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National Personal Protective Technology Laboratory
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DETERMINATION OF AIR VELOCITY AND NOISE LEVELS - SOUND LEVEL, TYPE C AND CE, SUPPLIED-AIR RESPIRATORS STANDARD TESTING PROCEDURE (STP)

1. PURPOSE

This document establishes the procedure for ensuring that operational air velocity and noise level requirements for hoods and helmets used on Type C and CE, Supplied-Air Respirators 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 J, Section 84.140

2. GENERAL

This STP describes the Determination of Air Velocity and Noise Level - Sound Level, Type C and CE, Supplied-Air Respirator 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. A 300 cubic foot gas cylinder of compressed Grade D air or equivalent.

3.1.2. Air regulator, Model 8, from Matheson Gas Products or equivalent.

3.1.3. A calibrated pressure gauge and connecting fittings or equivalent.

3.1.4. Quest Technologies Noise Pro Series Dosimeter or equivalent. For OSHA use, the dosimeter must have a 5 dB exchange rate, use a 90 dBA criterion level, be set at slow response, and use either an 80 dBA or 90 dBA threshold gate, or a dosimeter that has both capabilities, whichever is appropriate for the evaluation.

3.1.5. Life size mannequin.

3.1.6. Respirator under test with the hose length and pressure range that supply the highest airflow rate to the respirator.

3.1.7. Associated couplings and fittings.

3.1.8. Three test human subjects.

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.

5.1.3. Following the respirator manufacturer's instructions, mount the respirator assembly onto the mannequin.

5.1.4 Use a pressure gauge with the appropriate range.

5.1.5 Each sample measurement should be averaged over 30 seconds. Once the dBA noise level of the mannequin setup has been determined to be below 85 dBA safety limit, test subject testing may begin.

5.1.6. Open the air cylinder valve fully by turning completely counterclockwise.

5.1.7 Open the regulator valve slowly by turning clockwise until the pressure gauge indicates the maximum delivery pressure specified by the manufacturer. This pressure must be held constant during the test. Once the cylinder pressure falls below 500 psi a recharged cylinder must be used.

5.1.8. Close the air cylinder valve by turning clockwise. Close the regulator valve by turning counterclockwise.

5.2. Human Subject Test

5.2.1. The evaluation is made on three test subjects.

5.2.2. 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.

5.2.3 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.

5.2.4. Two readings are taken on each subject at both ears and averaged.

5.2.5 Record the results.

6. PASS/FAIL CRITERIA

6.1. The criterion for passing this test is set forth in 42 CFR, Part 84, Subpart J, Section 84.140.

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

84.140 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 within pressure and hose length requirements 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

8.1. Example Data Sheet

SOUND LEVEL DETERMINATION, TYPE C AND CE, SUPPLIED-AIR RESPIRATORS

Project No : _____ Date: _____

Company : _____

Respirator Type: _____

Reference: 42 CFR, Part 84, Subpart J, Section 84.140

Requirement: Noise levels generated by the respirator will be measured inside the hood or helmet at the maximum airflow obtainable within pressure and hose length requirements shall not exceed 80 dBA.

		Trial 1		Trial 2		Results		
NIOSH #	Subject	Left Ear dBA	Right Ear dBA	Left Ear dBA	Right Ear dBA	Average dBA	Max dBA	PASS/ FAIL
	Manikin						85	
	#1						80	
	#2						80	
	#3						80	

Comments:

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Test Engineer: _____ PASS_____ FAIL_____

Revision History

Revision	Date	Reason for Revision
1.0	23 February 2001	Historic document
1.1	20 September 2005	Update header and format to reflect lab move from Morgantown, WV No changes to method
1.2	1 October 2020	The document is updated to current style and content standards. There is no change to the test set up or method, but specified sound measurement instrumentation 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.