

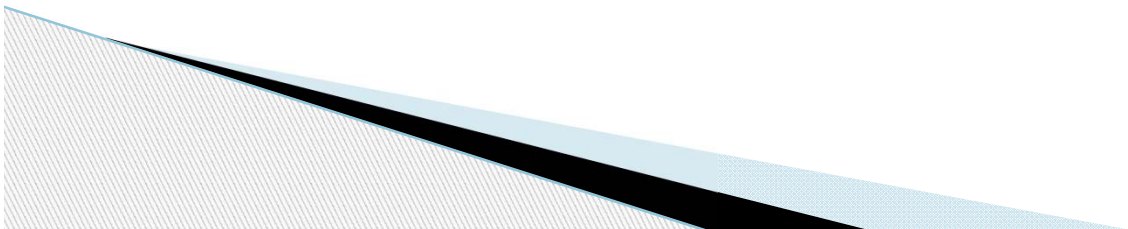
Confined Space Air Monitoring

DRPGM – Direct Reading Portable Gas Monitors



Road Map

- ▶ Theory ~ 15 Minutes
 - What the limits are on various gases
 - What are the testing requirements
 - How to sample a diverse selection of environments
 - Unique methods to complete sampling in a safe manner
- ▶ Exercises ~45 Minutes
 - How to use, bump test, and calibrate a selection of gas monitors



Disclaimer

▶ **Material used in this presentation was adopted from a Confined Space Attendant, Entry, Supervisor Course. “This material was produced under Grant SH-21000-10-60-F-29 from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.”**

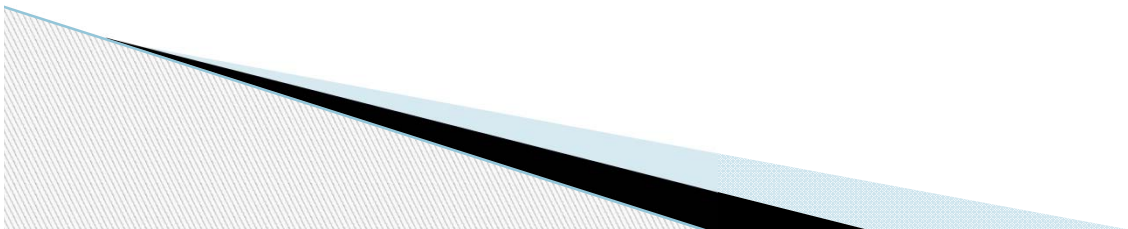
What is a Confined Space?

- A Space that is
 - Is large enough, and so configured that, an employee can enter bodily and perform work;
 - Has limited or restricted means of entry or exit; and
 - Is not designed for continuous human occupancy.

Remember: If you break the plane of a confined space, you have entered the confined space!

Atmosphere Testing Must Be Performed

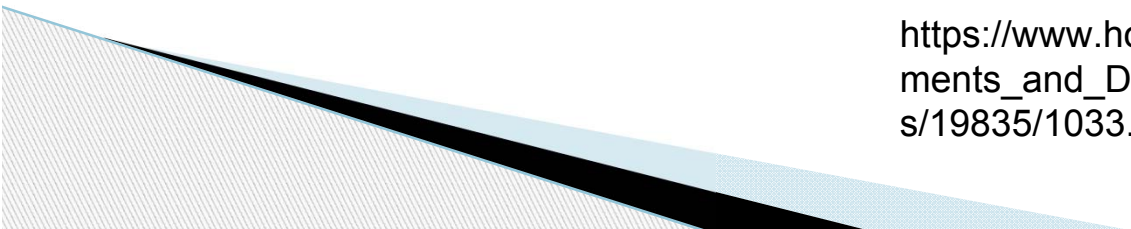
- Prior to every entry when the space is vacant;
- After a 10 minute ventilation period (if ventilation is necessary);
- At least hourly for permit-required confined spaces. NOTE: A good practice is to re-test the atmosphere after breaks or having been out of the confined space for a period of time.
- More frequently, if conditions or suspicions warrant.



Test the Atmosphere

Oxygen

- Content:
 - At least 19.5% and less than 23.5%
- Check for Combustibles:
 - Less than 10% of the LEL (Lower Explosive Limit)
- Check for Toxic Gasses:
 - Carbon Monoxide (CO) 35 PPM
 - Hydrogen Sulfide (H₂S) TWA 10 PPM, STEL 15 PPM
 - Or any other hazardous materials as determined by the use of the space.



https://www.honeywellsafety.com/Supplementary/Documents_and_Downloads/Instrumentation/Best_Practices/19835/1033.aspx

