

Intended for  
**Project Co.**

Document type  
**Report**


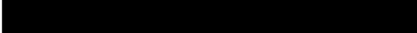

Date  
**October 2024**

Project number  
**1100035545-058**

# Post Commissioning Threshold Performance Noise Compliance Assessment



# Post-Commissioning Threshold Performance Noise Compliance Assessment

Project name **Kwinana Perth WtE**  
Project no. **1100035545- 058**  
Recipient **Project Co.**  
Document type **Report**  
Document No. **KWIWTE-141-147**  
Version **2 – Final Issue**  
Date **27.10.2025**  
Prepared by   
Checked by   
Approved by   
Description **Assessment of Threshold Performance noise emissions from Kwinana Energy Recovery Facility operation during post-commissioning stage**

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## Acoustics Glossary

<b>Ambient Noise</b>	The all-encompassing noise within a given environment. It is the composite of sounds from many sources, both near and far.
<b>Background noise</b>	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA90 descriptor (see below).
<b>dB</b>	Abbreviation for decibel, a measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm of a given sound power to a reference power.
<b>dB(A)</b>	A measure of A-weighted sound levels. A Weighting is an adjustment made to the sound level measurement to approximate the response of the human ear.
<b>Extraneous noise</b>	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods. Normal daily traffic is not extraneous noise.
<b>LA1</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the measurement period.
<b>LA10</b>	The noise level, measured in dB(A), which is exceeded for 10 per cent of the time.
<b>LA90</b>	The noise level, measured in dB(A), which is exceeded for 90 per cent of the time, referred to as the background noise level. This is considered to represent the background noise (see above).
<b>LAeq</b>	The level of noise equivalent to the energy average of noise levels occurring over a defined measurement period.
<b>LAeq (period)</b>	The average equivalent noise level, measured in dB(A), during a measurement period (e.g., 15-minute, day, evening, or night).
<b>LAm<sub>ax</sub></b>	The A-weighted sound pressure level that represents the maximum noise level measured over the time that a given sound is measured.

## 1. Introduction

Ramboll Australia Pty Ltd (Ramboll) has been commissioned by Project Co. to complete a Post-Commissioning Threshold Performance Noise Compliance Assessment for the Kwinana Energy Recovery plant (KER) located at Kwinana, Western Australia.

The objective of this assessment was to assess the operational noise levels of the KER facility against the Threshold Performance Test requirements specified in KER Performance Guarantee Test Procedure (KW2E-05-TC-PR-ACC-0515), Annex PG7 – Noise and Vibration, during the commissioning stage under normal full load operational conditions.

In August 2024, Ramboll carried out baseline noise monitoring at the KER plant boundary ahead of its operational commencement (Document No. KWIWTE-141-129 Rev. 2). The baseline monitoring results have been compared with the results from the subsequent post-commissioning noise monitoring conducted at the same boundary locations.

