



Global EHS - Confined Space Program Standard

CONTROL INFORMATION

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1 Purpose

This fatality and serious injury prevention program describe the expectations for sites to protect Micron team members, contractors and vendors from hazards associated with of working inside a confined space. Possible confined space hazards may include:

- Atmospheric hazards from toxic or flammable gases or vapors, or oxygen deficient or oxygen rich environment;
- Operating equipment inside the confined space which can pinch/crush/entrap entrants;
- The possibility of liquids, gases, solids or hazardous energies being introduced to the space during occupancy;
- Rescuing the victim is more difficult. The interior configuration of a confined space often restricts the movement of people or equipment within it;
- Natural ventilation alone is often not sufficient to maintain breathable quality air because the interior configuration of some confined spaces does not allow air movement to circulate; or
- Conditions can change very quickly;

This is a minimum standard and sites may have additional requirements that may reflect local regulation or specific requirements associated with spaces at the site.

2 Scope

Items	Details
Site(s) Impacted	All Micron manufacturing sites
Target Audience	All Micron team members and its partners, suppliers, vendors, and contractor employees working in confined spaces at Micron facilities

3 Roles and Responsibilities

Roles	Responsibilities
Site Leadership, Site EHS Manager, or designee	<ul style="list-style-type: none"> • Ensure compliance to the requirements of Global EHS Confined Space program. • Develop and implement a site Confined Space Entry program when entry into permit-required confined spaces is performed. • Engage qualified person to identify and label, where possible, all the confined spaces in the workplace • Ensure that all team members and contractor/vendor employees entering confined spaces have been trained on confined space entry, hazards, and protective measures • Responsible for reviewing confined space permits and updating the program annually to ensure that team members participating in entry operations are protected from permit space hazards.
Micron team members,	<ul style="list-style-type: none"> • Adhere to the requirements of this program. Failure to comply with these requirements can result in disciplinary actions up to and including termination

Roles	Responsibilities
Contractor/ Vendor employees or designee	<ul style="list-style-type: none"> • Do not enter into any confined space until authorized by required training and their supervisor • Record any problems encountered during any entry operation on the permit so that appropriate revisions to the confined space program can be made • Notify site EHS in the event that they become aware of a new confined space due to hazard, tool, or configuration changes
Global EHS	<ul style="list-style-type: none"> • Maintain and ensure Global EHS Confined Space Standard is up to date. • Audit the compliance of the standard through regular audits and site reviews.
Manager, Supervisor, Contractor / Vendor Host, Equipment / Tool Owner, Area in- charge	<ul style="list-style-type: none"> • Managers and supervisors are responsible for the health and safety of their team members and for enforcing EHS Confined Space programs. Their responsibility is to ensure that employees are adequately trained, and the entry permit is completed and approved before carrying on with any work. • Work with site EHS to engage qualified person to identify and label, where possible, all the confined spaces in the workplace. • Inform site EHS of any new confined spaces that will need evaluation or permit required confined spaces that are not signed and therefore, not in the current site inventory. • Conduct periodic evaluations of entry operations.
Entry Supervisor/ Assessor	<ul style="list-style-type: none"> • Know the requirements of the confined space entry program, including proper execution of duties of entrants, attendants and rescue personnel • Know the space hazards, including information on the mode of exposure, signs or symptoms, and consequences • Verify that all required actions have been taken prior to endorsing the permit and allowing entry to begin, and ensure that acceptable conditions are maintained for the duration of the entry • Verify that rescue services are available prior to and throughout the entry and that the means for summoning them are operable • Communicate the status and requirements of the entry to other entry supervisor(s) whenever the entry supervisor is changed • Terminate entry, assure removal of personnel and equipment, and revoke or cancel the permit when required • The entry supervisor/assessor may need to perform the role of an atmospheric tester and know how to properly conduct tests to ensure all areas where entrants will access are tested
Attendant	<ul style="list-style-type: none"> • Provide standby assistance to entrants entering the confined space • Direct entrants to exit the confined space when any irregularities are observed • Initiate evacuation and emergency procedures. • Monitor for any conditions or changes that could adversely affect the entry • Remain at the entry point and maintain communication with the entrant(s) until relieved by another attendant or the entry is completed or terminated • Prevent unauthorized entry

