

Discipline		NEBB Instrument Master List (Effective January 1, 2020)														BET	BSC	CPT	FHT	RCx	Sound	Tab	Vibration	Notes	Calibration Requirements		
		RANGE				ACCURACY				RESOLUTION																	
Function																											
		Air	Air Pressure	0	in wg	to	10	in wg		2%	of reading	±	0.001	in wg	0.001	in wg	<	1	in wg								
														0.01	in wg	>	1	in wg	x	x	x						
0	Pa			to	2500	Pa		2%	of reading	±	0.25	Pa	0.10	Pa	<	250	Pa										
														1.0	Pa	>	250	Pa									
Air Velocity Instrument	100		fpm	to	3500	fpm	±	5%	of reading	±	7	fpm	1	fpm													12 Months
	0.50		m/s	to	20	m/s	±	5%	of reading	±	0.04	m/s	0.01	m/s					x	x	x						
FHT Air Velocity	25		fpm	to	2500	fpm	±	3%	of reading	±	3	fpm	1	fpm													12 Months
	0.10		m/s	to	12.7	m/s	±	3%	of reading	±	0.02	m/s	0.01	m/s													
Digital Direct Reading Hood	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							
Temperature	Air Meter with probe	0	°F	to	200	°F	±	0.5%	of reading	±	2.0	°F	0.1	°F												12 Months	
		-20	°C	to	100	°C	±	0.5%	of reading	±	1.0	°C	0.1	°C													
	Immersion Meter with probe	0	°F	to	200	°F	±	0.5%	of reading	±	2.0	°F	0.1	°F												12 Months	
		-20	°C	to	100	°C	±	0.5%	of reading	±	1.0	°C	0.1	°C													
Humidity	Humidity Meter (w/Probe, if req'd)	10	% RH	to	90	% RH		3%	of reading				1%													12 Months	
Electrical	Amperage Measurement	0.1	AC Ampere	to	100	AC Amperes		2%	of reading	±	5	digits	0.1	AC Ampere												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												12 Months	
Hydronic	Pressure Measurement	0.4	psi	to	200	psi		2%	of reading	±	1	psi	0.1	psi												12 Months	
		3	kPa	to	1400	kPa		2%	of reading	±	7	kPa	1.0	kPa													
	Δ Pressure measurement	0.4	psi	to	75	psi		2%	of reading	±	0.5	psi	0.01	psi												12 Months	
		3	kPa	to	500	kPa		2%	of reading	±	3.5	kPa	0.1	kPa													
RCx Instruments	Receptacle Circuit Tester	125	VAC					Not Applicable				Not Applicable														Not Required	
	Voltage Detector	50	VAC	to	1000	VAC		Not Applicable				Not Applicable															Not Required
	Light Level Measurement	0	FC	to	4000	FC	±	3%		+	5%	full scale	0.1	FC													Per Manufacturer's Requirements
0		lx	to	40000	lx	±	3%		+	5%	full scale	1.0	lx														
BET / RCx Instruments	Temp Documentation Thermal Camera	-4	°F	to	450	°F	±	2%		or	3.6	°F	0.1 @ 86 °F		&	160 x 120										Per Manufacturer's Requirements	
		-20	°C	to	232	°C	±	2%		or	-15.7	°C	0.1 @ 30 °C		&	160 x 120											

