**Confined Space: Forced Air Ventilation Operation Quiz**

Student: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Minimum passing score is 80%.

1. What is the safety industry’s recommended minimum number of air changes per hour during a confined space entry?
	1. 2 c. 10
	2. 5 d. 20
2. What is mechanically pushing air that is potentially contaminated from a confined space called?
	1. Forced air ventilation c. Exhausted air ventilation
	2. Blower air ventilation d. Negative air ventilation
3. How does attaching ducts or elbows to the blower affect the volume of air flow from the blower?
	1. Reduces air flow c. Has no impact on air flow
	2. Increases air flow d. Can increase or decrease, depends on the duct or elbow
4. Continuous forced air ventilation is required for permit-required confined space entries for what conditions?
	1. Actual hazardous atmospheres c. Immediately dangerous to life or health (IDLH) atmospheres
	2. Potential hazardous atmospheres d. All of the above
5. When can forced air ventilation operations be stopped during a permit-required confined space entry?
	1. The last entrant has left the space c. Oxygen levels are between 19.5 & 23.5
	2. Lower Explosive Limit is 0.0 d. When the last Lock Out Tag Out device is removed
6. The forced air blower duct in a vertical confined space, such as a below-grade vault, should extend to what level in the space?
	1. Floor-level c. Workers’ breathing zone (nose) level
	2. Mid-height level d. Within 1 foot of ceiling
7. What is the volume of a confined space vault that measures 30 feet long, 20 feet wide, & 8 feet high?
	1. 58 cu. ft. c. 4,800 cu. ft.
	2. 408 cu. ft. d. 50, 800 cu. ft.
8. What is the total cubic feet per hour (cfh) delivery rate of air needed to achieve 20 air changes per hour (ACH) for a confined space that measures 20 ft. x 10 ft. x 10 ft.?
	1. 2,000 cfh c. 10,000 cfh
	2. 8,000 cfh d. 40,000 cfh
9. For the above confined space operation, what would be the minimum cubic feet per minute (cfm) needed at the end of the forced air blower system?
	1. 450 cfm c. 670 cfm
	2. 540 cfm d. all meet the minimum requirement
10. If the blower stops working during a confined space entry, what must be the response?
	1. Immediately evacuate entrants c. Verify air quality is still safe. Evacuate entrants if unsafe.
	2. Call the Entry Supervisor d. Put the confined space rescue team on stand-by

**Confined Space: Forced Air Ventilation Equipment Skill Sheet**

Student: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Evaluator: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🞏 Pass 🞏 Fail

|  |  |  |
| --- | --- | --- |
| Equipment Used for Observation: | Make | Model |
| Ventilation Blower & Duct |  |  |

\_\_\_\_\_\_ (initial) I have reviewed the Owners/Operator’s manual for the above ventilation equipment and been given an opportunity to ask questions.

|  |
| --- |
| **Required Knowledge**: |
| *The student shall demonstrate they have the necessary information to safely operate the above blower, duct and accessories to the satisfaction of the evaluator.* |
| Describes the proper clean air intake considerations for placement of blower | 🞏 Pass 🞏 Fail |
| Can give the rated flow rate of the blower and effective flow rate with duct(s), elbows, and other accessories connected | 🞏 Pass 🞏 Fail |
| Can describe the advantages and methods to achieve effective air movement in and through a confined space.  | 🞏 Pass 🞏 Fail |
| Given the dimensions of a confined space, the student can give the time needed to achieve the needed number of air changes using the blower and attachments. | 🞏 Pass 🞏 Fail |
| Can describe the benefits of positive ventilation and negative ventilation and the best use of each. | 🞏 Pass 🞏 Fail |
| Can explain how vapor density of gases can affect the efficacy of removing gases from a confined space. | 🞏 Pass 🞏 Fail |

|  |
| --- |
| **Demonstrated Skill: Monitoring the atmosphere in a confined space** |
| *The student shall ventilate a confined space with 100% accuracy using the air blower and accessories.* |
| Student inspects the blower and accessories for damage before use. | 🞏 Pass 🞏 Fail |
| Student places blower on a stable surface and upwind from the work location, with a clean source of air. | 🞏 Pass 🞏 Fail |
| Student sets up for a positive pressure (forced air) ventilation operation * Connects the duct and accessories to the blower’s **outlet**
* Connects duct and elbows, as necessary, to position cone of air flow that completely covers the entrance opening
* Establishes an exhaust opening
 | 🞏 Pass 🞏 Fail |
| Student sets up for a negative exhaust ventilation operation * Connects the duct and accessories to the blower’s **inlet**
* Connects duct and elbows, as necessary, to effectively extract hazardous atmospheric contaminants from a simulated welding operation.
 | 🞏 Pass 🞏 Fail |
| Student connects the blower to a proper electrical source with a GFCI. | 🞏 Pass 🞏 Fail |
| Student checks for proper operation of blower and sufficient air movement | 🞏 Pass 🞏 Fail |
| Student completes air ventilation portion of Confined Space Permit. | 🞏 Pass 🞏 Fail |
| Student breaks down the blower and accessories, and returns unit to storage. | 🞏 Pass 🞏 Fail |

Comments:

**Confined Space: Forced Air Ventilation Operation Quiz – Answer Key**

Student: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Minimum passing score is 80%.

1. What is the safety industry’s recommended minimum number of air changes per hour during a confined space entry?
	1. 2 c. 10
	2. 5 d. 20
2. What is mechanically pushing air that is potentially contaminated from a confined space called?
	1. Forced air ventilation c. Exhausted air ventilation
	2. Blower air ventilation d. Negative air ventilation
3. How does attaching ducts or elbows to the blower affect the volume of air flow from the blower?
	1. Reduces air flow c. Has no impact on air flow
	2. Increases air flow d. Can increase or decrease, depends on the duct or elbow
4. Continuous forced air ventilation is required for permit-required confined space entries for what conditions?
	1. Actual hazardous atmospheres c. Immediately dangerous to life or health (IDLH) atmospheres
	2. Potential hazardous atmospheres d. All of the above
5. When can forced air ventilation operations be stopped during a permit-required confined space entry?
	1. The last entrant has left the space c. Oxygen levels are between 19.5 & 23.5
	2. Lower Explosive Limit is 0.0 d. When the last Lock Out Tag Out device is removed
6. The forced air blower duct in a vertical confined space, such as a below-grade vault, should extend to what level in the space?
	1. Floor-level c. Workers’ breathing zone (nose) level
	2. Mid-height level d. Within 1 foot of ceiling
7. What is the volume of a confined space vault that measures 30 feet long, 20 feet wide, & 8 feet high?
	1. 58 cu. ft. c. 4,800 cu. ft.
	2. 408 cu. ft. d. 50, 800 cu. ft.
8. What is the total cubic feet per hour (cfh) delivery rate of air needed to achieve 20 air changes per hour (ACH) for a confined space that measures 20 ft. x 10 ft. x 10 ft.?
	1. 2,000 cfh c. 10,000 cfh
	2. 8,000 cfh d. 40,000 cfh
9. For the above confined space operation, what would be the minimum cubic feet per minute (cfm) needed at the end of the forced air blower system?
	1. 450 cfm c. 670 cfm
	2. 540 cfm d. all meet the minimum requirement
10. If the blower stops working during a confined space entry, what must be the response?
	1. Immediately evacuate entrants c. Verify air quality is still safe. Evacuate entrants if unsafe.
	2. Call the Entry Supervisor d. Put the confined space rescue team on stand-by