



OMB Control #0693-0043

Expiration: 6/30/2025

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## Participant ID

Input Participant ID

## Pre Training Quiz

Which of the following gases is lighter than air?

- ☐ Carbon Dioxide
- ☐ Propane
- ☐ Methane
- ☐ Chlorine

At what height should you hold a gas meter when sampling for gases heavier than air?

- ☐ Above your head
- ☐ At chest level
- ☐ At waist level
- ☐ Near the ground

What does it mean if the LEL sensor on an air sampling device triggers but none of the other sensors show an alert?

- ☐ There is a high concentration of oxygen
- ☐ There is a potentially explosive atmosphere
- ☐ The device is malfunctioning
- ☐ The area is safe

How are alert levels typically set on an air gas meter?

- ☐ Standard operating procedures
- ☐ Device manufacturer settings
- ☐ FEMA guidelines
- ☐ User preference

What is the T-90 time in gas detection?

- ☐ The time it takes for a gas detector to detect 90% of a gas concentration
- ☐ The time it takes for a gas detector to detect 10% of a gas concentration
- ☐ The time it takes for a gas detector to reset after an alert
- ☐ The time it takes for a gas detector to calibrate

Which of the following gases is heavier than air?

- ☐ Helium
- ☐ Hydrogen Sulfide
- ☐ Ammonia
- ☐ Methane

What should you do if the oxygen (O<sub>2</sub>) sensor on an air sampling device triggers an alert?

- ☐ Ignore the alert
- ☐ Evacuate the area immediately
- ☐ Check other sensors for additional alerts
- ☐ Increase ventilation in the area

Which of the following is a common alert level for oxygen deficiency on an air gas meter?

- ☐ 21%
- ☐ 19.5%
- ☐ 23.5%
- ☐ 18%

When conducting air sampling, at what height should you hold a gas meter for gases with similar buoyancy to air?

- ☐ Above your head
- ☐ At chest level
- ☐ At waist level
- ☐ Near the ground

What is an action level?

- ☐ The concentration of a substance that triggers an action
- ☐ The maximum allowable exposure limit for a substance
- ☐ The time-weighted average concentration of a substance over an 8-hour workday
- ☐ The lowest concentration of a substance detectable by instruments

What is typically the time for the short-term exposure limit?

- ☐ 8 hours
- ☐ 4 hours
- ☐ 1 hour
- ☐ 15 minutes

At what percent do most portable gas detectors alarm for LEL?

- ☐ 10%
- ☐ 25%
- ☐ 40%
- ☐ 50%

What happens to the oxygen level in air when the contaminant level increases?

- ☐ Oxygen level remains constant
- ☐ Oxygen level decreases
- ☐ Oxygen level increases
- ☐ Oxygen level fluctuates unpredictably

What is the typical T-90 time for most gases when detected by portable gas detectors?

- ☐ 10 seconds
- ☐ 30 seconds
- ☐ 60 seconds
- ☐ 90 seconds

## Return to RA

Thank you. Please return this device to the research assistant.

## VRSQ

Please rate how the experience with the HazMat training system made you feel in terms of:

	None	Slight	Moderate	Severe
General Discomfort	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fatigue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eyestrain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Headache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fullness of Head	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulty Focusing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Blurred Vision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dizzy Eyes Closed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Vertigo

None

Slight

Moderate

Severe

☐☐☐☐

## SPQ

Please choose the appropriate response based on your experience with the HazMat training system

I devoted my whole attention to the training experience.

Strongly  
Disagree

Disagree

Neither  
Agree or  
Disagree

Agree

Strongly  
Agree

☐☐☐☐☐

I concentrated on the training experience.

☐☐☐☐☐

The training experience captured my senses.

☐☐☐☐☐

I dedicated myself completely to the training experience.

☐☐☐☐☐

I was able to imagine the arrangement of the spaces presented in the training experience very well.

Strongly  
Disagree

Disagree

Neither  
Agree or  
Disagree

Agree

Strongly  
Agree

☐☐☐☐☐

I had a precise idea of the spatial surroundings presented in the training experience.

☐☐☐☐☐

I was able to make a good estimate of the size of the presented space.

☐☐☐☐☐

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strong Agree
Even now, I still have a concrete mental image of the spatial environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strong Agree
I felt like I was actually there in the environment of the presentation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It was as though my true location had shifted into the environment in the presentation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt as though I was physically present in the environment of the presentation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It seemed as though I actually took part in the action of the presentation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strong Agree
I had the impression that I could be active in the environment of the presentation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt like I could move around among the objects in the presentation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The objects in the presentation gave me the feeling that I could do things with them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
It seemed to me that I could do whatever I wanted in the environment of the presentation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
I thought most about things having to do with the training experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thoroughly considered what the things in the presentation had to do with one another.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The training experience presentation activated my thinking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought about whether the training experience presentation could be of use to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
I concentrated on whether there were any inconsistencies in the training experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I didn't really pay attention to the existence of errors or inconsistencies in the training experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I took a critical viewpoint of the training experience presentation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
It was not important for me whether the training experience contained errors or contradictions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
I am generally interested in the topic of the training experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have felt a strong affinity to the theme of the training experience for a long time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There was already a fondness in me for the topic of the training experience before I was exposed to it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I just love to think about the topic of the training experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