### 1.1 Reference Documents

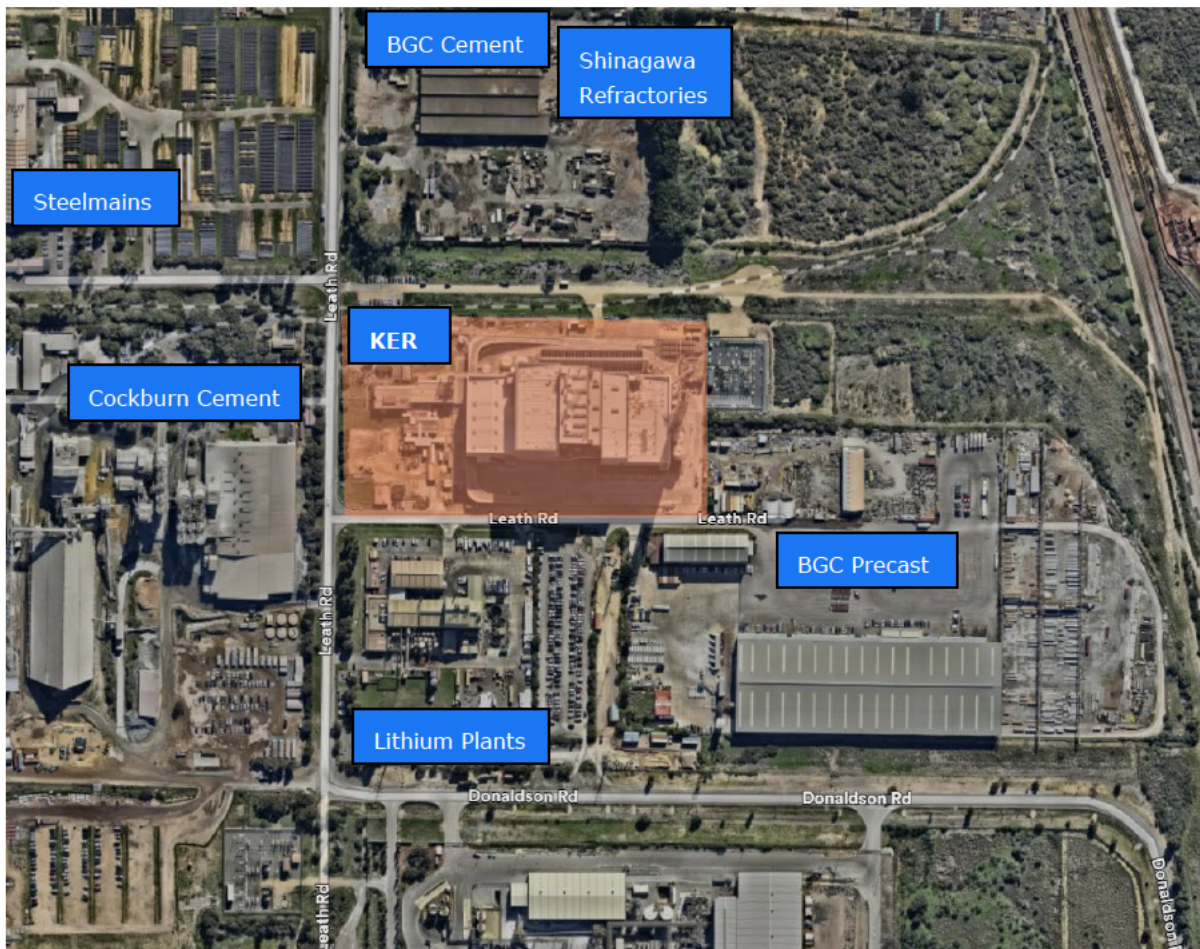
This assessment referred to and was undertaken in accordance with the guidelines provided in the following documents.

- KW2E-05-TC-PR-ACC-0515 Annex PG7, Performance Guarantee Test Procedure – Noise and Vibration (PG7)
- KW2E-00-PE-SS-IDO-4001 Noise Impact Study
- Environmental Protection (Noise) Regulations 1997 (Western Australia)
- Standards Australia – AS 1055:2018 Acoustics – Description and measurement of environmental noise
- AS/NZS IEC 61672.1:2019 Electroacoustics – Sound level meters, Part 1: Specifications
- ISO 3746:2010 Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane
- BS 4142:2014 Methods for rating and assessing industrial and commercial sound

## 2. Site Location and Existing Acoustic Environment

The KER facility is located in the Kwinana Industrial Area (KIA), which is zoned for heavy industry. The adjacent heavy industrial operations include Cockburn Cement Kwinana, Lithium plants, BGC Precast, Shinagawa Refractories, BGC Cement and Steelmains where noise emissions from these premises form part of the existing acoustic environment. The dominant noise sources in the area are industrial operations and road traffic noise.

**Figure 2-1** shows the KER site and surrounding industrial premises.



**Figure 2-1** KER facility and surrounding industrial premises (Source: Nearnmap)

### 3. Noise Monitoring

#### 3.1 Applicable Performance Tests

The applicable noise test specified by PG7 applicable to Threshold Performance are as follows:

- PG7.1 Plant Boundary

#### 3.2 Noise Monitoring Locations

The monitoring was conducted at the following locations as specified in PG7 and shown on **Figure 3-1**.

**Table 3-1 Noise Monitoring Locations**

Performance Test Item	Monitoring Loc ID	No of Monitoring Points	Description
PG7.1	N1N, N2N, N3N, N4N, N5N	5	Facility northern boundary
	N1E	1	Facility eastern boundary
	N1S, N3S, N4S, N5S	4	Facility southern boundary
	N1W	1	Facility western boundary

#### 3.3 Methodology and Instrumentation

The noise monitoring was conducted continuously from Monday, 22<sup>nd</sup> September to Saturday, 27<sup>th</sup> September 2025. Noise levels of approximately 24 hours were collected at each facility boundary monitoring point.

