Proposed Total Inward Leakage Testing in NIOSH Certification Program Concept

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NIOSH/NPPTL PUBLIC MEETING
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NIOSH

• 30 CFR 11
  – 1972
  – Schedule 21C
  – Coal dust test abolished
  – Isoamyl acetate test
    • Configuration issues

• 42 CFR Part 84
  – 1995
  – Isoamyl acetate test eliminated
  – Undefined NIOSH effectiveness studies for isoamyl acetate or ANSI/OSHA accepted fit testing
  – OSHA individual fit testing
  – Best practices used in a quality respirator program
Lack of Fit Testing

- *Respirator Usage in Private Sector Firms, 2001*
  - Only 53% of respondents conduct fit tests
- OSHA public hearing on the proposed revision to 29 CFR Part 134
  - Table for assigned protection factors
  - Maximum use concentrations
- During the hearings, NIOSH committed to add a quantifying fit method to respirator certification requirements

Total Inward Leakage Program

- As a continuation of NIOSH's unique modular approach to Standards Development, a program was established to TIL requirements for:
  1. Half-mask particulate respirators
  2. PAPR and supplied-air respirators
  3. All other respirators
  4. Other PPE, e.g., encapsulating suits
Total Inward Leakage Program

- Phase 1: Investigative/concept draft
  - Gather and review existing TIL respirator information,
  - Review existing TIL test equipment capabilities and technical specifications,
  - Identify a peer review team composed of manufacturers, users, academia and government,
  - Develop initial TIL concept addressing performance requirements and test protocol,
  - Conduct peer review and a public meeting
  - Establish technical specification for TIL test facility

Total Inward Leakage Program

- Phase 2: Test facility/benchmark testing
  - Establish NPPTL TIL test facility,
  - Perform benchmark testing to establish state of the art respirator performance,
  - Continue development of TIL concept requirements and protocols,
  - Identify draft implementation plan
Total Inward Leakage Program

- Phase 3: Consistency testing and implementation plan
  - Conduct validation testing for TIL facility,
  - Finalize implementation plan,
  - Finalize TIL concept requirements and protocols

TIL Certification Performance Criteria

- Not a substitute for OSHA mandated individual fit-testing
  - Only method of accessing individual fit is a fit test
  - No respirator can be certified to fit
TIL Certification Performance Criteria

- Establish certification performance criteria
  - Based on actual fit factor results, not based on APF
  - Inappropriate to use previously obtained fit-test data
  - Conduct benchmark testing on state-of-the-art respirators within class
  - Rely on the manufacturer's User Instructions
  - Use entire panel for TIL evaluation

Total Inward Leakage Program

- For the half-mask project the following test method characteristics were compared:
  - Ability to be used to measure TIL on all styles of halfmasks, quartermasks and filtering facepieces regardless of air purifying element
  - Required sensitivity for the desired results
  - Ability to give accurate, repeatable results
  - Ability to do required test exercises without disturbing the fit due to test equipment, probes, etc
  - Ease of duplication (i.e., intra-lab reproducibility)
  - Cost of equipment
  - Need for a test chamber
  - Ease of preparation, use, clean up, etc
Total Inward Leakage Program

- Best choice for measuring half-mask respirator TIL is PortaCount® Plus with Companion™ in a direct reading mode
- Most reproducible exercise methods are thought to be those used in the OSHA fit test protocol
  - A standard workplace with standardized movements does not exist

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Total Inward Leakage Program

• Summary
  – Phase 2 is complete, in Phase 3
  – The study was designed to assess the overall capabilities of individual respirators
  – The Benchmark Data was derived by testing across the complete panel regardless of respirator size designation and therefore does not represent actual field use
  – The Data was analyzed in several different ways, and conclusions have been reached concerning proposed requirements for Certification

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Thank you

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