

NO: SAMM 955

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LABORATORY LOCATION:
(PERMANENT LABORATORY)ACTIVE ACOUSTIC ENGINEERING SDN BHD
E-43-1, BLOCK E, JALAN TEKNOLOGI 3/9
BISTARI DE'KOTA, KOTA DAMANSARA
47810 PETALING JAYA, SELANGOR

FIELDS OF CALIBRATION:

ACOUSTIC, ELECTRICAL & VIBRATION

This laboratory has demonstrated its technical competence to operate in accordance with MS ISO/IEC 17025:2017 (ISO/IEC 17025:2017).

This laboratory's fulfillment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001 (see Joint ISO-ILAC-IAF Communiqué dated April 2017).

* The uncertainty covered by the CMC is expressed as the expanded uncertainty corresponding to a coverage probability of approximately 95 % and have a coverage factor of k=2 unless stated otherwise.

SCOPE OF CALIBRATION: ELECTRICAL

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Portable Gas Detector (Laboratory)	CO (100 ppm) CH ₄ (2.5% Vol) H ₂ S (25 ppm) O ₂ (18.0%) O ₂ (20.9%) O ₂ (50ppm)	6.0 ppm 0.15% Vol 1.0 ppm 1.0% Vol 0.5% Vol 1.6 ppm	Direct measurement using standard gases with reference to: i. ISO/IEC 60079-29-1; 2016-07 ii. ISO/IEC 60079-29-2; 2015-03

Signatories:

1. Mohd. Harith Hakimi bin Mahdazar
2. Phua Yeong Siang

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SCOPE OF CALIBRATION: ELECTRICAL**SITE: CATEGORY I**

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty(\pm)*	Remarks
Fixed Gas Detection System	CH ₄ (50% LEL) C ₅ H ₁₂ (50% LEL) HFC-134A (550 ppm) H ₂ (500 ppm) CO ₂ (16% Vol) NH ₃ (50 ppm) SO ₂ (5 ppm) CO (100 ppm) H ₂ S (25 ppm) O ₂ (18.0%) O ₂ (20.9%)	2.0% LEL 4.4% LEL 13 ppm 19 ppm 0.64% Vol 3.2 ppm 0.6 ppm 3 ppm 1.6 ppm 1.1% Vol 1.2% Vol	Direct measurement using standard gases with reference to: i. ISO/IEC 60079-29-1; 2016-07 ii. ISO/IEC 60079-29-2; 2015-03

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SCOPE OF CALIBRATION: ACOUSTIC

Instrument calibrated/ Measurement parameter	Range	Calibration and Measurement Capability expressed as an uncertainty (\pm)*	Remarks **
Sound Calibrator Class 1 & 2	Sound Pressure Level at 94 dB and 114 dB Referenced at 250 and 1kHz	0.11 dB	Comparison with reference microphone and reference sound calibrator. ASCL-CP-08 Sound Calibrator procedure with reference IEC 60942:2017 clause 5.3, 5.4, 5.6, B4.6, B4.7, and B4.8
	Frequency at 250 Hz and 1 kHz. Referenced at 94 dB and 114 dB	0.07 Hz	
	Total Harmonic + Noise from 22.4Hz to 22.4kHz. Referenced at 94 dB and 114 dB	0.31 %	
Noise Dosimeter	Absolute acoustical sensitivity at 125 Hz, 1 kHz and 8 kHz. Referenced at 94 dB and 1 kHz	0.2 dB	Comparison with reference microphone and closed coupler. ASCL-CP-11 Noise Dosimeter Procedure with reference to IEC 61252:1993 clause 6
	Frequency weighting at 63 Hz to 8 kHz. Referenced at range 90 dB to 100 dB and 1 kHz.	1.7%	Comparison with reference electrical signal. ASCL-CP-11 Noise Dosimeter Calibration Procedure to IEC 61252:1993 clause 7
WS2 Microphone	Pressure sensitivity 10Hz to 20kHz Referenced at 94 dB.	0.33 dB	Comparison with reference microphone. ASCL-CP-10 Microphone Calibration Procedure with reference to IEC 61094-5:2016

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SCOPE OF CALIBRATION: ACOUSTIC

Instrument calibrated/ Measurement parameter	Range	Calibration and Measurement Capability expressed as an uncertainty (\pm)*	Remarks **
Sound Level Meter / Sound Analyzer	Acoustic signal test at 125Hz, 1kHz and 8kHz. Referenced at 94 dB	0.3 dB	Comparison with reference microphone and closed coupler. ASCL-CP-09 Sound Level Meter Calibration procedure with reference to IEC 61672-3:2013 clause 12.
	Electrical signal test of frequency weighting at 10Hz to 20kHz Referenced at range 90 dB to 100 dB	0.1 dB	Comparison with reference electrical signal. ASCL-CP-09 Sound Level Meter Calibration procedure with reference to IEC 61672-3:2013 clauses 13 to 21.
	Frequency and time weighting at 1kHz. Referenced at 94 dB	0.1 dB	
	Long term stability at 1kHz. Reference at 94 dB	0.1 dB	
	Level Linearity on the reference level range at 8 kHz	0.1 dB	
	Level Linearity including the level range control at 1 kHz. Referenced at 30 dB and 94 dB	0.1 dB	
	Tone Burst Response at 4kHz Referenced at range 30 dB to 140 dB	0.1 dB	
	C-weighted Peak Sound Level at 500 Hz and 8 kHz. Referenced at range 30 dB to 140 dB	0.1 dB	
	Overload Indication at 4kHz. Referenced at range 30 dB to 130 dB	0.3 dB	
	High Level Stability at 1kHz Referenced at 137 dB	0.1 dB	

