



## CONFINED SPACE ENTRY PROCEDURES

CONFINED SPACE NAME:

Air Handling Units

ID #

N/A

LOCATION:

Gerry Brewer Building  
(5), City Hall (4), Library  
(2)

EP #

6

DATE:

November 2012

HAZARDOUS ATMOSPHERIC RATING:

**Low**

### SCOPE OF WORK (From Hazard Assessment)

This Hazard Assessment (HA) refers to entry for the purpose of visual inspection and manual tasks with manual tools such as fan motor replacements, checking temperature sensors and manually greasing fan motor bearings with a synthetic/sodium or lithium based grease (short duration task). The entry will occur with the entrant having to position their body approximately halfway into the fan motor compartment in order to access the fan motor and bearings. Tasks are expected to be greater than 15 minutes in duration.

A short duration task of changing the air filters is also conducted typically from outside the space via separate compartments than the fan motor compartments of the air handling unit (access to the air filters are located in the centre of the air handling units and the entry doors are of similar size and shape compared to the fan motor compartment entry doors).

*Hot work and other atmospheric contaminant generating activities are not included in this Hazard Assessment.*

### SUMMARY OF POTENTIAL HAZARDS

	Hazards	Undisturbed Space	Work Tasks	Additional Comments
ATMOSPHERE	Oxygen (O <sub>2</sub> ) Deficiency	No	No	See Hazard Assessment for additional details.
	O <sub>2</sub> Enrichment	No	No	
	Chemical	No	No	
	Biological Hazards	No	No	
	Fire/Explosion	No	No	
SAFETY HAZARDS	Structural	No	No	
	Engulfment	No	No	
	Entrapment	No	No	
	Electrical	Yes	No	
	Access/egress	Yes	No	
	Fall	No	No	
	Slip/Trip	No	No	
	Visibility/Light Level	No	No	
	Baffles/internal arrangement	No	No	
	Floor openings in space	No	No	
PHYSICAL AGENTS	Noise/Vibration	Yes	No	
	Temperature	Yes	No	
	Non/Ionizing Radiation	No	No	
	Laser	No	No	
OTHERS	Ingestion/Skin Contact	No	Yes	
	Mechanical	Yes	No	
	Traffic Hazard	No	No	
	Ergonomics	No	Yes	
	Hydraulic/ Pneumatic	No	No	


**COMPLETED BY:**

**Prepared by:** Peter Bergholz, BSc, CIH, AMEC,  
November 2012

**Reviewed by:** Victor Leung, MSc, CIH, ROH,  
CRSP, AMEC, November 2012

**SOURCE:** Paul Elsoff & Richard Howard


This Entry Procedure pertains to the activity and confined space listed above. This entry procedure is required to be reviewed within 3 years of preparation. Any change in activity requires a review of the related HA and a review of the entry procedures (especially when contaminants will be generated by an activity such as welding, radiation or chemical usage).

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Topics	No.	Tasks/ Equipment Required
<b>Prior to Entry</b>		
<b>Equipment Required</b>	1.	Ensure the following is available: <ul style="list-style-type: none"> <li>Pick up gas detector (with pump). Gas detector must be bump tested and/or calibrated prior to use and have the following sensors:               <ul style="list-style-type: none"> <li>oxygen (O<sub>2</sub>),</li> <li>flammable/combustibles (LEL),</li> <li>carbon monoxide (CO), and</li> <li>hydrogen sulphide (H<sub>2</sub>S)</li> </ul>               (City standard)             </li> <li>Blower with a minimum of 160 CFM</li> <li>Two-way radio and/or cellular telephone (for Standby Person and Entry Supervisor)</li> <li>Step ladder (if required)</li> </ul>
	2.	<b>General PPE:</b> <ul style="list-style-type: none"> <li>Safety boots</li> <li>Work gloves (chemical resistant gloves such as nitrile gloves for grease application)</li> <li>Safety glasses with side shields</li> </ul>
	3.	<b>Rescue equipment:</b> <ul style="list-style-type: none"> <li>Two-way radio and/or cellular telephone (for Standby Person and Entry Supervisor)</li> </ul>
<b>Entry Permit/Gas Testing Log</b>	4.	Complete and post the <b>Confined Space Entry Permit</b> at the entrance. (NOTE: Update the Permit accordingly.)
	5.	Entry Supervisor to sign Confined Space Entry Permit once all equipment is ready to be installed and observe initial entry.
<b>Space Preparation</b>	6.	None required
<b>Pre-Work Coordination</b>	7.	Inspect all equipment for damage before use. Remove damaged equipment from service.
	8.	Standby and Entry Supervisor must have a two-way radio and/or cellular telephone.
	9.	Standby must have training in monitoring duties, initiating emergency response and rescue training (manual removal of injured victims).
	10.	Rescue personnel must have training in first aid and CPR.
<b>Isolation and</b>	11.	Space must be isolated and locked-out prior to entry.

