

## AUDIOMETRIC TEST BOOTH SURVEY

<b>IH UIC:</b>		<b>Activity:</b>		<b>UIC:</b>		<b>Field Office:</b>		
<b>Bldg./HULL#:</b>		<b>Shop Location:</b>			<b>Shop Code/Name:</b>			
__ Shore Stationary Booth		__ MOHCAT/MOHCAV Booth			__ Shipboard Booth			
__ Pier-side/Cold Iron		__ Pier-side/Lit-Off		__ Underway		Speed (knots):		
<b>Booth Manufacturer:</b>				<b>Serial/Prop #:</b>				
<b>Booth Location (Bldg./Rm/Space):</b>				<b>Walled:</b>		<b>Booth Lights:</b>		<b>Booth Fan:</b>
<b>Types of Audiometric Testing</b>	<b>Octave Band Center Frequency (Hz)</b> <b>*Max SPL allowed (dB)</b>							<b>**Meets specifications to conduct this type of audiometric testing - (Yes/No)</b>
	<b>125</b>	<b>250</b>	<b>500</b>	<b>1000</b>	<b>2000</b>	<b>4000</b>	<b>8000</b>	
<b>Medical Surveillance Testing (Ears Covered)</b> - HCP (2215/16), physical exams, PHA's, etc.	N/A	N/A	27	29	34	39	41	
<b>Diagnostic Audiology Testing (Ears Covered)</b> – supra-aural headphones	35	25	21	26	34	37	37	
<b>Diagnostic Audiology Testing (Ears Covered)</b> – insert earphones	59	53	50	47	49	50	56	
<b>Diagnostic Audiology Testing (Ears Not Covered)</b> - Sound field testing or bone conduction testing	35	21	16	13	14	11	14	
<b>SPL Measured Inside Booth (dB)</b>								<b>DOEHRS Sample #</b>
<b>SPL Measured Outside the Booth (Info Only):</b>				<b>(dBA):</b>			<b>(dBC):</b>	
<b>DOEHRS Sample #</b>								
<b>Field Calibration: Pre-Calibration Date:</b> _____ <b>Time:</b> _____ <b>Date:</b> _____ <b>Field Calibration: Post-Calibration Date:</b> _____ <b>Time:</b> _____ <b>Date:</b> _____ <b>Field Calibration OK:</b> ____ <b>Field Calibrated By:</b> _____								
<b>Equipment Data</b>	<b>Manufacturer</b>	<b>Model #</b>		<b>Serial #</b>			<b>Cal Date</b>	
SLM								
Microphone								
Octave Band Filter								
Calibrator								

Signature \_\_\_\_\_

Date \_\_\_\_\_

\* Max permissible ambient noise level (MPANL) criteria per ANSI S3.1, 1999 (R2023) and DODI 6055.12, Latest Edition

\*\* Any significant new noise (inside or outside the booth) or relocation of the booth requires a new survey

## Audiometric Test Booth Survey Procedures

- I. References:**
- (a) NMCPHC TM6290.91, Latest Edition. Industrial Hygiene Field Operations Manual, Chapter 5
  - (b) NMCPHC TM6260.51-99, Latest Edition. Navy Medicine Hearing Conservation Program Technical Manual
  - (c) American National Standards Institute. 2018. American national standard maximum permissible ambient noise levels for audiometric test rooms (ANSI/ASA S3.1-1999 (R2023))
  - (d) Chung, K. 2023. Calibration matters: I. Sound level meter basics. *Journal of Communication Disorders*, 101, 106300. <https://doi.org/10.1016/j.jcomdis.2022.106300>

### II. Background Information

- **Annual Survey Required:** All audiometric booths require a survey at least annually (every 365 days).
- **Coordination with Audiologist:** Essential to determine the types of audiometric testing conducted in the booth, as there are four distinct approval criteria based on booth purpose.

### III. Instrumentation

- **Minimum Requirement:** Type 1 sound level meter (SLM) with a 1/1 octave band filter/analyzer (OBA). Note: Depending on the manufacturer of the Type 1 SLM, a one-inch microphone may be required.
- **Self-Noise:** The SLM, OBA, and microphone's self-noise must be at least 3 dB below the applicable "Max SPL" criteria in the survey table.
- **Calibration:** The SLM, OBA, microphone, and calibrator must each have been professionally calibrated within the past year.

### IV. Measurement Procedures

1. **Operating Conditions:** Obtain measurements inside the booth during normal operational conditions (lights, ventilation on) and activity levels representative of anticipated use.
2. **Frequencies:** Take readings at all frequencies listed on the survey, measuring one octave below the lowest testing frequency.
3. **Calibration Check:** Perform pre- and post-field calibration of the SLM.
4. **Settings:** Select the 1/1 OBA, flat or linear weighting, and slow response mode.
5. **Microphone Placement:** Position the microphone at the center of the seat, where a listener's head would normally be.
6. **Reading and Recording:** Select the octave band screen, take the sound pressure levels (SPLs) at the required frequencies, and record. (Note: Check levels at seats closest and furthest from the door; record the higher values.)
7. **External Noise:** Have someone talk outside the booth to assess impact on testing. If conversation invalidates testing, annotate this on the survey.
8. **Record Data:** Document SPLs, pertinent details, and equipment information on the survey as indicated.
9. **Self-Noise Correction:**
  - If "Max SPL" is 10 dB or higher than the self-noise, no correction is needed.
  - If self-noise is 3-10 dB below "Max SPL", apply this correction:  
$$L_{ActualAmN} = 10\log(10^{MeasuredAmN/10} - 10^{SLMSelfN/10}), \text{ dB SPL}$$
  - Where:
    - $L_{ActualAmN}$ : Actual ambient sound level generated by the background, corrected for the instrument's self-noise.
    - $MeasuredAmN$ : Total ambient noise level measured including the instrument's self-noise.
    - $SLMSelfN$ : Self-noise level of the instrument.

### V. Completion and Documentation

- Sign, date, and post the survey on the exterior of the booth or adjacent wall.
- Retain a file copy.

### VI. Mobile Occupational Health Conservation Audiometric Vehicles/Trailers (MOHCAV/MOHCAT)

- Follow the procedures above.
- Conduct the survey at primary customer locations/the locations most often used, with realistic external noise.
- **Impractical to re-survey after each move.** Occasional cross-traffic, generators, flyovers, and small crafts pier-side all have the potential to invalidate test results. Some alternatives to ensure test validity:
  - Conduct/document booth survey at each prospective test location in worst case conditions.
  - Do a test audiogram (on a normal listener) at each location prior to beginning patient care

### VII. Shipboard Booths

- Pier-side surveys are invalid for underway use. Surveys must be evaluated and annotated under representative underway conditions.

### VIII. Re-Survey Trigger

- Any significant new noise (inside or outside) or relocation of the booth requires a new survey.