Roles	Responsibilities
Entrant	<ul style="list-style-type: none"> • Recognize potential hazards that may be encountered during the entry and proper use and limitations of equipment for control of these hazards. Inspect for hazards not identified by atmospheric monitoring during entry activities • Respond to emergencies, which includes method(s) for self-rescue or evacuation • Recognize symptoms and warning signs of exposure to potential hazards or prohibited conditions • Notify the attendant of any symptoms of exposure, emergency or unacceptable condition in the confined space • Exit the confined space immediately if symptoms, warning signs or unacceptable conditions occur or if directed by the attendant or entry supervisor

4 Terms and Definitions

Terms	Definitions
Acceptable entry conditions	The conditions that must exist in a permit-required confined space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter and work within the space.
Anchorage	A secure point of attachment for equipment such as lifelines, lanyards, deceleration devices, and rope descent systems.
Attendant	An individual stationed outside one or more permit-required confined spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.
Authorized entrant	An employee who is authorized by the employer to enter a permit-required confined space.
Body harness	Straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.
Confined space	<p>"A space must meet the following criteria to be considered a confined space:</p> <ul style="list-style-type: none"> - Limited or restricted means for entry or exit from the space - The space must be large enough for a person to enter - The space is not designed for continuous human occupancy <p>A space is considered a Permit-Required confined space if additional hazards exist. Please see Permit-Required Confined Space."</p>
Control of Hazardous Energy (CoHE)	The placement of a lock and tag on an energy isolating device, in accordance with an established procedure (EIP), ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lock is removed.
Dangerous equipment	Equipment, such as vats, tanks, electrical equipment, machinery, equipment or machinery with protruding parts, or other similar units, that, because of their function or form, may harm an employee who falls into or onto the equipment.
Emergency	"A sudden, unplanned, serious event or situation that has the potential of putting human life, the environment, or property at risk such as earthquake, explosion, fire, or release of hazardous energy or chemicals."

Terms	Definitions
	Context of Confined Space: Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants."
Engulfment	The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.
Entry Permit	The written or printed document that is provided by the employer to allow and control entry into a permit-required confined space.
Entry Supervisor/ Assessor	The person responsible for determining if acceptable entry conditions are present at a permit-required confined space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section. An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills.
Fall hazard	Any condition on a walking-working surface that exposes an employee to a risk of harm from a fall on the same level or to a lower level.
Fall protection	Means any equipment, device, or system that prevents an employee from falling from an elevation or mitigates the effect of such a fall. Refer to the Work At Heights Standard for more details.
Hazardous atmosphere	<p>"An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:</p> <ul style="list-style-type: none"> - Flammable gas, vapor, or mist in the atmosphere is 10 percent or more than its lower flammable limit (LFL) or lower explosive limit (LEL); - Atmospheric oxygen concentration volume is less than 19.5 percent or more than 23.5 percent; - Atmospheric concentration of any substance in the atmosphere exceeding the permissible occupational exposure limit (OEL). - Any other atmospheric condition that is immediately dangerous to life or health"
Hot work permit	The employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.
Injury	Harm to any part of the body, either acute or chronic, caused by a traumatic or undesired event e.g. a fall from height, being struck by an object, ergonomic injuries, chemical exposure, occupational illnesses, etc.
Isolation	The process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as
Lanyard	A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.
Lifeline	A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serve s as a means for connecting other components of a personal fall arrest system to the anchorage.
Line breaking	The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Terms	Definitions
Lower Explosive Limit (LEL)	"Refers to the lowest concentration of gas or vapor (% by volume in air) that will burn or explode if an ignition source is present at ambient temperatures.
Occupational Exposure Limit (OEL)	A limit on the amount or concentration of a chemical to which workers may be exposed. Any recognized exposure limits. This includes the TLV (established by ACGIH), PEL (OSHA), WEEL (AIHA), REL (NIOSH), or other "approved consistent measures" for chemicals not identified by those groups.
Permit-Required Confined Space	Any confined space, in which: <ul style="list-style-type: none"> - A hazardous atmosphere exists: dangerous gases, vapors or fumes are liable to be present to such an extent as to involve risk of fire or explosion, or persons being overcome thereby; - The supply of air is inadequate, or is likely to be reduced to be inadequate, for sustaining life; - There is a risk of engulfment by material; or - Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
Personal fall arrest system	A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. Refer to the Work At Heights Standard for more details.
Personal fall protection system	A system (including all components) an employer uses to provide protection from falling or to safely arrest an employee's fall if one occurs. Examples of personal fall protection systems include personal fall arrest systems, positioning systems, and travel restraint systems. Refer to the Work At Heights Standard for more details.
Platform	A walking-working surface that is elevated above the surrounding area.
Qualified Personnel	Describes a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.
Rescue service	The personnel designated to rescue employees from permit-required confined spaces.
Retrieval system	The equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit-required confined spaces.
Testing	The process by which the hazards that may confront entrants of a permit-required confined space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.
Work area	That portion of a walking/working surface where job duties are being performed.

