RESPIRATORY PROTECTION STANDARD

SWS 19000-005

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Document Owner: Environment, Health and Safety Manager

Document Contact: Safety and Hygiene Advisor

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SCOPE AND PURPOSE

The purpose of this standard is to outline respiratory protection requirements to help eliminate or mitigate potential exposure to occupational related illnesses or injuries.

The scope of this program applies to all work environments at SCEP and will include roles and responsibilities around PPE, hazard assessment, general controls and specific requirements for outlined PPE where applicable.

RESPONSIBILITIES

Environmental Health and Safety

- Assist with identification of work location and/or specific work activities for which donning respiratory protection is mandatory or recommended
- Provide recommendations to site leadership related to respiratory protection
- Ensure appropriate respiratory protection and selection criteria are available to employees
- Coordinate hygiene monitoring as required

Joint Health and Safety Committee

- Provide input on respiratory protection where appropriate (worker concerns, suggestions for improvement, work activities for review etc.)
- Report, as soon as practicable, any worker concerns related to respiratory protection to their supervisor and escalate as necessary.
- Communicate information provided at the JHSC to their co-workers and gather feedback for JHSC consideration
- Support worker compliance with this respiratory protection standard
- Provide input to the scope for hygiene sampling events and attend sampling where practicable

Discipline Managers (Operations, Maintenance, Technical, etc.)

- Identify hazard areas and/or work activities and employees who have the potential to be exposed
- Ensure that all employees are aware of hazards associated with relevant work activities and are utilizing appropriate respiratory protection control measures
- Take appropriate steps to minimize the risk of hazards, and use of PPE, including, but not limited to, identification and implementation of control measures where feasible (elimination (where practicable), engineering controls, and administrative control measures) related to work activities.
- Support compliance with respiratory protection requirements related to the work activities
- Support follow-up and response to any worker concerns related to respiratory protection or other workplace hazards
- Support worker schedules to allow for respiratory fit testing and any associated training

Shift Supervisors

- Conduct hazard assessment in order to Identify hazard areas and/or work activities and employees who have the potential to be exposed
- Enforce compliance related to proper selection, use and care of respiratory protection
- Ensure workers have proper training
- Ensure respiratory protection controls are clearly outlined on Safe Work Permits
- Contact EHS for requests related to respiratory protection concerns when appropriate

Employees

- Comply with respiratory protection standard
- Attend and complete respiratory fit testing and training as required, and ensure training remains valid
- Proper care and use for respiratory protection where required
- Report respiratory protection concerns to Supervisor

HAZARD ASSESSMENTS

Hazard assessment of the work area and/or specific work activities should be conducted to determine potential respiratory hazards present prior to selecting respiratory protection. Hazard assessments will be completed by the shift supervisor or operations coordinator (with support from the Industrial Hygiene & Safety Advisor as needed) as part of Safe Work Permit or work planning activities.

The following factors are to be considered during a respiratory protection hazard assessment:

- Oxygen Concentration
- Type & Concentration of airborne contaminants (either present or generated via work activities)
- Natural/Physical state of contaminants
- Warning properties & toxicity of contaminants
- LEL/IDHL levels of contaminants
- Condition of work area, operations, processes or tasks involved
- Duration of worker exposure
- Potential for emergency escape
- Cartridge change out schedule

RESPIRATOR SELECTION

Selection of the appropriate respirator will be determined by the results of the hazard assessment. Where the concentration of the contaminant is unknown SABA or SCBA must be used. Refer to Appendix A- Respirator Selection Chart for further guidance for selection criteria.

Required respiratory protective equipment must be specified on the relevant work permit.

Respiratory protective equipment selection includes:

- Air Purifying Respirator (APR) – Half or Full Face
- Supplied Air Breathing Apparatus (SABA)
- Self-Contained Breathing Apparatus (SCBA)
- Power Air Purifying Respirator (PAPR)

Respirators can only be used at or up to the maximum use concentration (MUC). MUC values for airborne contaminants for respirators are determined by multiplying the assigned protection factor (Refer to Table 1) by the relevant occupational exposure limit (OEL) or time weighted average (TWA).

