provided it is marked to that effect. All other portable electrical equipment (including those not permanently connected to the wiring system) must be effectively grounded using approved cords and polarized plugs inserted into the grounded polarized receptacles.

When used outdoors or in a wet or damp location, portable electrical equipment, including temporary lighting, must be protected by an approved ground fault circuit interrupter of the Class A type installed at the receptacle or on a circuit at the panel, unless another acceptable means of protection is provided. A ground fault circuit interrupter must not be used in place of grounding, except as permitted by the Electrical Safety Act and its Regulations.

Paragon Ventilation Ltd shall ensure than an electrical extension or power supply cord used for supplying energy to any electrical equipment.

- Is approved for the intended use and location of the electrical extension or power supply cord.
- Is fitted with approved cord end attachment devices that are installed in an approved manner.
- Is provided with a grounding conductor.
- Is maintained and protected from physical or mechanical damage.
- Is plugged into an approved GFCI plug adapter or GFCI receptacle (if used in a damp location).

Electrical

Purpose

This safe work practice is intended to apply to persons who are working with electricity or on “energized equipment” below 750 volts. It is not intended to apply to the more complex and advanced phases of electrical technology that deal with generation, distribution and transmission of high voltage electricity. This document provides an overview of basic safety considerations developed to minimize employee exposure to hazardous low voltage.

No employee shall perform work on any electrical equipment, as defined in the Electrical Safety Act and/or Regulations unless they are certified under the provisions of that Act.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer’s specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction regarding electrical safety prior to commencing with any related tasks.

Worker

It will be the responsibility of the worker(s) to take reasonable and practical measures to have site equipment serviced, maintained and operated in a professional and safe manner. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equipment Required

1. PPE (CSA/ANSI approved safety footwear and approved headgear are required on all projects. Hi-visibility vests shall be used when working around mobile equipment or in other traffic situations).
2. All workers should use PPE suitable and necessary for the hazards of the work being performed.
3. Cotton or wool fabrics are recommended for clothing worn by personnel working with electricity.

Practice

1. All electrical equipment, acquired or used within our organization shall be approved in accordance with the provisions of Part 1 of the Canadian Electrical Code, (Standard C22.1-1982), and certified for use by the Canadian Standards Association (CSA), or other acceptable testing agency. UL (Underwriters Laboratories).
2. Flammable material shall not be stored or placed in proximity to electrical equipment.
3. All electrical distribution switched and controls shall be clearly marked to indicate the machinery or equipment which they serve.
4. Metal ladders, or wire reinforced wooden ladders, shall not be used in proximity to energized electrical equipment.
5. The requirements for lock-out of energized electrical equipment shall be followed whenever such equipment is to be worked on.
6. Only electricians or authorized employees shall perform electrical repair or maintenance on electrical tools, machinery or equipment, or replace electrical fuses.
7. Electrical equipment shall be de-energized before work is done on such equipment. Switched shall be locked out and other measures taken which shall prevent the equipment from being energized without the knowledge of the individuals working on it. Such locks and preventative devices shall be removed only by the persons who installed them or by authorized personnel. The Lockout Tag-Out Procedure is available from your supervisor.
8. All electrical tools and equipment must be grounded or double installed.
9. Extension cords should only be used for temporary service and should be maintained in good condition at all times. They should be routinely inspected for frayed, torn or split cords and damaged plugs or connectors. All damaged cords must be repaired or replaced immediately.
10. Never replace a blown fuse with a larger capacity fuse.
11. Cover plates should in place non all switches and outlets.
12. Jacketed electrical cords should be used with portable electric tools and with extension lamps in boilers, tanks or other grounded enclosures.
13. Non-conductive material should be used to form handles on portable hand lamps and there should be no metallic connectors between the lamp guard and the socket shell.
14. Always make certain that plug connector configurations match as they are intentionally designed that way to prevent hazardous, or even fatal, electrical connections.
15. Avoid suing electrical tools and equipment in or around damp or wet areas.
16. Fire extinguishers or type “BC” (carbon dioxide) or “ABC” (multipurpose dry chemical) should be readily available in case of an electrical fire. Type “A” (pressurized water) shall not be used on electrical fires. Halon type extinguishers are acceptable, but are no longer manufactured.
17. Synthetic fibre type clothing can be readily ignited and melted by an electrical flash. Flame retardant garments made of either cotton or wool fabrics are recommended for employees working with electricity.

First Aid

In the event that someone is electrocuted, immediately de-energize the equipment before touching the individual. Immediately call for first aid or emergency assistance.

Lockout

The electrical and mechanical superintendents will review the scope of work and determine where and when “Lockout” will be required and documented. A Site Specific Lockout Program will be developed prior to supervisors and workers working on live electrical and mechanical systems.

- Workers must review the lockout procedures prior to working on electrical systems or mechanical systems (i.e. pressurized systems) where lockout is required and abide strictly with these practices and procedures developed for this project. Management and foremen will provide this training as needed.
- A formal system of lockout must be implemented and include personal locks and tags for each worker affected by the lockout protocols.
- Managers, foremen or workers not abiding by the lockout program will be disciplined accordingly which may lead to immediate termination of employment dependent upon the circumstances and discretion of the Manager or project manager.

Elevating Work Platforms

Purpose

To pride instruction and direction to all workers who may have to be exposed to the hazards of operating elevated work platforms.

Read and understand the instruction manual before operating the work platform. If you do not know how to operate this piece of equipment obtain training from your supervisor. All operators of elevated work platforms must be trained and certified to operate this type of lift provided prior to beginning work. All field modifications should only be approved by the manufacturer.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction regarding electrical safety prior to commencing with any related tasks.

Worker

It will be the responsibility of the worker(s) to take reasonable and practical measures to have site equipment serviced, maintained and operated in a professional and safe manner. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equipment Required

1. PPE (CSA/ANSI approved safety footwear and approved headgear are required on all projects. Hi-visibility vest, personal fall protection).

Practice

Platform Specifications

Elevating work platforms and all similar aerial platforms shall be fitted with:

- Guardrails, intermediate rails and toe boards on all open sides, or be enclosed to a height of 40- 42 inches (107 cm); and
- Guards to protect the occupants from contact with the elevating machinery; and
- Signs indicating the safe work load.

- Outriggers when provided by the manufacturer shall be fully extended and on a firm surface during the use of an elevated work platform.

Operator Training and Responsibility

All operators of elevated work platforms shall be adequately trained in the safe operation of these devices and be familiar with their limitations.

Fall Protection

Occupants of elevated work platforms shall wear adequate fall protection secured to suitable and substantial anchorage points as designated by the equipment manufacturer.

Transporting Workers

Workers shall not be transported on aerial platforms. Workers may remain on platforms while minor adjusting movements are made.

Guarding

Scissor type and other lifting mechanisms that create a shearing hazard shall be guarded if there is a possibility of workers inadvertently coming into contact with any hazardous moving parts of the platform lifting mechanism

Emergency Lowering Valve

Every elevating work platform shall be fitted with a clearly marked over-riding lowering control that, in an emergency, will enable a worker at ground level to lower the platform.

Modification, Additions and Repairs

Modification, additions or repairs to the elevating work platforms shall only be affected in accordance with the instruction of the manufacturer or of a registered professional engineer.

Inspections

All elevating work platforms must be thoroughly inspected prior to use as per the manufacturers specifications and the authority having jurisdiction. As a minimum, daily inspections of the equipment maintained with the equipment or on the job site for review if so requested.

Equipment Red Tag/Lockout

Purpose

To protect workers from injuries associated in working with electrical systems, where there is, or may be a danger to a worker from the inadvertent operation if electrical equipment.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction regarding electrical safety prior to commencing with any related tasks.

Worker

It will be the responsibility of the worker(s) to take reasonable and practical measures to have site equipment serviced, maintained and operated in a professional and safe manner. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equipment Required

1. PPE (CSA/ANSI approved safety footwear and approved headgear are required on all projects. Hi-visibility vest, personal fall protection).

Practice

The "Red Tag" Procedure is a means of taking mobile equipment out-of-service until necessary inspection and/or repairs can be made. The purpose of the procedure is to insure that equipment, which is unsafe to use, is not put into service until repaired.

The procedure is to be used only when an operator, driver or authorized person believes the equipment is unsafe to operate and that such operation would result in an accident or personal injury. It is not meant to replace the normal practice or reporting defects. It is meant to supplement these practices and to insure that there is a visible warning placed on the equipment to prevent a second person from in knowingly operating unsafe equipment.

Equipment Red Tag/Lockout

1. The “Red Tag” must be used whenever the operator or driver believes the equipment is unsafe to operate and that further operation would result in an accident or personal injury.
2. The supervisor or appropriate person in charge of the equipment must be notified of the decision to “Red Tag” a piece of equipment.
3. Any person who removes a “Red Tag” from equipment and is not authorized to do so will be considered in deliberate violation of the Safety Rules and subject to severe disciplinary action, up to and including discharge.
4. After inspection and/or necessary repairs have been made, the “Red Tag” will be removed from the equipment by the supervisor and the equipment released for use.
5. Equipment that has been marked with the “Red Tag” will be moved only by a person designated by a supervisor.

Ergonomics (Musculoskeletal Injuries [MSI])

Purpose

To provide steps to reduce stress and to eliminate the many potential injuries and disorders associated with the overuse of muscles, posture and repetition of the tasks that employees and contractors may be exposed to.

Definition

Musculoskeletal Injury or MSI – An injury or disorder of the muscles, tendons, ligaments, joints, nerves, blood vessels or related soft tissue including a sprain, strain and inflammation, that may be caused or aggravated by work.

Hazards

- Work Posture
- Repetitive Motion
- Contact with hard objects
- Lifting
- Slip, trips and falls

Risk Identification and Assessment

Paragon Ventilation Ltd shall identify factors in the workplace that may expose personnel to a risk of musculoskeletal injury (MSI).

When factors that may expose personnel to a risk of MSI have been identified, Paragon Ventilation Ltd will ensure that the risk to the personnel is assessed.

Risk Factors

The following factors shall be considered, where applicable, in the identification and assessment of the risk of MSI:

- The physical demands of work activities, including:
  - Force required
  - Repetition
  - Duration
  - Work postures
  - Local contact stresses
- Aspects of the layout and condition of the workplace or workstation, including:
  - Working reaches
  - Working heights

  - Seating
  - Floor surfaces
- The characteristics of objects handled, including:
  - Size and shape
  - Load condition and weight distribution
  - Container, tool and equipment handles
- The environmental conditions, including cold temperature.
- The following characteristics of the organization of work:
  - Work-recovery cycles
  - Task variability
  - Work rate

Risk Control

Paragon Ventilation Ltd shall eliminate or, if that is not practicable, minimize the risk of MSI to personnel. Personal Protective Equipment (PPE) may only be used as a substitute for engineering or administrative controls if it is used in circumstances in which those controls are not practicable.

Paragon Ventilation Ltd shall without delay, implement interim control measures when the introduction of permanent control measures will be delayed.

Training

Education

Paragon Ventilation Ltd shall ensure that an employee or contractor who may be exposed to a risk of MSI is educated in risk identification related to the work, including the recognition of early signs and symptoms of MSIs and their potential health effects.

An employee or contractor to be assigned to work, which requires specific measures to control the risk of MSI shall be trained in the use of those measures including, where applicable, work procedures, mechanical aids and personal protective equipment.

Evaluation

Paragon Ventilation Ltd shall monitor the effectiveness of the measures taken to comply with the ergonomics (MSI) requirements and ensure they are reviewed at least annually. When the monitoring required identifies deficiencies, they shall be corrected without undue delay.

Consultation

Paragon Ventilation Ltd shall consult with the joint committee or the employee health and safety representative, as applicable, with respect to the following when they are required by the ergonomics (MSI) requirements:

- Risk identification, assessment and control.
- The content and provision of personnel education and training.
- The evaluation of the compliance measures taken.

When performing a risk assessment, Paragon Ventilation Ltd will consult with:

- Personnel with signs or symptoms of MSI.
- A representative sample of the personnel who are required to carry out the work being assessed.

Personal Protective Equipment

- Back belts (if required)
- Padded gloves (if required)
- Elbow pads (if required)
- Knee pads (if required)
- Anti slip footwear (if required)

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Explosive/Powder Actuated Fastening Tools

Purpose

This practice provides recommendations to protect employees and contractors from injuries associated with using explosive/powder actuated fastening tools.

Manufacturers of these devices provide detailed instructions regarding their use and maintenance. The instructions, along with the occupational legislation specifically set out for their use, are to be followed closely at all times.

Definition

Competent – Employee/contractor is qualified, suitably trained, and either has enough experience to work safely without supervision or with only minimal supervision. Work that may pose a danger to the employee/ contractor is to be completed by another employee/contractor who is more competent in that particular task. Training is to be continued until the employee/ contractor meets the above definition of "competent." Employees/contractors are not allowed to operate equipment unless they have been identified as being competent.

General Recommendations

The following general recommendations/requirements apply to all explosive/powder actuated tools:

- Only competent, trained/qualified operators are allowed to use this type of tool. The user shall possess proof of training issued by the manufacturer, authorized dealer/distributor or other competent source.
- The tool must be CSA Standard approved.
- Only load the tool just prior to use and make sure it is the correct load for the job.
- Do not load tools and leave them unattended or move them to a different work site after they are loaded.
- Do not point the tool at anyone, whether it is loaded or unloaded. Keep hands away from the muzzle end at all times.
- Always store explosive/powder actuated tools in their proper lockable boxes.
- Never use explosive/powder actuated tools in an explosive/ignitable atmosphere.
- When using the tool, hold it firmly and at right angles to the surface being driven into.
- Always wear eye protection. Where there is a danger of spalling, full-face protection must be worn. Hearing protection is also to be worn in confined/restricted spaces.
- To prevent free-flying studs, ensure the material being driven into will not allow the stud to completely pass through it (i.e., glass block, hollow tile, etc.).
- Always follow the manufacturer's recommendations whenever there is a doubt about the material being driven into, maintenance procedures or load strength to be used.
- Always be aware of personnel in the area. Where operating the tool may create a hazard to others exists, signs and barricades must be in place that identify the hazard area.
- Do not permit the trigger to be mechanically held in the "ON" position unless specified too in the manufactures specifications.

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Fire Protection

Purpose

This practice sets out the process for the company in taking the necessary steps regarding fire protection.

Fire protection will be instituted at all workplace locations, and Paragon Ventilation Ltd. will provide the necessary equipment for protecting personnel and property from fire damage. These procedures are considered temporary control measures only; in all situations, the nearest fire department and/or Alberta Sustainable Resource Development (Forestry Division) must be notified immediately.

Equipment – General

- Selection of the appropriate fire extinguishers will be reviewed before starting work.
- The location of firefighting equipment must be clearly visible, and open access to the equipment maintained at all times.
- A qualified competent inspector must annually inspect all firefighting equipment. Monthly inspections will be conducted as part of the routine inspection process.
- Personnel will be trained in the correct use of equipment as necessary based on their exposure.

Classes of Fire	Combustible Materials	Flammable Liquids	Energized Electrical	Combustible Metals	Combustible Cooking Media
	Wood, paper, cloth, rubber, plastics	Gasoline, oil, grease, tar, oil-based paint, lacquer, flammable gas	Equipment Wires, fuse boxes, circuit breakers, motors, switches	Sodium, potassium, magnesium, zirconium, and titanium	Vegetable or animal oils and fats
Fire Extinguisher Label					

FIRE SUPPRESSION						
Extinguishing Agents	**Suppression methods**	**CLASS A FIRES** A	**CLASS B FIRES** B	**CLASS C FIRES** C	**CLASS D FIRES** D	**CLASS K FIRES** K
Water	Cools the fire	Yes	No	No	No	No
Foam	Excludes oxygen and cools fire	Yes	Yes	No	No	No
CO2 Carbon Dioxide	Displaces Oxygen	No	Yes	Yes	No	No
Regular dry chemical Sodium bicarbonate base	Smothers Flames	No	Yes	Yes	No	No
Purple K dry chemical Potassium bicarbonate base	Smothers Flames	No	Yes	Yes	No	No
Multi-purpose dry chemical Ammonium phosphate base	Smothers Flames	Yes	Yes	Yes	No	No
Dry Powder	Exclude oxygen and/or cools fire	No	No	No	Yes	No
Wet chemical Potassium acetate base	Smothers Flames and cools fire	No	No	No	No	Yes

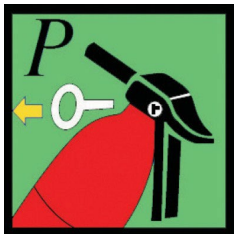
Portable Fire Extinguishers

- A fire extinguisher, rated not less than 2a as indicated on manufacturer's label, must be provided for each 278.7 m2 (3,000 square feet) of protected work area or warehouse. Travel distance from any point of the protected area to the nearest fire extinguisher must not be more than 304.8m (1,000 feet).
- The type of fire extinguisher will be determined based on the specific risk.
- A fire extinguisher, rated not less than 13.61kg (30lbs), will be located within 15.2m (50 feet) of flammable/combustible liquids that total more than 22.7L (5 gallons).

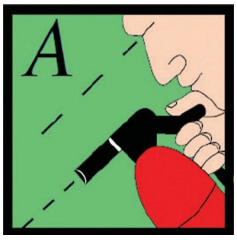
The supervisor or a designated qualified competent person will visually inspect fire extinguishers to ensure they are at full charge and there is no evidence of damage to any of the exterior parts.

- Each extinguisher must have a tag attached to show the date of the last visual inspection, along with the initials of the person who conducted the inspection.

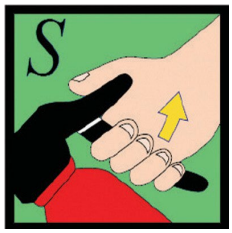
- Employees/contractors should know proper fire extinguisher operation as illustrated below:



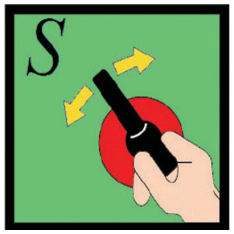
Pull the pin and point the nozzle away from you.



Aim low and direct the extinguisher at the base of the fire.



Squeeze the handle slowly and evenly. Continue to squeeze until the fire is out and/or the fire extinguisher is empty.



Sweep the extinguisher from side-to side. Start at one side of the fire and slowly work to the other side. Do not start in the middle of the fire.

Fire Prevention Measures

- Smoking is prohibited at or in the vicinity of operations that represent a fire hazard, and the area must be posted as **"NO SMOKING AND NO OPEN FLAME."**
- Internal combustion engine powered equipment must be located so the exhaust is well away from combustible material.
- Temporary buildings that are located within another building or structure must either be made of non-combustible materials or have a fire resistance of one hour or greater.
- Open yard storage of combustible materials must be maintained for stability of the pile. In no case will the piles be higher than 6m (20 feet).
- Storage areas must not:
  - Contain accumulated combustible materials.
  - Be kept within 30m of an underground shaft
  - Be stored within the immediate vicinity of an air intake system of an internal combustion engine, fire box or furnace, or ventilation supply
- Flammable substances must be kept in CSA approved containers.
- Internal combustion engines in highly hazardous areas must:
  - Have a flame arresting device.
  - Be located outside of the hazardous area.
  - Have all surfaces exposed to the hazardous area at a temperature lower than the ignition temperature or shielded in such a way as to prevent flammable substance in coming in contact with the surface heat.
- Compressed gases and liquids:
  - Are kept in approved containers which are used, handled, stored and transported according to manufacturers' specifications.
  - Are stored properly. For example, compressed flammable gas and compressed oxygen are not in the same room, unless in accordance with Alberta Fire Code.

- Are protected from damage during transport, handling, filling and storage.
- If kept in a cylinder with a means of attachment, the cylinder is equipped with a valve protection cap.
- Oxygen distributing systems are kept free of oil and grease.

Fire Protection of Company Structures

- All exits must be clearly marked and never blocked.
- Materials must be arranged to minimize the spread of flames and permit access for firefighting.
- Clearance of at least 0.9m (36 inches) must be maintained between the top level of stored material and any sprinkler deflector.

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Grinders

Purpose

To bring awareness to employees regarding potential and existing hazards associated with using hand held angle grinders.

Definitions

Competency – Competency can be demonstrated by operating the equipment to a level considered satisfactory by another worker who is competent in the operation of that same or similar equipment and who has been designated by the employer to assess this competency. To operate the equipment safely, the worker must understand the equipment's operating instructions. Only workers authorized by the employer may operate grinders.

Hazards

- Flying Debris
- Sparks
- Fire
- Cuts

General Guidelines

- Complete a pre-use inspection of the equipment before attempting to operate (do not operate without supervision if you have not been deemed competent to do so by you direct supervisor).
- Use both hands when holding a grinder.
- Check the wheel speed marked on the wheel is greater than or equal to the maximum speed of the grinder.
- Keep power cord away from the grinding wheel and material being ground.
- Do not operate a grinder on wet floors.
- Ensure that the operators manual has been reviewed.
- Confirm that tool is de-energized prior to doing inspection.
- If grinder has damage or guards are missing, tag the equipment and remove from service.
- Ensure that spark containment is used when operating grinder.
- Use fire watch as required both during and post to ensure there is no potential for fire.
- Ensure proper fire extinguisher is available and has been inspected.
- Always direct sparks away from other workers and sources of ignition.
- Wear CSA safety glasses with full-face shield when operating grinder.
- Complete a FLHA before starting task.
- Grinder/abrasive wheel work/tool rests shall not be adjusted more than 1/8" from wheel.