The noise monitors detailed in **Table 3-2** were used for the assessment. A total of five (5) noise monitors (Sound Level Meters) were utilised for the purpose of this assessment. The Sound Level Meters (SLMs) satisfy the performance test requirements and comply with the Class 2 requirements in accordance with “AS/NZS IEC 61672.1:2019 Electroacoustics – Sound level meters, Part 1: Specifications” and have current calibration certificates traceable to a NATA certified laboratory.

**Table 3-2 Noise Monitors used for assessment**

Device ID	Make	Model	SLM Serial Number
1	SiteHive	Hexanode Noise	HEX-390
2	SiteHive	Hexanode Noise	HEX-459
3	SiteHive	Hexanode Noise	HEX-483
4	SiteHive	Hexanode Noise	HEX-539
5	SiteHive	Hexanode Noise	HEX-589

The noise monitors were set to statistically process and store the measured noise continuously for the whole monitoring period, with the measuring microphones set at 1.2 – 1.5 metres above ground level.

All the SLMs have been laboratory calibrated within the previous two years. The calibration is valid for 2 years, and the calibration certificates for the monitors used for the monitoring are included in Appendix 1. Calibration of the sound level meters was also checked prior to the noise monitoring.

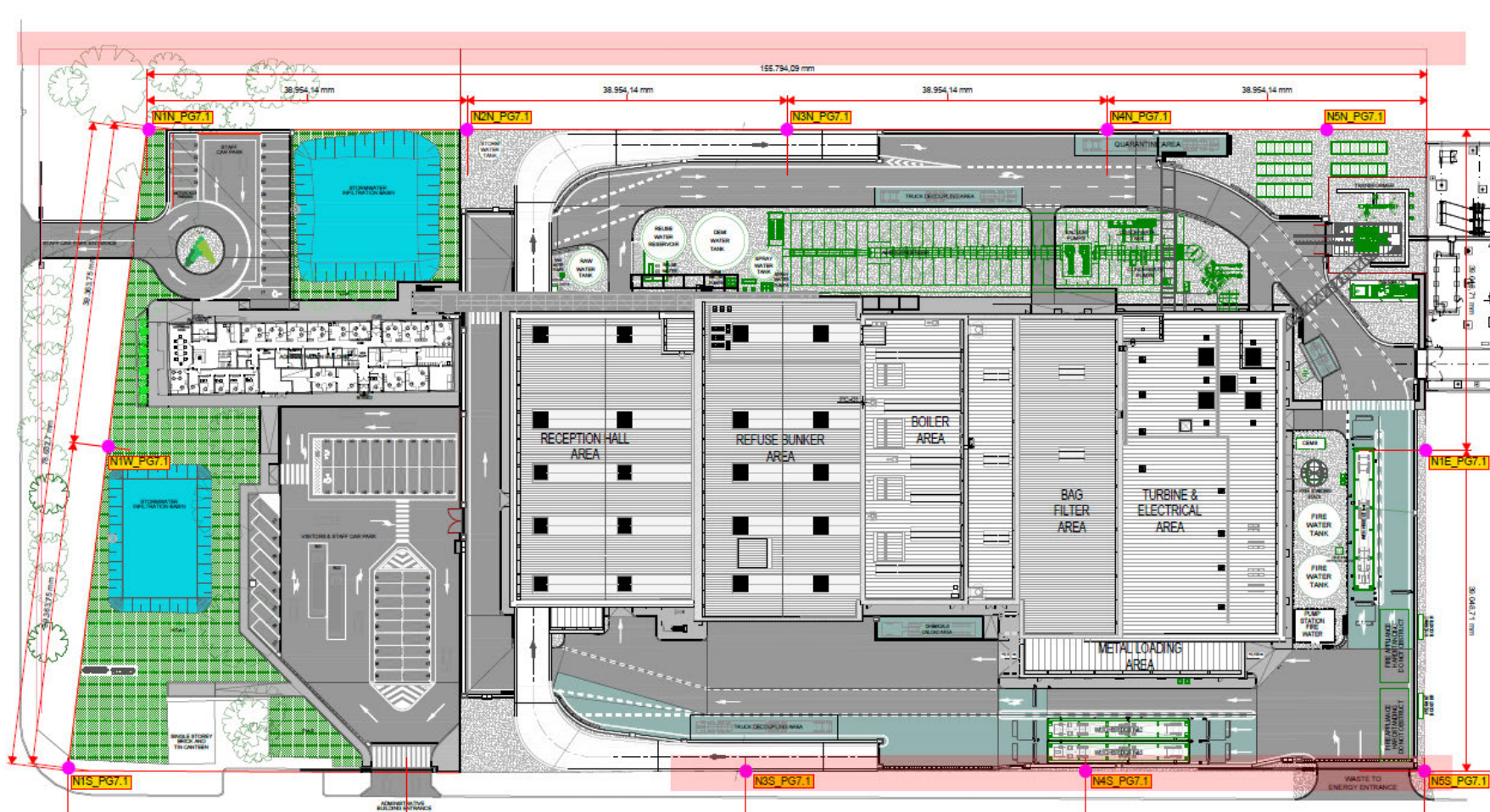


Figure 3-1 Noise Monitoring Locations – Facility Boundary

### 3.4 Noise Monitoring Results

The results of the noise monitoring for the facility boundary are presented in **Table 3-3**.

**Table 3-3 Noise Monitoring Results: PG7.1 – Boundary**

Monitoring Location	LA10 (dBA)				LA1 (dBA)				LAmx (dBA)			
	Average	D	E	N	Average	D	E	N	Average	D	E	N
N1N	<b>65</b>	68	59	65	<b>83</b>	86	78	79	<b>94</b>	98	90	88
N2N	<b>59</b>	61	57	59	<b>74</b>	78	68	70	<b>85</b>	89	75	78
N3N	<b>67</b>	68	67	67	<b>80</b>	82	75	80	<b>88</b>	91	81	88
