



National Institute for Occupational Safety and Health  
 National Personal Protective Technology Laboratory  
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Procedure No. RCT-ASR-STP-0114	Revision: 1.1	Date: 20 September 2005
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DETERMINATION OF SOUND LEVEL MEASUREMENT, ESCAPE, OPEN-CIRCUIT,  
 SELF-CONTAINED BREATHING APPARATUS USING HOODS OR HELMETS  
 STANDARD TESTING PROCEDURE (STP)

1. PURPOSE

This test establishes the procedures for ensuring that the level of protection provided by the air velocity and noise level requirements for hoods or helmets used on Self-Contained Breathing Apparatus (SCBA) 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 84.63(a)(c)(d); Volume 60, Number 110, June 8, 1995.

2. GENERAL

This STP describes the Determination of Sound Level Measurements, Open-Circuit, Self-Contained Breathing Apparatus Using Hoods or Helmets 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/MATERIALS

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



3.1.1. General Radio Noise Dosimeter - Model GR1954 or equivalent.

Approvals:	1 <sup>st</sup> Level	2 <sup>nd</sup> Level	3 <sup>rd</sup> Level
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### 3.1.2. Mannequin.

## 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. Perform the following operations according to the respective paragraphs in the GR1954 Noise Dosimeter Instruction Manual on both dosimeters:

- a. Battery Installation.

- b. Installation of Monitor in Indicator Housing.
  - c. Battery Check.
  - d. Calibration of Monitor.
- 5.2. Install the GF1954 microphones on each ear of the mannequin.
- 5.3. Mount the hood or helmet for the respirator under test on the mannequin according to the manufacturer's instructions.
- 5.4. Start SCBA at highest flow recorded during air flow test.
- 5.5. Three sound level measurements are taken at each ear and averaged. The results for the two ears are then averaged.
- 5.6. Record all measurements on test data sheet.
- 5.7. Data Analysis
- 5.7.1. Each and every measurement must not exceed 115 dBA for satisfactory performance.

Note: This test should be performed in a location with a minimum of background noise.

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); 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 maximum sound level for SCBA hoods or helmets shall not exceed 115 dBA.

## 7. RECORDS\TEST SHEETS

7.1. All test data will be recorded on the SPECIAL TEST - SOUND LEVEL MEASUREMENT, OPEN-CIRCUIT, SELF-CONTAINED BREATHING APPARATUS USING HOODS OR HELMETS 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 - SOUND LEVEL MEASUREMENT, OPEN-CIRCUIT, SELF-CONTAINED BREATHING APPARATUS USING HOODS OR HELMETS**

Project No : \_\_\_\_\_ Date: \_\_\_\_\_

Company : \_\_\_\_\_

Respirator Type: \_\_\_\_\_

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

Requirement: The maximum sound level inside of an SCBA hood or helmet shall not exceed 115 dBA.

Procedure: The respirator is mounted on a manikin. Three sound level measurements are taken at each ear and averaged. The results for the two ears are then averaged.

Results:

Sound Level	<u>Unit #1</u>		<u>Unit #2</u>	
	<u>Left ear</u>	<u>Right ear</u>	<u>Left ear</u>	<u>Right ear</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
AVERAGE:	_____	_____	_____	_____

Comments:

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Test Engineer: \_\_\_\_\_ Pass \_\_\_\_\_ Fail \_\_\_\_\_









### Revision History

<b>Revision</b>	<b>Date</b>	<b>Reason for Revision</b>
1.0	1 June 2000	Historic document
1.1	20 September 2005	Update header and format to reflect lab move from Morgantown, WV No changes to method