- Ensure that proper guard is used with the proper disk, i.e. Zip disks use a different guard than grinding disks.
- Check the grinder wheel for cracks, chips, or uneven wear before using. If the wheel is damaged, tag out the grinder or zip disk and replace the wheel.
- Run the grinder at operating speed to check newly mounted wheels for vibration before using the equipment for grinding.
- Move the work piece back and forth across the rotating grinding wheel to minimize the potential for uneven wear.
- Practice good housekeeping.
- DO NOT make tool rest adjustments while wheel is in motion.
- DO NOT exceed the maximum wheel speed (as marked on the wheel). Check the identified wheel speed and compare it to the grinder speed before starting the equipment.
- DO NOT operate grinders near flammable materials.
- DO NOT use grinder for operations that it was not designed (i.e., cutting any material or grinding aluminum).

Training

- Only trained and competent workers are to operate grinders.

Personal Protective Equipment

- Steel toed boots
- Foam back safety glasses
- Face shield
- Leather Gloves

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Hand Tools

Purpose: Hand tools that are in poor condition or misused are a major cause of accidents in the workplace. Proper maintenance and necessary replacement of hand tools are critical to reducing accidents and injuries. All workers must ensure that tools are safe to use, in good repair, adequate for the work, and free of defects.

PRACTICES:

- Workers must inspect hand tools before use to ensure that they are in proper working order. Damaged or defective tools must be reported to the supervisor and must be repaired or removed from service.
- Supervisors must periodically inspect shop tools to ensure that tools are in proper working condition and meet appropriate guidelines.
- Proper and appropriate personal protective equipment must be worn when using all tools.
- All tools must be cleaned and properly stored after use. Each tool must have its own storage area to prevent damage. This is particularly important with power tools.
- Tools must not be used beyond their manufacturer's designed capacity since such use may create a personal hazard. Tools must be used solely for their intended purpose. The designed capacity of tools must not be exceeded by unauthorized attachments.
- Face shields or goggles must be worn when operating a grinder.
- Power saws, grinders, and other power tools must have proper guards in place at all times and must be properly grounded. Those with automatically adjusting guards must be inspected for proper movement.
- All fuel-powered tools must be shut down while being refueled. Smoking is prohibited during refueling operations. Other nearby sources of ignition, such as cutting and welding, also must be halted during refueling operations.
- Chisels, screwdrivers, and pointed tools should never be carried in a pocket. They should be carried in a toolbox, cart, carrying belt, tool pouch, or in the hand with points and cutting edges away from the body.
- Inspect and check the following common hand tools:
    - Screwdrivers: Ensure that handles are smooth and clean and that bits are sharp and square. A sharp square-edged bit will not slip as easily as a dull rounded one and requires less pressure. When working around electrical-current-bearing equipment, use an insulated screwdriver as a secondary precaution.

- Hammers: Ensure that handles are unbroken and clean and that the face of the head is smooth and clean. Hammers are made in various types and sizes, with varying degrees of hardness and different configurations for specific purposes. Use the correct hammer for the correct purpose.
    - Ball-Peen Hammers are designed for striking chisels and punches and for riveting, shaping, and straightening unhardened metal.
    - Sledgehammers are designed for general sledging operations in striking wood, metal, concrete, or stone. Always wear safety glasses when using a hammer. A hammer blow should always be struck squarely. Avoid glancing blows.
- Punches are designed to mark metal and other materials that are softer than the point end, to drive and remove pins, and to align holes. Never use a punch with a mushroomed struck face or with a dull, chipped, or deformed point. Any bent, cracked, or chipped punch must be removed from service.
- Cold chisels have a cutting edge for cutting, shaping, and removing metal softer than the cutting edge. Factors determining the selection of a cold chisel are the material to be cut, the size and shape of the tool, and the depth of the cut to be made.
- Ensure that file tangs are protected by handles and that teeth are sharp and clean. The correct way to hold a file is to grasp the handle firmly in one hand and use the thumb and forefinger of the other to guide the point. Push the file forward while bearing down on it. Release the pressure and bring the file back to its original position. Never use a file without a smooth, crack-free handle. Select the proper file for the work.
- Knives: Ensure that the handle is guarded and that the blade is sharp. The cutting stroke should be away from the body. Avoid jerky motions. Keep knives and other sharp hand tools separated from other tools. With the knife's sharp edge turned away from the hand, wipe the blade with a towel or cloth. Do not substitute knives2 for can openers, screwdrivers, or ice picks.
- Shovels: Keep shovel edges trimmed, and check handles for splinters. When not in use, hang up shovels, stand them against walls, or keep them in racks or boxes.
- Wrenches (Spanners): Safe use of all wrenches requires that the user always be alert and prepared for the possibility that the wrench may slip, the fastener may suddenly turn free, or the wrench or fastener may break. The user must always inspect the wrench for flaws.
    - Open-end wrenches have strong jaws and are satisfactory for medium duty turning.
    - Box and Socket Wrenches are necessary for a heavy pull. Never overload the capacity of a wrench by using a pipe extension on the handle or by striking the handle with a hammer. When possible, use penetrating oil to loosen tight nuts.
    - Socket wrenches should be kept clean of dirt and grime inside the socket to ensure that the tool fits securely on the bolt or nut.
    - Adjustable wrenches are generally recommended for light-duty work. Place the adjustable wrench on the nut with the open jaws facing the user; wrenches should be pulled, not pushed.
    - Both straight and chain pipe wrenches must have sharp jaws and be kept clean to prevent their slipping. The handle of every wrench is designed to be long enough for the maximum allowable safe pressure. Do not use handle extensions to gain extra turning power unless the wrench is so designed. Never use a pipe wrench on nuts or bolts.

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Housekeeping

Purpose

The purpose of this practice is to promote compliance with both government and Paragon Ventilation Ltd guidelines regarding the maintenance of a clean, safe and productive work environment.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction in the safe use of related equipment and PPE prior to commencing the activity.

Worker

It will be the responsibility of the worker(s) to adhere to the safety requirements regarding this specific task. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equipment Required

1. Brooms and shovels.
2. Spill kits and waste containers.
3. CSA/ANSI approved safety footwear and approved safety headgear are required on all projects. Hi-visibility vests shall be used when working around mobile equipment or in other traffic situations.

Practice

In order to minimize physical environmental hazards to employees on all Paragon Ventilation Ltd projects, the following sound practices shall be adhered with:

1. The best way to minimize housekeeping hazards is to control the hazard at the source. That is to say each worker must be responsible to keep their work area clean and tidy.
2. Scrap materials must be collected and disposed of in a timely manner. Daily clean up will be conducted by each worker and every worker or more often if conditions are warranted.

Housekeeping

3. Construction debris must not be allowed to accumulate within access/egress routed where it will pose a slippage/tripping hazard.
4. Construction debris such as scrap lumber or oily rags poses a serious fire hazard if left to accumulate. Such debris of this or similar nature must be cleaned up on a regular basis.
5. All surplus construction materials must be returned to their designate storage area at the end of each shift.
6. Oily rags must be kept within approved metal containers and the containers labelled as such.
7. Work areas must be maintained free of debris and obstructions at all times. Tools, loose object, oil, grease, power cords and other materials left lying around are materials.
8. Materials, tool and equipment must not be stored within stairways, ramps, passageways, corridors or other access/egress routes.
9. To prevent slipping, falling or collapse, all materials must be properly stacked and stored. Pipe, conduit or tubing should be stacked within pipe racks or stacked and blocked to prevent movement. Lumber must be stacked properly to prevent shifting and/or collapse.
10. Power cords must not be left lying in obvious access/egress areas as they pose a serious tripping hazard. Positioned cords away from designated routes or support them overhead where practical.
11. Broken glass or other sharp objects must be disposed of in containers other than standard garbage cans. Sharps must be disposed of within containers supplied to Paragon Ventilation Ltd by the safety supplier. These are referenced as “Sharps Containers”.
12. Salvage lumber must have protruding nails removed immediately and tacked in a safe manner in a designated storage location.
13. Spills must be cleaned up immediately with the contaminated materials and clean up materials disposed of in an environmentally friendly manner. Chemical waste must not be dumped into sewage systems or the like.

Ladders – Constructed

Purpose

This practice provides guidelines for selecting, setting up, maintaining and using ladders in a safe manner.

Ladders are the most common type of access equipment and personnel have significant exposure to ladder hazards on a regular basis. Training alone will not yield a sufficient reduction in ladder-related accidents. Any significant reduction in the number of such accidents requires regular supervisory reinforcement of training as well as improved site control of operations involving ladders.

Definition

Constructed Ladders – Ladders constructed at a work site.

Ladder Safety

All employees and contractors shall make sure the following requirements are met when using ladders:

- Personnel must not use a ladder if there is another safe and recognized way to enter or exit a raised/elevated work area.
- Use each ladder only for the purpose it was designed, constructed and maintained to ensure safer function.
- Check the condition of the ladder before use. Anything that might endanger personnel must be repaired/remedied before the ladder is used. Ladders to be repaired must be tagged Do Not Use or similar and taken out of service. Never use broken or damaged ladders.
- If work cannot be done safely from a ladder, a work platform must be provided.
- Personnel are not permitted to carry heavy or bulky objects up or down a ladder, or any other objects that could make the ascent/descent unsafe.
- Preserve wooden ladders with a transparent protective coating – do not paint them.
- When servicing energized or potentially energized electrical equipment, use ladders made of non-conductive materials.

If there is a potential for personnel to fall 1.8m (6ft.) or more, an approved fall arrest system must be used. However, fall protection is not necessary under the following conditions:

- While an individual moves up or down the ladder.
- Where it is not practical to use the fall arrest system (work must be light-duty and of short duration at each site).
- Personnel do not extend any portion of their body except their arms beyond the side rails of the ladder (generally, one hand must be available to hold onto the ladder or other support).

Constructed Ladder Criteria

Constructed ladders must meet the following criteria:

- Made of lumber that does not have loose knots or knotholes
- Do not construct ladders by fastening cleats across a single rail or post. Side rails of a ladder up to 5m (16ft.) in length are built of lumber measuring at least 38mm by 89mm.
- Side rails of a ladder more than 5m (16ft.) in length are built of lumber measuring at least 38mm by 140mm.

Rungs of a ladder are constructed of solid lumber measuring not less than 21mm by 89mm, and are uniformly spaced at 250mm to 300mm.

Ladders - Fixed

Purpose

This practice provides guidelines for selecting, setting up, maintaining and using ladders in a safe manner.

Ladders are the most common type of access equipment and personnel have significant exposure to ladder hazards on a regular basis. Training alone will not yield a sufficient reduction in ladder-related accidents. Any significant reduction in the number of such accidents requires regular supervisory reinforcement of training as well as improved site control of operations involving ladders.

Definition

Fixed Ladder – A ladder fixed to a structure in a vertical position or at an angle between vertical and 25° degrees to the vertical.

Ladder Safety

All employees and contractors shall make sure the following requirements are met when using ladders:

- Personnel must not use a ladder if there is another safe and recognized way to enter or exit a raised/ elevated work area.
- Use each ladder only for the purpose it was designed, constructed and maintained to ensure safer function.
- Check the condition of the ladder before use. Anything that might endanger personnel must be repaired/remedied before the ladder is used. Ladders to be repaired must be tagged Do Not Use or similar and taken out of service. Never use broken or damaged ladders.
- Preserve wooden ladders with a transparent protective coating – do not paint them.
- When servicing energized or potentially energized electrical equipment, use ladders made of non-conductive materials.

Fixed Ladder Criteria

Cages are required on fixed ladders greater than 6m (20 ft.) to a maximum unbroken length of 9m (30 ft.). The ladder length refers to the vertical distance between landings. Cages are also required on fixed ladders less than 6m (20 ft.) in length where the ladder is located at an elevated platform that does not provide adequate fall protection. Ladder safety devices may be used in lieu of the required cage protection. Cages must meet the requirements of Process Industry Practices (PIP) Standard STF05501 August 2000, Fixed Ladders and Cages.

Additional fixed ladder criteria include:

- A safety gate or equally effective means, at the ladder-way floor opening and platforms.
- Ladder is no more than 15 degrees from the vertical and does not lean back.

Ladders - Fixed

If there is a potential for personnel to fall 1.8m (6 ft.) or more, an approved fall arrest system must be used. However, fall protection is not necessary under the following conditions:

- While an individual moves up or down the ladder. Where it is not practical to use the fall arrest system (work must be light-duty and of short duration at each site).
- Personnel do not extend any portion of their body except their arms beyond the side rails of the ladder (generally, one hand must be available to hold onto the ladder or other support).

Ladders – Portable/Step

Purpose

This practice provides guidelines for selecting, setting up, maintaining and using ladders in a safe manner.

Ladders are the most common type of access equipment and as such, there are many thousands of hours of exposure to ladder use hazards every week. Employee training alone will not yield sufficient improvement. Any significant reduction in ladder accidents will require regular supervisory reinforcement of training as well as improved site control of operations involving ladders.

Definition

Portable Ladders – Include any ladders not fixed in place, including stepladders and extension ladders.

CSA defines a portable ladder as one that can be readily moved or carried, and usually consists of side rails joined at intervals by steps, rungs, cleats or rear braces.

General Guidelines

All employees and contractors shall make sure the following requirements are met when using ladders:

- Do not use a ladder if there is another safe and recognized way to enter or exit an elevated work area.
- Check that every ladder is used as designed, constructed and maintained to function safely.
- Check the condition of the ladder before use. Any condition that might endanger persons shall be repaired/remedied before the ladder is used.
- Do not use broken or damaged ladders. Ladders to be repaired must be tagged “Do not Use” or similar and taken out of service.
- If work cannot be done from a ladder without presenting a high risk hazard to the person, a work platform must be provided.
- Do not carry up or down a ladder, heavy or bulky objects or any other objects which could make the ascent or descent unsafe.
- Do not paint wooden ladders or stepladders. Preserve ladders with transparent protective coating – not paint.
- Use ladders made of non-conducting materials during the servicing of energized or potentially energized electrical equipment.
- Before using any ladder, make sure that it is in good condition and is the right ladder for the job to be done.
- Only CSA approved ladders are to be used.

Portable Ladders

The CSA Standard for portable ladders specifies design and performance requirements and tests for common types of portable ladders. Portable ladders used by Paragon Ventilation Ltd employees and contractors will meet the CSA Standard *CAN3-Z11-M81 (R2005)* or ANSI *Standard A14.1-2007*.

The following procedures are to be followed when using portable ladders:

- A manufactured portable ladder must be marked for the grade of material used to construct the ladder and the use for which the ladder is constructed.
- The ladder should be set at the proper angle of one (1) horizontal to every four (4) vertical. In other words, the base of an inclined ladder is to be no further from the base of the wall or structure than one quarter the length of the ladder. Measure from the point at which the ladder contacts the wall or structure.
- Secure ladder against movement and place on a level and stable base. Always secure the ladder or assign a person to hold the ladder to avoid slippage or falling.
- At a minimum, the side rails of portable ladders must extend at least 1 m (3 feet) above any platform.
- Always face the ladder when using it. Grip the side rails (not the rungs) firmly and use the three-point contact method when climbing or descending. Use a hand-line to raise or lower objects.
- Use a tool belt and pouch for holding small tools while working on a ladder.
- Do not overreach while on the ladder. Climb down and move the ladder over to a new position when reaching is required.
- Keep both metal and wooden ladders away from electrical sources.
- Never splice short ladders together to make a longer ladder.
- Never place ladders in front of doors that open towards the ladder.
- Ensure only one person is on a ladder at any one time.
- Never work from either of the top two rungs of a ladder unless permitted to do so by the manufacturer's specifications.

In addition, if there is a potential for workers to fall a distance of 3m (10 feet) or more, an approved fall arrest system must be used. Fall protection is not necessary under the following conditions:

- While an individual moves up or down the ladder.
- Where it is not practical to use the fall arrest system (work must be light-duty and of short duration at each site).
- Do not extend any-body portion except arms beyond the side rails of the ladder (generally, one hand must be available to hold on to the ladder or other support).

Step Ladders

Step ladders are to be used only on clean and even surfaces.

- Step ladders are to be used only on clean and even surfaces.
- Never work from either of the top two rungs of a ladder unless permitted to do so by the manufacturer's specifications.
- When in the open position ready for use, the incline of the front step section will be one (1) horizontal to six (6) vertical.
- The step ladder is only to be used in the fully opened position with the spreader bars locked.
- Step ladders are not to be used as a support for scaffolds.
- Do not overreach while on the ladder. Climb down and move the ladder over to a new position.

Training

- Training on ladder safety must be received in-house or by an accredited agency such as the Canadian safety council.

Personal Protective Equipment

- An approve fall arrest system must be used if working at heights where there is a potential for workers to fall a distance of 10 feet or greater.

Lockout and Tag Out of Hazardous Energy

Purpose

This practice sets guidelines for preventing personal injury and/or property damage due to unexpected energization (movement of machinery during repair, maintenance or testing). It is important to isolate the energy source before work starts. A locking device performs the lock out and Danger – Do Not Operate tags identify the item.

Paragon Ventilation Ltd will ensure the work activity is performed safely. Work cannot be performed until the machinery, equipment or powered mobile equipment has come to a complete stop and all sources of hazardous energy have been isolated by the energy-isolating device which has been secured.

There are three approaches to use when securing energy-isolating devices:

1. By individual workers
2. By a group
3. By a complex group process

Appropriate procedures should be in place to ensure all communication requirements are fulfilled and safety precautions implemented for all instances requiring lock out and tagging.

Definition

Lockout/Tag Out – A safety procedure that is used to ensure dangerous machines are properly shut off and not started up again, before maintenance or servicing work is completed. It requires hazardous power sources to be "isolated and rendered inoperative" before any repair procedure is started. "Lock and tag" works in conjunction with a lock, usually locking the device or power source and placing it in such a position that no hazardous power sources can be turned on. A tag must be affixed to the locked device indicating that it should not be turned on.

Hazard

Isolation Verification

Before working on machinery, equipment or powered mobile equipment that has been de-energized (locked out) or rendered inoperative, it must be verified that it is in fact inoperative. The employee/contractor is required to try to activate the machinery, equipment or powered mobile equipment, to ensure it is inoperable.

In a group lockout situation, the supervisor or operator may perform a bump test to ensure the machinery or equipment is locked out and de-energized. Employees/contractors must be satisfied the machinery, equipment or powered mobile equipment will not operate. An employee/contractor can refuse to work on the equipment until the test is done and he/she is sure it is safe to proceed with the work.

General Guidelines

Before any repair, maintenance or testing of equipment or systems (where energy sources may cause unexpected energization, start-up, or movement), all authorized personnel will follow the minimum standards below:

- When lockout of energy isolating devices is required, the devices must be secured in the safe position using locks in accordance with procedures that are made available to all persons who are required to work on the machinery or equipment.
- Apply specific company procedures for lockout and tagging requirements. All affected personnel of the lockout/tagging will be properly trained in its application.
- Survey the job to determine appropriate isolation of energy sources before work starts on any equipment or system.
- Notify supervisor of the requirement to isolate the energy source.
- The supervisor must inform all affected employees/contractors of the necessary lockout/tagging, and of the meaning of the lockout device and tags on the operational controls. Conduct a Toolbox Meeting with all affected employees and contractors before work starts.
- Remove the equipment or system from service in accordance with manufacturer's specifications or safe operating procedures.
- Before starting work, dissipate and verify any form of stored energy. Slowly release pressures through a bleed or vent valve and verify by checking a pressure gauge or physically disconnect lines between the isolation device and the equipment. Consider all energy sources and ensure all are blocked, isolated or de-energized.
- Ensure appropriate details are posted at all lockout points. Danger – Do Not Operate tag details should include:
  - Name and signature of employee/contractor(s) installing the lock and tag
  - Current date
  - Estimated completion time
  - Name of the equipment to be serviced
- Install a proper lockout device to isolate all sources of energy in the inoperative position with the tag. Lock the reversing controls in both directions.
- Ensure that no personnel are in danger. Then conduct a test-start to ensure the equipment will not energize.
- Remove tools from the area and then remove the lockout device and tag.
- Ensure personnel and tools are clear before testing or returning equipment or system to normal service. Resume the energy source feed to the equipment, machinery or system. Test-start the equipment as a final check.
- The lock is to be marked or an identification tag put on that identifies to whom the lock is assigned. While the lock is in place, the employee/contractor who placed the lock must be readily available during the time the equipment is locked out.

Working on Equipment and Machinery

If machinery, equipment or powered mobile equipment is to be serviced, repaired, tested or adjusted, employees/contractors must follow the lockout/tag out procedure to ensure that it is inoperative and the person is assured that it is inoperative.