N4N	<b>71</b>	72	70	70	<b>80</b>	82	78	79	<b>87</b>	89	84	85
N5N	<b>70</b>	72	69	66	<b>82</b>	86	71	80	<b>91</b>	95	73	89
N1E	<b>66</b>	67	65	65	<b>77</b>	79	74	76	<b>84</b>	87	80	83
N1S	<b>70</b>	73	63	69	<b>84</b>	86	80	85	<b>94</b>	95	92	95
N3S	<b>63</b>	66	56	60	<b>77</b>	79	73	77	<b>87</b>	87	85	88
N4S	<b>71</b>	75	62	66	<b>85</b>	89	71	77	<b>94</b>	99	77	85
N5S	<b>67</b>	71	61	64	<b>83</b>	85	73	83	<b>93</b>	95	81	95
N1W	<b>69</b>	72	62	67	<b>82</b>	86	75	80	<b>91</b>	95	84	88

Monitoring Location	LAeq (dBA)				LA90 (dBA)			
	Average	D	E	N	Average	D	E	N
N1N	<b>63</b>	65	59	62	<b>55</b>	54	56	56
N2N	<b>59</b>	61	57	58	<b>57</b>	58	56	57
N3N	<b>67</b>	68	66	67	<b>66</b>	66	66	66
N4N	<b>70</b>	71	69	69	<b>69</b>	69	68	69
N5N	<b>69</b>	71	68	65	<b>68</b>	70	67	63
N1E	<b>64</b>	65	64	64	<b>62</b>	62	62	62
N1S	<b>67</b>	70	64	66	<b>59</b>	59	59	59
N3S	<b>61</b>	64	57	59	<b>56</b>	57	54	55
N4S	<b>68</b>	72	61	63	<b>64</b>	67	60	61
N5S	<b>66</b>	69	60	63	<b>59</b>	59	59	59
N1W	<b>67</b>	70	62	64	<b>58</b>	58	58	58

- D (Day): 0700 – 1900 | E (Evening): 1900 – 2200 | N (Night): 2200 – 0700

## 4. Assessment of Monitoring Results

### 4.1 Noise Acceptance Criteria

The project noise acceptance criteria specified in PG7 – Noise and Vibration are presented in **Table 4-1**.

**Table 4-1 Acceptance Criteria - Noise**

Performance Test	Measurement Location	Acceptance Criteria
PG7.1	Facility Boundary	70 dBA (LA10)

### 4.2 Negligible or Marginal Exceedances of Noise Criteria

In typical environmental settings (with background noise, variable sources and ambient conditions) changes of less than 3 dB are much less likely to be perceptible. Therefore, an exceedance of 1-2 dB is commonly considered negligible to marginal with respect to human perception.