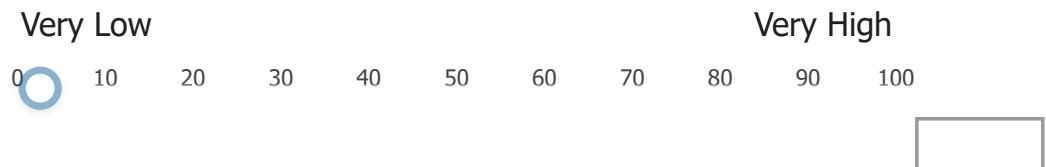


	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
When someone shows me a blueprint, I am able to imagine the space easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for me to negotiate a space in my mind without actually being there.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I read text, I can usually easily imagine the arrangement of the objects described.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
When someone describes a space to me, it's usually very easy for me to imagine it clearly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## NTLX Questionnaire

How mentally demanding was the task?



How physically demanding was the task?



How hurried or rushed was the pace of the task?



How successful were you in accomplishing what you were asked to do?



How hard did you have to work to accomplish your level of performance?



How stressful was the task?



## Post Training Quiz

Which of the following gases is lighter than air?

☐ Carbon Dioxide

- ☐ Propane
- ☐ Methane
- ☐ Chlorine

At what height should you hold a gas meter when sampling for gases heavier than air?

- ☐ Above your head
- ☐ At chest level
- ☐ At waist level
- ☐ Near the ground

What does it mean if the LEL sensor on an air sampling device triggers but none of the other sensors show an alert?

- ☐ There is a high concentration of oxygen
- ☐ There is a potentially explosive atmosphere
- ☐ The device is malfunctioning
- ☐ The area is safe

How are alert levels typically set on an air gas meter?

- ☐ Standard operating procedures
- ☐ Device manufacturer settings
- ☐ FEMA guidelines
- ☐ User preference

What is the T-90 time in gas detection?

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- ☐ The time it takes for a gas detector to reset after an alert
- ☐ The time it takes for a gas detector to calibrate

Which of the following gases is heavier than air?

- ☐ Helium
- ☐ Hydrogen Sulfide
- ☐ Ammonia
- ☐ Methane

What should you do if the oxygen (O<sub>2</sub>) sensor on an air sampling device triggers an alert?

- ☐ Ignore the alert
- ☐ Evacuate the area immediately
- ☐ Check other sensors for additional alerts
- ☐ Increase ventilation in the area

Which of the following is a common alert level for oxygen deficiency on an air gas meter?

- ☐ 21%
- ☐ 19.5%
- ☐ 23.5%

☐ 18%

When conducting air sampling, at what height should you hold a gas meter for gases with similar buoyancy to air?

- ☐ Above your head
- ☐ At chest level
- ☐ At waist level
- ☐ Near the ground

What is an action level?

- ☐ The concentration of a substance that triggers an action
- ☐ The maximum allowable exposure limit for a substance
- ☐ The time-weighted average concentration of a substance over an 8-hour workday
- ☐ The lowest concentration of a substance detectable by instruments

What is typically the time for the short-term exposure limit?

- ☐ 8 hours
- ☐ 4 hours
- ☐ 1 hour
- ☐ 15 minutes

At what percent do most portable gas detectors alarm for LEL?

☐ 10%

- ☐ 25%
- ☐ 40%
- ☐ 50%

What happens to the oxygen level in air when the contaminant level increases?

- ☐ Oxygen level remains constant
- ☐ Oxygen level decreases
- ☐ Oxygen level increases
- ☐ Oxygen level fluctuates unpredictably

What is the typical T-90 time for most gases when detected by portable gas detectors?

- ☐ 10 seconds
- ☐ 30 seconds
- ☐ 60 seconds
- ☐ 90 seconds

**Return to RA**

Thank you. Please return this device to the research assistant.



## Practical Instructions

The research assistant instructs the users on the practical test. They will follow the user around the PSITC and document any gases detected and the alert thresholds for each location.