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															Function		RANGE				ACCURACY				RESOLUTION				Notes
Data Loggers	Carbon Dioxide CO <sub>2</sub>	0	ppm	to	2500	ppm	±	5	ppm				1	ppm							X			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												Qty = 1	See Note 5		
	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												Qty = 2	See Note 5		
	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	±	0.63	°F	@	32-122	°F	0.05	°F	@	77	°F									Qty = 8	See Note 5			
	-20	°C	to	65	°C	±	0.35	°C	@	0-50	°C	0.03	°C	@	25	°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	±	4	°F	0.5	°F												Per Manufacturer's Requirements			
		-20	°C	to	260	°C	±	2%	of reading	±	2	°C	0.2	°C															
	TDS Meter	0	μ	to	1000	μ	±	2%	full scale				1.0%														Per Manufacturer's Requirements		
0		ppm	to	1000	ppm	±	2%	full scale																					
Capacitance Moisture Meter	0%		to	100%		±	5%					0.75	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, 2020)											Notes	Calibration Requirements																					
		RANGE			ACCURACY			RESOLUTION							BET	BSC	CPT	FHT	RCX	Sound	Tab	Vibration													
CPT Option 1	Aerosol Photometer	CHOOSE ONLY 1 OF THE 2 OPTIONS	The instrument shall have a threshold sensitivity of 10 <sup>-3</sup> micrograms/liter of challenge aerosol particles and be capable of measuring concentrations over a range of 105 times the threshold sensitivity. Sample flow rate shall be 28.3 L/min (1 cfm). Readout shall be either linear with an accuracy of 1% of full scale of the selected range. ± 2% of reading ± 0.1 psi 0.04 psi (US)												x																	*1	12 Months or 400 operating hours		
	Pneumatic Aerosol Generator		A device that can aerosolize oil medium to serve as an artificial challenge for filter integrity testing of systems under 3,000 cfm, typically Laskin nozzle(s) type, thermal generator, atomizer, etc.												x																		Not Required		
	Thermal Aerosol Generator		A device that can aerosolize oil medium to serve as an artificial challenge for filter integrity testing of systems of 3,000 to 60,000 cfm												x																		Not Required		
CPT Option 2	Optical Particle Counter for Scan Test		A particle counter should have a 1.0 cfm flow rate with a threshold sensitivity of at least 0.3µm. The counter must have an audible alarm for every particle that is counted. The particle counter shall have a continuous counting mode or a sample time that exceeds the time required to completely scan the area of the filter under test. This counter may also be used for Cleanliness Classification above.												x																	*1	12 Months		
	Diluter		A device used with the scanning particle counter to sample the aerosol challenge upstream of a filter under test. The dilution ratio shall be between 300 – 1,000:1. The resulting counts after dilution should not exceed 100,000 particles.												x																		12 Months		
	Aerosol Generator		A device that can aerosolize oil or microsphere medium to serve as an artificial challenge for filter integrity testing. A low output (defined as one which supplies of < 5 x 10 <sup>9</sup> particles /min of ≥ 0.3 um in size) or a normal output generator may be used.												x																		Not Required		
FHT Instruments	Tracer gas Detector			Minimum detection range: 0.01 PPM Minimum response time: 1 second The units shall be configured to measure sulfur hexafluoride (SF6), or other approved tracer gas, and display in concentration measurement units (PPM)			±	10%	of reading	or	0.025	ppm	0.01	ppm																				12 Months	
	Detection Calibrator			Device used to calibrate the detection instrument in accordance with the manufacturer's specifications.			Not Applicable			Not Applicable																								12 Months When Required	
	Local Challenge Source			Device that can generate a small relatively neutrally buoyant smoke, discharging with minimal velocity.			Not Applicable			Not Applicable																								Not Required	
	Large Challenge Source			Device that can generate a large relatively neutrally buoyant smoke, discharging with minimal velocity.			Not Applicable			Not Applicable																									Not Required
	Ejector w/critical orifice			Shall conform to the requirements as indicated in the current edition of NEBB FHT PS. See appendix D for instrument specifications			Not Applicable			Not Applicable																									Not Required
	Orifice Calibrator	Flow Meter	0	l/m	to	10	l/m	±	3%				0.1	l/m																				Not Required	
		Mechanical Device	0	l/m	to	15	l/m	±	0.1	l/m			0.1	l/m																			*2	12 Months	
	Tracer Gas		Sulfur Hexafluoride Commercial grade (Minimum purity of 99%) or approved replacement gas			Not Applicable			Not Applicable																									SDS Required	
Mannequin		A three dimensional mannequin (torso) with arms and shall be of reasonable human proportions and be clothed with a lab coat. The height must be adjustable to meet the height requirements of the various hood configurations; i.e. standard bench hood, ADA height, floor mounted, etc. Probe shall be placed in the normal breathing zone based on the various heights.			Not Applicable			Not Applicable																									Not Required		
BET Instruments	Digital pressure flow measurement system		Not Applicable			±	4%	of reading				0.1 Pa (0.0004 inwc, 0.002 psf)																			x	Per Manufacturer's Requirements			

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		Function	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 Lines of resolution ≥ 800 Detection - Peak, Peak-to-Peak, RMS 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%																		
	Accelerometers / Transducer	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%																		
<b>NOTES</b>																				
*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.																		
<b>General Note:</b>		Some local jurisdictions require qualified electrician for any electrical readings																		
<b>Calibration Requirement:</b>		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.																		