



National Institute for Occupational Safety and Health  
National Personal Protective Technology Laboratory  
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Pittsburgh, PA 15236

Procedure No. RCT-APR-STP-0030

Revision: 2.0

Date: 28 May 2019

DETERMINATION OF NOISE LEVEL TEST,  
POWERED AIR-PURIFYING RESPIRATOR WITH HOODS OR HELMETS  
STANDARD TESTING PROCEDURE (STP)

1. PURPOSE

This document establishes the procedure for ensuring that operational noise levels of powered air-purifying respirators with hoods or helmets, as submitted for Approval, Extension of Approval, or examined during Certified Product Audits, do not exceed the established maximum certification requirements as provided for by 42 CFR Part 84, Subpart G, Section 84.63(a)(c)(d), Subpart L, Section 84.202, and Subpart KK, Section 84.1139; Volume 60, Number 110, June 8, 1995.

2. GENERAL

This STP describes the Determination of Noise Level Test, Powered Air-Purifying Respirators with 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. Completely assembled, powered air-purifying hood or helmet respirator in the configuration as worn by the user with fully charged battery and new air purifying elements

3.1.2. Life-size mannequin

3.1.3. Precision, fast-response sound level meter with built in A-weighting network, capable of averaging measurements over selected time intervals of at least up to 30 seconds. Sound level meter must accommodate two microphone inputs.

4. TESTING REQUIREMENTS AND CONDITIONS

4.1. Prior to beginning any testing, confirm that all measuring equipment employed has been calibrated in accordance with the testing laboratory's calibration procedure and schedule. All measuring equipment utilized for this testing must have been calibrated using a method traceable to recognized international standards when available.

4.2. A background noise level of no greater than 60 dB shall be established and maintained in the location where the procedure is performed.

## 5. PROCEDURE

- 5.1 Prior to the use of the test subjects, a noise level screening test will be performed on the complete respirator assembly affixed to a mannequin. The purpose of the screening is to prevent exposing subjects to noise levels which may exceed 85 dBA.
  - 5.1.1. Position the microphones of the sound level meter on each ear of the mannequin.
  - 5.1.2. Using the sound level meter, verify the background noise requirement per section 4.2.
    - 5.1.1. Following the respirator manufacturer's instructions, mount the respirator assembly onto the mannequin.
- 5.2. Each sample measurement should be averaged over 30 seconds. Once the dBA noise level of the mannequin setup has been determined to be below the 85 dBA safety limit, test subject testing may begin.
- 5.3 The evaluation is made on three test subjects.
- 5.4. It is recommended that both males and females be employed as test subjects, and that a wide variation in body size and shape of subjects be sought.
- 5.5. The test subjects will be allowed to wear ear-insert type hearing protectors, which do not interfere with the positioning of the microphones, if they desire. A choice of protectors will be provided for this purpose.
- 5.6. Two readings are taken on each subject at both ears and the results averaged.
- 5.7. Record the results.

## 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), Subpart L, Section 84.202 and Subpart KK, Section 84.1139; 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.

84.202 Air velocity and noise levels; hoods and helmets; minimum requirements.

Noise levels generated by the respirator will be measured inside the hood or helmet at maximum airflow obtainable and shall not exceed 80 dBA.

84.1139 Air velocity and noise levels; hoods and helmets; minimum requirements.

Noise levels generated by the respirator will be measured inside the hood or helmet at maximum airflow obtainable and shall not exceed 80 dBA.

7. RECORDS\TEST SHEETS

7.1. Record test data in a format that shall be stored and retrievable. Data is to be reported as shown in the attached example data sheet.

8. ATTACHMENTS

8.1. Example Test Data Sheet

Attachment 8.1. Example Test Data Sheet

**National Institute for Occupational Safety and Health  
Respirator Branch  
Test Data Sheet**



Task Number: \_\_\_\_\_ Reference No.: CFR 84.1139; 84.202  
 Test: Sound Level Test-Direct dB STP No.: 30.1  
 Manufacturer: \_\_\_\_\_  
 Item Tested: \_\_\_\_\_

Subject	Trial 1 (dba)		Trial 2 (dba)		Average (dba)		Maximum Allowable (dba)	Result
	Left Ear	Right Ear	Left Ear	Right Ear	Left Ear	Right Ear		
Manikin 1							85	
2							80	
3							80	

Overall Result: \_\_\_\_\_

Signature \_\_\_\_\_ Date: \_\_\_\_\_  
 Engineering Technician

Task Number: \_\_\_\_\_ Reference No.: CFR 84.1139; 84.202  
 Test: Sound Level Test-Direct dB STP No.: 30.1  
 Manufacturer: Item Tested: \_\_\_\_\_

Comments:  
 Testing was done using the (respirator part numbers). All test subjects were medically cleared for testing.  
 Was all equipment verified to be in calibration throughout all testing?  Yes  No

Signature \_\_\_\_\_ Date: \_\_\_\_\_  
 Engineering Technician

### Revision History

<b>Revision</b>	<b>Date</b>	<b>Reason for Revision</b>
1.0	7 March 2002	Historic document
1.1	14 June 2005	Update header and format to reflect lab move from Morgantown, WV No changes to method
2.0	28 May 2019	The document is updated to current style and content standards. There is no change to the test set up or method, but the specified sound measurement instrument has been updated. The ability to collect an average measurement expressed in dBA over the specified 30-second interval eliminates the need to convert dose to dBA.