Rendering the equipment or machinery inoperative may involve removing vital parts, putting blocking in place, or pinning. When this occurs, the method used must provide a level of employee/contractor protection equal to or greater than that provided by isolating and securing. When isolation of the energy source has been completed, employees/contractors must be advised not to alter the control.

If machinery or equipment is shut down for maintenance, no work may be done until:

- All parts and attachments have been secured against unintentional movement.
- Where the work will expose persons to energy sources, the hazard has been effectively controlled.
- The energy isolating devices have been locked out as required.

In some instances, it may be necessary to work on equipment while it is turned on (i.e., troubleshooting, minor adjustments, testing, etc.). This approach is justifiable only if it is required by the manufacturer. If there are no manufacturer's specifications, Paragon Ventilation Ltd will develop and implement written procedures for control of identified points of hazardous energy to ensure the work is performed safely. Employee/contractor involvement in establishing controls may be required.

The application of a lock is not required if:

- The energy isolating device is under the exclusive and immediate control of the person at all times while working on the machinery or equipment, or
- A tool, machine or piece of equipment that receives power through a readily disconnected supply, such as an electrical cord or quick release air or hydraulic line, is disconnected from its power supply and its connection point is kept under the immediate control of the person at all times while work is being done.

Isolation Securement

The employee/contractor who is involved in isolating an energy source is required to attach his/her own lock to render the machinery or equipment inoperable. By placing the lock on the machinery, equipment or powered mobile equipment, the employee/contractor has verified that the energy source has been isolated and a bump test has been performed and documented.

When multiple employees and/or contractors are involved or multiple energy isolating devices must be secured, a group process can be used. Paragon Ventilation Ltd will ensure that a written procedure for group isolating is in place before working on energized equipment, machinery or powered mobile equipment. This written procedure shall be clearly posted at the place where the system is in use.

The following steps will be followed:

1. Place a securing device on each energy-isolating device.
2. Put the key to each securing device in a lockable key securing device.
3. Complete, sign and post a list identifying the machinery or equipment that has been locked out or de-energized.

In some instances where there may be more than one employee/contractor working at the same isolation point, each employee/contractor must attach his/her own personal lockable securing device (typically a keyed padlock) to the energy isolating device. The first employee/contractor must verify that the energy source has been effectively isolated. Each person's lock must be marked or tagged to identify the person applying it. Employees/contractors may lock out a secondary key securing system if two qualified persons lock out the primary key securing system, and place their keys in the secondary system. On completion of his/her work, each employee/contractor must remove his/her personal lock from the key securing system. Combination locks must not be used for lockout.

At the beginning of each shift, if there is a personnel change, persons must transfer the control of the locked out energy isolation devices from the outgoing persons to the incoming persons.

Removal of Locks

Upon returning to work, Paragon Ventilation Ltd must ensure that if the person's lock has been removed, the person will be informed that their isolating device has been removed.

In most instances, only the employee/contractor who installed the lock is allowed to remove it. This is intended to prevent other persons from removing the lock and unknowingly creating a safety hazard.

Situations may arise in which the employee/contractor who installed the lock is unavailable (i.e., off shift, on holidays, in transit, etc.), and an emergency arises involving the equipment. In these situations, the matter must be referred to supervisor/management in charge (or a designated competent person). They will be responsible for its removal. Management must make every reasonable effort to contact the employee/ contractor who installed the lock. Before removing the lock, ensure the machinery or equipment can be operated safely.

Before all securing devices (locks) are removed:

- Each employee/contractor involved in the work activity must be accounted for.
- Any personal locks placed by employees/contractors must be removed, if they affect the operation of equipment, machinery or powered mobile equipment.
- Before returning equipment to operation, it must be determined that other employees/contractors are not in danger. It may be necessary to personally contact employees and contractors in the area who might be at risk of injury in some circumstances, to let them know that the equipment, machinery or powered mobile equipment is being returned back to operation.

Work on Energized Equipment

If it is not practical to shut down machinery or equipment for maintenance, only the parts that are vital to the process may remain energized. The work must only be performed by persons who:

- Are competent and qualified to do the work.
- Have been authorized by Paragon Ventilation Ltd to do the work.
- Have been provided with and follow procedures or practices where hazard have been controlled to an acceptable level of risk.

Training

Workers servicing and conducting maintenance on equipment must have thorough training relating to these and/or client procedures.

Only trained, authorized and competent persons are to apply locks and tags and de-energize or isolate that particular equipment. Workers affected by the application of the lockout/tag out must be familiar with these standards, particularly the meaning of locks and tags on operational controls

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Machine Guards – Working around Moving Parts

Purpose

This practice provides guidelines for the use of safeguards when working around moving parts or other hazardous work services.

Safeguards may be needed to prevent a worker who accidentally, or through the work process, come into contact with:

- Moving parts of machinery or equipment,
- Points of machinery or equipment at which material is cut, shaped, or bored,
- Surfaces with temperatures that may cause skin to freeze, burn, or blister,
- Energized electrical cables,
- Debris, material, or objects thrown from machinery or equipment,
- Material being fed into or removed from process machinery or equipment,
- Machinery or equipment that may be hazardous due to its operation, or any other hazard

Definition

Safeguard – A precautionary measure to ward off impending danger, damage or injury.

General Guidelines

- Wear clothing that fits close to the body and cannot get caught on moving parts.
- Avoid loose cuffs, belts, ties or protruding buckles that are easily caught on equipment.
- Wearing close fitting leather or insulated work gloves that are less likely to become caught than loose fitting hand wear. In some circumstances, it may not be appropriate to wear gloves at all, if there is a risk of them getting caught in moving parts.
- Lace boots using all eyelets and tucking in bootlaces.
- Tie back long hair and covering it with a hairnet that is snug to the head.

Work Activity Involving Mechanical Hazards

Dangerous moving parts involve these three basic areas:

1. **The Point of Operation** – The point where work such as cutting, shaping or boring is done to material.
2. **Power Transmission Apparatus** – All components of the mechanical system that transmit energy to the part of the machine performing the work. These components include flywheels, bull wheels, pulleys, belts, connecting rods, couplings, cams, spindles, chains, cranks, gears, etc.
3. **Other Moving Parts** – All parts of the machine that move while the machine or equipment is working. These can include reciprocating, rotating and transverse moving parts, as well as feed mechanisms.

Removing Safeguards

- Before working around moving parts, workers are to complete an inspection prior to operation of the tool or equipment to ensure that all guards are in place and functioning as designed.
- If safeguards have been removed, the equipment must be locked out and tagged out of service.
- Notify the supervisor of missing guard and tag the equipment out of service.
- Do not to remove any guard or barrier until the machine or equipment has been locked out and tagged.
- At no time is a machine to be operated when a safeguard has been removed.
- Lock out the machinery or equipment or make it ineffective prior to maintenance, tests, repairs or adjustments on machinery.

PARAGON Ventilation Ltd.
Our Name Stands For Excellence

Machine Guards – Working around Moving Parts

Purpose

This practice provides guidelines for the use of safeguards when working around moving parts or other hazardous work services.

Safeguards may be needed to prevent a worker who accidentally, or through the work process, come into contact with:

- Moving parts of machinery or equipment,
- Points of machinery or equipment at which material is cut, shaped, or bored,
- Surfaces with temperatures that may cause skin to freeze, burn, or blister,
- Energized electrical cables,
- Debris, material, or objects thrown from machinery or equipment,
- Material being fed into or removed from process machinery or equipment,
- Machinery or equipment that may be hazardous due to its operation, or any other hazard

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Man-Hoist

Purpose

The purpose of this practice is to provide guidelines pertaining to the safe use of man-hoists.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction in the safe use of related equipment and PPE prior to commencing the activity.

Worker

It will be the responsibility of the worker(s) to adhere to the safety requirements regarding this specific task. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equpmen Requred

1. CSA/ANSI approved safety footwear and approved safety headgear are required on all projects. Hi-visibility vests shall be used when working around mobile equipment or in other traffic situations. Fall protection is required when using any type of man hoists.
2. Man-hoists are not to be left unattended unless they have been locked out. A lockout procedure must be developed and implemented regarding man-hoists as per Provincial Health and Safety Regulation.
3. Regular inspections must be carried out and recorded in the operator's logbook as per the manufacturer's specifications.
4. Hoist erection and dismantling must only be done by an agency having qualifications to do so. Personnel doing so must comply with Provincial Health and Safety Regulations regarding the use of fall protection.
5. Hoists must be installed according to the manufacturer's instruction and standards and must comply with all applicable Acts, Regulations and Codes and ANSI A10.4-1963.
6. All hoists must be clearly marked with the safe working load capacity for the equipment.
7. Door or gate shall protect the full width and height of car.

8. All hoist entrances must be guarded to a height of at least 6 feet except for the side used for loading. Al hoists are required to have a gate, not less than 6 feet in height and located not more than 4 inches from the hoist way.
9. Hoist platforms shall be equipped with standard guardrails and toe boards on all sides.
10. Hoist control devices shall be tested daily prior to operation of the hoist. Safety devices shall be tested and hoist shall be inspected weekly. Test results and inspection results shall be recorded in the hoist logbook.
11. All deficiencies found during any tests and/or inspections shall be noted and corrected prior to the hoist being placed into service during the shift.
12. Hoists may only be operated by persons who have been instructed and authorized to so do and who have shown demonstrated knowledge of the operation and signal codes pertainbing to the specific hoist.
13. Hoist operators are responsible for keeping loads within safe limits of the hoist and ensuring that all safety devices are in place and operating effectively.
14. Hoist operators shall not leave the hoist controls unattended unless the platform is at ground level.
15. In the event of an emergency (fire, medical, etc.) the hoist operator shall return the hoist to the ground level immediately and make themselves and the hoist available to responding emergency personnel.
16. The hoist shall be returned to the ground level and adequately secured to prevent unauthorized use at the end of each work shift.
17. The operator shall keep the hoist free of debris and loose materials, which may become tripping hazards or may be knocked off the hoist during normal operation.

Manual Lifting and Carrying of Loads

Purpose

Most lifting incidents/injuries are due to improper lifting methods rather than lifting heavy loads. Every employee who lifts or does other manual handling tasks is at some risk for musculoskeletal injury. Low back injury is the most likely kind of injury. Employees can reduce the number and the severity of manual handling-related injuries substantially by following safe practices.

Definitions

Ergonomics (or human factors) – Scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance

General Guidelines

All manual lifting should be planned and safe lifting practices followed:

- Conduct a hazard assessment before performing the task of manual lifting.
- Assess your own physical limitations and the approximate weight of materials they are attempting to lift. Get proper exercise and maintain a good diet will improve lifting capabilities.
- Obtain assistance in lifting heavy objects whenever the task may be more than can be safely handled.
- Before any manual lifting is done, the use of power equipment or mechanical lifting devices such as dollies, trucks or similar devices should be considered and employed where practical.
- Bulky loads should be carried in such a way as to permit an unobstructed view ahead.
- Ensure a good grip before lifting.
- Lift gradually. Lift slowly, smoothly and without jerking.
- The back should be kept close to vertical or straight and the lifting done with the leg muscles, which are large and strong. Avoid unnecessary bending. Do not place objects on the floor if they must be picked up again later.
- Avoid unnecessary twisting. Turn your feet, not your hips or shoulders. Leave enough room to shift so as not to twist.
- Avoid reaching out. Handle heavy objects close to the body. Avoid a long reach out to pick up an object.
- Do not be tempted at the last moment to swing the load on to the deck or shelf by bending or twisting your back; it could end up being your last heavy load.
- Pipes, conduits, reinforcing rods and other conductive materials should not be carried on the shoulders near exposed live electrical equipment or conductors.
- When two or more persons carry a heavy object that is to be lowered or dropped, there should be a pre-arranged signal for releasing the load.
- When two or more persons are carrying an object, each employee, if possible, should face the direction in which the object is being carried.

- When lifting, should an individual experience or endure any musculoskeletal injury (back injury or strain), Paragon Ventilation Ltd will review the activity of the individual to identify work related causes of the symptoms and take corrective measures to avoid further injury (if the causes are work related).

Training

Employees shall be competently trained in the specific measures involved to eliminate or reduce the possibility of musculoskeletal injuries, which shall include:

- Identification of factors that could lead to musculoskeletal injuries,
- Early signs and symptoms of musculoskeletal injuries and their potential health effects, and
- The use of altered work procedures, mechanical lifting and personal protective equipment.
- Interaction between employee and the environment/systems (ergonomics).

Personal Protective Equipment

- Steel toed boots
- Safety glasses
- Hard hat
- Gloves

Material Handling, Storage and Disposal

Purpose

This practice establishes guidelines to prevent injury or property damages caused by unsafe material handling and/or storage methods or Chemical, Biological Hazards and Harmful substances.

General Guidelines

Chemical, Biological Hazards and Harmful Substances

Chemical, biological and hazardous materials are any materials covered under the following legislative categories:

- Workplace Hazardous Materials Information System (WHMIS),
- Transportation of Dangerous Goods (TDG) and,
- Occupational Health and Safety (OH&S) legislation.

Materials that employees may be exposed to, but not limited to are:

- All compressed gases and aerosols, including calibration gases
- All liquids, gels, emulsions, pastes and semi-liquids
- Process chemicals and additives
- Cleaners and solvents
- Lubricants
- Fuel, such as gasoline and diesel
- Paints
- Adhesives
- Hand cleaners and barriers
- Janitorial supplies
- Consumer products such as Javex, WD-40 and detergents

Controlled Products

Management will ensure the following aspects of the workplace:

- An inventory of all controlled products.
- All controlled products labelled with risk details precautions to take, personal protective equipment required for handling and first aid treatment procedures, before entering the work site.
- Safety Data Sheets (SDS) are to be made available for all employees at the work site.

Controlled products cover a wide range of chemicals, mixtures, gases and products found in the workplace, as well as various bio-hazardous infectious materials. Controlled products include:

- Compressed gas

- Flammable and oxidizing (combustible) material
- Poisonous and infectious material
- Corrosive material
- Dangerously reactive material and,
- Poisonous gas – hydrogen sulphide H_2S.

Hazard Assessment and Control – Health Hazard Exposure

In workplace situations where employees may be exposed to chemical and biological substances, adequate PPE will be made available, as well as controlling the exposure to all personnel. The following are required when employees are/may be exposed to chemical and biological substances:

- Exposure measured over any 15 minute period must not exceed the 15 minute OEL. Employee exposure to a substance measured over successive 15 minute periods at a concentration above its 8 hour OEL, but at or below its 15 minute OEL, must not happen four times per day.
- Exposure must never exceed ceiling limits of applicable legislation.
- If a ceiling limit is not listed for a substance, the 8 hour OEL may not be exceeded and the 3 x and 5 x rules apply.
- Atmospheric testing shall be conducted to control exposure levels before starting work.

When employees at a work site have potential of being exposed to a harmful substance, a hazard assessment must be completed, identifying the substance and the affect it can have. The toxicity of the substance – type of action, route of exposure and target organs must be known. Other factors relating to the degree of hazard are:

- The nature of the process in which the material is used, or generated
- Possibility of reaction with other physical or chemical agents
- Controls such as ventilation and enclosure
- Type and degree of toxic response.

Emergency Equipment and Emergency Preparedness

Emergency Baths, Showers and Eyewash Equipment

If an employee may be contaminated by a harmful substance at a work site, either the client or Paragon Ventilation Ltd must provide facilities including showers for decontamination. Individuals exposed to the harmful substance will need to remove contaminated clothing. Employees should be able to leave the work site without carrying away any amount of harmful substance.

Work sites where chemicals can be harmful to the eyes and skin, identified through the Hazard Assessment and Control process, will require Paragon Ventilation Ltd to make provisions to address the immediate treatment of the affected area by means of shower, eyewash station or eyewash bottle.

To be effective when needed, emergency baths, showers, eyewash bottles or stations must be inspected and maintained according to the manufacturer's specifications.

Emergency baths, showers, eyewash stations and similar equipment should be:

- Located in the area or work process that creates the hazard
- Unobstructed at all times for quick access
- Marked with clear signage to indicate their location

Workplace Hazardous Material Identification System

The Workplace Hazardous Materials Information System (WHMIS) is Canada's National Hazard Communication Standard. The key elements of the system are hazard classification, cautionary labelling of containers, the provision of (material) safety data sheets (MSDSs) and worker education and training programs.

WHMIS Label

- All controlled products require a WHMIS label before entering the workplace.
- Supplier labels must not removed, modified, or altered on a container in which a controlled product is received from a supplier if any amount of the controlled product remains in the container. If the supplier label on a controlled product or its container is illegible or is removed or detached, an employer must immediately replace the label with another supplier label or a work site label.
- Work site labels are to appear on products that have been transferred from suppliers' containers to work site containers, and on controlled projects manufactured at the work site.
- Work site labels are to include name of product, information on how to use product safely and reference to SDS for more information.

Safety Data Sheets (SDS)

- All controlled products entering the workplace are required to have a SDS before any individuals are permitted to use the product.
- MSDS sheets shall be kept current (within 3 years) while the product is at the workplace.
- MSDS must be readily available to all individuals at the work site.
- Hard copies or electronic versions of SDS must be accessible to all personnel at work sites (including mobile work sites).

Containers and Storage

- The container of a hazardous substance must be designed, constructed and maintained in good condition to securely contain the substance.
- The amount of a hazardous substance in a work area must not exceed the quantity reasonably needed for work in progress – normally in one work shift.
- Bulk or reserve quantities must be stored in a designated area separate from the work area.
- Designated storage areas shall be: Designed and constructed in such a way to allow safe containment of its contents.
- Clearly identified by signs, placards or similar means.

- Designed and maintained to provide safe movement for all persons, material and equipment.
- Properly lit and ventilated.
- Located in an area not usually occupied by persons.
- Storage areas shall be situated away from: Lunchrooms (eating areas), Change rooms, and Locker areas.
- Storing hazardous substances in vehicles is strictly prohibited.
- Hazardous substances shall be stored in such a way to protect from falling, becoming dislodged or suffering damage. They shall also be protected from extreme temperature elements.
- An area in which material may be dropped, dumped or spilled must be guarded to prevent inadvertent entry by personnel, or protected by adequate covers and guarding. Material and equipment shall be placed, stacked or stored in a stable and secure manner. Stacked material or containers must be stabilized as necessary by interlocking, strapping or other effective means of restrain to protect the safety of personnel.

Material Disposal

- Controlled products are to be disposed of as per SDS.
- All scrap insulation, lumber, waste material and rubbish must be removed as the work progresses. Arrangement for this disposal should be made with waste management principles applied whenever practical.
- All solvent waste, oily rags and flammable liquids will be kept in a fire resistant covered container until removed from the work site.

Training

Employees will be trained in the proper methods of moving and storing materials in-shop and when operating in the field. Only persons trained on the WHMIS program may handle controlled products.

No person may transport dangerous goods unless trained on the TDG program.

Employees who may be exposed to a harmful substance must receive training to minimize their exposure to the substance. Education includes all those activities that provide knowledge and skill to employees so they work safely with, or near controlled products. WHMIS program will include training in the following areas:

- Content required on supplier or work site labels.
- Purpose and significance of information contained on label.
- Content required on Material Safety Data Sheets (SDS).
- Purpose and significance of SDS.
- Procedures for the safe use, storage, and handling of controlled products at the work site in which they may be exposed to.
- Methods of identification used in the workplace.
- Rights and responsibilities of employees and supervisors.
- Emergency procedures to be followed in the event of the release of a controlled product.
- Methods of control to manage the hazardous material including required PPE.

Mechanical Lifting (Cranes, Hoists and Lifting Devices >2000kg Rating

Purpose

This practice provides guidelines for selecting and using mechanical lifting devices (cranes, hoists, etc.).

Mechanical lifting includes equipment such as hydraulic jacks, cranes (mobile and overhead), as well as various lifting devices that include equipment designed to lift with proper rigging practices.

Paragon Ventilation Ltd will provide sufficient mechanical lifting devices for lifting, lowering or pushing, pulling, carrying, handling or transporting heavy loads. If the load is heavier or more awkward than anticipated, Paragon Ventilation Ltd will assess alternative lifting methods as described.

In each configuration, style or type, the manufacturer specifications such as load rating capacity, must be legible on each device. The manufacturer specifications and guidelines must be followed. The crane used should be properly identified by the manufacturer's name, model, year of manufacture and serial number.

Definitions

Critical Lifts – (Note: Before attempting lifts in this category, a documented procedure must be completed by a competent person. Critical lifts with mobile cranes can be extremely hazardous and require special care and attention.)

- Any lift in excess of 80% of the machine's maximum rated capacity at the maximum required radius.
- Lifts requiring the coordination of multiple cranes working in unison.

Engineered Lifts – Any lifts over 95% of the machines maximum rated capacity. Engineered lifts require a lifting procedure prepared by a registered professional engineer.

Hazards

- Failure of slings, chains, rope;
- Failure of securing point on load;
- Failure of lifting equipment;
- Crane or other equipment toppling;
- Swinging load;
- People being in the wrong place

General Guidelines

Mechanical Lifting

- Accessible areas within the swing radius will be barricaded to limit the potential for unauthorized entry.
- One person will be assigned to direct the operator when powered equipment is used to raise or lower materials. The crane operator will be directed to follow the signals from only that assigned

person. The signal person will remain in visual contact with the operator while the load is being handled. The signal person will wear a high visibility vest that identifies him/her as the designated signal person. The operator must stop the operation of the equipment on receiving a stop signal from the signaler.

