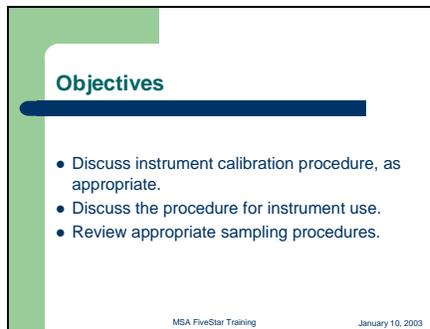


Slide 1



Introduce yourself and give work history.

Slide 2



Slide 3



Slide 4

Instrument Calibration



- Place the instrument into the holder and slide it forward, making sure of a tight connection with the gas delivery fitting.
- Depress the center ON/OFF button.
- When prompted, depress the RUN button on the TIMS.
- Once finished, you will see the prompt saying calibration complete and a PASS – you are free to use the instrument.
- If the calibration FAILS – DO NOT USE the instrument. Notify division/section ES&H personnel immediately.

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The instrument shall be calibrated prior to each day's use.

The TIMS system will prompt you throughout the calibration if it runs into problems.

If you experience problems, contact your division/section ES&H personnel. If the instrument fails calibration, tag the instrument with a note documenting any error messages on the TIMS and notify your division/section ES&H personnel.

Do not turn the instrument off until values reach 0 for H₂S, CO and COMB and about 21% for O₂.

Slide 5

Instrument Operation #1 Turning the Instrument On



Turn the instrument ON by depressing the center ON/OFF button.

One beep will sound and the alarm lights will flash once.

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When you first turn the instrument on, note the instrument's audio and visual alarms.

Slide 6

**Instrument Operation #2
Fresh Air Setup**

User will be prompted for Fresh Air Setup?

Select NO (Left Page button) if you just removed from the TIMS. NO is also the default response.

Select YES (Right Reset button) if in clean air and the TIMS unit has not been used.



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Default is set to NO. If no button is selected within 5 seconds, no fresh air setup will be performed.

Fresh air setup is a feature that allows for the combustible and toxic sensors to be zeroed and the oxygen sensor can be spanned to 20.8%. For this reason, you need to be certain that you are in fresh, uncontaminated air. Otherwise, inaccurate readings can result and the instrument can falsely indicate that a hazardous atmosphere is safe.

Fresh air setup is not a substitute for daily calibration checks.

Fresh air setup is not required if the instrument has just been removed from the TIMS because the calibration or bump testing on the TIMS includes fresh air setup.

Slide 7

**Instrument Operation #3
Display**



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After Fresh Air Setup has been completed (refer to Step #2), the four gas values will be displayed as shown.

COMB = LEL (Alarm Setpoint = 10%)

CO = Carbon monoxide (Alarm Setpoint = 25 ppm)

O2 = Oxygen (Alarm Setpoints = 19.5%-23.5%)

H2S = Hydrogen sulfide (Alarm Setpoint = 5 ppm)

If any of the values enters the alarm range, the instrument will demonstrate a visual alarm (red flashing lights) and sound an audible alarm (the same sound as when the instrument was first turned on). The alarm will continue as

long as the gas concentration is in the alarm range and the instrument has not been reset. Users are to immediately evacuate the space and contact their division/section ES&H personnel. To RESET the instrument, press the right RESET button.

Slide 8

**Instrument Operation #4
Battery Check**

Check remaining battery life by depressing the left PAGE button.

Instrument will beep and show remaining battery life as a bar graph, percent remaining and hours remaining.

If the battery is dying, an alarm will sound.



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After obtaining your reading, determine whether or not the battery life is sufficient for you to perform the tasks to which you have been assigned. If it is insufficient, repeat steps with another instrument and place this one on charger. Display will default back to four gas values after a few seconds.

Slide 9

**Instrument Operation #5
Date and Time**

Air monitoring data needs to be recorded pre-entry and at least once per hour during entry.

