



DETERMINATION OF NOISE LEVEL TEST,
POWERED AIR-PURIFYING RESPIRATORS 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 L, Section 84.202, and Subpart K, Section 84.177.

2. GENERAL

This STP describes the determination of noise level test for powered air-purifying respirators (PAPRs) 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, PAPR with hood or helmet in the configuration as worn by the user with fully charged battery and new air-purifying elements.

3.1.2. Life-size manikin.

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 one complete PAPR donned on the manikin. 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 manikin.
 - 5.1.2. Using the sound level meter, verify the background noise requirement per section 4.2.
 - 5.1.3. Following the respirator manufacturer's User Instructions, mount the respirator assembly onto the manikin and turn on the PAPR blower.
 - 5.2. Two 30-second sample measurements are taken within one minute, where each 30-second sample measurement is averaged. The "manikin" result is recorded on the test data sheet. Once the noise level screening has determined that the dBA noise level is below the 85 dBA safety limit, testing on a test subject may begin.
 - 5.3 The noise level is checked using three test subjects and 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.
 - 5.4. 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. The test subjects don and wear the PAPR as described in the User Instructions. The functioning of the PAPR is confirmed by the test operator.
 - 5.5. Two 30-second sample measurements are taken within one minute, where each 30-second sample measurement is averaged.
 - 5.6. Record the results.
6. PASS/FAIL CRITERIA
- 6.1. The noise level generated by the PAPR that covers the wearer's ears (i.e., inside the hood or helmet) at maximum air flow obtainable must be 80 dBA or lower.
 - 6.2. This test establishes the standard procedure for:
 - 84.177 Total noise level test - PAPR classes HE and PAPR100.

Noise levels generated by any powered air-purifying respirators that cover the ears (i.e., hood or helmet) will be measured at the entrance to each ear at maximum airflow obtainable and must not exceed 80 dBA.
 - 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.

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

National Institute for Occupational Safety and Health Test Data Sheet								
Task Number:		STP No.: 30						
Test:								
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								
2								
3								
Overall Result:								
Signature:		Date:						
Comments:								
Was all equipment verified to be in calibration throughout all testing? <input type="radio"/> Yes <input type="radio"/> No								

Revision	Date	Reason for Revision
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.
2.1	4 November 2022	The document was updated to reflect updated regulatory references.