- Signals used to direct crane/hoist/derrick operators will be those described by the applicable ANSI standard (U.S.) for the type of crane/hoist/derrick in use. An illustration of these signals will be posted at the jobsite.
- Notify workers in the area before a crane or hoist is used to lift a load and if the crane/hoist will be moved from its current location.
- Check load for loose objects or material to reduce the potential for items to fall while suspended.
- Operators are to not move a load over the heads of individuals or over the cab of an occupied vehicle.
- At no time are people permitted to stand or pass under suspended loads as per Company Rules.
- Maintain a safe distance from ropes, cables and chains that are under tension.
- Suspended loads are not to be left unattended.
- Allow the operator to be aware of your presence when in close proximity of a suspended load.
- Do not stand between the load swing and objects or equipment that present a potential crush hazard.
- Inspect the area where the load will be placed for potential hazards (objects that may fly into the air, uneven surface, etc.) before the load is lifted.
- Tag lines will be attached to loads before they are lifted to provide guidance and load control, as appropriate.
- Place the load slowly and carefully to avoid injuring any assisting workers, and to allow adequate time for people to move out of the way if the load begins to roll.
- Before use, cranes and hoists are required to be inspected by a designated competent person to verify that the equipment is at an acceptable operating condition and that it is constructed/ equipped within manufacturer standards. Additionally, lifting equipment is required to be periodically inspected as per manufacturer inspection recommendations. Damaged or defective equipment must be repaired before the equipment is returned to service.
- Hoisting and lifting equipment must be equipped with load limit switches for vertical and horizontal travel.
- The safe working load will be clearly marked on rigging, chains, slings, spreaders or other devices used for lifting loads.
- Pinch points will be appropriately guarded. Keep hands and fingers away from pinch points, impact areas and connections.
- Personnel are forbidden to ride on lifting equipment.
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Lifting Device Selection

In choosing the most suitable crane for any operation, the size and characteristics of the crane should be considered in relation to:

- The weights, dimensions and lift radii of the heaviest and largest loads to be lifted by that specific crane or lifting device. Mechanical lifting will be accomplished using the lifting equipment as per manufacturer instructions and within the equipment's limitations. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions will be posted. This information must be visible to the equipment operator at the controls.
- The maximum lift height, the maximum lift radius, and the weight of the loads that must be handled at that height and radius.
- The number of lifts that have to be made and how often.
- The type of lifting to be done. For example, is the precise placement of the load or loads a critical factor in the operation.
- The type of carrier required. This requirement will depend on the ground conditions and the capacity of the machine in its operating quadrants. The maximum capacity is normally over the rear of the carrier and decreases as the boom is swinging over the side.
- Determine whether loads have to be walked or carried.
- Will the load be suspended for lengthy periods of time? Will loads be lifted over people?
- The site conditions include such factors as ground conditions (where the machine will be located), access roads and ramps that the crane will have to travel, and available space for erection, operation and dismantling of the crane (if applicable).
- Load charts apply only to equipment in excellent condition, operating under ideal conditions. A substantial safety margin must be allowed for factors such as weather, wind speed, cross-sectional area of the load if operating in windy conditions, and the condition of the equipment.

The following factors should be considered in reviewing and preparing a lift procedure:

- Make, model and configuration of the boom and outriggers.
- Size, weight and center of gravity of the load to be lifted.
- Size and weights of rigging, headache falls and extended wire rope.
- Lift geometry, including position of crane, height of lift, load radius and boom length.
- Levelness of the crane.
- Ground conditions; soil-bearing capacities.
- Wind effects and the cross-sectional area of both load and boom.
- Environmental factors such as temperature.
- All cranes and lifting devices arrive on site with up-to-date crane certifications.
- Cranes and lifting devices are in acceptable operating condition, with no defects that would limit the crane/lifting device capacity or affect safety of site personnel.
- Operator is required to be knowledgeable in rigging standards, practices and procedures for rigging and lifting loads.

- Operator is required to be competent to operate the assigned equipment and have been granted consent to operate it.
- Operators of cranes must hold a current crane operator's certificate. In a work site environment (where overhead, jib, gantry type of cranes are used), it is the operator's responsibility to know the weights to be lifted as well as the safe operating procedures.
- Test controls, brakes and hoisting ropes before use.
- Do not move any equipment or load unless they are assured the task can be conducted safely without endangering any persons.
- Operator and signalman are required to be competent in using proper hand signals for lifting loads.
- Keep the equipment clean, tidy and free of oil/grease build up.
- Access the cab using the three-point contact system.
- Avoid distractions and refrain from talking to others; concentrate on the job.
- Loads should be positioned as close to the ground as possible before unloading.
- Allow adequate time for people to move out of the way if the load begins to roll.
- Before use, cranes and hoists are required to be inspected by a designated competent person to verify that the equipment is at an acceptable operating condition and that it is constructed/equipped within manufacturer standards. Additionally, lifting equipment is required to be periodically inspected as per manufacturer inspection recommendations. Damaged or defective equipment must be repaired before the equipment is returned to service.
- Hoisting and lifting equipment must be equipped with load limit switches for vertical and horizontal travel.
- The safe working load will be clearly marked on rigging, chains, slings, spreaders or other devices used for lifting loads.
- Pinch points will be appropriately guarded. Keep hands and fingers away from pinch points, impact areas and connections.
- Personnel are forbidden to ride on lifting equipment.
- Cranes must hold a current crane operator's certificate. In a work site environment (where overhead, jib, gantry type of cranes are used), it is the operator's responsibility to know the weights to be lifted as well as the safe operating procedures.
- Test controls, brakes and hoisting ropes before use.
- Do not move any equipment or load unless they are assured the task can be conducted safely without endangering any persons.
- Are competent in using proper hand signals for lifting loads.

Inspection, Repairs and Maintenance

Each crane and hoist must be inspected and maintained at a frequency and to the extent required to ensure that every component is capable of carrying out its original design function with an adequate margin of safety.

In order to ensure equipment is operating safely, reliably and efficiently, it is essential that maintenance be conducted on all lifting devices:

- Repairs shall be performed before use.

- Defective equipment will not be operated. Defects found during inspection or use of a crane or hoist must be recorded in the logbook and reported immediately to the supervisor, who will then determine the course of action to be taken.
- Repairs and maintenance will only be performed on equipment that is stopped and locked out.
- All maintenance will be recorded in the equipment logbook.

Mobile cranes and boom trucks must be inspected at least once every 12 months in accordance with good engineering practices, to ensure it meets:

- The crane or boom truck manufacturer's specifications
- The requirements of the applicable design or safety standard
- The requirements of the occupational regulations

A mobile crane or boom truck must not be used after an inspection unless a certified engineer certifies that it is safe for use on the basis of that inspection.

Logbook and Records

Operators assigned to operating cranes and lifting devices will maintain a logbook which must contain the following:

- Equipment type
- Name of equipment manufacturer
- Equipment model
- Equipment serial number
- Year of original sale of manufacturer
- Total weight of the unit, and ground bearing pressures on tracks, tires and outriggers
- Weight of boom sections
- A copy of load chart or reference of chart used for lift
- Inspection and maintenance of lifting unit
- Rigging specifications used
- All entries must be dated and signed by the operator, mechanic and supervision. The logbook will remain with the equipment and be updated daily as per use.

Training

Only trained and competent workers should operate or signal for mechanical lifting.

Personal Protective Equipment

- Steel toed boots
- Hard hat
- Gloves (Rigging)
- Reflective Clothing (vest) - Rigger

Office Safety

Purpose

This practice gives basic guidelines regarding potential and existing hazards associated with the office environment.

Definitions

Musculoskeletal injury - are injuries and disorders that effect the human body's movement or musculoskeletal system (i.e.: muscles, tendons, ligaments, nerves, disks or blood vessels).

Hazards

- Slip trips and falls
- Electrical shock
- Potential Allergens (Perfumes, scents, cleaning agents)
- Indoor air quality
- Eye strain
- Prolonged sitting, repetitive manual tasks, working in awkward positions
- Lifting
- Musculoskeleletal disorders

General Guidelines

Ensure:

- You are knowledgeable about emergency evacuation.
- All electrical cords and wall plugs are in good condition and are not overloaded.
- Computer monitors are adjusted to correct height and kept clean.
- Fans/space heaters are used according to manufacturer specifications.
- Floors and aisles are kept clear of clutter and garbage.
- Only one drawer of a filing cabinet is open at a time; all drawers must be closed when not actively being used.
- The correct type of fire extinguisher is easily available.
- When transporting heavy materials, handcarts and trolleys are used properly.
- Operation of the microwave/coffee maker is used in accordance to manufacturer specifications.
- Chairs are in good repair.
- Rugs are clean and in good repair, free of tripping hazards, and do not slide.
- Paper cutter blade is placed in closed, lock position when not in active use.
- Loose clothing (including jewellery, scarves and neckties) and long hair are confined or tied back when using a paper shredder.

Overhead Power Lines

Purpose

This practice is to increase awareness of the potential hazards and occupational legislation associated with working in areas where overhead power lines exist.

Procedure

Overhead lines shall be considered to be energized unless and until the owner of the line or the electrical authorities indicates the line is not energized and the line is visibly grounded.

The procedure presented below will be followed when working near overhead power lines:

- Paragon Ventilation Ltd is required to contact the power utility operator/owner before work is done or equipment is operated within 7.0m of an energized overhead power line to:
  - Determine the operating voltage of the line and confirm the safe approach distance.
  - Establish the appropriate safe limit approach as per Schedule 4 of the Occupational Health and Safety (OH&S) Regulations[1].
  - Perform power line marking.
  - Determine the support required when excavating near power poles. Request locations in case ground grids are buried at the base of the pole.
- If the energized overhead power line is less than the safe limit of approach distance listed, Paragon Ventilation Ltd. will not allow work to continue until the utility owner has provided assistance in protecting persons involved.
- No work may be performed in an area within 7.0m of an overhead power line if the voltage is unknown.

The approach distances are calculated as follows:

Safe Limit of Approach to Power Lines

Operating voltage between conductors of overhead power line	Safe limit of approach distance for persons and equipment
0-750 V - Insulated or polyethylene covered conductors[2]	300 mm
0-750 V - Bare, non-insulated	1.0 m
Above 750 V - Insulated conductors[3]	1.0 m
750 V-40 kV	3.0 m
69 kV, 72 kV	3.5 m
138 kV, 144 kV	4.0 m
230 kV, 260 kV	5.0 m
500 kV	7.0 m

1 Alberta Occupational Health and Safety Act, Regulation and Code effective July, 2009
2 Conductors must be insulated or covered throughout their entire length to comply with this group
3 Conductors must be manufactured to rated and tested insulation levels

- When work is to be conducted in areas in excess of 7m:
  - Examine the work area to establish the safe limit of approach distances.
- Calculate the required distance, taking into consideration booms, derricks or other extensions that have the potential to extend past the calculated distance (arcing).
  - Maintain an awareness of the current weather conditions. High humidity may require that the safe distance from the power line be increased.
  - Place hazard identification signs approximately 9m on either side of the overhead power line and in view of equipment travelling either direction under the power line. These signs shall use high visibility or reflective colours.
  - Do not place materials under the adjacent overhead power line if it reduces the clearance above ground, as required by occupational legislation.
- If power lines cannot be de-energized, the lines must be masked or work in the area shall be moved to a safe distance.
- Place a signaller to direct the movement of equipment capable of approaching distance restrictions when working near overhead power lines or other electrical equipment. Ensure the safe limit of approach is not violated and involved personnel know the applicable limits of approach to overhead power lines for both persons and equipment.
  - Identify the signaller with a high-visibility fluorescent vest or similar clothing and equip the signaller with an air horn to sound if the operator comes inside the applicable distance restrictions.
  - The designated signaller shall not be assigned any other duties during the times when the equipment is near the limits of approach to the overhead utility line.
  - The equipment operator and the signaller should know all applicable hand signals.
  - Do not allow equipment or objects to approach the overhead power line closer than the safe limit of approach, as specified in the above chart.

Transportation of Equipment

Paragon Ventilation Ltd does not transport equipment, loads or buildings that are in excess of 4.15m. However, safe limit approaches will be maintained as per Schedule 4 of the OH&S Regulations.

Painting and Coating

Purpose

This practice is developed to provide personnel involved in the process if painting and coating with knowledge and instruction in the safe handling, installing and processing of paints and other coating materials.

Paint is a fairly safe substance, but it is far from risk free. You can work safely with paint, and other coating materials, if you take some basic precautions. Check labels and Material Safety Data Sheets for the product you are using abide by the written warnings.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction in the safe use of related equipment and PPE prior to commencing the activity.

Worker

It will be the responsibility of the worker(s) to adhere to the safety requirements regarding this specific task. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equipment Required

1. CSA/ANSI approved safety footwear and approved safety headgear are required on all projects. Hi-visibility vests shall be used when working around mobile equipment or in other traffic situations.
2. All workers should use PPE suitable and necessary for the hazards of the work being performed.

Practice

Pressure Equipment

1. Pressure equipment used in painting operations is hazardous because of the compressed air component. Painter and/or supervisor must ensure that all spraying equipment is in serviceable condition.

2. A pressure regulator must be installed on all spraying equipment between the compressor and the painting equipment. A pressure relief valve and a pressure gauge must be installed between the pressure regulator and a pressure the pressurized paint container or spray gun. Pressure relief valves shall be set to open at pressures not more than 10 pounds above the required working pressure.

Other Equipment

Ladders, scaffolds, and other equipment used in the painting and coating process must be inspected prior to use to endure they are in safe condition.

Paint Mixing

1. Paint mixing shall be done in designated, adequately ventilated areas.
2. All sources of ignition shall be removed from areas where paints and coatings are mixed.
3. All electrical fixtures or equipment within 20 feet of a designated paint preparation area shall meet the requirements of the National Fire Code.

Housekeeping

1. Good housekeeping is essential for safety in and around painting areas.
2. Paint rooms, booths, etc. Shall be kept clean with equipment stored in a proper and orderly manner.
3. All solvent or paint soiled rags shall be placed in approved, self closing, metal containers clearly marked to indicate their contents.
4. At the end of each day, these containers shall be empties or removed to an approved location.

Personal Safety

1. Remove paint from skin promptly with soap and water or in accordance with the manufacturer's instructions.
2. DO NOT use solvents or thinners to remove paint from skin.
3. Paint only in well ventilated areas, away from heat and ignition sources.
4. DO NOT use paint if label is:
   - Missing
   - Incomplete
   - Illegible

Paper Shredder

Purpose

To ensure safe and proper use and basic maintenance of office equipment. It is important to remember not to shred more than manufacturer's number of sheets of paper at a time.

Procedure

Prior to shredding any paper:

1. Ensure no long sleeves, neckties, jewelry or long hair at access point.
2. Check bin window, make sure bin is not full (if full, shut off, empty bin).
3. Inspect paper; ensure there are no staples or paper clips.
4. Turn select switch to "auto."
5. Insert paper to be shredded
6. When shredding is completed, turn to "off."

In the event of paper jam:

1. Turn the select switch to the "reverse" position.
2. If the jam does not clear, turn the machine off and unplug it prior to removing the shredder head.
3. Use caution, blades are sharp. Do not remove jammed pieces with fingers, use needle nose pliers.
4. After cleaning jammed paper, replace head on bin.
5. Connect power and set select switch to "auto" and test-shred 1 or 2 pages prior to full operation.
6. When complete turn the select switch to "off."

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Personal Protective Equipment (PPE)

All personnel in the field are required to wear Safety Vests and Steel Toed Boots

Prior to using any PPE the following actions must be followed:

1. Design to reduce or eliminate the hazard:
   - Handrails around platforms or catwalks
   - Machinery positioned out of work areas
2. Install Engineering Controls:
   - Ventilation systems
   - Guardrails
3. Develop Administrative Controls:
   - Work Permit
   - Safe Work Plans and Procedure
   - Worker education and training
4. Choose PPE appropriate to the hazard if the previous control measures are not feasible.

Personal Protective Equipment is the last line of defence from identified hazards in the workplace. A hazard assessment must be conducted to identify hazards that are present or likely to be present in every Paragon Ventilation Ltd workplace.

The assessment should include observations on the likelihood of injury or illness from the following:

- Sources of motion - machinery or processes where an injury could result from movement of tools, machine elements or particles, or movement of personnel that could result in collisions, blows or tripping around stationary objects.
- Sources of high temperatures that could result in burns, eye injury or ignition of protective equipment.
- Types of chemical exposures such as splash, vapour, spray or immersion that could cause chronic illnesses or physical injury.
- Sources of harmful dust that can accumulate or become airborne and cause a physical hazard to workers' eyes, and/or respiratory system.
- Sources of light radiation such as welding, brazing, cutting, furnaces, heat treating, high intensity lights.
- Sources of falling objects or potential for dropping objects that could pose a compression or projectile hazard to workers.
- Sources of sharp objects, which might pierce the feet or cut the hands.
- Sources of rolling or pinching objects, which could crush the feet.
- Layout of workplace and location of workers.
- Any electrical hazard.
- Potential for falls from elevation.

Personal Protective Equipment (PPE

Each hazard source must be evaluated for risk level. Based on this evaluation the correct PPE can be selected to adequately protect Paragon Ventilation Ltd. workers from the identified hazard.

Before using any Personal Protective Equipment, the following training will be provided for the specific item:

- Use
- Dangers of not using the PPE
- Correct fitting
- Limitations
- Care
- Maintenance

Paragon Ventilation Ltd will supply all basic and special PPE required by its workers. Supervisors will be responsible to ensure workers obtain and utilize the proper PPE for each job and work site. Workers are not allowed to use any non-approved PPE.

The following are Hardhat requirements for the field:

- **Earthworks**: Yellow ANSI approved
- **Underground**: Red CSA approved
- **Trucking**: Black ANSI approved
- **Yellowhead**: Red CSA approved

Pneumatic Nail Gun

Purpose

To provide instruction and directions to all workers who may be exposed to the hazards of operating a pneumatic nail gun.

Read and understand the instruction manual before operating any nail gun. If you do not know how to operate this piece of equipment obtain advice from your supervisor.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction in the safe use of related equipment and PPE prior to commencing the activity.

Worker

It will be the responsibility of the worker(s) to adhere to the safety requirements regarding this specific task. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equipment Required

1. CSA/ANSI approved safety footwear and approved safety headgear are required on all projects. Hi-visibility vests shall be used when working around mobile equipment or in other traffic situations.
2. All workers should use PPE suitable and necessary for the hazards of the work being performed.

Practice

Prior to operating the nail gun

1. ONLY trained and experienced workers shall operate the pneumatic nail gun.
2. Inspect the tool before connecting to an air supply. Ensure that the safety mechanism is operating and that all screws and cylinders caps are in place and tight.

3. Check for correct air supply and pressure before connecting tool. Once connected, check to make sure the tool is properly connected and that the safety mechanism is operating.
4. ALWAYS handle the tool as if it contains fasteners.

Personal Protective Equipment

1. Safety glasses and/or face shield shall be worn while operating the nail gun.
2. Hearing protection, as required, is recommended while operating the nail gun.

While operating the pneumatic nail gun

1. Ensure that the mechanical linkage between the work contacting element and the trigger is enclosed.
2. Use only fasteners that were designed for the gun.
3. Always operate the gun at air pressures recommended by the manufacturer. Never operate the gun at higher than recommended pressures.
4. Always maintain your balance and footing while operating the gun. Never overreach.
5. DO NOT point the gun at yourself or any other person. Never depress the trigger unless the nose piece is directed onto a safe work surface.
6. Never transport the tool or load it with fasteners with the trigger depressed.
7. Always disconnect the tool from the air supply when it is left unattended or when it is being cleaned or adjusted. Before clearing a blockage from the tool, disconnect the air supply and ensure the air is exhausted from the tool by depressing the trigger.

Portable Power Tool

Purpose

The purpose of this safety requirement is to establish guidelines and accountability for portable power tools used by employees.

Power tools improve employee efficiency in job performance. The safety with these tools is to protect users from inflicting harm to themselves and others. Proper selection, use, care, and supervision of portable power tolls can prevent abuse of these tools and eliminate or reduce employee injuries.

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction in the safe use of related equipment and PPE prior to commencing the activity.

Worker

It will be the responsibility of the worker(s) to adhere to the safety requirements regarding this specific task. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equipment Required

1. CSA/ANSI approved safety footwear and approved safety headgear are required on all projects. Hi-visibility vests shall be used when working around mobile equipment or in other traffic situations.
2. All workers should use PPE suitable and necessary for the hazards of the work being performed.

Practice

General Requirements – Inspection

All portable power tools supplied by the employer or employees will be maintained in safe working order.

Portable power tools shall be inspected regularly and before using. Tools with missing or broken guards, nicked or frayed electrical cords, broken plugs, broken switches, damaged equipment housing, or missing or broken tool retainer shall not be used and shall be tagged and removed from service.