5 References

Table 1
Internal References

Title	Link
Global EHS - Work At Heights Program Standard	2W4373RQWREN-1568922467-48
Global EHS - Control of Hazardous Energy (CoHE) Standard	2W4373RQWREN-1568922467-29

Table 2
External References

Title	Link
N/A	N/A

6 Standard

6.1 Confined Space Local Legal Requirements

Sites shall ensure that all confined space work activities comply with local EHS legal requirements and Micron internal standards. If legal regulatory requirements are more stringent than those established by Micron in this standard, the legal requirements will prevail.

- Sites shall be aware of legal requirements associated with confined spaces and shall ensure that all legal requirements are properly communicated to impacted stakeholders including contractors and that legal requirements are being observed through periodic management system auditing for the site.

6.2 Evaluation of Confined Space

A qualified person shall conduct an initial survey of the premises and operations to identify confined spaces as defined by this standard.

- A documented inventory of current confined spaces shall be established to include the addition or deletion of confined spaces over time to keep a current record. The purpose of the evaluation is to develop an inventory of those locations or equipment, or both, which meet the definition of a confined space so that personnel may be made aware of them and appropriate procedures developed for each prior to entry. This inventory shall be accessible to those stakeholders that may need to know or access confined spaces.
- A “confined space” as stipulated by this Standard, is a space that meets all three of the following three criteria:
 - Limited or restricted means for entry or exit from the space
 - The space must be large enough for people to enter
 - The space is not designed for continuous human occupancy
- A “**permit-required confined space**” as stipulated by this Standard, is a space that meets the criteria for a confined space and contains any of the following characteristics:
 - Dangerous gases, vapors, or fumes are liable to be present to such an extent as to involve risk of fire or explosion, or persons being overcome thereby;
 - The supply of air is inadequate, or is likely to be reduced to be inadequate, for sustaining life;
 - There is a risk of engulfment by material;
 - Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
 - Contains any other recognized hazards

6.3 Permit-required Confined Space Identification

- For confined space and/or permit-required confined space identified in section 5.3, a sign reading “**DANGER - CONFINED SPACE, DO NOT ENTER**” or “**DANGER - PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER**” or one using other similar language is the minimum identification signage requirements for a confined space.
- The site may display additional essential information beside the above danger signage which include the following
 - Apply confined space permit before any entry operation

- Confined space identification number
- Micron emergency contact information, department, person in-charge, contact, site emergency number

6.4 Confined Space Entry Permit

No person shall enter or work in a permit-required confined space without a valid entry permit. A formal check is necessary to ensure that all the elements of a safe system of work are in place before any persons are allowed to enter or work in permit-required confined spaces.