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SCOPE OF CALIBRATION: VIBRATION

Instrument calibrated/ Measurement parameter	Range	Calibration and Measurement Capability expressed as an uncertainty (\pm)*	Remarks **
Accelerometer / Transducer	Amplitude Response at frequency range 20 Hz to 99 Hz 100 Hz to 1999 Hz 2 kHz to 10 kHz Nominal value at amplitude 10 m/s ² r.m.s Sensitivity ranges from 0.25 to 1000 mV/ms ⁻²	 1.6 % 1.5 % 3.1 % 	Comparison with reference accelerometer. ASCL-CP-16 Accelerometer procedure with reference to ISO 16063-21:2003 Amd.1 2016
	Phase Response at frequency range 20 Hz to 199 Hz 200 Hz to 999 Hz 1 kHz to 10 kHz Nominal value at angle 0° to 180° Sensitivity ranges from 0.25 to 1000 mV/ms ⁻²	 0.77 ° 1.5 ° 1.5 ° 	
Vibration Measuring Instrument	Amplitude Response: Acceleration at frequency range 10 Hz to 99 Hz 100 Hz to 1999 Hz 2 kHz to 10 kHz Nominal value at amplitude 10 ms ⁻² r.m.s	 1.7 % 1.5 % 2.6 % 	Comparison with reference accelerometer. ASCL-CP-17 Vibration Measuring Instrument procedure with reference to ISO 16063-21:2003 Amd.1 2016
	Amplitude Response: Velocity at frequency range 10Hz to 99 Hz 100 Hz to 1999 Hz 2 kHz to 4 kHz Nominal value at amplitude 0.2 mm/s to 200 mm/s r.m.s	 1.6 % 1.1 % 2.7 % 	

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SCOPE OF CALIBRATION: VIBRATION

Instrument calibrated/ Measurement parameter	Range	Calibration and Measurement Capability expressed as an uncertainty (\pm)*	Remarks **
Vibration Measuring Instrument	Amplitude Response: Displacement at frequency range 10Hz to 50 Hz Nominal value at amplitude 0.2 μ m to 20 mm peak to peak	1.7 %	Comparison with reference accelerometer. ASCL-CP-17 Vibration Measuring Instrument procedure with reference to ISO 16063-21:2003 Amd.1 2016
Vibration Measuring Instrument in Building / Geophone	Design values at reference frequency of 16 Hz: X – axis / Longitudinal Y – axis / Transverse Z – axis / Vertical Nominal Amplitude 10 mm/s	1.1 % 1.1 % 1.1 %	Comparison with reference accelerometer. ASCL-CP-18 Vibration Measuring Instrument in Building procedure with reference to DIN 45669-1:2020-06 clause 6.3.2
	Amplitude Response: Peak Particle Velocity (PPV) at X – axis / longitudinal 2 Hz to 30 Hz 30 Hz to 80 Hz Nominal value at amplitude 10mm/s and referenced at 16 Hz	1.4 % 1.8 %	Comparison with reference accelerometer. ASCL-CP-18 Vibration Measuring Instrument in Building procedure with reference DIN 45669-1:2020-06 clause 6.3.3

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SCOPE OF CALIBRATION: VIBRATION

Instrument calibrated/ Measurement parameter	Range	Calibration and Measurement Capability expressed as an uncertainty (\pm)*	Remarks **
Vibration Measuring Instrument in Building / Geophone	Amplitude Response: Peak Particle Velocity (PPV) at Y – axis / Transverse 2 Hz to 30 Hz 30 Hz to 80 Hz Nominal value at amplitude 10mm/s and referenced at 16 Hz	 1.3 % 1.6 %	Comparison with reference accelerometer. ASCL-CP-18 Vibration Measuring Instrument in Building procedure with reference DIN 45669-1:2020-06 clause 6.3.3
	Amplitude Response: Peak Particle Velocity (PPV) at Z – axis / Vertical 2 Hz to 30 Hz 30 Hz to 80 Hz Nominal value at amplitude 10mm/s and referenced at 16 Hz	 1.3 % 1.6 %	
Portable Vibration Exciter / Calibrator	Amplitude Response at frequency range 80 Hz to 159.2 Hz Nominal value at amplitude: 9.81 or 10; ms ⁻² , 9.81 or 10 mm/s; and 9.81 or 10 μ m	 2.1 %	Comparison with reference accelerometer. ASCL-CP-19 Portable Vibration Exciter procedure.
	Frequency Response at amplitude: 9.81 or 10 ms ⁻² ; 9.81 or 10 mm/s; and 9.81 or 10 μ m Frequency: from 80 Hz to 159.2 Hz	 0.01 %	

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