Table 1: Assigned Protection Factors (APF) for Respiratory Protection

Mask Type	Fit Test Method	Assigned Protective Factor
Half Face APR	Qualitative or Quantitative	10
Full Face APR	Qualitative	10
Full Face APR	Quantitative	50
PAPR-Full Face (tight fitting)	Quantitative	1,000
SCBA Full Face	Quantitative	10,000

*Protective Factor Values based on CSA Z94.4 – Selection, Care, Use of Respiratory Protection

USE OF RESPIRATORS & CARTRIDGES

Respiratory protective equipment shall be used as per manufacturer's instructions and shall not be modified**.** Workers required to don a respirator must ensure that the respirator seal is not impeded in anyway i.e facial jewelry, facial hair, eye glasses etc. See Appendix B for acceptable facial hair.

Cartridges must be changed-out as outlined in the *Respiratory Selection Guideline* Document to reduce the potential for contaminant breakthrough in the cartridge.

For employees requiring prescription glasses, inserts are offered that can be used when donning a full face piece. Contact HR/Payroll Administrator for more information and to initiate the process. New lenses will be provided as the prescription changes. Employees are responsible for filling prescriptions.

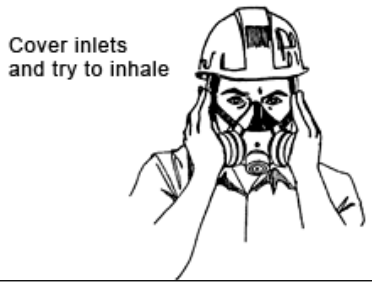
CLEANING, INSPECTION, MAINTENANCE AND STORAGE OF RESPIRATORS

Prior to donning a respirator workers must inspect the face piece for defects or damages including:

- Cuts, tears, flexibility and elasticity of the straps
- Distortions, cracks, dirt or tearing around the face seal, valves, and vale seats
- Threaded cartridge is flush with face piece
- Cartridge selected provides adequate protection

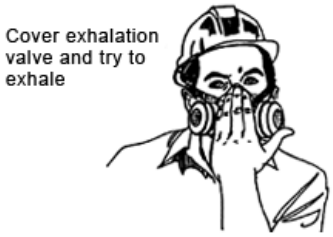
Workers should perform a positive and negative pressure test on any air-purifying respirator as part of their inspection to ensure the seal is working. A negative pressure check (Figure 1) should be performed prior to a positive pressure check (Figure 2).

Figure 1- Negative Pressure Check



A *negative pressure check* is when the inlet opening of the cartridge is closed off with the palm of your hand, inhale to slightly collapse the face piece, hold breath for 10 seconds. Face piece should remain slightly collapsed with no air leakage – this indicates the seal is working.

Figure 2-Positive Pressure Check



A *positive pressure check* is when the exhalation valve (middle valve by mouth) is covered with palm of hand and as you exhale slight positive pressure is built up inside the face piece. Face piece should fill with air/balloon slightly to indicate the seal is working.

If either pressure check fails, inspect for cracks, cuts, tears and tighten face straps and repeat checks. If a seal cannot be successfully achieved due to continued failure - workers must danger tag respirator, remove from service and notify supervisor, and select a new air purifying respirator.

Air purifying respirators may be cleaned with supplied disinfectant wipes, or by placing the respirator in the labelled cleaning bin (near the control room) to allow for third party cleaning, checking and sanitizing.

All air purifying respirators and cartridges are found in the safety cage. Workers are allowed to keep respirators for more than one use, however they must properly clean and store them after each use. Respirators shall be stored in a way that protects against any potential hazard that may impact or compromise the integrity of the respirator including but not limited to: sunlight, extreme temperatures, dust, moisture, damaging chemicals/oils/greases.

SUPPLIED AIR RESPIRATORY EQUIPMENT

Supplied Air respirators include both SABA and SCBA. All Supplied air respirators and SCBA air cylinders are located in the process building control room and are inspected monthly by a third party contractor. After use, workers must return supplied air equipment to the control room and notify their supervisor and/or EHS of use. Functional testing of all supplied air respirators and air cylinders are conducted by a third party contractor and carried out as per CSA Z94.1 & Z180.1 requirements as well as manufacturer's instructions.

SABA- requires a certified supplied air attendant that does not directly participate in the execution of work being performed. Length of airline/supply hose and couplings must be used in accordance with manufactures guidelines, note brass couplings should be used in high spark potential environments and locations classified as hazardous (see site drawing SE0803-833 for locations). Block manifolds can be used with a cap of 4 users/connections per air system in use.