Portable Power Tools

Electrical tools include (but are not limited too) drills, circular saws, reciprocating saws, mitre-box and chop saws, stationary band saws, jig/sabre saws, rotary die grinders, soldering irons, percussion tools, grinding wheels, buffers, wire brushes, sanders, and routers. Employees must recognize and protect themselves from shock, noise, cuts, burns and other potential hazards by using proper guards and safety equipment and devices.

Air powered tools include air hoses, grinders, and pneumatic-impact tools. Workers should ensure hoses do not prevent a tripping hazard, avoid using hoses as cleaners, and prevent accidental disconnection of hoses from the tools. Air-powered grinders require the same type of guarding as electrical guards.

Pneumatic-impact tools include nailers, drills, impact wrenches, staplers, jackhammers, etc., require two safety devices: an automatically closing valve and a retaining device to hold the tool in place to prevent it from being fired accidentally. Additionally, employees must check noise levels to determine if ear protection is needed and guard their eyes against flying debris.

Gasoline-powered tolls are commonly used in logging and construction activities. The chain saw, mowers, trimmers, and other various gasoline-powered tolls are used.

Gasoline-powered tools prevent serious hazards and must be operated only by trained personnel and adequately guarded to prevent fires and injuries.

Portable power tools are designed for particular tasks and if used for other purposes other hazards may be created. Additionally, the extreme mobility of these tools and their power sources create significant hazards.

Vibration minimization is usually a tool design function. If extreme vibration of the tool is a problem to the employee, using isolation pads within the machine or between the handles and operator may be an option.

Tool guards should be provided where possible. Tools such as circular saws, belt sander, and abrasive wheel grinders should be equipped with guards that effectively present the hands and fingers of the operator from coming into contact with the blades and nip points.

Guarding may not be possible on some equipment such as chainsaws. In those cases, other safety features should be in place (e.g. blade brake, anti kick-back deign, etc.).

Safeguarding energy sources must be practiced with all power tools. Electrical safeguards, controls for handling gasoline and other flammable liquids, and controls for air and fluids under pressure must all be in place.

Employees using power tools are to be provided with PPE when exposed to falling, flying, abrasive and splashing objects, or harmful dust, fumes, vapours or gases.

The PPE should be matched against the particular hazard to provide the required level of protection. See PPE - Safe Work Practice for details on matching PPE against the particular hazard.

Specific Tool Types

Electric Tools

Only tools in good repair and listed by Paragon Ventilation Ltd. shall be used.

Protection from electric shock while using portable power tools has been described as 'depending upon third wire protective grounding'. "Double insulated" tools provide more reliable shock protection without third wire grounding. Tools in this category are permanently marked by the words "double insulation" or "double insulated".

Double insulated tools shall not be operated on wet surfaces.

All electric power tools shall be effectively grounded. The exceptions are double insulated and cordless type tools.

Electric cords shall be inspected periodically and kept in good condition. Heavy-duty plugs that clamp to the cord should be used to prevent strain on the current-carrying parts if the cord is accidentally pulled.

Electric saws are usually well guarded by the manufacturer, but employees must be trained to use the guard as intended. The guard should be checked frequently to be sure that it operates freely and encloses the teeth completely when it is not cutting and encloses the unused portion of the blade when it is cutting.

Circular saws shall not be jammed or crowded into the work. The saw is to be started and stopped outside the work.

Abrasive Wheels and Tools

All grinding machines shall be supplied with sufficient power to maintain the spindle speed at safe levels under all conditions of normal speed.

Grinding machines must be equipped with safety guards in conformance with the requirements of CSA/ ANSI, for the use, care and protection of abrasive wheels.

Cup-type wheels used for external grinding shall be protected by either a revolving-cup guard or a band-type guard. All other portable abrasive wheels used for external grinding shall be provided with safety guards, except as follows:

- When the work location makes it impossible, a wheel equipped with safety flanges shall be used.
- When wheels two inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

When safety guards are required, they shall be so mounted to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage.

When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only use safety flanges of a type and design and properly assembled so as to ensure that the pieces of the wheel will be retained in case of an accidental breakage.

All abrasive wheels shall be closely inspected and ring-tested before mounting to ensure that they are free from cracks and defects.

Grinding wheels shall fit freely on the spindle and shall not be forced into place. The spindle nut shall be tightened only enough to hold the wheel in place.

All employees using abrasive wheels shall be protected by eye protection equipment.

Pneumatic Power Tools

The operating trigger on portable hand-operated equipment shall be located to minimize the possibility of its accidental operation and shall be arranged to close the air inlet valve automatically when the pressure of the operator's hand is removed.

Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tools from becoming accidentally disconnected.

All pneumatic driven nailers, staplers and other similar equipment provided with automatic fastener feed, which operate at more than 100 psi pressure at the tool, shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.

Compressed air shall not be used for cleaning purposes except with an air blowgun limited to 30 psi static pressure at the outlet nozzle and then only with effective chip guard and PPE.

The manufacturer's safe operating procedures for hoses, pipes, valves, filters and other fittings shall not be exceeded.

All hoses exceeding ½ inch inside diameter shall have a safety device at the source of supply or line to reduce pressure in case of hose failure.

Gasoline-Powered Tools

All gasoline powered tools shall be stopped while being refuelled, serviced, or maintained and fuel shall be transported, handled and stored in approved safety cans. All cans shall be properly labelled.

Leakage or spillage of flammable or combustible liquids shall be disposed of promptly and safely.

When gasoline-powered tools are used in enclosed spaces, the applicable requirement for concentrations of toxic gases and use of PPE shall apply.

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Preventing Distracted Driving

Purpose

To protect the health and safety of Paragon Ventilation Ltd employees and contractors as well as that of the general public by prohibiting the use of hand-operated electronic devices while on duty and to raise awareness of the regulatory compliance of distracted driving laws in regards to communication and entertainment.

Enforcing the prohibition of the use of these devices and ruling on the use of hands-free devices will help minimize distractions that could prevent a worker from safely operating a motor vehicle.

Definition of Distracted Driving

Distracted driving – is the diversion of attention from driving, as a result of the driver focusing on a non-driving object, activity, event, or person. This diversion reduces awareness, decision-making, or performance leading to increased risk of driver-error, near-crashes, or crashes.

It is illegal to operate hand-held electronic devices while working Paragon Ventilation Ltd projects, driving in Alberta as well as many other jurisdictions in North America.

Application

This policy applies to all employed personnel on Paragon Ventilation Ltd projects.

Exemptions: drivers of authorized emergency vehicles.

Prohibition

Hand-operated electronic devices that cannot be used while driving include but are not limited to:

- Cell phones and smart phones
- Computers and laptops
- Pagers and text message devices
- Global positioning system (GPS) devices
- MP3s, DVD players and other portable entertainment device

Telephone calls are not to be made or taken while driving unless in hands-free mode or a hands-free device is being used in conjunction with the phone and accepting, initiating or ending the call requires one touch once of the device.

Texting while driving is not allowed under any circumstances.

GPS screens can be in view but cannot be programmed or handled while driving unless it relates to the proper function of the vehicle.

MP3/Entertainment Devices cannot be browsed or handled in any way while driving. Built in devices are allowed.

Portable Screens/Monitors cannot be in view of the driver. This does not include GPS for obtaining navigation information, displays that are required of the function of the vehicle or a device for calling in hands-free mode or in conjunction with a hands-free device.

Two Way Radios can only be used in commercial vehicles with several conditions. (Ref: Alberta Traffic Safety Act section 115.1 for more information)

Hands-Free Mode

Driver's may use a device in hands-free mode if accepting, initiating or ending a call requires only one touch once of the device for each action. All other functions are performed by voice commands.

Purchase and Use of Hands-Free Devices

All purchase and use of hands-free devices require authorization from Paragon Ventilation Ltd management. Paragon Ventilation Ltd does allow the use of hands-free devices providing the use conforms to the law, regulations and this policy.

Guidelines

Prepare phones and equipment before the trip by:

- Setting up hands-free mode
- Setting up caller ID and/or voicemail
- Placing the device in a location where the call ID function can be seen without taking your eyes off the road completely
- Keep hands on the wheel at all times
- Let incoming calls go to voicemail if not recognized as urgent
- If necessary to take or make a call while driving notify the other person on the call that you are driving and to keep it brief and stress free
- Pull off to a safe location off the road when the conversation becomes technical or stressful in nature
- Obtain authorization by management to purchase or use hands-free devices

References

- Canadian Council of Motor Transport Administrators
- Alberta Traffic Safety Act Section 155

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Safety Belts, Lanyards and Lifelines

General Information

Body harnesses are used on construction sites to provide workers working at heights above ground level with freedom of movement and protection from falls. These devices will arrest a fall and absorb some of the shock of the fall. The systems are usually worn around the body and attached to a lanyard, fall arresting device or rope grab. Better quality systems usually have some form of shock absorber in the system.

Do

- Obtain expert advice before purchasing a fall arresting device
- Properly train and practice with the system you decide to use
- Use webbing type harnesses instead of leather harnesses
- Inspect carefully before each use (inspection to be performed by a trained worker)
- Have the harness fitted snugly to the worker using the system
- Insure that the anchor points are secure and able to support the load in the event of a fall
- Follow the manufacturer's instructions on care and use
- Insure all lines used with the systems are CSA approved
- Use only the proper safety rated fastenings with the system
- Use a full body harness with shock absorber at all times

Don't

- Modify, change or put additional holes in the harness or hardware
- Jerry-rig the system
- Use the system for any other than its intended use
- Use the lifeline for a service line

Scaffolds and Temporary Work Platforms

Purpose

This practice establishes safe work practices in the selection and use of scaffolds. Scaffolding, whether purchased or rented, will meet applicable *CSA Standards – S269.2 – M87 (R2003), Access Scaffolding for Construction Purposes.*

Definitions

Competent – Adequately qualified, suitably trained and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

Scaffold – An elevated working platform for supporting both personnel and materials. It is a temporary structure used mainly in construction and/or maintenance work. Scaffolding is erected to provide a secure platform for elevated work locations, or access/egress to a work area.

Scaffolding – A structure made of wood or metal frame set (forms and brace or tube and clamp).

Paragon Ventilation Ltd Responsibilities

will ensure that scaffolds used by employees/contractors are in safe condition and able to withstand the load, regardless of whom erected the scaffold.

When required to have personnel erect a scaffold (where applicable), Paragon Ventilation Ltd will keep records of maintenance, repair or modification for elevating the work platform, swing stage and permanent powered platforms.

Scaffolding used to carry the equivalent of an evenly distributed load exceeding 367kg per square metre, shall be:

- Designed and certified by a qualified engineer.
- Constructed, maintained and used in accordance with the certified specifications.

Supervisor Responsibilities

Supervisor shall be responsible for ensuring that personnel are informed regarding the maximum load that the scaffold can safely carry.

Scaffolding Design

The major types are wood pole scaffolding, tube and coupler (clamp) scaffolding, and tubular welded frame scaffolding.

Wood Pole Scaffolding

All load-carrying timber members of scaffolds shall be a minimum of 1,500 fibre construction grade lumber/ stress grade. All planking shall be scaffold grade or equivalent. The maximum permissible spans for 2 x 10in. (5 x 25cm) or wider planks shall be as shown in the following chart (lumber sizes, except where otherwise stated, are nominal sizes):

	Full Thickness Undressed Lumber			Nominal Thickness Lumber	
Working Load (lb. /sq. ft.)	25	50	75	25	50
Permissible Span(ft.)	10	8	6	8	6

Wood pole scaffolding greater than 60ft. (18m) in height shall be designed by a competent, qualified engineer, and it shall be constructed and erected in accordance with such design. All wood pole scaffolding 60ft. (18m) or less in height shall be constructed and erected in accordance with appropriate regulatory standards.

Tubular Metal Scaffolding

Tubular metal scaffolding is readily available, versatile, adaptable to all scaffolding problems and economical to use. Most manufacturers and suppliers of tubular metal scaffolding provide engineering service to help in designing adequate scaffolding for any situation. If the metal scaffold is located close to a high voltage energized electrical conductor or equipment, the scaffold must be effectively grounded to prevent an electrical charge. Many suppliers also furnish erection and dismantling services. Erect such scaffolding according to the manufacturer instructions. Do not exceed load limits and do not use different metals together in one scaffolding.

The following are some common sense rules for erecting, disassembling, and using metal scaffolding:

- Post safety rules for scaffolding in a conspicuous place and make sure personnel follow them.
- Abide by all regulatory codes, ordinances and regulations.
- Inspect all equipment before use. Never use equipment that is damaged or deteriorated in any way.
- Keep equipment in good repair. Avoid using rusted equipment since its strength is not known.
- Inspect erected scaffolds regularly to be sure they are maintained in safe condition.
- Consult the scaffolding supplier when in doubt. Never take chances.
- Use extreme caution when metal scaffolds are used in the vicinity of energized electrical circuits.
- Prohibit climbing of braces. Provide a ladder or stairway for entry and exit.
- All metal scaffolds and towers shall be plumb and level. The sections of metal scaffolds shall be securely connected and all braces securely fastened.
- Scaffold planks should extend over their end supports not less than 6in. (15cm), nor more than 12in. (30cm).

Tube and Clamp (Coupler) Scaffoldings

Tube and clamp (coupler) scaffolding is an assembly that consists of tubing used as posts, bearers, braces, ties and runners. It is also the base supporting the posts and special couplers, which serve to connect the uprights and to join the various parts.

Light-duty tube and coupler scaffolding should have nominal 2in. (5cm) O.D. steel tubing bearers. Posts should be spaced no more than 6 ft. (1.8m) apart by 10ft. (3m) along the scaffold.

Medium-duty tube and coupler scaffolding should have posts spaced no more than 6ft. (3m) apart by 8ft. (2m) along the scaffold. It should have bearers of nominal 2½ in. (6cm) O.D. steel tubing. Posts spaced no more than 5ft. (1.5m) apart by 8ft. (3m) along the scaffold should have bearers of nominal 2in. (5cm) O.D. steel tubing, with the posts spaced no more than 6ft. (3m) by 6½ft. (4.5m).

Install cross bracing according to the manufacturer's specifications. Spacing of bracing may vary by manufacturer.

General Safe Practices

- Provide scaffolds for all work except that which can be done safely from the ground or similar footing. A competent person, trained in scaffold erection, dismantling and alteration, shall supervise all scaffold erection, dismantling, moving or alteration. Scaffolds must also be inspected for safety at the start of every shift by a competent person.
- All scaffolds should be designed, constructed and maintained in accordance with the manufacturer instructions and applicable industry standards.
- Design scaffolds to support at least four times the anticipated weight of the personnel and materials that will be on them.
- If these structures, including such accessories as braces, brackets, trusses, screw legs and ladders are damaged or weakened from any cause, they should be repaired or replaced immediately.
- Keep scaffolds, platforms, runways and floors free of ice, snow, grease, mud or any other material or equipment that will make them unsafe or hazardous to persons using them.
- Where walkways and work surfaces are slippery, use appropriate abrasive material to ensure safe footing.

General Guidelines and Safety Precautions

- Scaffolds must only be erected on a firm and level surface, or must be capable of providing secure footing by use of mudsill or some other device.
- Scaffolding must be constructed and dismantled by or under the supervision of a competent person in accordance with manufacturer specifications, CSA Standards and OH&S guidelines. The person who will use the scaffold must inspect it before use.
- All personnel using scaffolding must be informed of the maximum load that the scaffold is permitted to carry. This maximum load will not be exceeded under any circumstances.
- Scaffolds must be erected with the vertical members plumb, level and square. The base must rest on bearing plates or sills that sit on a solid surface capable of withstanding the weight of the scaffold. Scaffolds shall be secured against lateral movement by diagonal bracing.

- Scaffolding wood material is to be sound, close grained, unpainted and finished on all four sides. The ends should be reinforced to avoid splitting.
- Scaffold wood platforms shall not span more than 3.1m on light-duty scaffolds and 2.3m on heavy-duty scaffolds with a projection beyond the ledge of any more than 300mm, or less than 150mm. The height of a scaffold must not exceed three (3) times its smallest base dimension unless tied in or supported laterally.
- The platform of each scaffold must be a minimum nominal width of 50cm (20), except that a nominal 30cm wide platform may be used with ladder jacks. No more than one opening in the platform is permitted, which can be no greater than 25cm in width. If the scaffold is not level, the design must allow for adequate footing.
- If work is to be done at a height of 6ft. or greater, or in an area where other people are working, guard rails and toe boards are to be installed.
- The horizontal rail must be from 36 – 42in. (0.092m – 1.07m) above the platform.
- The intermediate rail must be midway between the platform and the top rail.
- The toe board must be installed at platform level and extend no less than 140mm above platform level.
- Vertical supports for the guardrails must be spaced no more than 2.44m or 8ft. apart.
- Spacing between platform planks must not exceed 2 in.
- When used as a work platform, scaffold planks must be secured from movement by cleats or be wired in place, and must be horizontal.
- Scaffolds are to be secured against movement and must be secured to a vertical structure every 15ft. and every 20ft. horizontally.
- All supporting components and connections must be securely fastened.
- Where there is likelihood that any powered mobile equipment can contact scaffolding, protective measures must be taken.
- Fall protection devices and guardrails will be installed to prevent injury from falling.
- Toe boards will be installed to prevent objects/persons from falling below the platform.
- Flagging or signage shall warn persons below of overhead hazards.
- All scaffold components shall be secure. The scaffold will be anchored and on firm ground or footing to prevent scaffold collapse.
- Scaffolding must be constructed and dismantled by or under the supervision of a competent journeyman scaffold employee/contractor in accordance with manufacturer specifications and with occupational legislation.
- Scaffolds must be inspected and tagged before initial use and every 21 days while in use by a competent journeyman.
- Fall protection equipment must be used when working above 3m.
- Where it is not possible to tie off safety lines to the structure, a lifeline must be rigged. Lifelines must be vertical and horizontal.
- Lifelines must be suspended independent of the scaffold.
- Safety lines shall be tied off at a level above the scaffold and should be kept as short as possible.
- Any scaffold material showing signs of defect must be repaired or replaced and tagged out, removing it from service.

- All scaffolds and work platforms should be at least two planks wide.
- The only acceptable means of access or egress shall be the use of the built-in scaffold ladder.
- Scaffolds must be capable of supporting 4 times the load that might be imposed on it. The load the scaffold is subjected to must **never** exceed the equivalent of 1/4 of the load for which it was designed.
- **Signs indicating Danger** – *Workers Overhead* must be posted during set-up and dismantling of scaffolding.
- Persons beneath any elevated platform (6rm or higher) shall be adequately protected from falling objects. These platforms must also have toe boards installed.
- No person shall ride on a rolling scaffold while it is being moved.
- No materials shall be carried up a ladder. Tool bags and/or taglines are to be used to pass materials safely.
- A safe scaffolding tagging system shall be used.

Tagging Requirements

To indicate status and condition, all scaffolds must be tagged at each point of entry (with the date of the inspection) according to the following color-coded tags. Personnel shall not use a scaffold if it has a red tag, a green or yellow tag that has expired, or no tag at all.

- **Green tag** with signage *Safe for Use*, or similar wording, to indicate it is safe for use.
- **Yellow tag** with signage *Caution - Potential or Unusual Hazard*, or similar wording, to indicate the presence of a potential or unusual hazard.
- **Red tag** with signage *Unsafe for Use*, or similar wording, to indicate it is not safe to use.
- Personnel must ensure that:
- Scaffolding assembled but not in service, or not used for more than 21 consecutive calendar days, has a red tag at each point of entry until it is inspected and tagged by a competent person for use.
    - Scaffolding must be inspected and tagged by a competent person before it is used for the first time, and at intervals of not more than 21 calendar days while personnel work from the scaffold or materials are stored on it.

The scaffolding tag must include:

- Weight limitations of scaffold (light or heavy duty)
- The date of last scaffold inspection
- The name of the person who conducted the last inspection
- A list of precautions to take while working on the scaffold
- The tag expiry date

Training

Paragon Ventilation Ltd will ensure any employees and contractors required to use scaffolds and temporary work platforms will be trained in their safe use, handling, erection, and storage.

Sheet Metal Work

Purpose

This practice provides guidelines for safely installing, assembling or disassembling sheet metal, sheet metal components, paneling or buildings.

Sheet metal in itself is a low hazard work duty. Most of the hazards that accompany this scope of work are associated more with ladders and scaffolding. *Reference SWP Ladders, Constructed, Fixed, Portable, Step. Reference SWP Scaffolds and Temporary Work Platforms.*

Definition

Competent – Adequately qualified, suitably trained and with sufficient experience to safely perform work without supervision or with a minimal degree of supervision.

