



National Institute for Occupational Safety and Health
National Personal Protective Technology Laboratory
P.O. Box 18070
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Procedure No. RCT-ASR-STP-0116	Revision: 1.1	Date: 21 September 2005
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DETERMINATION OF AIRFLOW RESISTANCE, CONTINUOUS FLOW, ESCAPE, OPEN-CIRCUIT, SELF-CONTAINED BREATHING APPARATUS WITH HOODS
STANDARD TESTING PROCEDURE (STP)

1. PURPOSE

This test establishes the procedures for ensuring that the level of protection provided by the airflow resistance requirements on Continuous Flow, Escape, Open-Circuit, Self-Contained Breathing Apparatus (ESCBA) with hoods submitted for Approval, Extension of Approval, or examined during Certified Product Audits, meet the minimum certification standards set forth in 42 CFR, Part 84, Subpart G, Section 84.84.63(a)(c)(d); Volume 60, Number 110, June 8, 1995.

2. GENERAL

This STP describes the Determination of Airflow Resistance, Continuous Flow, Escape, Open-Circuit, Self-Contained Breathing Apparatus (ESCBA) with Hoods test in sufficient detail that a person knowledgeable in the appropriate technical field can select equipment with the necessary resolution, conduct the tests, and determine whether or not the product passes the tests.

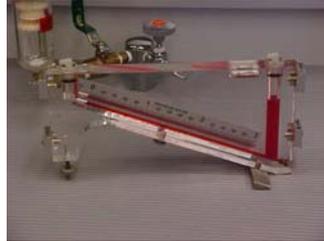
3. EQUIPMENT/MATERIALS

3.1 The list of necessary test equipment and materials follows:



3.1.1. Anthropometric Test Head with tube for measuring breathing resistance (Sierra Engineering Company Model 428) or equivalent.

Approvals:	<u>1st</u> Level	<u>2nd</u> Level	<u>3rd</u> Level
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- 3.1.2. Dwyer Slant Manometer 0-3", F. W. Dwyer Manufacturing Co., Michigan City, Indiana or equivalent.

4. TESTING REQUIREMENTS AND CONDITIONS

- 4.1. Prior to beginning any testing, all measuring equipment to be used must have been calibrated in accordance with the manufacturer's calibration procedure and schedule. At a minimum, all measuring equipment utilized for this testing must have been calibrated within the preceding 12 months using a method traceable to the National Institute of Standards and Technology (NIST).
- 4.2. The compressed gas cylinder must meet all applicable Department of Transportation Requirements for cylinder approval as well as for retesting/requalification.
- 4.3. Normal laboratory safety practices must be observed. This includes all safety precautions described in the current ALOSH Facility Laboratory Safety Manual.
- 4.3.1. Safety glasses, lab coats, and hard-toe shoes must be worn during all testing.
- 4.3.2. Work benches must be maintained free of clutter and non-essential test equipment.
- 4.3.3. When handling any glass laboratory equipment, lab technicians and personnel must wear special gloves which protect against lacerations or punctures.

5. PROCEDURE

Note: Reference Section 3 for equipment, model numbers and manufacturers. For calibration purposes use those described in the manufacturer's operation and maintenance manuals.

- 5.1. Charge cylinder to the pressure which gives the highest flow (determined during the flow test).
- 5.2. Mount hood on an anthropometric head.
- 5.3. Plug breathing machine connection on the back of the head with a cork.
- 5.4. Connect a slant manometer to the pressure tap exiting the anthropometric head.

5.5. Open cylinder and record pressure reading from slant manometer.

Note: This test should be done on a minimum of two respirators, or more if additional testing is required (42 CFR, Part 84, Sections 84.12, 84.30, and 84.60.)

6. PASS/FAIL CRITERIA

6.1. The criterion for passing this test is set forth in 42 CFR, Part 84, Subpart G, Section 84.84.63(a)(c)(d); Volume 60, Number 110, June 8, 1995.

6.2. This test establishes the standard procedure for ensuring that:

84.63 Test requirements; general.

(a) Each respirator and respirator component shall when tested by the applicant and by the Institute, meet the applicable requirements set forth in subparts H through L of this part.

(c) In addition to the minimum requirements set forth in subparts H through L of this part, the Institute reserves the right to require, as a further condition of approval, any additional requirements deemed necessary to establish the quality, effectiveness, and safety of any respirator used as protection against hazardous atmospheres.

(d) Where it is determined after receipt of an application that additional requirements will be required for approval, the Institute will notify the applicant in writing of these additional requirements, and necessary examinations, inspections, or tests, stating generally the reasons for such requirements, examinations, inspections, or tests.

6.3. The resistance to air flowing from the respirator shall not exceed 25 mm (1 inch) of water-column height when the air flow into the respiratory inlet covering at maximum volume flow.

7. RECORDS\TEST SHEETS

7.1. All test data will be recorded on the SPECIAL TEST - AIRFLOW RESISTANCE, CONTINUOUS FLOW, ESCAPE, OPEN-CIRCUIT, SELF-CONTAINED BREATHING APPARATUS WITH HOODS test data sheet.

7.2. All videotapes and photographs of the actual test being performed, or of the tested equipment shall be maintained in the task file as part of the permanent record.

7.3. All equipment failing any portion of this test will be handled as follows:

7.3.1. If the failure occurs on a new certification application, or extension of approval application, send a test report to the RCT Leader and prepare the hardware for return to the manufacturer.

- 7.3.2. If the failure occurs on hardware examined under an Off-the-Shelf Audit the hardware will be examined by a technician and the RCT Leader for cause. All equipment failing any portion of this test may be sent to the manufacturer for examination and then returned to NIOSH. However, the hardware tested shall be held at the testing laboratory until authorized for release by the RCT Leader, or his designee, following the standard operating procedures outlined in Procedure for Scheduling, and Processing Post-Certification Product Audits, RB-SOP-0005-00.

