

Discipline Function		SM Required Instrumentation (Effective January 1, 2024)					
			RANGE	ACCURACY	RESOLUTION	Notes	Calibration Requirements
Sound Instruments	Sound Level Meter & Octave Band Analyzer	Sound Level Meters (SLM's) with time averaging and full octave band filters	As listed in Table 3-1.2.1, 3-1.2.2 and 3-1.2.3 which conforms to Type 1 or Type 2 requirements specified in ANSI S1.4	which conforms Appendix A of the NEBB Instrument List		*3	12 Months
		Full Octave Filters	As listed in table 3-1.2.2 and 3-1.2.3 (which conforms with ANSI S1.11 Specification for Octave-Band and Fractional-Octave-Band Analog & Digital Filters)	which conforms Appendix A of the NEBB Instrument List			12 Months
	Acoustic Calibrator	As listed in Table 3-1.1 (which conforms to ANSI S1.40 Specification for Acoustical Calibrators)				*3	12 Months

NOTES

- *1 CPT Option - choose only Option 1 OR Option 2 - along with required instrument for CPT certification (All instruments in any of the chosen is required)
- *2 FHT Orifice Calibrator - Choose only one.
- *3 Refer to Appendix A for complete instrumentation requirements for Sound Measurement (SM)
- *4 Firms may own or rent vibration equipment instrumentation for vibration certification
- *5 Calibration Requirement: Data logger calibration may be verified from a calibrated instrument with an associated calibration form showing calibration readings from both the calibrated instrument and the data logger. If a data logger is out of calibration and cannot be adjusted, the logger must be sent back to the factory for re-calibration or be replaced
- *6 Accuracy of an instrument is either stated as a percentage of full scale or as a percentage of the reading. NEBB has chosen percentage of reading due to it being a more accurate reading. Since a % of reading error becomes smaller as you read near the lowest part of the scale the instrument resolution and accuracy must be very small to maintain the accuracy of the reading. To overcome this the manufactures add a standard offset to the % of reading to maintain a reasonable accuracy at all locations on the scale. Normally for TAB readings we are never operating at the extreme ends of the scale so this has no impact on our work.
- *7 Calibrated per Industry/Manufacturer standards.
- *8 Firms may own or rent Temp Documentation Thermal Camera for RCx. BET Temp Documentation Thermal Camera must be owned.
- *9 Sound level meters with vibration integrators are *NOT* acceptable for NEBB approved instrumentation for making vibration measurements. That is, 1/3 octave or full octave vibration readings are not sufficient for NEBB Sound and Vibration work.
- *10 Vibration meters, which *ONLY* acquire and display the overall vibration level, displacement, velocity, and/or acceleration DO NOT meet NEBB minimum requirements for Vibration instrumentation. These types of meters may only be used if the contract documents specifically allow for their usage.

General Note: Some local jurisdictions require qualified electrician for any electrical readings

Calibration

Requirement: Instruments require a 3-point calibration, traceable to National Institute of Standards and Technology (NIST) or National Metrology Institute (NMI) unless otherwise noted.

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Appendix A - NEBB Sound Level Meter and Acoustic Calibrator Instrumentation Minimum Calibration Data

1.0 Introduction:

NEBB allows for ANSI S1.4 Type 1 or Type 2 meters; which, minimally have full octave band filters sets. There are two general configurations of SLM and filter set instruments used by NEBB firms; an older SLM with an external filter set which attaches to the SLM and more modern SLM / Real Time Analyzer, which has the filters built into the instrument. Most NEBB firms use modern instruments, SLM / Real Time Analyzer.

The amplitude tolerances for Type 1 and 2 meters are different in each octave band. Therefore, there are two sets of compliance tables; one set for Type 1 / Class 1 instruments and one set for Type 2 / Class 2 instruments. The two sets cannot be combined, since, some NEBB firms have Type 1 instruments which are required for government work.

