

Discipline Function		NEBB Instrument Master List (Effective January 1, 2019)													BET	RCx	CPT	FHT	RCx	Sound	TAB	Vibration	Notes	Calibration Requirements		
		RANGE					ACCURACY					RESOLUTION														
Air	Air Pressure	0	in wg	to	10	in wg	±	2%	of reading	±	0.001	in wg	0.001	in wg	<	1	in wg	x	x	x	x	x		12 Months		
		0	Pa	to	2500	Pa	±	2%	of reading	±	0.25	Pa	0.10	Pa	<	250	Pa									
		Air Velocity Instrument	100	fpm	to	3500	fpm	±	5%	of reading	±	7	fpm	1	fpm				x	x	x	x	x		12 Months	
	FHT Air Velocity	0.50	m/s	to	20	m/s	±	5%	of reading	±	0.04	m/s	0.01	m/s										12 Months		
		25	fpm	to	2500	fpm	±	3%	of reading	±	3	fpm	1	fpm										12 Months		
	Digital Direct Reading Hood	0.10	m/s	to	12.7	m/s	±	3%	of reading	±	0.02	m/s	0.01	m/s										12 Months		
		100	cfm	to	2000	cfm	±	5%	of reading	±	7	cfm	1	cfm										12 Months		
		50	l/s	to	1000	l/s	±	5%	of reading	±	4	l/s	1	l/s				x	x	x	x			12 Months		
Temperature	Air Meter with probe	-20	°F	to	200	°F	±	0.5%	of reading	±	2.0	°F	0.1	°F				x	x		x	x		12 Months		
		-30	°C	to	100	°C	±	0.5%	of reading	±	1.0	°C	0.1	°C										12 Months		
	Contact Meter with probe	-20	°F	to	200	°F	±	0.5%	of reading	±	2.0	°F	0.1	°F				x			x	x		12 Months		
		-30	°C	to	100	°C	±	0.5%	of reading	±	1.0	°C	0.1	°C										12 Months		
	Immersion Meter with probe	-20	°F	to	200	°F	±	0.5%	of reading	±	2.0	°F	0.1	°F				x			x	x		12 Months		
-30		°C	to	100	°C	±	0.5%	of reading	±	1.0	°C	0.1	°C										12 Months			
Humidity	Humidity Meter (w/Probe, if req'd)	10	% RH	to	90	% RH	±	3%	of reading				1%					x			x	x		12 Months		
Electrical	Amperage Measurement	0.1	AC Ampere	to	100	AC Amperes	±	2%	of reading	±	5	digits	0.1	AC Ampere					x			x	x	12 Months		
	Voltage Meter - True RMS	1	VAC	to	600	VAC	±	2%	of reading	±	5	digits	1	Volt										12 Months		
Rotation	Rotation Measurement	60	rpm	to	5000	rpm	±	2%	of reading	±	2	rpm	1	rpm				x			x	x		12 Months		
Hydronic	Pressure Measurement	0	psi	to	200	psi	±	2%	of reading	±	1	psi	0.01	psi				x			x	x		12 Months		
		0	kPa	to	1400	kPa	±	2%	of reading	±	7	kPa	0.1	kPa										12 Months		
	Δ Pressure measurement	0	psi	to	75	psi	±	2%	of reading	±	1	psi	0.01	psi				x			x	x		12 Months		
0		kPa	to	520	kPa	±	2%	of reading	±	7	kPa	0.1	kPa											12 Months		
RCx Instruments	Receptacle Circuit Tester	125	VAC					Not Applicable					Not Applicable								x			Not Required		
	Voltage Detector	50	VAC	to	1000	VAC		Not Applicable					Not Applicable										x		Not Required	
	Light Level Measurement	0	FC	to	4000	FC	±	3%		+	5%	full scale	0.1	FC								x		Per Manufacturer's Requirements		
0		lx	to	40000	lx	±	3%		+	5%	full scale	1.0	lx										Per Manufacturer's Requirements			
BET / RCx Instruments	Temp Documentation Thermal Camera	-4	°F	to	450	°F	±	2%		or	3.6	°F	0.1 @ 86 °F		&	160 x 120		x				x		Per Manufacturer's Requirements		
		-20	°C	to	232	°C	±	2%		or	-15.7	°C	0.1 @ 30 °C		&	160 x 120								Per Manufacturer's Requirements		