SPECIAL TEST - AIRFLOW RESISTANCE, CONTINUOUS FLOW, ESCAPE, OPEN-CIRCUIT, SELF-CONTAINED BREATHING APPARATUS WITH HOODS

Project No : _____ Date: _____

Company : _____

Respirator Type: _____

Reference: 42 CFR, Part 84, Subpart G, Section 84.63(a)(c)(d).

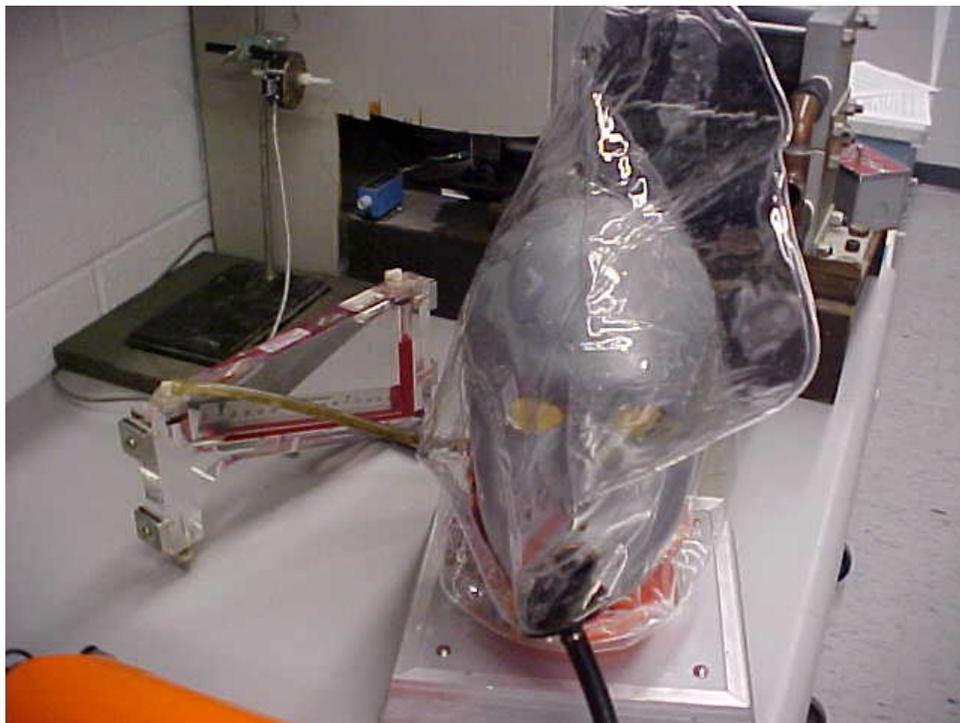
Requirement: The resistance to air flowing from the respirator shall not exceed one inch water column height when the air flow into the respiratory inlet covering is at maximum volume of flow.

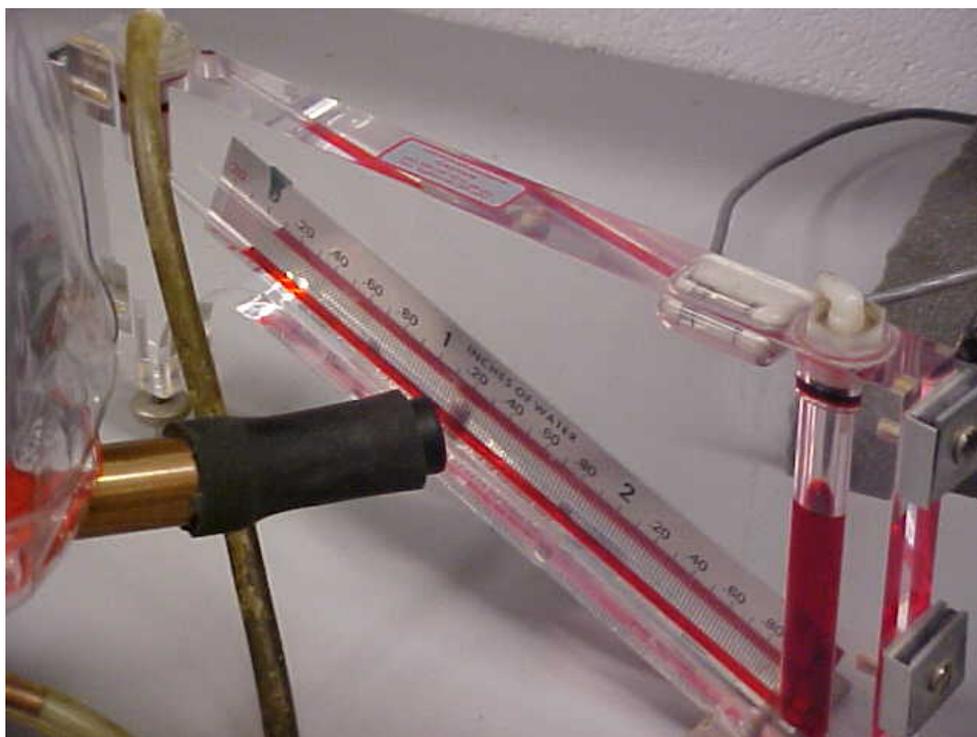
Results:

<u>Unit</u>	<u>Resistance / Inches of H₂O</u>
_____	_____
_____	_____

Comments:

Test Engineer: _____ PASS _____ FAIL _____





Revision History

Revision	Date	Reason for Revision
1.0	23 May 2001	Historic document
1.1	21 September 2005	Update header and format to reflect lab move from Morgantown, WV No changes to method