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National Personal Protective Technology Laboratory

Industrial PAPR Concept
Pittsburgh, PA

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CBRN Respirator Standards

The findings and conclusions in this presentation have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be construed to represent any agency determination or policy.

Information Docket Industrial PAPR

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Industrial PAPR Implementation

- Much of the Technical Work developed in the CBRN PAPR project can be applied to the Industrial Standard
- Will use Concept Paper format up to the initiation of Rulemaking – revised concept in 45 to 60 days
- Additional public meeting November 2005
- Formal Rulemaking Process –
 - Follow administrative procedures and staffing requirements
 - Target date for formal notice January 2006
 - 18 to 21 months to implementation (Fall 2007)

Overview

- **Place all PAPR requirements in one subpart of 42 CFR**
 - **Keep existing general categories (Subparts A-G)**
 - **Supersede Subpart KK**
 - **Clarify/update/consolidate requirements**
 - **Incorporate requirements for breath response and constant flow units**
 - **Provide provisions for positive pressure units**

Major Areas Under Consideration

- Indicators for flow/pressure & battery
- Low/moderate/high flow rating
- Two filter types (PAPR 95/PAPR 100)
- Single level canister/cartridge testing
- Conditioning/rough handling requirement
- General use (visual, human factors)
- Rated duration of battery in 1-hour increments

Specific Design Consideration Areas

- Accessible switches
- Flexible breathing tubes
- Harness design (unit and head)
- Marked containers
- Lens impact resistance
- Low pressure- real time indicator
- Low flow- real time indicator
- Battery charge indicator
- Noise

Specific Performance Consideration Areas

- **Flow- Positive pressure**
 - Low ≥ 14.5 res./min @ 10.5 lpm
 - Moderate ≥ 24 res./min @ 40 lpm
 - High ≥ 30 res./min @ 86 lpm
 - + 30 res/min @ 103 lpm for 10 min
- **Flow- Continuous flow**
 - Low ≥ 85 lpm tight, 115 lpm loose
 - Moderate ≥ 115 lpm tight, 170 lpm loose
 - High ≥ 261 lpm tight, 350 lpm loose- last 10 min

Specific Performance Consideration Filter

- **PAPR 95- 95% initial filter efficiency when tested against DOP**
- **PAPR 100- 99.97% efficiency when loaded with DOP as the test challenge**
- **Test at highest flow rate of system divided by number**

Specific Performance Consideration Gas/Vapor

- All tested in same manner
- Flow divided by number of units
- Concentrations similar to CBRN

Specific Performance Consideration – Inlet Covering

- **CO2 machine test**
 - 14.5 res/min 10.5 lpm, 5% CO2 ex., $\leq 0.5\%$ in.
- **Breathing gas human subject test**
 - Stand then walk at 3.5 mph
 - O2 $\geq 19.5\%$
 - CO2 $\leq 2\%$
- **LRPL**
 - PF $\geq 10,000$ for $\geq 95\%$ of trials

Specific Performance Consideration - Other

- **Eyepiece**
 - Impact res. or state otherwise
 - Low temp fog resistant
- **ESLI**
 - Per existing criteria
- **FMEA (failure mode effects analysis)**
- **Hydration device option**
- **Intrinsic Safety per recognized lab**

New considerations

- All PAPRs tested and evaluated as positive pressure
- Evaluation criteria for silent mode operation
 - Test requirements with blower off
 - Could serve as FMEA
- Add field of view requirement