- The entry permit shall clearly identify the roles and responsibilities of persons who may authorize particular jobs and who are responsible for specifying the necessary precautions (e.g., isolation, atmospheric testing, emergency arrangements, etc.). However, the entry permit does not entitle the applicant to carry out hot work or any other hazardous work. Separate permits-to-work (PTW) must be obtained to carry out this works.
- The confined space entry permit (hereinafter referred to as entry permit) and PTW ensure that:
 - The confined space work is carried out with careful consideration to the safety and health of persons who are carrying out the work;
 - Workers are informed of the hazards associated with confined space work;
 - The necessary safety precautions are taken and enforced when confined space work is being carried out.
- The entry permit shall adhere to local legislation for confined space permit and should generally include at the following information:
 - Identification of the confined space;
 - Location of the confined space;
 - Purpose of entry;
 - Entry date and time duration;
 - Validity of the permit (date and time of completion/expiration of entry/work);
 - Potential hazards in the confined space;
 - Control measures (how hazards will be controlled so that the space is safe to enter);
 - Personal Protective Equipment (PPE);
 - Emergency response and rescue plan;
 - Name of confined space attendant;
 - Results of the atmospheric testing of the confined space;
 - Provision of ventilation;
 - Names and signatures of confined space entry supervisor/assessor, and authorized manager.
- A copy of the entry permit issued by the entry supervisor/assessor shall be displayed by the supervisor clearly at the entrance to the confined space at all times so that entrants are informed of the condition of the space and the measures taken to ensure safe entry.
- If, after issuing an entry permit, the entry supervisor/assessor or any entrant determines that the entry is unsafe or that an additional hazard is present, the work will be stopped immediately, and all entrants will be removed from the space. The entry supervisor/assessor shall terminate entry and cancel the permit when:
 - The entry operations covered by the entry permit have been completed; or

- A condition that is not allowed under the entry permit arises in or near the permit space. For example, the entry supervisor/assessor is to revoke the entry permit when the monitoring equipment alarm sounds; indicating the deficiency of oxygen level, or 10% of LEL, or POEL of toxic gas is exceeded.
- When a hazardous atmosphere in a confined space is detected by periodic tests or continuous monitoring, the supervisor or confined space safety assessor shall withdraw the entry permit. A “no entry” sign shall be clearly displayed at the entrance of the confined space and the entry supervisor/assessor shall revoke the entry permit.
- The duration of the permit should not exceed the time needed to complete the assigned work or one work shift, whichever is less. As a rule, permits should only have a duration of one shift. Any conditions that would change the original conditions of the permit or entrants on the permit, should result in the permit being revoked and a new one issued.

6.5 Control of Hazardous Energy for Confined Space

Many hazards in a confined space can be eliminated by effective hazardous energy control. Refer to the Control of Hazardous Energy, and equipment specific energy isolation procedures, for more details.

6.6 Opening of Confined Space

Before an entrance cover is removed, any known unsafe conditions shall be eliminated.

- When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier. This will prevent anyone from falling through the opening which exposed to falling from height hazard. The barrier or cover shall prevent foreign objects from entering the space and protect each employee working in it. If it is in a traffic flow area, adequate barriers shall be erected to divert the traffic.
- It is necessary to take precautions when opening the covers to tanks and within other confined or enclosed spaces in the event the space is under pressure or hazardous materials have leaked from internal piping systems. It is important to leave at least two nuts on opposite sides of the cover in place until the cover can be cracked and any internal pressure has released.
- It is essential to use safety barriers to separate workers from hazards that cannot be reasonably eliminated by other engineering controls. Selection of suitable barriers will depend on the nature of the hazard and the size of the area or equipment to be cordoned off. The supervisor must determine if safety barriers will be needed for the confined space entry prior to any workers entering the confined space.