Fixed hose connections are required when entering an inert atmosphere.
Dual connections are considered a minimum requirement in the following situations:

- were transitions between air supply hoses are a potential~~,~~
- were redundant air hoses are used (not including inert atmospheres), work is being conducted in a CO2 area, on/in the fermenters, or gasoline tank~~.~~

SCBA-Using SCBA in low temperature environments (below 5°C) requires Appendix D of CSA Standard Z94.4 - 11 to be followed. Pressure above 31Mpa should not be used in low temperature environments. This appendix outlines the required atmospheric dew point for compressed air used at specific air temperatures to reduce excessive moisture content issues (regulator freezing, internal corrosion).

POWER AIR PURIFYING RESPIRATORY EQUIPMENT

Power Air Purifying Respirators (PAPR) are located in the EHS trailer. In addition to the above mentioned inspection of the respiratory face piece, workers must also ensure the blower hose, belt, battery pack and breathing tube connections are not visibly damaged or deteriorated, and ensure the battery is fully charged for use. Use of a PAPR must be included as "hot work" during the Safe Work Permit process

RESPIRATOR FIT TESTING & TRAINING

Respirator fit testing and training is provided by a third party training provider that meets CSA Z94.4-11. Respirator fit testing & training will be provided to any worker who may be required to don respiratory protective equipment. Recertification takes places every 2 years for all respiratory protective equipment with the exception of PAPR, which is recertified annually.

Training topics include fit testing, selection and limitations of respiratory protection, general knowledge of SCEPs respiratory protection standard, care and use of respiratory equipment, repair and maintenance.

Contractors are responsible to ensure that their workers have up to date fit test records/training if their workers are required or may be required to don a respirator while onsite.

MEDICAL SURVEILLANCE

Prior to fit testing and respirator use it shall be confirmed that the worker is free from any condition that may prohibit them from being able to safely and appropriately use a respirator. This is often evaluated during a pre-employment medical, voluntary medical surveillance, or identified via medical note.

Contractors are responsible for performing medical monitoring of their employees.

RECORD KEEPING

Training records will be kept for 3 years. Relevant medical surveillance documentation will be kept with the employees medical records for the employee's job tenure plus 30 years.

PROGRAM EVALUATION

A program evaluation/audit will be conducted every 5 years by occupational hygiene in consultation with occupational health to ensure program effectiveness.

REVIEW/REVISION

A review of this document will occur following a regulatory change or at a minimum of every 5 years utilizing the "**EH&S SOP Review and Sign-Off Sheet**" *file128**stclair**Operations**Employee Resource Centre**Procedures**SOP's & OGS's*. The Document Control Administrator will notify the Environment Health and Safety Team Lead - who will steward the review and will engage the Operation Coordinator to support the review from an operations and maintenance perspective.

Other events which trigger review (MOC, Incident Findings) include processes which will initiate review.

DEFINITIONS

Assigned Protective Factor (APF) - anticipated level of respiratory protection that would be provided by a properly functioning respirator to properly trained and fitted user.

Clean Shaven- having no visible hair between the sealing edge of the respirator face piece and the skin.

Maximum Use Concentration (MUC)- the maximum concentration of an airborne contaminant from which an employee is expected to be protected when wearing a respirator, determined by the APF of the respirator and the occupational exposure level or time weighted average for the relevant contaminant.

Powered Air Purifying Respirator (PAPR) - a device equipped with a face piece, hood or helmet, breathing tube, canister, cartridge, filter, canister with filter or cartridge with filter and a powered blower.

