



National Institute for Occupational Safety and Health
National Personal Protective Technology Laboratory
P.O. Box 18070
Pittsburgh, PA 15236

Procedure No. RCT-ASR-STP-0136

Revision: 1.1

Date: 27 September 2005

DETERMINATION OF DEMAND GAS FLOW - CLOSED-CIRCUIT, DEMAND
AND PRESSURE-DEMAND, SELF-CONTAINED BREATHING APPARATUS
STANDARD TESTING PROCEDURE (STP)

1. PURPOSE

This test establishes the procedures for ensuring that the level of protection provided by the the gas flow requirements on Closed-Circuit, Demand and Pressure-Demand, Self-Contained Breathing Apparatus (SCBA) submitted for Approval, Extension of Approval, or examined during Certified Product Audits meet the certification requirements set forth in 42 CFR, Part 84, Subpart G, Section 84.63(a)(c)(d), and Subpart H, Section 84.94(c); Volume 60, Number 110, June 8, 1995, and Federal Register, Volume 50, No. 222, November 18, 1985.

2. GENERAL

This STP describes the Determination of Demand Gas Flow - Closed-Circuit, Demand and Pressure-Demand, Self-Contained Breathing Apparatus test in sufficient detail that a person knowledgeable in the appropriate technical field can select equipment with the necessary resolution, conduct the test, and determine whether or not the product passes the test.

3. EQUIPMENT/MATERIAL

3.1. The list of necessary test equipment and materials follows:



3.1.1 Electric timer, calibrated to hundredths of a minute (Precision Scientific Company).

Approvals:	1 st Level	2 nd Level	3 rd Level
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3.1.2. Dry test - Gas meter, (Singer-American Meter Division - Model DTM-200A) varies depending on expected flow.

3.1.3. Compressed oxygen cylinder provided with the SCBA.

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 at all times.

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. The demand valve is secured in the fully open position.

5.2. Connect the oxygen supply at the regulator outlet to a calibrated dry test meter.

5.3. Activate unit and start timer simultaneously. Record flow from full cylinder pressure down to 500 psig.

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5.4. See Standard Test Procedure RCT-ASR-STP-0123A to determine demand valve operating characteristics and follow as described.

5.5. Average the flow readings obtained during the test and record on test data sheet.

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 84.63(a)(c)(d), and Subpart H, Section 84.94(c); Volume 60, Number 110, June 8, 1995 and Federal Register, Volume 50, No. 222, November 18, 1985.

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.

84.94 Gas Flow Test; Closed-Circuit Apparatus; description.

(c) All demand flow devices shall provide at least 30 liters of oxygen per minute when in the fully open position.

Federal Register, Volume 50, No. 222, November 18, 1985.

The positive-pressure closed circuit self-contained breathing apparatus will maintain a positive pressure in the facepiece during all pressure and flow tests.

6.3. All pressure-demand flow devices shall provide at least 30 liters of oxygen per minute when facepiece pressure is equal to or greater than ambient pressure.

7. RECORDS/TEST SHEETS

7.1. All test data will be recorded on the GAS FLOW TEST, DEMAND AND PRESSURE-

DEMAND, CLOSED-CIRCUIT, SELF-CONTAINED BREATHING APPARATUS 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.

**GAS FLOW TEST, DEMAND AND PRESSURE-DEMAND, CLOSED-CIRCUIT,
SELF-CONTAINED BREATHING APPARATUS**

Project No : _____ Date: _____

Company : _____

Respirator Type: _____

Reference: 42 CFR, Part 84, Subpart H, Section 84.94(c), and Federal Register, Volume 50, No. 222, November 18, 1985.

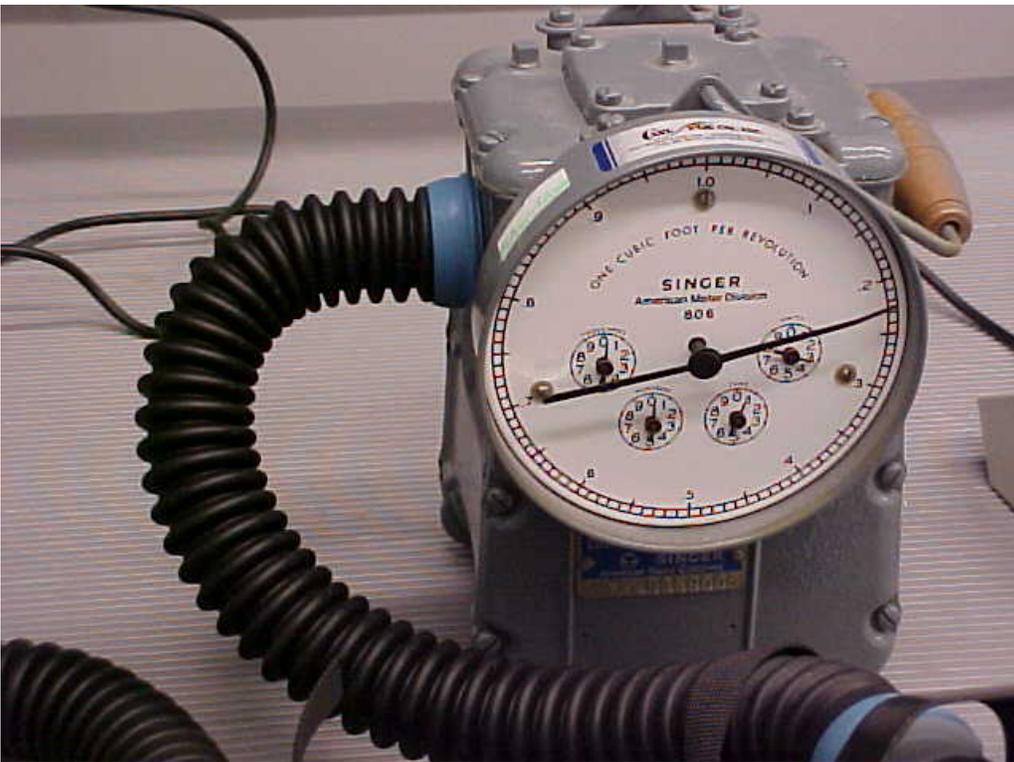
Requirement: All demand and pressure-demand flow devices shall provide at least 30 liters of oxygen per minute when in the fully open position.

Results:

	<u>Flow/LPM</u>
<u>Unit #1</u>	_____
<u>Unit #2</u>	_____

Comments :

Test Engineer: _____ PASS _____ FAIL _____





Revision History

Revision	Date	Reason for Revision
1.0	20 November 2000	Historic document
1.1	27 September 2005	Update header and format to reflect lab move from Morgantown, WV No changes to method