6.7 Access and Egress

Where the possibility for inadvertent or unauthorized entry to a confined space exists, it is required to use appropriate means to prevent such an entry (e.g., a barrier or safety warning sign that is clear, legible and visible).

- A safe way in and out of the confined space should be provided for the individuals carrying out the work. Wherever possible, quick, unobstructed and ready access and egress should be made available. It is essential that the means of escape be suitable for use by every individual who enters the confined space so that he or she can escape quickly in an emergency.

- The size of openings used for access to and egress from confined spaces needs to be adequate to allow ready passage. Openings providing access need to be sufficiently large and free from obstruction to allow the passage of persons wearing the necessary protective clothing and equipment, and to allow adequate access for rescue purposes. These openings need to be kept clear whenever a confined space is occupied. Where practicable, it is necessary to have an alternative opening for insertion of hoses, ventilation ducts, power lines and other cables required for the work. Certain confined spaces may have design deficiencies which increase the level of entry risk to an unacceptable level. These include spaces whose openings are too tight for safe passage or which are of convoluted construction (turns, baffles, etc.), or which involve excessive distances to a point of escape. Structural modifications (e.g., the making of temporary openings) will be necessary before entry is possible in these cases.
- Confined Space Attendant should be appointed where any person enters or carries out any work in a confined space and remain outside the confined space to:
 - Monitor atmospheric conditions in the space prior to and during entry and document air sampling results and other permit required information during entry.
 - Monitor persons entering and working in the confined space;
 - Maintain regular contact with the persons in the confined space and when necessary assist them to evacuate should the need arise; and
 - Alert the rescue personnel to activate the rescue operation in an emergency
- All confined space entrants are required to wear a suitable harness. The harness is required to facilitate non-entry rescue from the confined space. A hazard assessment of the space will determine the type of harness that will be needed.
- Confined space shall have and display a list of names of all entrants to the confined space available at all times.

6.8 Communication

An effective and reliable means of communication among entrants inside the confined space, and between entrants and attendants, is required. When choosing a means of communication, it is advisable to consider all anticipated conditions inside the confined space (e.g., visibility, possibility of a flammable atmosphere, and noise levels) and to the personal protective equipment in use (e.g., ear muffs and breathing apparatus).

- The communication system used can be based on speech, hand signals, telephone, radio, and so on. Whatever system is used, it is important that all messages can be communicated easily, rapidly and unambiguously between relevant people. It is important to take note on the limited penetration of radio signals into buildings, vessels and below-ground structures. The advantages of having a person outside the confined space in direct voice and visual contact with the entrants are clear. This also facilitates the monitoring of entrants for the symptoms or behavioral effects of exposure to hazards.
- It is important that confined space entrant(s) are informed quickly if a situation arises on the outside which could endanger the entrants, such as problems with a supplied air system or ventilation system.
- Appropriate means of communication between the person working inside a confined space and the attendant stationed outside, whether by voice, rope tugging, tapping or by battery-operated communication system specially designed for confined space use.

6.9 Lighting Requirements

Adequate and suitable lighting shall be provided for entry and work in a confined space. Access and passage into a confined space shall be provided with illumination of not less than 50 lux.

- Temporary lights shall be equipped with guards to prevent accidental contact with the bulb, except when the construction of the reflector is such that the bulb is deeply recessed. Temporary lights shall be equipped with heavy-duty electric cords with connections and insulation maintained in safe condition. Temporary lights may not be suspended by their electric cords unless cords and lights are designed for this means of suspension. Temporary lights and electrical services should be protected by an earth leakage circuit breaker (ELCB) or ground fault circuit interrupter (GFCI).

