

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



Total Inward Leakage Program

NIOSH Bivariate Panel

		Face Width (mm)		
		120.5	132.5	144.5
Face Length (mm)	138.5		9	10
	128.5	6	7	8
	118.5	3	4	5
	108.5	1	2	
	98.5			

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

Quality Partnerships Enhance Worker Safety & Health

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Thank you

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