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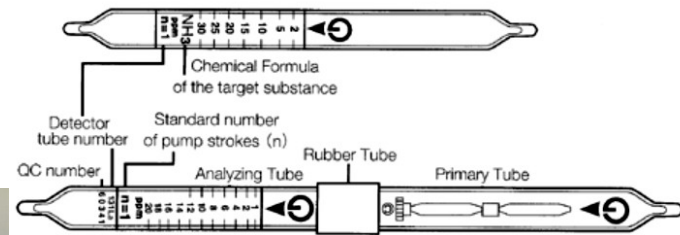
Direct Reading Instruments and OSHA

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DREAM Workshop
11/08

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Historical use of direct reading instruments

- Noise dosimeters
- Heat Stress
- Colorimetric tubes
- Ecolyzer



A closeup of Gastec gas detector tube(s)



71007

Direct reading instruments for permit required confined space entry

- **"permit-required confined space"**
 - describes a confined space that among other characteristics: contains or has the potential to contain a hazardous atmosphere.
- **1910.146(c)(5)(ii)(C)** Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order.
- **1910.146(c)(5)(ii)(F)** The atmosphere within the space shall be periodically tested as necessary ...

Types of Gases or Vapors OSHA wants to measure

- Oxygen
- Flammable
- Toxic - PELs



Direct Reading Instruments for exposure monitoring - regulations

- 1910.1028, Benzene, Appendix D, Sampling and analytical methods for Benzene monitoring and measurement procedures
 - Sampling and analysis may also be performed by portable direct reading instruments, real-time continuous monitoring systems, passive dosimeters or other suitable methods. The employer has the obligation of selecting a monitoring method which meets the accuracy and precision requirements of the standard under his unique field conditions. The standard requires that the method of monitoring must have an accuracy, to a 95 percent confidence level, of not less than plus or minus 25 percent for concentrations of benzene greater than or equal to 0.5 ppm.

OSHA Cincinnati Technical Center Equipment Evaluation Considerations

- Check Manufacture Specifications
- Cost considerations
 - upfront and recurring
- Testing/Evaluation
 - Operational, Environmental, Electromagnetic Susceptibility
- Servicing and quality
- User friendliness

OSHA Salt Lake Technical Center



- OSHA Salt Lake Technical Center is home to the Agency's :
 - Analytical Services
 - Sampling and Analytical Methods Development
- Regarding exposure assessment - integrated sampling with laboratory analysis has been the gold standard for OSHA

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Integrated Sampling and Analytical Methods Development

Evaluation Guidelines For Air Sampling Methods Utilizing Chromatographic
Analysis

47 pages

Evaluation Guidelines for Air Sampling Methods Utilizing Spectroscopic
Analysis

39 pages

Target Concentrations
Reliable Quantitation Limit (RQL)
Reproducibility
Sampling Rate and Capacity
Extraction Efficiency

Detection Limit
Determination of the Precision
Interferences
Retention Efficiency
Effects of Storage

Written reports fall into three basic categories:

- ***Evaluated Methods*** - methodology that has been thoroughly evaluated according to the guidelines.
- ***Partially Evaluated Methods*** - procedures for which an in-depth evaluation has not been performed. Often performed rapidly to meet immediate need of field personnel.
- ***Studies*** - Investigations that involve a class or group of analytes, or an aspect of methodology that may be common to many methods in general. Unsuccessful evaluations will be reported as studies.

SLTC Direct reading methods

- **1993 - SLTC evaluated the Draeger 190 – CO monitor.**
- **OSHA ID-209**
 - CARBON MONOXIDE IN WORKPLACE ATMOSPHERES



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Portable Field Instruments

Evaluation Guidelines, with Testing and Reporting Protocols for OSHA On-site Air and Surface Sampling Methods

35 pages

Target Concentrations

Linearity of Response

Response time

Uncertainty (precision and bias)

Detection Limit

Interferences (water vapor)

Face velocity effects

Interferences

Future of Direct Reading Gas and Vapor Instruments

- Market forces (demand)
- OSHA's willingness to support "Cite on Site"
- Screening versus Compliance
- Safety and Health Management Systems

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