Potential Hazards

- Jagged edges produced from cutting material
- Sharp edges (thin gauge sheet metal)
- Power tools
- Slippery
- Hand cutting tools
- Very light materials (caution when windy)

Rules

- Hard hats shall be worn at all times in the workplace as per Part 8.11, Personal Protective Clothing and Equipment, which must meet *CSA Standard CAN/CSA-Z94.1-92, Industrial Protective Headwear.*
- Employees and contractors shall remove all jagged edges from sheet metal or sheet cuttings. Jagged edges must not be hidden beneath the overlap, as they are a hazard to other persons.
- Personnel must keep their work area clean. Sheet metal, when wet or covered with snow, is very slippery. All unused sheet metal or cuttings shall be removed from the workplace upon completion of the work day. It shall be stacked neatly in an area where it cannot be stepped/fallen on.
- Power tools must be used in accordance with manufacturer specifications. *Reference SWP Powered Mobile Equipment – Tools.*

Training

Employees and contractors shall be properly trained in the installation of sheet medalling. Helpers shall only install sheet metal under the direction of a competent qualified person.

Personal Protective Equipment

All personnel are required to wear the following PPE in accordance with CSA Standards:

- Work gloves
- Hard hats
- Safety glasses
- Clothing suitable for environmental conditions
- Steel toed bootss

PARAGON Ventilation Ltd.
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Skid Steer/Bobcat/Forklift

Purpose

This practice provides guidelines for safe operation of a skid steer/bobcat. The operator's manual may be consulted for further information.

Definitions

Skid steer, skid loader, skid-steer loader- is a rigid frame, engine-powered machine with lift arms used to attach a wide variety of labor-saving tools and attachments.

Bobcat- is sometimes used as a generic term for skid-steer loaders.

ROPS (Roll over Protection Structure) - refers to operator compartment structures (usually cabs or frames) intended to protect equipment operators and motorists from injuries caused by vehicle overturns or rollovers.

Possible Hazards

- Collision with persons, vehicles and stationary objects.
- Overturning the equipment by turning too quickly, exceeding the load limits or shifting loads.
- Dropping the load.
- Pinch Points
- Other Workers
- Other Equipment
- Slips, Trips and Falls
- Travelling sideways on slopes

General Guidelines

Supervisor is responsible for

- Qualifying personnel for the operation of the equipment.
- Ensuring that any required maintenance is performed.

The operator is responsible for

- Inspecting the equipment prior to use.
- Operating the equipment in a safe manner.

Load Capacity

- The lifting capacity is specified on a plate located to the right of the driver's seat.
- The lifting capacity decreases as the center of gravity of the load moves farther away from the mass.

Procedure for Starting

- Before using, conduct an inspection of the equipment to check:
  - Possible physical damage
  - Tire condition
  - Obstacles not visible from the seat
  - Condition of hydraulic hoses
  - Oil level
- To start the equipment:
  - Put shift lever to neutral.
  - Apply parking brake.
  - Turn ignition switch to “on” and verify the oil light is on.
  - Press accelerator pedal slightly and turn switch to “start.”
  - Do not crank engine more than 5 sec. at a time.
  - Allow the engine to warm up before use.
  - Operate all cylinders to full extension several times to lubricate surfaces.

Tips for Safe Use

- Operate the loader from the operator’s compartment—never from the outside
- Stay seated when operating the loader controls
- Work with the seat belt fastened and the restraint bar in place
- Keep your arms, legs, and head inside the cab while operating the loader
- When possible, plan to load, unload, and turn on level ground
- For maximum stability, travel and turn with the bucket in the lowest position possible
- Never exceed the manufacturer’s recommended load capacity for the machine
- Operate on stable surfaces only
- Avoid traveling across slopes; travel straight up or down with the heavy end of the machine pointed uphill
- Always face the direction of travel
- Keep bystanders away from the work area
- **NEVER** modify or bypass safety devices

Entering and Exiting from the Loader Safely

- Enter only when the bucket or other attachment is flat on the ground—or when the lift-arm supports are in place
- Use supports supplied or recommended by the manufacturer
- Never use foot or hand controls for steps or handholds
- Keep all walking and working surfaces clean and clear of debris
- Before leaving the operator’s seat:
  - Lower the bucket or other attachment flat to the ground

  - Set the parking brake
  - Turn off the engine
- If you are unable to exit through the front of the machine, use the emergency exit through the roof or across the back

Maintaining the Loader in Safe Operating Condition

- Follow the manufacturer's instructions for maintaining the loader
- Keep the foot controls and the operator's compartment free of mud, ice, snow, and debris
- If the machine cannot be serviced with the bucket on the ground, use the lift arm supports recommended or provided by the manufacturer. If the machine is not equipped with lift arm supports, contact the equipment dealer or manufacturer's representative for help in selecting proper supports
- Never work on the machine with the engine running unless directed to do so by the operator's manual. Follow the manufacturer's safety recommendations to complete the task. If the adjustments require that the engine be in operation, use two persons to perform the task.
- Before servicing; set the parking brake, lower all attachments and buckets to the ground, turn off engine, and remove the key

Never

- Pick up a load on a broken pallet or attempt to lift boxes in poor condition.
- Touch, lean on or reach through the mast, boom or lift mechanism or permit others to do so.
- Climb on the mast, boom or lift mechanism.
- Allow anyone to stand or pass under the raised pallet forks, mast, carriage, boom or attachments.
- Drive up to someone standing in front of a fixed object.
- Stand (or allow anyone else to stand) in front of, alongside of or under a load.
- Attempt to lift a load with only one fork.
- Add more weight to the back of the equipment to carry a heavier load. Lighten the load instead.
- Adding certain attachments may change the weight capacity.

Training

Personnel will be required to demonstrate to the supervisor that they are capable of operating the equipment.

Personal Protective Equipment

- Safety Footwear
- Eye Protection
- Hand Protection
- Hard Hat

Thermal Exposure

Purpose

This practice provides guidelines for working in cold or hot temperatures.

Cold Weather Safety

Working in cold weather can be dangerous to personnel without adequate training and winter clothing. To cope with winter, stay active, dress warmly and follow safety rules.

Cold Stress Assessment and Exposure Control Plan

If personnel are, or may be exposed to thermal conditions that:

- Could cause cold stress or injury,
- Could cause a person's core body temperature to fall below 36°C (96.8°F), or
- Are below the levels classified as little danger to persons in the criteria for the cooling power of wind on exposed flesh described in the table under Maintenance of Cold Weather Apparel.

Then Paragon Ventilation Ltd will:

- Conduct a cold stress assessment to determine the potential for hazardous exposure of workers, using measures and methods that are acceptable to the Board.
- Develop and implement a cold exposure control plan.
- If this is not practical, Paragon Ventilation Ltd will reduce the exposure hazard by providing:
- Effective administrative controls, or
- Personal Protective Equipment, if the equipment provides protection equally effective to the administrative controls.

The Effects of Cold Weather

- A cold environment takes away body heat. Too much heat loss can cause lowering of the inner body temperature to dangerously low levels causing hypothermia.
- Exposed body parts may freeze in extreme cold, causing frostbite.
- Loss of body heat (hypothermia) and frostbite (freezing of body tissue) can present serious danger to life and health.
- Cold weather can increase pain from arthritis or rheumatism.
- Cold affects dexterity, affecting skill and ease of using the hands, and also mental skills and coordination.
- Prolonged exposure to moderate cold and dampness can result in other types of injuries or illness.
- Working in cold environments increases the risk of back injuries and other musculoskeletal injuries. Perform warm up stretching exercises before handling heavy equipment and material.

Cold Hazards

Wind makes air temperatures colder, and brisk winds and cold temperatures combine to make it dangerously cold.

Exposed human flesh freezes within one minute at -29°C (-20.2°F) when wind speed is 8km/h (5mph). When the wind speed increases to 32km/h (20mph), human flesh freezes at -12°C (10.4°F). These danger warnings for wind chill apply if your clothes and skin are dry. When you are wet, cold injury can occur at less cold temperatures.

Cold Weather Apparel

- Wear cotton or polypropylene long underwear for all-over warmth.
- Wear multiple layers of light, loose-fitting clothing. Air between the layers provides warmth. Outerwear should be waterproof Wear cold weather clothing or arctic clothing that is appropriate for the outdoor temperature range and the type of activity.
- Wear mittens instead of gloves whenever possible, as mittens are warmer.
- Wear a warm hat with ear protection to prevent heat loss from the head. As much as 40% of body heat can be lost from an uncovered head.
- Use an appropriate hard hat liner to reduce heat loss.
- Wear woollen socks to protect ankles and feet; carry an extra pair where moisture or sweat is likely and change when needed.
- Keep an extra pair of safety shoes for inside work.
- Protect your vision from UV rays or blowing ice crystals by wearing appropriate eye protection while working in snow and ice on a bright day.
- Keep snow and water out of your footwear.
- Use suspenders. Tight belts can constrict blood circulation.
- Wear a scarf or face mask while working in cold wind.
- Do not wear dirty and oily clothing as such clothing has lost much of its insulation value.
- Do not wear gloves or scarves that can get caught in moving parts of the machinery.

Examples of Cold Weather Clothing

Clothing	Type
Long, dry underwear	Wool or polypropylene Wool; cotton in dry conditions.
Pants, Shirts, Sweaters, Turtleneck	Wool, fleece or synthetic substitutes
Headgear	Wool, polyester or polyvinyl caps, scarves, face masks
Gloves	Loose fitting with wool liners, gloves inside heavy mittens for extremely cold conditions.
Socks	Two pairs – light or medium inner and heavy wool outer socks.
Parka	Loose fitting, filled with down or insulating Fiberfil, attached hood and outer layer of waterproof material.

Layers

When personnel start working, they generally start sweating, and sweat dampened clothes lose their insulation value. The following sequence is suggested when removing layers of clothing to avoid sweating:

1. Remove gloves/mittens, unless protection from snow and ice is needed.
2. Remove headgear and neck wrapping.
3. Open jacket at the waist and sleeves.
4. Remove outer layers of clothing.
5. Replace clothing in the reverse sequence as soon as work is done. Do not wait until you start feeling cold. Re-warming will take time.

Maintenance of Cold Weather Apparel

- Carry cold weather protective clothing with you at all times.
- Shake feather/down garments when removing them from the duffel bag to increase their loft for insulation value.
- Keep garments dry; brush off snow and frost before entering warm buildings or vehicles.
- Follow manufacturer guidelines for cleaning clothing. Incorrect cleaning and washing methods may cause harm to insulation, fur and leather parts.
- Do not keep cold weather clothing stored or compressed in a duffel bag for long periods.
- Do not store damp clothing in a duffel bag. Hang it on a hanger for drying.
- Do not leave rips or tears untended. Temporary repairs can be made with electrical or duct tape.

Environment Canada Wind Chill Chart
Actual Air Temperature T air (˚C)

Wind Speed $V_{10\,m}$ (Km/h)	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
20	1	-5	-12	-18	-24	-30	-37	-43	-49	-56	-62	-68
25	1	-6	-12	-19	-25	-32	-38	-44	-51	-57	-64	-70
30	0	-6	-13	-20	-26	-33	-39	-46	-52	-59	-65	-72
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-73
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-74
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-75
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69	-76
55	-2	-8	-15	-22	-29	-36	-43	-50	-57	-63	-70	-77
60	-2	-9	-16	-23	-30	-36	-43	-50	-57	-64	-71	-78
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
70	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-80
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66	-73	-80
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81

Where

T_{air} = Actual Air Temperature In ˚C

$V_{10\,m}$ = Wind Speed at 10m in km/h (as reported in weather observations)

Notes:

1. For a given combination of temperature and wind speed, the wind chill index corresponds roughly to the temperature that one would feel in a very light wind. For example, a temperature of -25˚C and a wind speed of 20km/h give a wind chill index of -37˚C. This means that, with a wind of 20 km/h and a temperature of -25˚C, one would feel as if it were -37˚C in a very light wind.
2. Wind chill does not affect objects and does not lower the actual temperature. If only describes how a human being would feel in the wind at the ambient temperature.
3. The wind chill index does not take into account the effect of sunshine. Bright sunshine may reduce the effect of wind chill (make it feel warmer) by 6 to 10 units.

Frostbite Guide
Low risk of frostbite for most people
Increasing risk of frostbite for most people within 30 minutes of exposure
High risk for most people in 5 to 10 minutes of exposure
High risk for most people in 2 to 5 minutes of exposure
High risk for most people in 2 minutes of exposure or less

Work Practices

A schedule of regular rest breaks should be established to allow individuals to warm up. These breaks should be a minimum of 10min in length and should be taken in a heated area. Outer clothing should be removed to prevent overheating and sweating when in the heated area. Returning to cold work while damp or sweaty may result in rapid chilling.

Work Practices for Continuous Cold Weather

- Heated warming shelters (tents, cabins, rest rooms, etc.) should be provided. People should be encouraged to use these at regular intervals; the frequency of use depends upon the severity of environmental exposure.
- When entering the heated shelter, outer and middle clothing layers (as necessary) should be removed to prevent overheating and to permit dampness to evaporate. A change of dry clothing may be necessary.
- Warm fluids should be consumed at the work site to provide energy, warmth and replace fluids lost during work. Significant fluid loss can occur in the cold due to sensible and insensible sweating, breathing and the extra energy requirements of working in the cold. Dehydration in the cold is a serious concern, increasing a person's susceptibility to hypothermia.
- The onset of severe shivering, the feeling of excessive fatigue, drowsiness, irritability or euphoria are indications for immediate return to the shelter.

The following additional precautions apply at colder temperatures:

- Individuals should be under constant protective observation by a buddy or supervision.
- Work rate should not be high enough to cause sweating. If heavy work must be performed, rest periods in heated shelters and the opportunity to change into dry clothing should be provided.
- New employees should not be required to work full-time in the cold during the first days of employment until they become accustomed to the working conditions and required protective clothing.
- Weight and bulkiness of clothing should be included in estimating required work performance.
- Work should be arranged to minimize periods of standing or sitting still.
- Personnel should be appropriately trained.

If an individual shows signs or symptoms of cold exposure/stress or injury, the individual shall be removed from further exposure and treated by a qualified first aider (if available), or by a physician.

Hot Working Conditions

High Temperature Health Hazards

Hot working conditions are present throughout the year in a variety of industrial settings and at outdoor work sites for a relatively brief seasonal period. These conditions expose individuals to thermal stress that can affect their health, safety and productivity.

The human body functions most efficiently within a narrow temperature range. At 2°C (35.6°F) above or below the body's normal temperature of 37°C (98.6°F), additional stress is placed on the body to regulate its temperature (i.e. perspiring to keep cool or shivering to keep warm).

Evaporation of perspiration is the main way the body cools itself. If fluid lost through perspiration is replaced at a rate similar to its rate of loss, few health effects are experienced. A net loss of body fluid may lead to some individuals becoming dizzy, irritable and inattentive, making them more likely to have accidents or injuries.

High humidity can reduce or altogether prevent perspiration from evaporating, compromising the body's ability to cool itself. The combination of high temperature and high humidity may lead to more serious heat-related problems. The problem may be further aggravated when heavy or impermeable protective clothing is worn and physically demanding work activities are performed.

Individuals who are obese, pregnant, abuse alcohol or have chronic diseases usually develop heat exposure problems more rapidly than do other people. Individuals who have recently suffered from heat stroke have an increased sensitivity to heat and should avoid exposure as much as possible. The chart below summarizes those factors involved in heat stress.

Factors Involved in Heat Stress

Environmental	Personal Characteristics	Other
• Temperature • Humidity • Movement of air • Radiant heat given off by sources such as the sun, a furnace, smelter, etc.	• Age • Weight • Fitness • Medical condition • Acclimatization to heat	• Clothing • Physical activity • An individual's use of medication(s)

Sources of Heat Gain and Heat Loss

Heat is gained or lost from the body in the following ways:

Evaporation

Evaporation of sweat from the skin cools the body. The rate at which the body sweats increases with increasing workload, humidity levels and environmental temperature. At very high humidity levels, sweat does not evaporate as quickly, or may not evaporate at all. Air movement and low levels of humidity increase evaporation.

Convection

Convection involves the exchange of body heat between the skin surface and the air or liquid surrounding it. Air, which is cooler than body temperature, cools the body. Warmer air increases body temperature.

Radiation

Radiation is heat exchange by non-ionizing electromagnetic radiation (i.e. radiant heat from a furnace, an oven or the sun).

Conduction

Conduction is heat exchange between the skin surface and a solid surface in direct contact with it. In general, this is an almost insignificant source of heat when considering heat gained by the body.

Metabolic Heat

The body creates its own internal heat, generated by the breakdown of food to create energy. Muscles are the principle source of metabolic heat and thus hard work in a hot environment contributes to the body's overall heat load.

Prevention of Heat Stress

Paragon Ventilation Ltd is responsible for ensuring that mechanisms are in place to identify, assess, control and monitor potential heat stress situations involving personnel.

If an employee/contractor is, or may be exposed to heat stress, Paragon Ventilation Ltd shall:

- Conduct a heat stress assessment to determine the potential for hazardous exposure to the individual, using measures and methods that are acceptable to the Board.
- Develop and implement a heat stress exposure control plan with reference to the ACGIH Standards.

The following are typical approaches to the prevention of heat stress at work sites.

Engineering Controls

An occupational health survey should be conducted to determine the measures to be taken to control exposure to severe heat. These measures may include:

- Control of the heat source through use of insulation and reflective barriers.
- Isolating individuals from the heat (i.e., using an air conditioned booth or automating the process).
- Using an exhaust system to pull hot air or steam out of the work area.
- Using fans or air blowers to circulate air.
- Reducing the humidity.
- Reducing the physical demands of the work (i.e., using mechanical equipment).

Administrative Controls

Administrative controls that may be effective in reducing heat stress include:

- Scheduling tasks to avoid heavy physical activity during the hottest period of the industrial process or day.
- Working in the shade whenever possible, if outdoors.
- Using additional people for the job.
- Ensuring that all personnel/supervisors understand the signs and symptoms of heat stress.
- Rotating personnel into tasks and areas which expose them to less heat load.
- Reducing the pace of work.

Personal Protective Equipment

Where engineering or administrative controls are not feasible or practical, the use of Personal Protective Equipment may be necessary.

Clothing – Should be light in weight and color; loose fitting where possible and made of cotton or a synthetic fabric that allows perspiration to be absorbed away from the skin and evaporate. Some tasks may require individuals to wear protective clothing, goggles, gloves and boots to provide a barrier from the heat source.

- Reflective clothing may be required for work near heat sources such as a hot furnace.
- Insulated or cooled clothing such as cooling vests may be required for short-term exposure work such as maintenance.
- Light-filtering eye protection may be required when work involves hot objects such as molten metals.
- Outdoor employees should wear appropriate clothing and sunglasses to reduce sun exposure.

Other – Additional measures include applying sunscreen lotion or cream to exposed skin. When purchasing sunscreen lotion or cream, the SPF number on the label (Sun Protection Factor) indicates the level of protection provided. The higher the number, the greater the protection.

Personal Measures

Acclimatization

This is the process by which the body becomes accustomed to heat. Acclimatization can be achieved by gradually increasing the duration of heat exposure over a period of 4-7 days. Physically fit individuals adapt to heat more quickly than those who are not fit. However, heat acclimatization is lost quickly; one week away from the hot conditions will require an individual to re-acclimatize.

Fluid Replacement

People should be encouraged to drink at least 250ml (1 cup) of fluid approximately every 20min. To encourage this consumption of fluid, potable water shall be located at or near where the work is being performed.

The feeling of thirst alone should not be relied upon to ensure sufficient intake. While the preferred replacement fluid is water (cool - not cold), other recommended alternatives include diluted fruit juice, tea or lemon tea. An electrolyte replacement drink, diluted to half strength with additional water may also be used. Alcohol and drinks with high caffeine content (i.e., coffee, some energy drinks, colas or other carbonated drinks, should be avoided because they act as diuretics, increasing fluid loss at a time when fluid balance is essential.

Signs of dehydration easily monitored by the employee or contractor include a decrease in the frequency and volume of urine produced. Individuals noting these signs should increase their fluid intake. The normal salt content of the individual's diet, together with salt added to food as a seasoning is usually sufficient to replace salt lost through perspiration. Salt tablets and salt supplementation are very rarely required.

Rest Breaks

Increasing the frequency and duration of rest breaks can reduce overall heat exposure. Rest breaks taken in a cooler area are an effective means of preventing heat-related health problems. Recommendations for these breaks are based on Wet-Bulb Globe Temperature (WBGT) readings, providing a measure of the combined effect of heat and humidity. At a given temperature, the higher the humidity, the greater the heat stresses. Recommended work/rest schedules are presented in the following chart.

Threshold Limit Values (TLVs) for Heat Exposure
Wet Bulb Globe Temperature (WBGT) Criterion Values for Work Rates that are:

Hourly Activity	Light		Moderate		Heavy		Very Heavy	
	U	A	U	A	U	A	U	A
100% Work	27.5	29.5	25.0	27.5	22.5	26.0	21.0	25.0
75% Work 25% Rest	29.0	30.5	26.5	28.5	24.5	27.5	22.5	26.5
50% Work 50% Rest	30.0	31.5	28.0	29.5	26.5	28.5	25.0	27.5
25% Work 75% Rest	31.0	32.5	29.0	31.0	28.0	30.0	26.5	29.5

U = Un-acclimatized A = Acclimatized Reference: ACGIH 1999; p.176

Dry Bulb Temperature (°C)	WBGT (°C)			
	20% R.H.	30% R.H.	40% R.H.	50% R.H.
29	20.0	21.5	23.0	24.0
32	21.5	23.0	25.0	26.5
35	24.0	26.0	27.5	29.5
38	26.0	27.5	30.0	31.0

Notes:

WBGT values are expressed in degrees Celsius and are rounded to the nearest half degree. The following is a conversion chart of dry bulb temperature to WBGT values, taking into consideration different relative humidity's (RH).