This is consistent with terminology used in Western Australian EPA and DWER environmental assessment documents, where 1–2 dB above assigned levels are described as “marginal exceedances”. Given the small magnitude involved, this exceedance is within typical acoustic uncertainty associated with modelling or measurement ( $\pm 1-2$  dB) and is not expected to result in a perceptible change in noise exposure or community response. Accordingly, 1-2 dB exceedance is unlikely to represent a material breach of the Environmental Protection (Noise) Regulations 1997. Similar magnitudes of exceedance are commonly described in WA environmental approvals as marginal or negligible, recognising that acoustic predictions and measurements inherently include small variations due to meteorological conditions, source variability and measurement tolerances.

### 4.3 Assessment of Noise Measurement Results – PG7.1

The results from the noise monitoring conducted at the boundary locations have been assessed against the project Design Noise Levels and presented in **Table 4-2**. The predominant noise sources causing the exceedances of the noise criteria were road traffic noise on Leath Road (at N1W, N1S, N3S, N4S and N5S) or mobile equipment operating in the adjoining premises (at N3N, N4N and N5N). Noise emissions from KER operations did not cause exceedance of the noise criteria.

**Table 4-2 Assessment of Noise Measurement Results: PG7.1 – Boundary**

Monitoring Location	Result (dBA)	Acceptance Criterion (dBA)	Compliance with Criterion
N1N	65	70	Yes
N2N	59	70	Yes
N3N	67 <sup>1</sup>	70	Yes
N4N	71 <sup>1,2</sup>	70	Yes
N5N	70 <sup>1</sup>	70	Yes
N1E	66	70	Yes
N1S	70 <sup>3</sup>	70	Yes
N3S	63 <sup>3</sup>	70	Yes
N4S	71 <sup>3,4</sup>	70	Yes
N5S	67 <sup>3</sup>	70	Yes
N1W	69 <sup>3</sup>	70	Yes

1. Predominant noise sources: mobile equipment operating in the adjoining premises.
2. 1 dB exceedance caused by mobile equipment operating in the adjoining premises, not by KER operation. The noise emission from KER operation was therefore compliant with the noise criterion. See also **Section 4.2**.
3. Predominant noise source: off-site road traffic on Leath Road.
4. 1 dB exceedance caused by off-site heavy vehicles, not by KER operation. The noise emissions from KER operation was therefore compliant with the noise criterion. See also **Section 4.2**.

## 5. Conclusion

This noise compliance assessment has been undertaken by Ramboll during to the commissioning stage under the normal full load operational conditions.

The assessment methodology, the noise measurement results and the assessment of the results are presented in **Sections 3 and 4** of this report.

The noise emissions from KER operation complied with the acceptance criterion of 70 dBA. The noise measurement results also show that, when comparing to the baseline noise monitoring results obtained in August 2024, the noise (LA10) measured at the facility boundary locations with KER in operation has increased up to 3 dB, which is considered a marginal increase.

## Appendix 1 Calibration Certificates

# Hexanode Calibration Certificate



11 Sep 2025

## Noise

Thank you for choosing SiteHive for your realtime environmental management. This calibration certificate is valid for the device below.

The Hexanode sound level meter has been pressure calibrated by SiteHive using a NATA Certified (IEC 60942: Sound calibrators) Sound Level Calibrator, at 104 Commonwealth Street, Surry Hills, NSW, 2010.

Serial Number	Noiseboard ID	Calibration Value	Calibration Date	Calibration Due
HEX-000390	4273865-006-0922000033	3.643519	08 Sep 2025	08 Sep 2027

Accuracy:	Complies with precision requirements of IEC 61672 for Class 2
Acoustic overload point:	135 dBSPL
Frequency Range:	20 Hz ~ 12.5 kHz
Frequency Rating:	Z, A and C weighting
Parameters (dB):	Frequency & time weighted integrations, statistical levels, and more
Direction of Arrival:	Device angle & cartesian angle (0°-360°) of dominant noise source
Reference Sound Level Calibrator:	Lutron SC-941
Calibration Reference Level:	94dB
Calibration Reference Frequency:	1 KHz
Environmental Conditions:	The environmental conditions remained within the acceptable limits as defined in IEC 61672.3

NATA Certificates of Calibration that comply with the Class 2 performance requirements of IEC 61672.3 are available on request.

