

Total Inward Leakage Standards Development Efforts

**NIOSH/NPPTL Public Meeting
Key Bridge Marriott, Arlington, VA
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Welcome

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Bureau of Mines



- Schedule 21
 - 1934
 - Thirty-minute test in coal dust
- Schedule 21A
 - 1959
- Schedule 21B
 - 1965
 - Coal dust but no exercises
- Isoamyl acetate test
- Organic vapor cartridges

NIOSH

- Schedule 21C
 - 1972
 - Coal dust test abolished
 - Isoamyl acetate test
 - Configuration issues
- 42 CFR Part 84
 - 1995
 - Isoamyl acetate test eliminated
 - OSHA individual fit testing
 - Undefined NIOSH effectiveness studies for isoamyl acetate or ANSI/OSHA accepted 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
- NPPTL to add a quantifying fit method to respirator certification requirements



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- NPPTL TIL assessment
 - Respirators with face-fit as a major contributor
 - TIL of other PPE such as total encapsulation suits
- ANSI Z88.2 *American National Standard for Respiratory Protection* and OSHA proposed APF schedule
 - Two areas of the most debate by the experts as to the actual protection and associated assigned protection factors
 - Half-mask respirators in particular, filtering facepieces
 - Hood/helmet devices both air supplied and powered air purifying
 - Notable Lawrence Livermore National Laboratory PAPR study

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- NIOSH's unique modular approach to Standards Development

- Develop requirements for half-mask respirators first
- PAPR and supplied-air respirators to follow



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,
 - Establish technical specification for TIL test facility

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- 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

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- 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

TIL ≠ APF

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
 - Not based on OSHA's APF
 - Based on actual fit factor results
 - 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 in lieu of specific guidance

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- 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

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



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- Project will be peer reviewed
 - Programmatically
 - Scientifically
 - Input from all stakeholders is welcome
- Two planned public meetings on the half-mask project
- Benchmark testing has begun
 - Plans to have the testing complete this year
- Final concept by late next spring
 - Recommendations are sought

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Phase	Dates	Objectives	Milestones
Phase 1: Investigative/ concept draft	Mar 04 through Aug 04	<ul style="list-style-type: none"> • Gather information, • Review test equipment • Identify peer review • Team, • Develop TIL concept, • Establish facility specification 	<ul style="list-style-type: none"> • TIL concept • Facility specification • Peer review • Public meeting
Phase 2: Test facility/ benchmark testing	May 04 through Feb 05	<ul style="list-style-type: none"> • Establish test facility • Benchmark tests, • Continued concept • development, • Draft implementation plan 	<ul style="list-style-type: none"> • Draft implementation plan • Peer reviews • Public meeting • Test facility complete
Phase 3: Validation testing/ implementation plan	Sept 04 through April 05	<ul style="list-style-type: none"> • Validation testing, • Implementation plan • Final TIL concept 	<ul style="list-style-type: none"> • Peer review • Implementation plan • Final TIL concept

Quality Partnerships Enhance Worker Safety & Health

Thank you

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