6.10 Gas Testing and Monitoring for Hazardous Atmosphere

Atmospheric testing shall be required to evaluate the hazards in the confined space and to verify that it is safe for entry into the confined space.

- Satisfactory atmospheric testing is carried out by a competent trained confined space entry supervisor/assessor before entry into any confined space. Check the oxygen level and the possible presence of flammable and/or toxic gases to determine if entry is permitted.
- Initial testing shall be performed from outside the confined space by drawing the air from the atmosphere using suitable sampling devices while performing the atmospheric hazards assessment.
- Entry shall be prohibited whenever testing of the atmosphere indicates that levels of oxygen, flammability or toxicity are not within acceptable limits or appropriate controls are implemented, appropriate work procedures established, and appropriate personal protective equipment is used.
- If entry is absolutely necessary, it is important to ensure the level of flammable gases/vapors is less than 10% LEL. The confined space entrant shall wear suitable breathing apparatus (BA) and is authorized by Micron EHS manager to enter. All gas testing results shall be recorded and attached to the entry permit.
- The entry supervisor/assessor and attendant to know and establish what atmospheric hazards may be present in the confined space. Once the atmospheric hazards are known, the correct gas testing equipment and their corresponding alarm concentrations on the equipment must be pre-set. The pre-set would shall provide a warning on the dangerous level according to the limit values for the substance of concern. As a minimum, the following shall be tested: oxygen reading, flammable gases and vapors reading, and toxic gases and vapors reading.
- Atmospheric hazards in the confined spaced will be measured using a calibrated, direct readout instrument. Calibration of direct reading portable atmospheric testing instruments shall be conducted according to the manufacturer's recommendations, or more often if necessary because of the instruments usage, to ensure accuracy is maintained.
- At a minimum, a function check or a practice meeting the manufacturer's recommendations shall be done prior to each day's use. Always test for oxygen first, followed by flammable gases and vapors and then for toxic gases and vapors. It is critical for the test results to satisfy the following criteria before the entry permit can be issued.
- The acceptable atmospheric limits are:
 - Oxygen reading: ≥ 19.5 % Vol. to ≤ 23.5 % Vol.
 - Flammable gases and vapors reading: $< 10\%$ LEL

- Toxic gases and vapors reading: < OEL values, action levels, or equivalent
- Continuous monitoring is required during any confined space entry even after the confined space is tested and certified safe for any person to enter, at least one person in a group working in the same vicinity shall be equipped with suitable instrument for measuring oxygen, combustible and the identified toxic contaminants.
- When the atmospheric hazards in a confined space are detected by the confined space safety assessor during periodic testing or continuous monitoring, all persons in the confined space shall vacate the confined space immediately. The confined space entry permit shall be cancelled immediately and “No Entry” signs must be prominently displayed at the entrance to prevent unauthorized entry.

6.11 Ventilation

When a confined space is known to contain hazardous contaminants, supplemental exhaust ventilation is required it is crucial to purge the space adequately before any entry. Subsequently, Continuous ventilation shall should be provided to maintain a safe work environment. It is also important to note that purging and ventilation do not exclude the need for gas atmospheric monitoring testing.