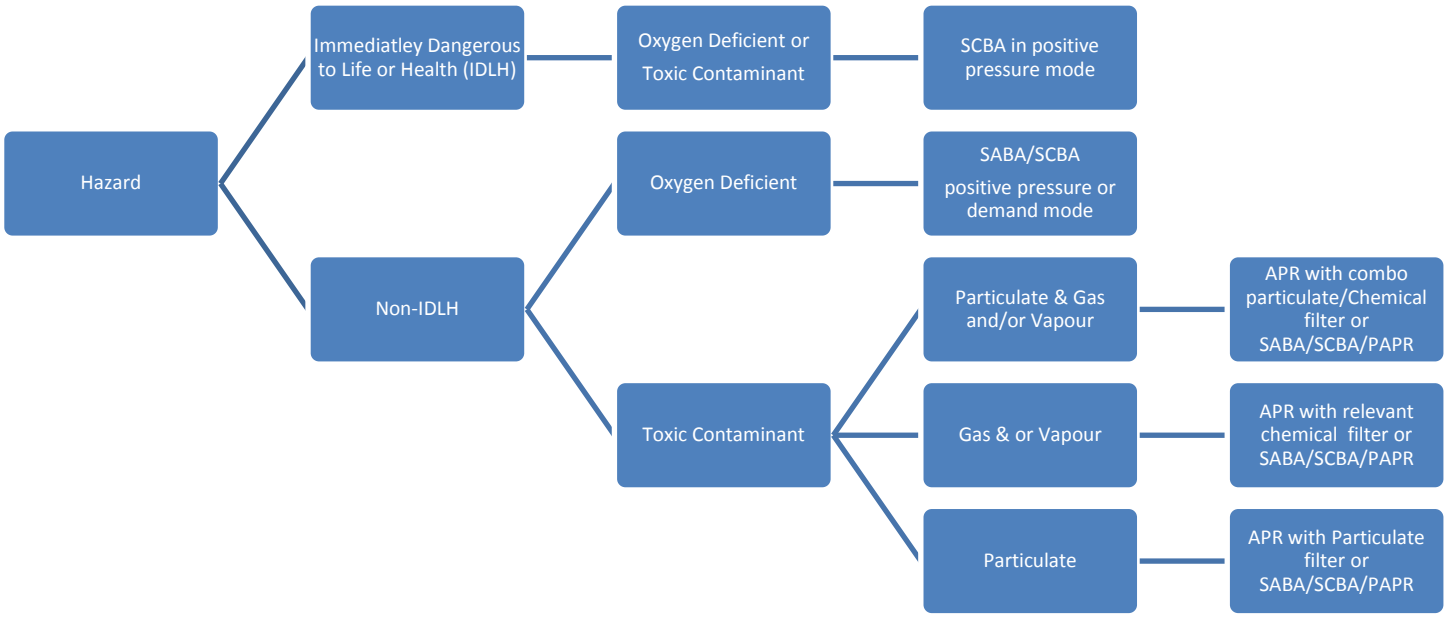
RELEVANT DOCUMENTS

SCEP Employee Orientation
SCEP - Contractor Orientation
Confined Space Entry
Silica Control Program
Respiratory Selection Guideline

REFERENCE DOCUMENTATION

O.Reg 851- Industrial Establishments
CSA Z94.4- Selection, Care and Use of Respiratory Equipment
CSA 180.1- Compressed Breathing Air & Systems
Honeywell Cartridge Service Life Estimation

APPENDIX A- RESPIRATOR SELECTION CHART



APPENDIX B - ACCEPTABLE/UNACCEPTABLE FACIAL HAIR FOR TIGHTFITTING RESPIRATORS (as per CSA Z94.4)

Acceptable

A. Clean-shaven, ideal for a good seal	
B. Amount of facial hair that will typically allow a good seal	
C. Moustache that does not interfere with the sealing surface, valves, or respirator function	
D. Soul patch that does not interfere with the sealing surface, valves, or respirator function	

Unacceptable

E. Soul patch that will interfere with the respirator seal in the chin area on elastomeric facepieces Facial hair and sideburns that will interfere with the sealing surface	
F. This facial "shadow" (not clean-shaven) will interfere with the sealing surface of a half or full facepiece. It will also compromise a secondary seal inside a tight-fitting hood-style respirator. Degradation of fit can occur during cumulative work hours when an individual grows this amount of facial hair.	
G. Moustache is too thick and too long (down around edge of mouth); will contact a sealing surface and interfere with exhalation valve. Sideburns and/or heavy hair under the chin will prevent a good seal.	
H. Moustache is too thick and too long (down around edge of mouth); will contact a sealing surface and could get stuck in an exhalation valve. The hair on the rest of the face will interfere with a sealing surface.	
I. Hair is in sealing region and under the chin. Hair is in chin cup sealing region and on the side of the face.	
J. Moustache is too thick and too long; will contact a sealing surface and interfere with exhalation valve.	

END OF SAFE WORK STANDARD

REVISIONS			
No.	**Date (mm/dd/yyyy)**	**Author**	**Description**
0	~~06/28/2017~~03/18/2008	~~J.Eldridge~~	Created
1	01/07/2010		Reviewed
2	10/26/2017	J. Eldridge	