

Discipline Function		SM Required Instrumentation (Effective January 1, 2021)					
			RANGE	ACCURACY	RESOLUTION	Notes	Calibration Requirements
Sound Instruments	Sound Level Meter, Real Time Analyzer, & Octave Band Analyzer		Sound Level Meters (SLM's) and Real Time Analyzers	Sound Level Meters (SLM's) and Real Time Analyzers	which conforms Appendix A of the NEBB Instrument List	#3	12 Months
			Real Time Analyzers	As listed in Tables 3-1.2.1, 3-1.2.2 and 3-1.2.3	which conforms Appendix A of the NEBB Instrument List		12 Months
			Full Octave Filters	As listed in Table 3-1.2.3	which conforms Appendix A of the NEBB Instrument List		12 Months
	Acoustic Calibrator		Sound Pressure Calibrator. Shall meet the requirements specified in Appendix A of the NEBB Instrument List.			#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.
- General Note:** Some local jurisdictions require qualified electrician for any electrical readings
- Calibration Requirement:** Instruments require NIST Traceable calibration or National Metrology Institutes (NMI) which exist in many countries maintaining primary measurements of standards; such as NPL in the UK, PTB in Germany and many others which are approved for those regions.

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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 Acoustic Calibrators (ANSI S1.40)

Acoustic calibrators typically have one or two sound amplitude levels and one or two frequencies. That is amplitudes 94 or 114 dB, and frequency 250 or 1000 Hz. These combinations cover 99% of all sound level (acoustic) calibrators. The tolerances are,

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

3.0 Sound Level Meters / Real Time Analyzers

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

The data listed in Tables 3.1.1 and 3.1.2 are minimum performance checks on a sound level meter, with the meter set in the overall sound level mode. The data in Tables 3.1.1 and 3.1.2 is **not** to be used to assess compliance of filter sets. Tolerance parameters for filter sets (analog or digital) is presented in Section 3.2

Table 3.1.1: 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: Overall Meter 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

3.2 Filter Set Requirements

(ANSI S1.11)

Table 3.2.1 Octave Band Filter Roll-Off Response

Octaveband Center Freq. Hz	Lower Octaveband Edge Limit, Hz	Band edge Roll-off Limits dB		Upper Octaveband Edge Limit< Hz	Band edge Roll-off Limits dB	
		Type 1	Type 2		Type 1	Type 2
31.5	22.4	-2.0 to -5.0	-1.6 to -5.5	44.7	-2.0 to -5.0	-1.6 to -5.5
63	44.7	-2.0 to -5.0	-1.6 to -5.5	89.1	-2.0 to -5.0	-1.6 to -5.5
125	89.1	-2.0 to -5.0	-1.6 to -5.5	178	-2.0 to -5.0	-1.6 to -5.5
250	178	-2.0 to -5.0	-1.6 to -5.5	355	-2.0 to -5.0	-1.6 to -5.5
500	355	-2.0 to -5.0	-1.6 to -5.5	708	-2.0 to -5.0	-1.6 to -5.5
1,000	708	-2.0 to -5.0	-1.6 to -5.5	1413	-2.0 to -5.0	-1.6 to -5.5
2,000	1413	-2.0 to -5.0	-1.6 to -5.5	2,818	-2.0 to -5.0	-1.6 to -5.5
4,000	2818	-2.0 to -5.0	-1.6 to -5.5	5623	-2.0 to -5.0	-1.6 to -5.5
8,000	5623	-2.0 to -5.0	-1.6 to -5.5	11220	-2.0 to -5.0	-1.6 to -5.5
16,000	11220	-2.0 to -5.0	-1.6 to -5.5	22390	-2.0 to -5.0	-1.6 to -5.5

3.3 Other Information Required to be on Calibration Certificate

Laboratory Conditions during Calibration:

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