- Purging of a confined space is conducted before any entry and the purpose is to remove any existing contaminants by displacing the hazardous atmosphere with another medium such as air, water, steam or inert gases. The choice of a suitable medium will depend on factors such as nature of the contaminants and their concentrations.
- Entry shall be prohibited when adequate ventilation is absent. Adequate and effective ventilation is required throughout the validity period of the entry permit. Even when the confined space has been certified safe for entry, new contaminants may be introduced from a change in conditions, or when work performed in the space such as welding releases new contaminants. It is important to provide an adequate and effective ventilation to always maintain the contaminants concentration level as low as possible, and the level of oxygen within the acceptable safe range.
- Mechanical ventilation shall be used when natural ventilation has been determined to be inadequate. is not adequate due to the unique characteristics of some confined spaces. Mechanical ventilation can largely be classified into three main types:
 - Forced (supplied) ventilation; and
 - Local exhaust ventilation (LEV);
 - Push-Pull System
- Forced (supplied) ventilation introduces fresh air into the confined space through the use of a mechanical air moving devices such as a blower. The constant supply of fresh air in sufficient quantity will help to maintain the level of oxygen in the space within the safe range, as well as dilute the level of contaminants released in the confined space to an acceptable level. Forced ventilation used to dilute contaminants is usually more suitable when:
 - The contaminants released are of relatively low toxicity;
 - The rate of emission or release is relatively constant and is of small quantities;
 - Contaminants are gases or vapors or finely suspended solids;
 - The release of the contaminants is widespread; or
 - There is sufficient distance between the worker and the source and allow effective dilution to take place.

- It is important to ensure that the air moving device is placed where the air is drawn into the confined space from a contaminant-free source. For example, it is not appropriate to place the air moving device behind a diesel generator where the exhaust gas of the generator could be drawn into the confined space.
- Exhaust ventilation is achieved by pulling air out of the confined space and in the process, removing the contaminants from inside the space. LEV is a specific application of exhaust ventilation where the extraction is applied directly at the contaminant source. The use of LEV should be considered when dilution ventilation is not effective due to restrictions in the confined space or when high local concentrations of contaminants may occur during work activities such as welding and chemical cleaning. In general, LEV is suitable when:
 - The released contaminants are of relatively moderate to high toxicity;
 - The rate of emission or release is of large quantity;
 - The contaminants are fumes or solids that are difficult to remove by dilution ventilation;
 - The release of the contaminants is localized; and
 - There is insufficient distance between the worker and the source to allow effective dilution to take place.
- For LEV to be effective, it is crucial to place the exhaust hood close to the contaminants' source. It is important that the exhausted air is discharged outside the confined space to avoid re-introduction into the space. In addition, it is also important that the fan capacity is adequate to pull the contaminants into the exhaust hood, move them along the duct and discharge into the atmosphere outside the space. As LEV removes air from the confined space, it creates a slight negatively pressured environment in the space. Therefore, it is important that replacement air is provided in the form of supply ventilation.
- A push-pull system uses a combination of both forced ventilation and exhaust ventilation. It usually provides more effective ventilation of the space than using any of the ventilation system alone and is highly recommended for use whenever practicable at Micron facilities. The push-pull system introduces fresh air into the space while removing contaminants by exhausting them. Below picture show an illustration of forced ventilation, exhaust ventilation and combination of both push-pull system.