## Practical Test

### Gas Detected at Location 1

- |   |  |
|---|--|
| <input type="checkbox"/> Helium (He)                              | <input type="checkbox"/> Carbon Dioxide (CO <sub>2</sub> ) |
| <input type="checkbox"/> Methane (CH <sub>4</sub> )               | <input type="checkbox"/> Ammonia (NH <sub>3</sub> )        |
| <input type="checkbox"/> Nitrogen Dioxide (NO <sub>2</sub> )      | <input type="checkbox"/> Oxygen High (O <sub>2</sub> )     |
| <input type="checkbox"/> Hydrogen Sulfide (H <sub>2</sub> S)      | <input type="checkbox"/> Oxygen Low (O <sub>2</sub> )      |
| <input type="checkbox"/> Carbon Monoxide (CO)                     | <input type="checkbox"/> Other                             |
| <input type="checkbox"/> Propane (C <sub>3</sub> H <sub>8</sub> ) | <input type="checkbox"/> None                              |
| <input type="checkbox"/> Chlorine (Cl <sub>2</sub> )              |  |

### Threshold for Gas 1

- ☐ None  
☐ Alert  
☐ Alarm

## Threshold for Gas 2

- ☐ None
- ☐ Alert
- ☐ Alarm

## Threshold for Gas 3

- ☐ None
- ☐ Alert
- ☐ Alarm

## Practice Test Location 2

### Gas Detected at Location 2

- |   |  |
|---|--|
| <input type="checkbox"/> Helium (He)                              | <input type="checkbox"/> Carbon Dioxide (CO <sub>2</sub> ) |
| <input type="checkbox"/> Methane (CH <sub>4</sub> )               | <input type="checkbox"/> Ammonia (NH <sub>3</sub> )        |
| <input type="checkbox"/> Nitrogen Dioxide (NO <sub>2</sub> )      | <input type="checkbox"/> Oxygen High (O <sub>2</sub> )     |
| <input type="checkbox"/> Hydrogen Sulfide (H <sub>2</sub> S)      | <input type="checkbox"/> Oxygen Low (O <sub>2</sub> )      |
| <input type="checkbox"/> Carbon Monoxide (CO)                     | <input type="checkbox"/> Other                             |
| <input type="checkbox"/> Propane (C <sub>3</sub> H <sub>8</sub> ) | <input type="checkbox"/> None                              |
| <input type="checkbox"/> Chlorine (Cl <sub>2</sub> )              |  |

## Threshold for Gas 1

- ☐ None

- ☐ Alert
- ☐ Alarm

### Threshold for Gas 2

- ☐ None
- ☐ Alert
- ☐ Alarm

### Threshold for Gas 3

- ☐ None
- ☐ Alert
- ☐ Alarm

## Practical Test Location 3

### Gas Detected at Location 3

- |   |  |
|---|--|
| <input type="checkbox"/> Helium (He)                              | <input type="checkbox"/> Carbon Dioxide (CO <sub>2</sub> ) |
| <input type="checkbox"/> Methane (CH <sub>4</sub> )               | <input type="checkbox"/> Ammonia (NH <sub>3</sub> )        |
| <input type="checkbox"/> Nitrogen Dioxide (NO <sub>2</sub> )      | <input type="checkbox"/> Oxygen High (O <sub>2</sub> )     |
| <input type="checkbox"/> Hydrogen Sulfide (H <sub>2</sub> S)      | <input type="checkbox"/> Oxygen Low (O <sub>2</sub> )      |
| <input type="checkbox"/> Carbon Monoxide (CO)                     | <input type="checkbox"/> Other                             |
| <input type="checkbox"/> Propane (C <sub>3</sub> H <sub>8</sub> ) | <input type="checkbox"/> None                              |

☐ Chlorine (CI)

### Threshold for Gas 1

- ☐ None
- ☐ Alert
- ☐ Alarm

### Threshold for Gas 2

- ☐ None
- ☐ Alert
- ☐ Alarm

### Threshold for Gas 3

- ☐ None
- ☐ Alert
- ☐ Alarm

## **RIMMS Questionnaire**

Please choose the appropriate response based on your experience with the HazMat training system

	Not True	Slightly True	Moderately True	Mostly True	Very True
The quality of the information provided helped to hold my attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The way the information is arranged and presented helped keep my attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The variety of provided information (video, hands-on, etc.) helped keep my attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is clear to me that the contents of this training experience are related to things I already know	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The content and style of user instruction convey the impression that learning how to conduct air monitoring is worth it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The training concepts will be useful to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not True	Slightly True	Moderately True	Mostly True	Very True
As I worked with the training experience, I was confident that I would be able to complete exercises with the air monitor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After working on this experience, I was confident that I would be able to pass a practical evaluation on it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The organization of the training helped me be confident in learning this topic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoyed working with these user instructions so much that I was stimulated to keep on working	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really enjoyed working with these user instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It was a pleasure to work with such well-designed user instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Open Feedback

What aspects of the training session did you find particularly helpful for learning the task?

What aspects of the training session made the task more challenging to learn?

Do you have any other thoughts or feedback about the training or task used in this study?

## **Demographics**

What is your sex?

- ☐ Male
- ☐ Female

What is your age?

How many years have you had in the fire service?

## **Thank you**

Thank you for taking part in our study. You may return the device to the research assistant.

For any questions in regards to this survey, please contact [psdcollab@nist.gov](mailto:psdcollab@nist.gov).

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