Additionally, many of the newer Real Time Analyzers have both full and third octave band filter sets. The NEBB S&V certification is to measure and report sound levels, which are in the form of overall A-weighted levels (overall dBA) or data input to Noise Criteria (NC) and /or Room Criteria (RC) curves. Both of which only use full octave band data. Therefore, the minimum calibration information is for full octave bands only.

As a matter of procedure for calibration of SLM / Real Time Analyzers, the information listed below is the minimum number of calibration check test points which must be on a calibration certificate.

2.0 Notes

- A. Smartphones with sound level meter and/or octave band filter analysis are not acceptable or approved as NEBB instrumentation for sound measurement.

3.0 Acoustic Calibrators / Sound Level Meters / Real Time Analyzers

3.1 Calibration Tolerances and Minimum Data (ANSI S1.4)

The data listed in Tables 3-1.2.1 and 3-1.2.2 are minimum performance checks on a sound level meter, with the meter set in the overall sound level mode. The data in Tables 3-1.2.1 and 3-1.2.2 is **not** to be used to assess compliance of filter sets. Tolerance parameters for filter sets (analog or digital) is presented in Tables 3-1.2.2 and 3-1.2.3.

Table 3-1.1: Acoustic Calibrator Performance Tolerances

Parameter	Type / Class 1	Type / Class 2
Amplitude	±0.55 dB	±0.95 dB
Frequency	±1.3%	±2.3%

Table 3-1.2.1: Overall Meter Performance Tolerances

Acoustical Parameter Check	Type 1	Type 2
Overall SPL Accuracy	±0.7 dB	±1.0 dB
Fast Response	-1 ±1.0 dB	-1, (+1, -2) dB
Slow Response	-4.1 ±1.0 dB	-4.1 ±2.0 dB
Linearity	±0.4 dB	±0.6 dB
Noise Floor	Note 1	Note 1

Note 1: 5 dB below manufacturers minimum published level.

Table 3-1.2.2: Type 1 Octave Band Frequency Response.

Frequency (Hz)	A-weighted Relative Response Level dB	Tolerance Limit dB	C-weighted Relative Response Level dB	Tolerance Limit dB	Z-weighted Relative Response Level dB	Tolerance Limit dB
31.5	-39.4	± 1.5	-3.0	+/-1.5	0.0	+/-1.5
63	-26.2	± 1	-0.8	+/-1	0.0	+/-1
125	-16.1	± 1	-0.2	+/-1	0.0	+/-1
250	-8.6	± 1	0.0	+/-1	0.0	+/-1
500	-3.2	± 1	0.0	+/-1	0.0	+/-1
1K	0	± 1	0.0	+/-1	0.0	+/-1
2K	1.2	± 1	-0.2	+/-1	0.0	+/-1
4K	1.0	± 1	-0.8	+/-1	0.0	+/-1
8K	-1.1	± 1.5/-3	-3.0	+1.5/-3	0.0	+1.5/-3

Table 3-1.2.3: Type 2 Octave Band Frequency Response

Frequency (Hz)	A-weighted Relative Response Level dB	Tolerance Limit dB	C-weighted Relative Response Level dB	Tolerance Limit dB	Z-weighted Relative Response Level dB	Tolerance Limit dB
31.5	-39.4	± 3.0	-3.0	± 3.0	0.0	± 3.0
63	-26.2	± 2.0	-0.8	± 2.0	0.0	± 2.0
125	-16.1	+/-1.5	-0.2	+/-1.5	0.0	+/-1.5
250	-8.6	+/-1.5	0.0	+/-1.5	0.0	+/-1.5
500	-3.2	+/-1.5	0.0	+/-1.5	0.0	+/-1.5
1000	0	+/-1.5	0.0	+/-1.5	0.0	+/-1.5
2000	1.2	± 2.0	-0.2	± 2.0	0.0	± 2.0
4000	1.0	± 3.0	-0.8	± 3.0	0.0	± 3.0
8000	-1.1	± 5.0	-3.0	± 5.0	0.0	± 5.0

3.2 Other Information Required to be on Calibration Certificate

Laboratory Conditions during Calibration:

1. Atmospheric Pressure,
2. Temperature, and
3. Humidity