Oxygen Deficiency

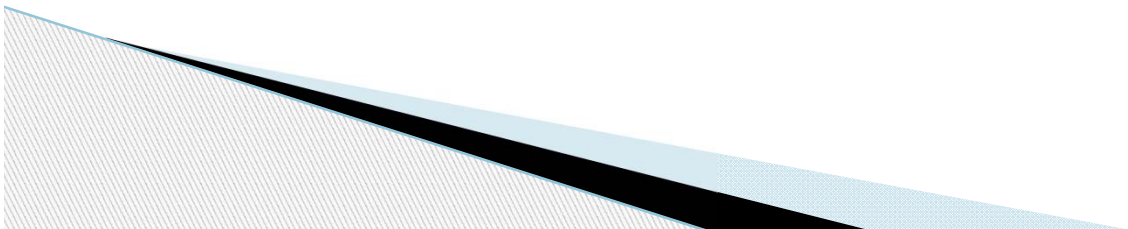
Oxygen could be removed from the air in a confined space by:

- Material in the space could displace the oxygen
- Rusting could create a chemical reaction that uses up the oxygen
- The space could be purged with a gas to prevent explosions.

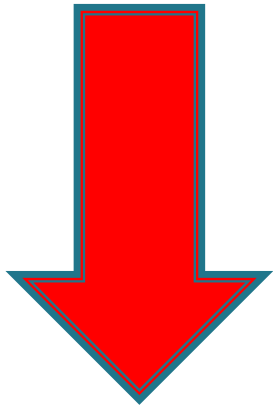
Notice

Any time a limit is exceeded, no matter what the reason, all personnel shall immediately exit the space, and no others shall enter until atmospheric conditions are returned to safe levels.

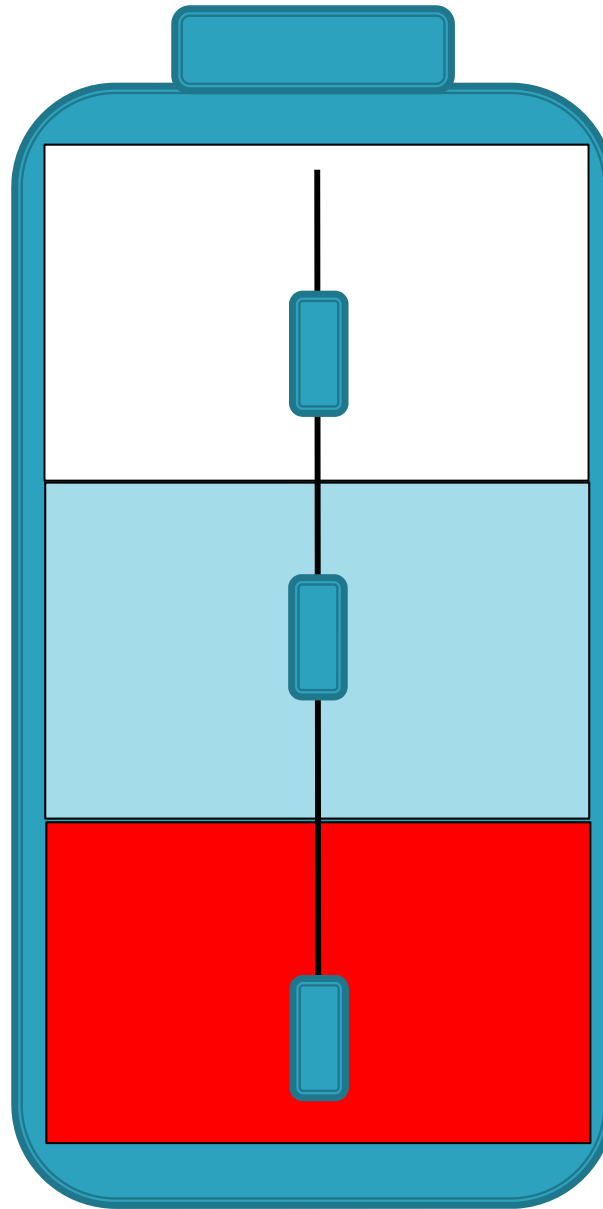
THERE ARE NO EXCEPTIONS TO THIS RULE!



**Always test the
air at various levels
to be sure that the
entire space is safe.**



**Good air near
the opening
does NOT mean
there is good air
at the other end!**



Good Air

Poor Air

Deadly Air

What About Other Spaces?



When do I need to Bump Test?

- ▶ ISEA updated its position statement on instrument calibration in 2010, stating:
 - "A bump test . . . or calibration check of portable gas monitors should be conducted before each day's use in accordance with the manufacturer's instructions."
- ▶ If an instrument fails a bump test or a calibration check, the operator should perform a full calibration on it before using it.

When do I need to Calibrate?

- ▶ Follow the manufacturer's guidelines for proper calibration.
- ▶ Only use a certified traceable test gas, and do so before its expiration date. Never use a test gas after its expiration date.
- ▶ Train DRPGM operators on the proper methods of calibration.

Documentation?

- ▶ How should I document a Bump Test or Calibration Check?
- ▶ How should I document a Full Calibration?