The Threshold Limit Values (TLV's) shown above are based on the assumption that persons exposed to heat stress conditions are:

- Adequately hydrated
- Non-medicated
- In generally good health
- Wearing lightweight summer clothing

These assumptions should be kept in mind when the TLVs are applied to situations in which the assumptions are not valid.

Schedule 3
Examples of Work Rate Activities

Work Rate	Example Activities
Light (up to 200 kcal/hr.)	• Sitting with moderate arm and leg movements • Standing with light work at machine or bench while using mostly arms • Using a table saw • Standing with light or moderate work at machine or bench and some walking about
Moderate (200-350 kcal/hr.)	• Scrubbing in a standing position • Walking about with moderate lifting or pushing • Walking on level at 6 km/hr (3.7 mph) while carrying a 3 kg (6.6 lb.) weight load
Heavy (350-500 kcal/hr.)	• Carpenter sawing by hand • Shovelling dry sand • Heavy assembly work on a non-continuous basis • Intermittent heavy lifting with pushing or pulling i.e., pick and shovel work
Very Heavy (>500 kcal/hr.)	• Shovelling wet sand

Health Problems Arising from Heat Exposure

Personnel exposure to heat is associated with a number of possible heat problems. The following chart summarizes these problems, including their treatment and prevention. If an individual shows signs or reports symptoms of heat stress or strain, the person shall be removed from the hot environment and treated by a qualified first aider (if available), or by a physician.

Health Problems Arising From Heat Exposure

Conditions & Symptoms	Treatment	Prevention
Heat Rash (prickly heat) Tingling & burning of the skin, red itchy rash. Due to plugging of sweat gland ducts with prolonged exposure of skin to heat, humidity and sweat.	• Thorough drying • Cool showers • Calamine lotion	• Keep skin as dry as possible • Rest in cool places • Shower often • Change clothes frequently • Keep skin clean
Heat Cramps Painful spasm of muscles that perform the hardest work (i.e. in the arms, legs, and abdomen). Can occur during or after working hours.	• Massage the muscle(s) • Eat salt-containing foods (unless not indicated for medical reasons)	• Warm up muscles before heavy work • Take appropriate rest breaks • Eat a normal, healthy diet
Fainting Increased blood flow to the skin to eliminate heat; reduced blood flow to the brain.	• Lie down in a cool place • Drink cool fluids to lower body temperature • Consult a physician if fainting recurs	• Drink plenty of fluids regularly • Avoid standing still in one position; move around
Heat Exhaustion Tired, weak, dizzy, clammy skin, slow weak pulse. Pale or flushed complexion. Elevated heart rate (160-180 beats/min)	• Lie down with knees raised • Drink cool – not cold – fluids • Contact a physician if condition does not improve rapidly	• Acclimatization for 4-7 days • Drink cool fluids regularly, both before and during the time exposed to heat. • Take rest breaks in a cool place
Heat Stroke Worker usually stops perspiring, body temperature is high 40° – 43°C (104° – 109.4°F), skin is hot and dry. Worker experiences headache, dizziness, confusion, may lose consciousness or have fits. Fatal if treatment is delayed.	• This is an emergency and the worker must be taken to a hospital as quick-ly as possible. • Move worker to a cool or shaded area, remove clothing, wrap in wet sheet, pour on chilled water and fan vigorously. Avoid overcooling. Treat for shock once temperature is lowered. • Cooling should begin immediately and continue while en route to hospital.	• Acclimatization for 4-7 days • Take breaks in a cool place • Drink plenty of fluids regularly • Wear suitable clothing • Follow a work/rest schedule

Transportation of Dangerous Goods (TDG)

Purpose

This practice provides guidelines for the Transportation of Dangerous Goods (TDG).

The TDG and regulations are designed to protect the public through safe handling and containment of dangerous goods and to protect emergency response personnel with the information about hazards of dangerous goods in the event of an accident involving a spill or release.

Where an accidental release of a dangerous good has occurred, the person in charge will manage or control the release as reasonably practicable and report the occurrence to the proper regulatory agencies.

Definitions

Carrier – means a person who has possession of dangerous goods while they are in transport.

Receiver (Consignee) – Initial person who receives a consignment of dangerous goods.

Shipper (Consignor) – a person who offers a consignment of dangerous goods for shipment.

TDG – Transportation of Dangerous Goods.

Dangerous Good – A product, substance or organism included by its nature or by the TDG regulations in any of the classes listed in the schedule of the act.

Hazards

- Improperly trained personnel handling dangerous goods
- Explosions
- Chemical reactions
- Improperly classed materials
- Damage

General Guidelines

The following standards will be followed in all Paragon Ventilation Ltd operations with respect to TDG when applicable:

- Every container containing dangerous goods will be labelled by the consignor for proper classification before being transported.
- Vehicles that transport dangerous goods must display the applicable placards.
- Proper shipping documents and manifest must accompany every shipment.
- All personnel who handle, transport and/or ship dangerous goods must be trained and certified in the process, or working directly under a supervisor trained and certified in TDG.
- A person must not handle, offer for transport, or transport dangerous goods unless the means of containment is designed, constructed, filled, closed, secured maintained and labelled so that under

normal conditions of transport, including handling, there will be no accidental release of dangerous goods that could endanger worker or public safety.

- A consignor must be able to produce a copy of any shipping document for up to two years after the date the shipping document (or electronic copy of it) was prepared or given to a carrier by the consignor; for dangerous goods imported into Canada, for a period of two years after the date the consignor ensured that the carrier, on entry into Canada, had an electronic copy which can be produced within 15 days upon receiving a written request from an inspector.
- Dangerous goods must be loaded and secured in a means of containment in such a way as to prevent (under normal conditions of transport) damage to the means of containment that could lead to an accidental release of dangerous goods.

Driver Responsibilities

- Ensure the consignor/shipper has complied with their responsibilities.
- Ensure the cargo is securely loaded, properly segregated and free of leaks prior to departure.
- Obtain a bill of lading/manifest from the consignor/shipper and ensure it has been properly completed with all required information, including proper classification of the dangerous goods.
- Display the appropriate safety marks (placards and labels) in the proper manner and at proper locations.
- Replace any marks that are damaged or lost while in transport.
- Refuse consignments of dangerous goods that are offered for transport that do not meet the requirements of the regulations.
- Inspect for TDG compliance as a part of vehicle inspections.
- Ensure that training certificates are valid and readily available when handling or transporting dangerous goods.
- Report all dangerous goods spills/leaks or discharges to dispatch, supervisor and/or safety advisor.
- Follow dangerous goods routes.
- Provide consignee/receiver with the copy of the TDG bill of lading/manifest.
- Supply copies of the TDG bills of lading/manifests for filing at the district offices for retention of up to two years.
- Ensure that a copy of the shipping document is kept in a pocket mounted on the driver's door, or within the driver's reach. If the driver leaves the power unit he/she must place the document in the door pocket, on the driver's seat or in a location that is clearly visible to anyone entering the power unit through the driver's door.

Dangerous Goods Reporting Requirements

The immediate reporting requirements for spills, releases, loss, theft or misplacement of dangerous goods depend on the quantities or levels of the dangerous goods.

The reporting requirements, as specified in legislation, vary according to the class of the goods spilled, released, lost, stolen or misplaced. In most circumstances, the primary contact is the local police. Paragon Ventilation Ltd must submit a Dangerous Occurrence Report to Transport Canada within 30 days of a reportable occurrence.

In the event of any of the following situations, immediately contact dispatch, supervisor and/or the safety advisor with respect to dangerous goods being lost, misplaced, stolen or spilled in the quantities equal to or greater than specified in the regulations:

- Any damage to a bulk container
- Any accident involving Class 7 dangerous goods
- A fire or explosion involving dangerous goods

In the event of an accidental release of dangerous goods from a means of containment, a person who has possession of the dangerous goods at the time of the accidental release must make an immediate report to the appropriate provincial authority as well as the employer, the consignor of the goods and the owner of the vehicle if the accidental release consists of a quantity of dangerous goods or an emission of radiation that exceed quantities set out for each class of dangerous goods.

In the event of the release of dangerous goods, a person in charge will take all reasonable emergency measures to reduce or eliminate any danger to public safety that results or may reasonably be expected to result from the release.

Incident Reporting and Classification

When a vehicle incident occurs, the incident must be classified as preventable or non-preventable.

An incident is deemed preventable if the driver fails to exercise sound judgment in his driving practices or does not comply with all regulatory requirements and company policy and/or fails to do everything reasonably possible to prevent the incident.

An incident is deemed non-preventable if a driver exhibits sound judgment in his driving practices, complies with all regulations and company policy, and does everything reasonable to prevent the incident.

The primary objective of Paragon Ventilation Ltd is to eliminate injury and reduce monetary loss through the prevention of incidents. All vehicle damage is preventable.

All incidents must be reported and investigated according to the requirements of Paragon Ventilation Ltd Investigations Policy.

A driver's response following a vehicular incident should be to:

- Stop the vehicle and shut off the engine.
- Care for the injured and provide necessary first aid, if trained.
- Protect the scene from further mishap by placing reflective triangles or reflectors 30 m to the front and rear of the collision. If the collision occurs at night, the reflectors must be placed 75 m from the collision.
- Ensure witness names, vehicle and insurance information and third party information is collected.
- Ensure all information reported to Paragon Ventilation Ltd and the investigating authorities are factual; do not offer an opinion.

Investigations and Follow-Up

Sound investigations provide Paragon Ventilation Ltd with the tools necessary to identify root causes of incidents and to implement appropriate corrective measures for prevention.

Training

Anyone who handles, offers for transport or transports dangerous goods must be adequately trained and have a valid Dangerous Goods Training Certificate or must be in the presence of and under the direct supervision of a trained person.

The employer issues a training certificate when he/she has reasonable grounds to believe that an employee possesses adequate training. A training certificate must have the following information:

- The name and address of the employer.
- The name of the employee
- The date the training certificate expires preceded by the words “Expires On” or “Date Expiration”.
- The aspects of handling, offering for transport or transporting dangerous goods for which the employee is trained.
- The signature of the employee and employer representative.

Personal Protective Equipment

- Safety Footwear
- Safety Glasses
- Gloves
- Respirator if required

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Use of Hand – Held Power Circular Saws

General

This type of power hand tool is one of the most commonly used in construction. Because of this common use there are numerous accidents due to thoughtless acts.

The following are the minimum accepted practices to be used with this saw:

- Approved safety equipment such as safety glasses or face shield is to be worn.
- Where harmful vapors or dusts are created, approved breathing protection is to be used.
- The proper sharp blade designed for the work to be done must be selected and used.
- The power supply must be disconnected before making any adjustments to the saw or changing the blade.
- Before the saw is set down be sure the retracting guard has fully returned to its down position.
- Both hands must be used to hold the saw while ripping.
- Maintenance is to be done according to the manufacturer's specifications.
- Ensure all cords are clear of the cutting area before starting to cut.
- Before cutting, check the stock for foreign objects or any other obstruction which could cause the saw to "kick back".
- When ripping, make sure the stock is held securely in place. Use a wedge to keep the stock from closing and causing the saw to bind.

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Welding

Purpose

This practice provides g uidelines to protect a nd educate personnel on welding safety procedures in the workplace, and ensure the health and safety of personnel at the worksite.

Paragon Ventilation Ltd Responsibility

Paragon Ventilation Ltd personnel shall ensure welding is done in a safe and efficient manner, regardless of the complexity of the job and potential time constraints.

Definitions

Purging – is the act of removing the contents of a pipe or container and replacing it with another gas or liquid. Purging is crucial in pipeline, piping, welding and industrial process. It removes contaminants from the piping and vessels, which reduces chances of corrosion. Purging can prevent a hazardous mixture of gas and air.

Some forms of purge include:

- **Inert purge:** The act of changing the contents of a pipe or container by using an inert substance to displace the original content or to separate the two media being interchanged. Flammable mixtures are thus avoided.
- **Dilution:** A form of purging in which replacement of one substance by another is accomplished with appreciable mixing.
- **Displacement**: A form of purging in which replacement of one substance by another is accomplished without appreciable mixing.

Acetylene – A colorless gas with a slight garlic-like odour. Flammable gas combining with air over a wide range forms explosive mixtures. Flammable limits are 2.5% and 100%. Minimum ignition temperature is 571^{o}F. It is lighter than air with a vapour density of 0.9. Distribution through hose and piping should be maintained at less than 15psi. It forms explosive compounds with copper, silver and mercury. Keep acetylene cylinders away from heat sources and the surrounding temperature should be kept below 54oC (130^{o}F).

Oxygen – Oil, grease or similar materials should never be allowed to come in contact with any valve, fitting, regulator or gauge of oxygen cylinders because of the spontaneous explosive hazard.

Hazards

Electric Shock- Electric shock can lead to severe injury or death, either from the shock itself or from a fall caused by the reaction to a shock. Occurs when welders touch two metal objects that have a voltage between them, thereby inserting themselves into the electrical circuit. For instance, if a worker holds a bare wire in one hand and a second bare wire with another, electric current will pass through that wire and through the welding operator, causing an electric shock. The higher the voltage, the higher the current and, thus the higher the risk for the electric shock to result in injury or death.

Fumes and Gases – Overexposure to welding fumes and gases can be hazardous to your health. Welding fume contains potentially harmful complex metal oxide compounds from consumables, base metal and the base-metal coatings, so it's important to keep your head out of the fumes and use enough ventilation and/or exhaust to control your exposure to substances in the fume, depending on the type of rod and base metal being used.

The specific potential health effects which relate to the welding consumable product being used can be found in the Health Hazard Data section of the Safety Data Sheet available from your employer or the consumable manufacturer.

Welding areas require adequate ventilation and local exhaust to keep fumes and gases from the breathing zone and the general area. In most situations, employers will provide a ventilation system- such as a fan, and an exhaust system or fixed or removable exhaust hoods- to remove fumes and gases from the work area.

Fire and Explosions – The welding arc creates extreme temperatures, and may pose a significant fire and explosions hazard if safe practices are not followed. While the welding arc may reach temperatures of 10,000 degrees Fahrenheit, the real danger is not from the arc itself, but rather the intense near the arc and the heat, sparks and spatter created by the arc. This spatter can reach up to 35 feet away from the welding space.

To prevent fires, before beginning to weld, inspect the work area for any flammable materials and remove them from the area. Flammable materials are comprised of three categories: liquid, such as gasoline, oil and paint; solid, such as wood, cardboard and paper; gas, including acetylene, propane and hydrogen.

Know where the fire alarms and extinguishers are located, and check the extinguisher's gauge to make sure it is full. If an extinguisher is not available, be sure to have access to fire hoses, sand buckets or other equipment that douses fire. And, know the location of the nearest fire exit.

If welding within 35 feet of flammable materials, have a fire watcher nearby to keep track of sparks, and remain in the work area for at least 30 minutes after finishing welding to be sure there are no smoldering fires. Put a fire resistant material, such as a piece of sheet metal or fire resistant blanket, over any flammable materials within the work area, if you can't remove them.

In an elevated location, make sure no flammable materials are beneath you, and watch out for other workers below you in order to prevent dropping sparks or spatter on them. Even high concentrations of fine dust particles may cause explosions or flash fires. If a fire starts, don't panic – and call the fire department immediately.

Injuries from insufficient PPE – Personal protective equipment (PPE) helps keep welding operators free from injury, such as burns – the most common welding injury – and exposure to arc rays. The right PPE allows for freedom of movement while still providing adequate protection from welding hazards.

Thanks to their durability and fire resistance, leather and flame-resistant treated cotton clothing is recommended in welding environments. This is because synthetic material such as polyester or rayon will melt when exposed to extreme heat. Welding leathers are especially recommended when welding out of position, such as applications that require vertical or overhead welding.

Avoid rolling up sleeves or pant cuffs, as sparks or hot metal will deposit in the folds and may burn through the material. Keep pants over the top of work boots – do not tuck them in. Even when wearing a helmet, always wear safety glasses with side shields or goggles to prevent sparks or other debris from hitting the eyes. Leather boots with 6-to-8-inch ankle coverage are the best foot protection; metatarsal guards over the shoe laces can protect feet from falling objects and sparks. It will not be pleasant if a hot piece of spatter finds its way inside your clothing or shoes.

Heavy, flame-resistant gloves should always be worn to protect from burns, cuts and scratches. As long as they are dry, they also should provide some protection from electric shock. Leather is a good choice for gloves.

Helmets with side shields are essential for protecting eyes and skin from exposure to arc rays. Make sure to choose the right shade lens for your process – use the helmet's instructions to help select the right shade level. Begin with a darker filter lens and gradually change to a lighter shade until you have good visibility at the puddle and weld joint but it is comfortable and does not irritate your eyes. Helmets also protect from sparks, heat and electric shock. Welder's flash from improper eye protection may cause extreme discomfort, swelling or temporary blindness, so don't take any risks – wear a helmet at all times during welding.

To protect ears from noise, wear hearing protection if working in an area with high noise levels. Doing so will protect your hearing from damage, as well as well prevent metal and other debris from entering the ear canal. Choose ear plugs or ear muffs to protect the ears.

General Guidelines

Requirements

Hot work must not begin until:

- A Welding and Hot Work Checklist is completed.
- A hot work permit is issued that indicates:
- The nature of the hazard
- The type and frequency of atmospheric testing required
- The safe work procedures and precautionary measures to be taken
- The protective equipment required
- The hot work location is:
  - Cleared of combustible materials, flammable materials, explosive, dust, gas or vapour, or
  - Suitably isolated from combustible materials.
  - Covered with Fire Blankets.
- Procedures are implemented to ensure continuous safe performance of the hot work.
- Testing shows that the atmosphere does not contain:
  - A flammable substance, in a mixture with air, in an amount exceeding 20% of that substance's lower explosive limit for gas or vapors.
  - The minimum ignitable concentration for dust

Welding, Cutting and Burning

Work involving welding, cutting and burning can increase the fire and breathing hazard on any job. The following should occur prior to the start of work:

- Compliance with the requirements of *CSA Standard W117.2-06*, Safety in Welding, Cutting and Allied Processes (or current version).
- Ensure that welding or allied process equipment is erected, installed, assembled, started, operated, used, handled, stored, stopped, inspected, serviced, tested, cleaned, adjusted, carried, maintained, repaired and dismantled in accordance with the manufacturer specifications.
- Ensure that before a welding or allied process is started, the area surrounding the operation is inspected and:
  - All combustible, flammable or explosive material, dust, gas or vapour is removed, or
  - Alternate methods of rendering the area safe are implemented. USE FIRE BLANKETS
- Ensure that adequate ventilation is supplied since hazardous fumes and gases can be created during welding, cutting or burning operations.
- Have firefighting or prevention equipment on hand before starting welding, cutting or burning.
- Where other personnel may also be exposed to the hazards such as burns, radiation and vapours created by welding, cutting and burning, they must be alerted to these hazards or protected from them by use of screens and general ventilation.
- A welder should never work alone. A fire or sparks watch should be maintained.
- Check hoses and cables to protect them from slag or sparks.
- Recently welded or flame cut work must be marked “HOT” or have sufficient guards in place to prevent contact by a worker, if there is a possibility a worker not directly involved in the hot work may enter the area.
- Never weld or cut lines, drums, tanks, etc. that have been in service without making sure that all precautions have been carried out and permits obtained.
- Never enter, weld or cut in a confined space without proper gas tests and the required safety lookout.
- When working overhead, use fire resistant materials (Fire blankets, tarps) to control or contain sparks, debris and other falling hazards, to protect employees below the operation.

Purging

Prior to any hot work being performed on any container that may have held any flammable or explosive material, the container must be purged with the minimum safety measures taken as follows:

- The internal layout of the container must be examined to ensure that fittings such as baffles will not inhibit cleaning or purging.
- The container must be drained and cleaned using appropriate methods.
- The interior of the container must be tested using a combustible gas detector to determine if the container is safe after completing the draining and cleaning. This test must be performed before hot work begins and periodically during the work.

- If the container cannot be drained and cleaned well enough to be made safe, it may be made safe by purging and inerting with an inert gas using the following precautions at a minimum:
  - Appropriate equipment and procedures must be used.
  - Workers must be aware of the limitations of the inerting process.
  - The oxygen level inside the container must be maintained at basically zero and monitored with an oxygen analyzer throughout the work process.

  A container must be tested and verified as safe before beginning any hot work. Never assume a container is clean or safe.