To check the date and time, press the left PAGE button twice.



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The display will default back to the four gas values after a few seconds.

Slide 10

Instrument Operation #6 Shutdown



Press and hold the ON/OFF button.

The display will show a countdown.

When the countdown reaches zero, the instrument will be turned off and the user can release the ON/OFF button.

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Any and all problems with the instrument should be reported immediately to your division/section ES&H personnel.

Slide 11

Atmospheric Testing



Depending on their weight, toxic and flammable gases can settle at the bottom, middle or top of a confined space. The only safe way to test the atmosphere in a confined space is to test at all three levels. This is done using a 25-foot sampling hose.

Bottom

Middle

Top

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As the diagram above indicates, depending on their weights, hazardous gases could be at the bottom, middle or top of a given confined space. Therefore, all levels of the confined space must be tested.

The instrument is equipped with a 25 foot hose.

Caution: The overall response time for the instrument with a 25 foot sampling hose is approximately 1.5 minutes.

Slide 12

Atmospheric Testing Comparison of Gases

The following gases are lighter than air.

Name	Vapor Density (Air=1)
Acetylene	0.9
Ammonia	0.7
Carbon Monoxide	0.6
Helium	0.1
Hydrogen	0.1
Nitrogen	0.6

The following gases are heavier than air.

Name	Vapor Density (Air=1)
Argon	1.4
Butane	1.9
Carbon Dioxide	1.5
Ethane	1.9
Hydrogen Sulfide	1.2
Hydrogen Cyanide	0.9
Hydrogen Chloride	1.3
Hydrogen Fluoride	1.3
Hydrogen Bromide	1.3
Hydrogen Iodide	1.3
Oxygen	1.3
Propane	1.5
Trichloroethylene	1.3

The gases in bold and larger print are those commonly found at Fermilab.

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The table above shows gases that are lighter and heavier than air. The ratio of the gases molecular weight compared to air is called its vapor density. With air being equal to 1, gases with vapor densities below 1 are then lighter than air and gases with vapor densities greater than 1 are heavier than air. The gases in bold and larger print are those commonly found at Fermilab.

Lighter than air are:

- Acetylene
- Ammonia
- Carbon Monoxide
- Helium
- Nitrogen

Heavier than air:

- Argon
- Ethane
- Hydrogen Sulfide
- Oxygen
- Propane

Slide 13

LEL Correlation Data Table

Gas	LEL (%)	Upper LEL (%)
Acetylene	2.5	100
Acetylene	2.5	100
Ammonia	15.0	28.0
Ammonia	15.0	28.0
Butane	1.9	8.0
Butane	1.9	8.0
Carbon Monoxide	12.0	75.0
Carbon Monoxide	12.0	75.0
Ethane	3.0	12.0
Ethane	3.0	12.0
Ethanol	3.3	12.0
Ethanol	3.3	12.0
Hexane	2.3	12.0
Hexane	2.3	12.0
Hydrogen	4.0	75.0
Hydrogen	4.0	75.0
Hydrogen Sulfide	4.3	45.0
Hydrogen Sulfide	4.3	45.0
Hydrogen Cyanide	1.3	10.0
Hydrogen Cyanide	1.3	10.0
Hydrogen Chloride	1.3	10.0
Hydrogen Chloride	1.3	10.0
Hydrogen Fluoride	1.3	10.0
Hydrogen Fluoride	1.3	10.0
Hydrogen Bromide	1.3	10.0
Hydrogen Bromide	1.3	10.0
Hydrogen Iodide	1.3	10.0
Hydrogen Iodide	1.3	10.0
Propane	2.1	10.0
Propane	2.1	10.0
Styrene	1.1	7.0
Styrene	1.1	7.0
Trichloroethylene	1.3	10.0
Trichloroethylene	1.3	10.0
Xylene	1.3	10.0
Xylene	1.3	10.0

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