# Hexanode Calibration Certificate



11 Sep 2025

## Noise

Thank you for choosing SiteHive for your realtime environmental management. This calibration certificate is valid for the device below.

The Hexanode sound level meter has been pressure calibrated by SiteHive using a NATA Certified (IEC 60942: Sound calibrators) Sound Level Calibrator, at 104 Commonwealth Street, Surry Hills, NSW, 2010.

Serial Number	Noiseboard ID	Calibration Value	Calibration Date	Calibration Due
HEX-000459	4273865-006-0423000081	3.8927	25 Aug 2025	25 Aug 2027

Accuracy:	Complies with precision requirements of IEC 61672 for Class 2
Acoustic overload point:	135 dBSPL
Frequency Range:	20 Hz ~ 12.5 kHz
Frequency Rating:	Z, A and C weighting
Parameters (dB):	Frequency & time weighted integrations, statistical levels, and more
Direction of Arrival:	Device angle & cartesian angle (0°-360°) of dominant noise source
Reference Sound Level Calibrator:	Lutron SC-941
Calibration Reference Level:	94dB
Calibration Reference Frequency:	1 KHz
Environmental Conditions:	The environmental conditions remained within the acceptable limits as defined in IEC 61672.3

NATA Certificates of Calibration that comply with the Class 2 performance requirements of IEC 61672.3 are available on request.

# Hexanode Calibration Certificate



11 Sep 2025

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Serial Number	Noiseboard ID	Calibration Value	Calibration Date	Calibration Due
HEX-000483	4273865-006-0922000015	4.214214	10 Sep 2025	10 Sep 2027

Accuracy:	Complies with precision requirements of IEC 61672 for Class 2
Acoustic overload point:	135 dBSPL
Frequency Range:	20 Hz ~ 12.5 kHz
Frequency Rating:	Z, A and C weighting
Parameters (dB):	Frequency & time weighted integrations, statistical levels, and more
Direction of Arrival:	Device angle & cartesian angle (0°-360°) of dominant noise source
Reference Sound Level Calibrator:	Lutron SC-941
Calibration Reference Level:	94dB
Calibration Reference Frequency:	1 KHz
Environmental Conditions:	The environmental conditions remained within the acceptable limits as defined in IEC 61672.3

NATA Certificates of Calibration that comply with the Class 2 performance requirements of IEC 61672.3 are available on request.

# Hexanode Calibration Certificate



11 Sep 2025

## Noise

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Serial Number	Noiseboard ID	Calibration Value	Calibration Date	Calibration Due
HEX-000539	4273865-006-0423000011	4.330085	10 Sep 2025	10 Sep 2027

Accuracy:	Complies with precision requirements of IEC 61672 for Class 2
Acoustic overload point:	135 dBSPL
Frequency Range:	20 Hz ~ 12.5 kHz
Frequency Rating:	Z, A and C weighting
Parameters (dB):	Frequency & time weighted integrations, statistical levels, and more
Direction of Arrival:	Device angle & cartesian angle (0°-360°) of dominant noise source
Reference Sound Level Calibrator:	Lutron SC-941
Calibration Reference Level:	94dB
Calibration Reference Frequency:	1 KHz
Environmental Conditions:	The environmental conditions remained within the acceptable limits as defined in IEC 61672.3

NATA Certificates of Calibration that comply with the Class 2 performance requirements of IEC 61672.3 are available on request.

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11 Sep 2025

## Noise

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Serial Number	Noiseboard ID	Calibration Value	Calibration Date	Calibration Due
HEX-000589	4273865-006-0922000122	4.501924	10 Sep 2025	10 Sep 2027

Accuracy:	Complies with precision requirements of IEC 61672 for Class 2
Acoustic overload point:	135 dBSPL
Frequency Range:	20 Hz ~ 12.5 kHz
Frequency Rating:	Z, A and C weighting
Parameters (dB):	Frequency & time weighted integrations, statistical levels, and more
Direction of Arrival:	Device angle & cartesian angle (0°-360°) of dominant noise source
Reference Sound Level Calibrator:	Lutron SC-941
Calibration Reference Level:	94dB
Calibration Reference Frequency:	1 KHz
Environmental Conditions:	The environmental conditions remained within the acceptable limits as defined in IEC 61672.3

NATA Certificates of Calibration that comply with the Class 2 performance requirements of IEC 61672.3 are available on request.