Oxy-Fuel Gas Equipment Precautions

- Supply hoses must be protected from traffic.
- Open all cylinder valves slowly. The spanner/wrench used for opening the cylinder valves should always be kept on the valve spindle when the cylinder is in use.
- Employees should never force connections that do not fit, nor shall they tamper with the safety relief devices of cylinder valves.
- Pressure regulators, required by provincial regulations, shall be in place and used on all compressed gas cylinders. Flash back prevention devices shall be installed at the regulator end of all fuel/ oxygen supply lines.
- Do not use regulators, hoses or torches unless they are working properly.
- Use only a spark lighter to ignite torches. Never use matches or cigarette lighters or carry butane lighters.
- Oxygen or acetylene torches must not be used to blow dust from work surfaces, clothing or skin. Valves should not be opened (cracked) to clear debris from the threads.
- In case of a fire, protect adjacent property. Keep the cylinder cool and let the fire burn out.
- Personnel using an oxy-acetylene cutting torch must wear goggles with the proper shade of lenses and also use leather gauntlet gloves.

Portable Arc Welders

- Portable arc welders are a piece of equipment that is to be treated like a vehicle. Do not operate them indoors.
- Be sure the machine is securely attached to the transporting unit.
- Check all fluid levels, water, oil and gas to be sure they are at acceptable levels for operation.
- When fueling, do not “top off” the gas tank. Gasoline expands as the outside temperature rises, which may result in weeping and an ensuing fire.
- Do not fuel the machine while it is running.
- Be sure the radiator and gas caps are in proper working order and securely attached.
- Do a “walk around” to check for damage and obvious leaks.
- Qualified mechanics or technicians should do any repairs.

- Make sure all cables are wound securely when transporting.
- Ensure that side covers are kept closed to protect the machine from any damage from external objects and outside weather, as well as to protect the operator and others from moving parts of the machine.

Storage and Handling

- Protect cylinders, piping and fittings against physical damage during handling, filling, transportation and storage.
- Cylinders should be properly secured and always used, transported or stored in accordance with manufacturer specifications.
- Store cylinders in a cool, well-ventilated and non-combustible place away from all possible sources of ignition. Outside storage is preferred with overhead protection from the weather.
- Cylinders of compressed flammable gas are not to be stored in the same room as a cylinder of compressed oxygen, unless the storage arrangements are in accordance with *Part 3 of the Alberta Fire Code (1997)*.
- Cylinders should not be stored where materials or equipment can strike, fall on or knock them over.
- Cylinders should be protected against lightning, static electricity, sparks, flames, contact with energized electrical equipment, or being inadvertently struck by a welding rod.
- Cylinders should have the valve protection cap or other approved protective device in place at all times, except when secured in position for actual use.
- Cylinders should not be rolled and lifted by the valve or valve caps. A suitable cradle or other approved device should be used or otherwise chained or secured so they cannot fall or be upset.
- Close the valves before moving the cylinders.
- A leaking gas cylinder must be shut off and removed to an outdoor location away from ignition sources and marked so it is readily identifiable. The supplier should be notified about the defective cylinder.

Training

- As per company requirements

PPE

- Welding helmet, hand shield, or goggles
- Respirators
- Fire/Flame resistant clothing and aprons
- Ear muffs, ear plugs
- Boots
- Insulated and/or Fire Resistant Gloves

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W-H-M-I-S (Workplace Hazardous Materials Information System)

Purpose

This practice provides information to ensure Paragon Ventilation Ltd personnel are aware of the Workplace Hazardous Materials Information System (WHMIS) and the controlled products in their immediate work environment.

WHMIS is a nationwide system which was developed for the control and safe use of hazardous materials in the workplace. WHMIS provides us with a standard classification and information system to help ensure that everyone understands his or her role. Information is provided to us through three components:

- Product labels
- Material Safety Data Sheets (MSDS)
- Worker education programs

It is important that everyone within the workplace have an awareness of the controlled products in their immediate work environment, as well as the safe handling, storage and disposal procedures for these materials, and how to prevent or deal with an accident in the event of an emergency.

WHMIS is the responsibility of the chemical supplier, employer and all employees.

General Guidelines

WHMIS Hazard Classes

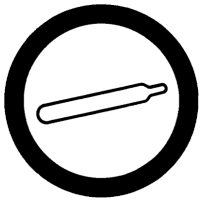
WHMIS applies to material called “controlled products”. A controlled product is a product that meets the criteria for one or more of the six (6) WHMIS hazard classes. Hazard symbols are useful as a visual aid in identifying hazardous materials.

The following are the six (6) WHMIS classes:

CLASS A - COMPRESSED AIR

This symbol indicates that the contents of the container are under pressure - anything done to weaken the structure of the container could result in an explosion or a dramatic release of pressure. A compressed gas is a material, which is a gas at normal room temperature and pressure, and is packaged under compression.

Helium and propane are common examples of materials that are supplied as a compressed gas.



CLASS B - FLAMMABLE/COMBUSTIBLE MATERIALS

“Flammable/Combustible” materials are solids, liquids or gases that will ignite and continue to burn if exposed to a flame or source of ignition. These materials may also be explosive in certain situations or react with other materials to produce a flammable material.

Diesel and gasoline are examples of commonly used flammable materials

CLASS C - OXIDIZING MATERIALS

These materials produce oxygen or another oxidizing substance which can cause or contribute to the combustion of another substance.

Chlorine is an example of an oxidizing material.

CLASS D - POISONOUS/INFECTIOUS MATERIALS

Class D materials refer to materials which are known to be poisonous and/or infectious.

These materials are further separated into three categories D1, D2, and D3. Let's have a closer look at each of these Poisonous/ Infectious material symbols.

CLASS D1 - MATERIALS CAUSING IMMEDIATE and SERIOUS TOXIC EFFECTS

The effects of Class D1 materials are very harmful based on short-term exposures. Very little exposure can produce serious toxic effects or possibly death. These materials are classified for toxicity based on information such as the lethal dose and the lethal concentration

Cyanide is an example of a material that causes immediate and serious toxic effects.

CLASS D2 - MATERIALS CAUSING OTHER TOXIC EFFECTS

Class D2 substances can produce many different toxic effects. They also have a wide variety of classifications. For example, D2 substances can be classified as carcinogens, teratogens, reproductive toxins, respiratory tract sensitizers, irritants, or chronic toxic hazards. Exposure effects range from short term (i.e., dizziness, difficulty breathing), to long term (cancer, lung disease).

Asbestos is an example of this class of material.

CLASS D3 - BIOHAZARDOUS INFECTIOUS MATERIALS

Class D3 materials refer to any organism, or the toxins produced by these organisms, that have been shown or are believed to be a biological hazard in either humans or animals. These materials are usually limited to laboratory and testing environments

CLASS E - CORROSIVE MATERIALS

Class E materials are corrosives that can cause decomposition of other materials (i.e., metals) or damage human tissue.

Sulphuric Acid and Ammonia are examples of corrosive materials.

CLASS F - DANGEROUSLY REACTIVE MATERIALS

Class F materials may react with other substances to produce a wide range of negative reactions. These reactions can range from decomposition to condensation. The stability of these materials may be adversely affected by exposure to certain elements such as water, pressure, or temperature.

Ozone is an example of a dangerously reactive material

Labels

There are two main kinds of WHMIS labels:

- Supplier Labels
- Workplace Labels

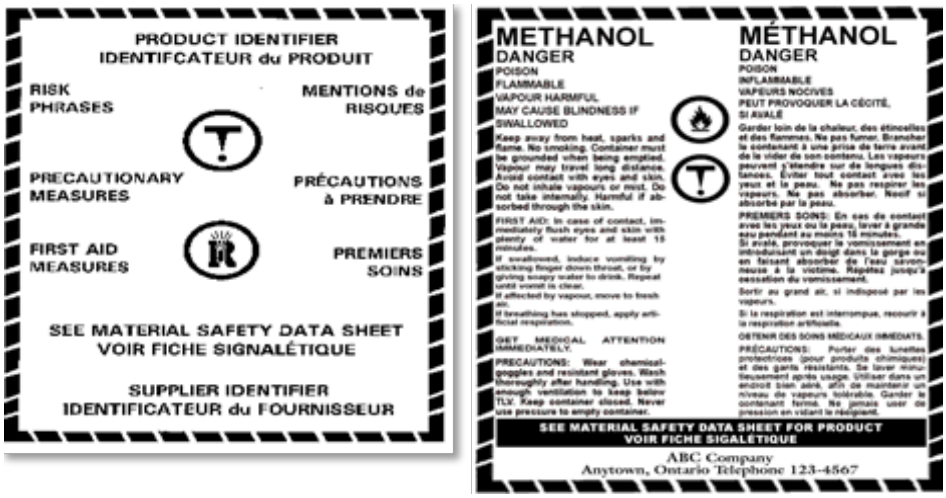
Supplier Labels

- Provides basic information about how to handle a product safely
- Have distinctive rectangular slash-marked borders

Supplier Label contains 7 pieces of information:

1. Hazardous Ingredients
2. Product Identification
3. Name and address of supplier
4. Symbols for each of the product's hazard classes
5. Main hazards of the product
6. Precautions during handing and use
7. Reference to the MSDS for more information

Example of WHMIS supplier label



Supplier Labels – Bulk Shipment of Controlled Products

- If a Controlled Product is shipped in containers of more than 454 litres (100 gallons) the supplier must do one or more of the following:
  - Send the Supplier Label separately
  - Add the Supplier Label information to the MSDS
  - Send the information as a separate document

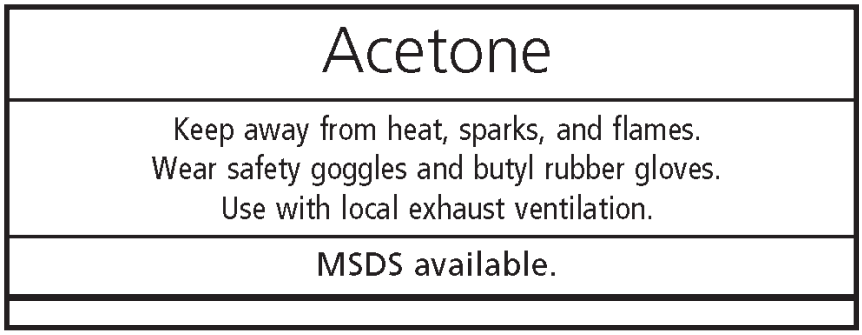
Supplier Labels – Small Containers

- If a controlled product container holds 100 ml or less, the Supplier Label needs to show only the following information:
  - Product Name
  - Supplier Identifier
  - Hazard Symbols
  - Reference to the Availability of an MSDS

Work Site Labels

- Appear on products that have been transferred from suppliers' containers to work site containers, and on controlled projects manufactured at the work site
- Work site labels are also used to replace supplier labels and only require three pieces of information:
  a. Name of product
  b. Information on how to use product safely
  c. Reference to MSDS for further information

Example of a WHMIS work site label



Material Safety Data Sheets (MSDS)

- If you need to know more about a product than you can find on the label – GO TO the product MSDS.
- These sheets have more detailed information about a product, its hazards, precautions, and first aid treatment.
- Certain sections of the MSDS will be more important to some than others. Everyone should know the name of the chemicals they are handling, the hazards associated with use, the safe handling, storage and disposal procedures, and, what to do in the event of an emergency.
- MSDS for all controlled products at a work site must be kept in a place where workers have easy access to them
- For Paragon Ventilation Ltd work sites – refer to the MSDS section of Paragon Ventilation Ltd manual.
- MSDS does not list all the product's ingredients. Lists only the ingredients considered to be hazardous, along with their concentrations.

MSDS - SUPPLIER RESPONSIBILITIES

- To produce and supply an up to date and comprehensive Material Safety Data Sheet for all controlled products in both official languages

MSDS - EMPLOYER RESPONSIBILITIES

To obtain all MSDSs (bilingual) from their suppliers' for all controlled products found in their work environment.

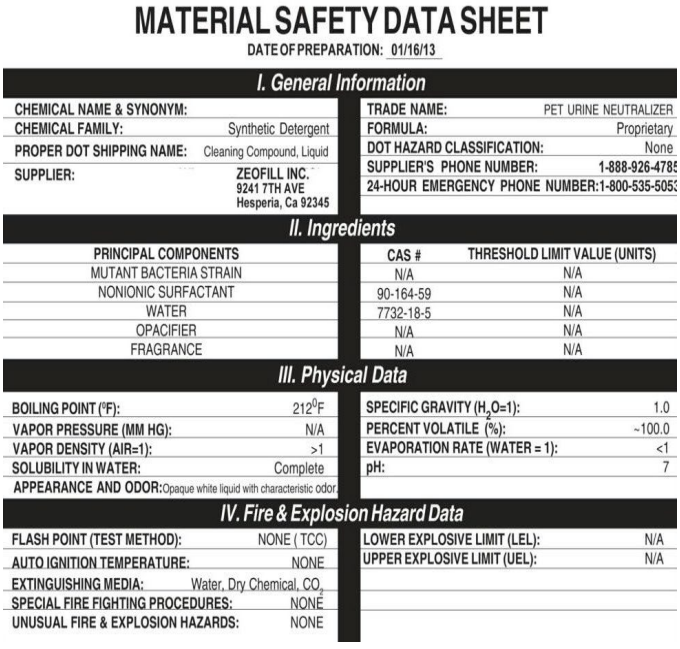
- MSDSs must be available to all employees at all times, at all work sites.
- The employer must ensure that all MSDSs are updated if there are any changes to a product, and, that they are no more than three years old.

MSDS - EMPLOYEE RESPONSIBILITIES

All employees are responsible for taking the time to familiarize themselves with the information found on an MSDS for each controlled product found in their work environment

NINE SECTIONS ON AN MSDS

1. Hazardous Ingredients
2. Product Identification
3. Fire and Explosion Data
4. Physical Data
5. Reactivity Data
6. Toxicological Properties (Health Effects)
7. Preventive Measures
8. First Aid Measures
9. Preparation Information



MATERIAL SAFETY DATA SHEET

DATE OF PREPARATION: 01/16/13

I. General Information

CHEMICAL NAME & SYNONYM:		TRADE NAME:	PET URINE NEUTRALIZER
CHEMICAL FAMILY:	Synthetic Detergent	FORMULA:	Proprietary
PROPER DOT SHIPPING NAME:	Cleaning Compound, Liquid	DOT HAZARD CLASSIFICATION:	None
SUPPLIER:	ZEOFILL INC. 9241 7TH AVE Hesperia, Ca 92345	SUPPLIER'S PHONE NUMBER:	1-888-926-4785
		24-HOUR EMERGENCY PHONE NUMBER:	1-800-535-5053

II. Ingredients

PRINCIPAL COMPONENTS	CAS #	THRESHOLD LIMIT VALUE (UNITS)
MUTANT BACTERIA STRAIN	N/A	N/A
NONIONIC SURFACTANT	90-164-59	N/A
WATER	7732-18-5	N/A
OPACIFIER	N/A	N/A
FRAGRANCE	N/A	N/A

III. Physical Data

BOILING POINT (°F):	212°F	SPECIFIC GRAVITY (H_2O=1):	1.0
VAPOR PRESSURE (MM HG):	N/A	PERCENT VOLATILE (%):	~100.0
VAPOR DENSITY (AIR=1):	>1	EVAPORATION RATE (WATER = 1):	<1
SOLUBILITY IN WATER:	Complete	pH:	7
APPEARANCE AND ODOR:	Opaque white liquid with characteristic odor.		

IV. Fire & Explosion Hazard Data

FLASH POINT (TEST METHOD):	NONE (TCC)	LOWER EXPLOSIVE LIMIT (LEL):	N/A
AUTO IGNITION TEMPERATURE:	NONE	UPPER EXPLOSIVE LIMIT (UEL):	N/A
EXTINGUISHING MEDIA:	Water, Dry Chemical, CO_2		
SPECIAL FIRE FIGHTING PROCEDURES:	NONE		
UNUSUAL FIRE & EXPLOSION HAZARDS:	NONE		

Preventive Measures

- Especially useful for workers
- Information about the following topics must be covered in the preventive measures section of all MSDSs:
  - **Personal protective equipment (PPE)** – clothing/equipment that a worker handling a controlled product wears to reduce or prevent exposure to the substance (goggles, gloves, aprons, etc.).
  - **Engineering controls** – measures for eliminating or reducing chemical hazards to which workers may be exposed (ventilation system requirements).
  - **Spill/leak procedures** – these procedures describe the steps to be taken in the event of a spill or leak of the controlled product.
  - **Handling procedures/equipment** – describes the basic precautions to be followed when handling the product, or the basic equipment to be used during handling.
  - **Storage requirements** - specific instructions for preventing the development of "conditions of flammability, instability or reactivity" during storage.
  - **Shipping information** – specific instructions for preventing the development of "conditions of flammability, instability or reactivity" during shipping.

First Aid Measures

- MSDS section about First Aid Measures gives instructions for the specific first aid measures to be taken if:
  - The hazardous substance gets into a worker's eyes or onto the skin.
  - A worker has been overexposed to the hazardous substance by ingesting or inhaling it.

Worker Education

- Everyone in the work environment has a responsibility in the WHMIS education process.
- Employers – are required to provide worker education for WHMIS.
- WHMIS worker education includes training workers to understand:
  - Information on WHMIS labels
  - MSDS
  - The Meaning of information and its application to their work
  - Identification systems that are used in place of labels at a work site
  - Procedures for safe use, handling, storage and disposal of the controlled products that workers are handling
  - Procedures for dealing with fugitive emissions of the controlled products workers may encounter
  - A fugitive emission is a term used to describe a small amount of a controlled product that is known to escape from process equipment or emission control equipment
  - Procedures for emergencies involving controlled products
- WHMIS must be reviewed at least once a year with employees.

Training

Before a Paragon Ventilation Ltd employee performs any work with controlled products they will be required to learn and abide by the general guidelines set out in this safe work practice, be properly trained and deemed competent by a qualified supervisor.

Zoom Boom

Purpose

The purpose of this procedure is to promote the safe use of mobile equipment (i.e. zoom boom).

Responsibilities

Manager

It will be the responsibility of the management to take reasonable and practical measures to have the sire equipment and materials made available and maintained in accordance with the applicable regulations and manufacturer's specifications.

Foreman

It will be the responsibility of the foreman to take reasonable and practical measures to have the site equipment serviced, maintained and operated by qualified personnel. The foreman is responsible to ensure workers have received proper training and instruction in the safe use of related equipment and PPE prior to commencing the activity.

Worker

It will be the responsibility of the worker(s) to adhere to the safety requirements regarding this specific task. The worker will advise the foreman of any damage, deviation in operation, excessive wear, etc., prior to using equipment or related materials.

Equipment Required

1. PPE (hardhat, CSA/ANSI footwear, eye and haring protection when required, hi-visibility vest).

Practice

1. The equipment operator will verify with the foreman that all appropriate permits, locates and advisories have been completed.
2. Visually check the area of operation to ensure sufficient operating room and identifying real or potentially hazards (e.g. process piping, power lines, building components, etc.). The operator will visually inspect the location where the work is to be done.
3. Prior to and after each use the equipment operator will complete a visual inspection of the equipment. This will include looking for: fluid levels, leaks, missing/damaged/loose components, excessive wear, inoperative safety devices, etc.
4. The equipment operator will, upon starting the zoom boom:
   - **Idle the equipment until it reaches operating temperatures and pressures**
   - Monitor the gauges to ensure the correct operating ranges

- Check hydraulic, levers, pedals, etc. Correct operation
- Identify “blind spots”

5. When entering and exiting the cab of the zoom boom, the operator will use the appropriate handles and “grabs” to ensure his/her safety.
6. Hearing protection is to be used when cab noise exceeds occupational exposure limits.
7. A zoom boom must be equipped with roll over protection and falling object protection cab.
8. Equipment operators shall use the manufacturer’s supplies seat belts when in motion.
9. Equipment operators will not allow riders (e.g. in cab, on forks, on load, etc.).
10. Keep floors, steps and running boards clean and free of oil, ice, mud and loose objects.
11. No portion of the machine or payload should be brought closer to any energized overhead electrical conductor with nominal phase voltage rating as specified below:

Schedule 4 – Safe Limit of Approach Distances

Safe limit approach distances from overhead power lines fort persons and equipment.

Operating voltage between power conductors of overhead power line	Safe limit of approach distance fort persons and equipment
0-750 volts Insulated or polyethylene covered conductors (1)	300 millimetres
0-750 volts Bare, uninsulated	1.0 metre
Above 750 volts Insulated conductors (1) (2)	1.0 metre
750 volts- 40 kilovolts	3.0 metre
69 kilovolts, 72 kilovolts	3.5 metre
138 kilovolts, 144 kilovolts	4.0 metre
230 kilovolts, 260 kilovolts	5.0 metre
500 kilovolts	7.0 metre

Note:
1. Conductors must be insulated or covered throughout their entire length to comply with this group.
2. Conductors must be manufactured to rated and tested insulation levels.

12. Equipment operators will transport materials and equipment as low to the ground as possible, thereby reducing the tripping potential.
13. Where there is potential for contact with other equipment, personnel, material, etc., a spotter will be used.
14. Equipment operators will load, unload and turn on level ground.
15. Keep personnel away from working area of the equipment.
16. Do not leave the zoom boom unattended with engine running or with lift arms up.
17. If in doubt about the safe operation of this equipment, ask or refer to equipment manual.
18. Equipment must be equipped with a fire extinguisher.