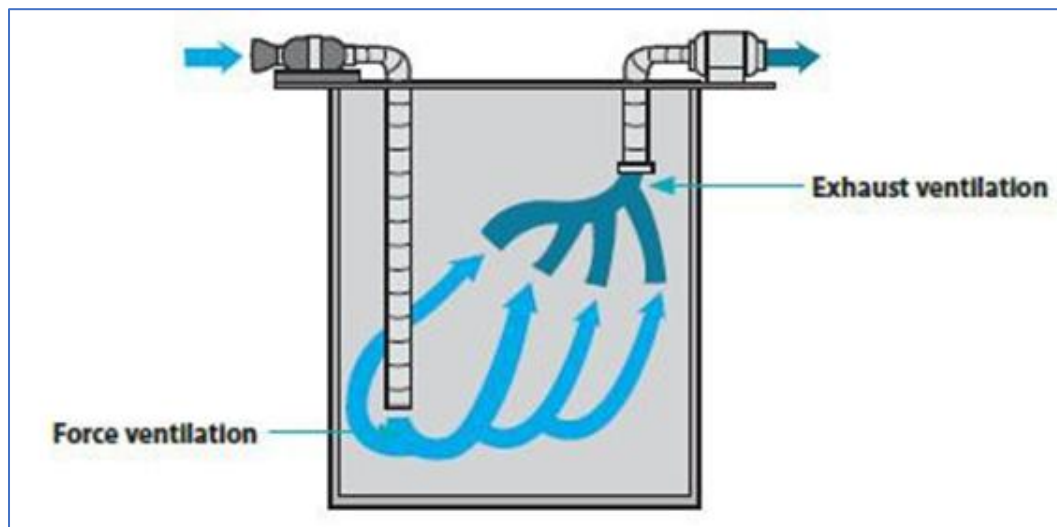


Figure 1 Illustration of Push-Pull System

6.12 Emergency and Rescue Procedures

Confined spaces shall be considered as immediately dangerous to life and health unless proven otherwise. Plan and prepare emergency response and rescue procedures for all confined space entry work. These procedures shall be in place before any work commences. It is important to note that a very short period, approximately four minutes, without adequate breathing can cause a worker to suffer permanent brain damage due to lack of oxygen.

- Confined space rescue teams shall be notified prior to any confined space entry and the confined space rescue team shall be on call for all permit required confined space entries.
- Before anyone is authorized to enter a confined space, emergency rescue personnel shall be identified and available when an entrant needs assistance should an emergency occur. The hazards of the confined space shall be communicated to the rescue service. The site shall ensure the rescue capabilities are evaluated prior to the selection. If the confined space involves hazards posing an immediate threat to life or health, external rescue providers shall be located nearby ready for entry at a moment's notice. If the hazards involved are not immediately life-threatening, the rescue providers must be capable of responding within a reasonable time commensurate with the nature of the hazard. Site shall require and work with the rescue team to familiar with the following:
 - the types of confined spaces located in the facility,
 - the hazards they may encounter,
 - the entry means into the confined spaces,
 - the types of rescue equipment to affect a rescue and
 - the types of PPE required for any potential rescue.

6.13 Training

The site shall ensure that any person, including contractor and vendor employees, required to enter a confined space is adequately trained in the tasks they are expected to perform. Entry personnel shall also attend any local mandatory training requirements needed to accomplish the mission of entering, working and exiting the space safely. This is to ensure that they understand the definition of a confined space, hazards associated with confined space work, entry procedures, measures to prevent and control hazards, safety precautions to take, and emergency procedures. It is important to have the training that is consistent with their duties and responsibility. In practice, some of the duties can be performed by the same person.

- Records of all confined space training, including refresher and supplementary training shall to be properly documented and kept by the site for as long as the persons continue to be involved in confined space work.

7 Appendices

None

8 Document Control

Items	Details
ECN Facility	CORP EHS
ECN Area	EHS SAFETY
Approval	This document is approved by the following MT Group(s): GLOBAL_EHS_SEAL_LT
Notification	Notification of changes to this document is managed through EDC Micron Approval Workflow to the MT Group(s): <ul style="list-style-type: none"> • GLOBAL_EHS • GLOBAL_EHS_MANAGERS • GLOBAL_EHS_SEAL_LT • GLOBAL_EHS_TEAM_MEMBERS • GLOBAL_FAC_NOTIFY • GLOBAL_FAC_MANAGER and any other relevant groups as requested by ECN Originator.
Review	This document will be reviewed at least biennially (once per two years) by Global EHS Team through the EDC Periodic Document Review (PDR) process.

9 Revision History

Table 3
Revision History

Rev	Date	Description	Originator
0	26 Mar 2018	ECN Number: 600980148 First published version	ROBINLOW
1	17 Dec 2018	ECN Number: N/A Document updates per site feedback	ROBINLOW
2	01 Jul 2019	ECN Number: 101027229 Added links to translated documents + template change Was: No links to translated documents, and old template Is: Added links to translated documents, and new template	JEREMIAHMOHR
2	10 May 2021	ECN Number: Not workflowed Periodic Document Review (PDR) completed. No changes required.	ROBINLOW

End of Document