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Topics	No.	Tasks/ Equipment Required
<b>Lockout</b>		<ul style="list-style-type: none"> <li>Follow space specific isolation and lockout document.</li> <li>Document must be available on-site prior to work.</li> </ul>
<b>Gas Testing</b>	12.	Persons calibrating/bump testing and operating the instrument must have appropriate training.
	13.	Test the atmosphere prior to entry; continuously during entry and if the space is left vacant for more than 20 minutes. Record the results on the Confined Space Entry Permit every 20 minutes.
	14.	Measure gas concentrations at the front, middle and back of the space (using pump and tubing). <i>Remember there is a delay in response as air is pumped into the instrument (approx. 1 sec per foot) and there is additional sensor response time.</i>
	15.	<p><b>Allowable gas concentrations (before and during entry) - where tasks are greater than 15 minutes in duration as per OHSR 9.31</b></p> <p>Entry and work in the space can occur only if the following conditions are met:</p> <ul style="list-style-type: none"> <li>O<sub>2</sub>: 20.9 % <math>\pm</math> 0.7 % is acceptable</li> <li>LEL: 0 % <math>\pm</math> 2 %</li> <li>CO: 0 ppm <math>\pm</math> 3 ppm</li> <li>H<sub>2</sub>S: 0 ppm <math>\pm</math> 1 ppm</li> </ul> <p>If these criteria cannot be met then the space must be evacuated.  <b>NOTE:</b> The space cannot be re-entered until levels are within the acceptable concentrations listed above (adjust ventilation, re-calibrate gas tester etc.).</p> <p><b>NOTE:</b> The above 'acceptable' concentrations are based on the approximate sensor error (for O<sub>2</sub>) for typical gas testing instruments and 10% of the applicable exposure limits (for LEL, CO and H<sub>2</sub>S) and is presented for compatibility to the OHSR definition of 'clean respirable air' as it applies to low hazardous atmospheric conditions as per OHSR Section 9.1 Definitions.</p> <p><i>If the problem persists contact Entry Supervisor for further instructions, see Entry Permit.</i></p>
	16.	The entrant must wear the atmospheric testing instrument.
<b>Ventilation</b>	17.	Set up blower (minimum 160 cfm) with duct through the entrance hole discharging near the middle of the space. Minimum ventilation requirements are based on achieving 20 air changes per hour. Ducting may be temporarily removed to allow entrant ease for access – replace ducting immediately after entry.
	18.	Ventilation must be operating prior to entry to allow 'clean respirable air' to circulate throughout the space.

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Topics	No.	Tasks/ Equipment Required
<b>During Entry</b>		
<b>Gas Testing</b>	19.	Continuous monitoring required – as above.
	20.	Record the gas testing results on the Confined Space Entry Permit at least every 20 minutes.
<b>Ventilation</b>	21.	Ventilation must be running during the entire entry.  Ducting may be temporarily removed to allow entrant ease from exiting/entering– replace ducting immediately after entry/exit.
	22.	Standby person must remain at or near the entrance to the space during the entry.
<b>Standby Person</b>	23.	Standby person must provide assistance with holding the step ladder if required.
	24.	Standby must order the evacuation of the confined space if an alarm sounds.
<b>Personal Protective Equipment (PPE)</b>	25.	All entrants must wear <b>General PPE</b> (see equipment required list above).
<b>Task/Additional Requirements</b>	26.	None required
<b>Rescue Plan</b>	27.	To activate the emergency response, Standby Person contacts 911 if first aid is required.
	28.	Standby Person contacts the Entry Supervisor using radio/cell phone and advises them of the situation and Entry Supervisor will respond to the scene.
	29.	Ventilation can be removed temporarily to allow extraction from space since there is only one entry point.
	30.	<b>Self-rescue</b> if possible
	31.	If self-rescue is not possible:  <b>Manual Rescue (the Standby Person will not have to enter inside the space as only the upper half of the body of the entrant is required to enter inside the space)</b> <ul style="list-style-type: none"> <li>Standby Person manually removes the entrant from the space</li> </ul>
<b>After Entry Has Been Completed</b>		
<b>Gas Testing</b>	32.	After the entry, record the peak, TWA, STEL, occurrence of alarms on the Confined Space Entry Permit.
	33.	Entry Supervisor to return the completed Confined Space Entry Permit to the Confined Space Program Administrator for filing (must be kept for 1 year).

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Topics	No.	Tasks/ Equipment Required
Work Coordination	34.	Ensure all entrants and tools have been removed from the space and secure the opening.
Equipment	35.	Return all equipment to its proper location.
	36.	Return gas detector to the storage location.

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