Discipline		NEBB Instrument Master List (Effective January 1, 2019)													Notes	Calibration Requirements														
		RANGE						ACCURACY				RESOLUTION					RT	BC	CPT	FRT	RCx	Sound	TAB	Vibration						
Function																														
Data Loggers	Carbon Dioxide CO ₂	0	ppm	to	2500	ppm	±	5	ppm					1	ppm													Qty = 1	Per Manufacturer's Requirements	
	Carbon Monoxide CO	0	ppm	to	1000	ppm	±	5	ppm					1	ppm													Qty = 1	Per Manufacturer's Requirements	
	Lighting Levels	0	FC	to	3000	FC	±	10	FC					2	FC													Qty = 1	See Note 5	
		0	lx	to	30000	lx	±	100	lx					0	lx															
	Electrical	0	VAC	to	600	VAC	±	2%	of reading					VAC	1.0	VAC												Qty = 2	See Note 5	
		0	Amperes	to	100	Amperes	±	4%	of reading					Ampere	0.1	Ampere														
	Static Pressure - Low	0	in wc	to	0.25	in wc	±	1%	full scale					0.01	in wc	<	1	in wc											Qty = 1	See Note 5
														0.1	in wc	>	1	in wc												
		0	Pa	to	60	Pa	±	1%	full scale					2.5	Pa	<	250	Pa												
	Static Pressure - High	0	in wc	to	6.00	in wc	±	1%	full scale					0.01	in wc	<	1	in wc											Qty = 1	See Note 5
														0.1	in wc	>	1	in wc												
0		pa	to	1500	Pa	±	1%	full scale					2.5	Pa	<	250	Pa													
Water Pressure	0	psi	to	100	psi	±	1%	of reading	psi				1.0	psi													Qty = 1	See Note 5		
	0	kPa	to	700	kPa	±	1%	of reading	kPa				0.1	kPa																
Temperature	-4	°F	to	150	°F	±	5	°F	@	77	°F		0.1	°F													Qty = 8	See Note 5		
	-20	°C	to	65	°C	±	1%	of reading	°C				0.1	°C																
Humidity	10	% RH	to	90	% RH	±	2.5%	RH					1%	RH													Qty = 8	See Note 5		
Event	Not Applicable						Not Applicable				Not Applicable															Qty = 2	Not required			
RCx Instruments	Thermal Infrared Thermometer	-4	°F	to	500	°F	±	2%	of reading					0.1	°F															Per Manufacturer's Requirements
		-20	°C	to	260	°C	±	2%	of reading					0.1	°C															
	TDS Meter	0	μ	to	1000	μ	±	2%	full scale					1.0%																Per Manufacturer's Requirements
0		ppm	to	5000	ppm	±	2%	full scale																						
Capacitance Moisture Meter	0%		to	100%		±	5%						1.25	inches		Penetration													Per Manufacturer's Requirements	
CPT Instruments	Particle Counter	A light scattering instrument with display or recording means to count and size discrete particles in air, as defined by ASTM F50-07. Instruments of this type shall provide for a minimum sampling flow rate of 28.3 L/min (1.0 cfm) and a threshold size discrimination of a minimum of 0.3 micrometer in size.																												12 Months

Discipline Function		NEBB Instrument Master List (Effective January 1, 2019)						BCT	B/C	CPT	FHT	B/Cx	Sound	TAB	Vibration	Notes	Calibration Requirements
		RANGE		ACCURACY		RESOLUTION											
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													
		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								x				#3	12 Months
		Full Octave Filters	As listed in Table 3-1.2.3	which conforms Appendix A of the NEBB Instrument List													
	Acoustic Calibrator	Sound Pressure Calibrator. Shall meet the requirements specified in Appendix A of the NEBB Instrument List.										x			#3	12 Months	
Vibration Instruments	Vibration Analyzer / Meter, Real Time Analyzer & Spectrum Analyzer	Shall meet the minimum requirements as specified below:															
		Displacement – 0.1 to 100 mils (0.0001 to 0.1 inches)															
Velocity – 0.0005 to 10 in/sec																	
Acceleration – 0.0001 to 30 G's																	
Frequency Range – 1 to 1000 Hz (60 to 60,000 RPM)																	
Frequency Resolution (bandwidth) – at least 1.25 Hz (1 / 75 RPM) Minimum														x	*4	12 Months	
Lines of resolution ≥ 800																	
Detection - Peak, Peak-to-Peak, RMS																	
Accelerometers / Transducer		FFT Windowing- Hanning at least															
		Averaging – exponential or time and selectable to at least four averages															
		Shall have the following minimum specifications:															
		Sensitivity (± 10%) ≥ 100 mV/G typical															
		Measurement Range = ± 20 G peak															
		Frequency Range = 2 to 3000 Hz at ± 5%													x	*4	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															
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.															

NEBB Required Instrumentation (Effective January 1, 2019)

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