



# Microsoft SYD05 Data Centre

## Operational Noise Verification Report

**Microsoft Datacentre (Australia) Pty Ltd**

Report number: 250792 - SYD05 - Operational Noise Verification Report - R0

Date: 17 December 2025

Version: For Information



## DOCUMENT CONTROL

<b>Project Name</b>	Microsoft SYD05 Data Centre
<b>Project Number</b>	250792
<b>Report Reference</b>	250792 - SYD05 - Operational Noise Verification Report - R0
<b>Client</b>	Microsoft Datacentre (Australia) Pty Ltd

Revision	Description	Reference	Date	Prepared	Checked	Authorised
0	For Information	250792 - SYD05 - Operational Noise Verification Report - R0	17 December 2025	Alex Danon		Matthew Harrison

### PREPARED BY:

Pulse White Noise Acoustics Pty Ltd  
 ABN 95 642 886 306  
 Suite 601, Level 6, 32 Walker Street, North Sydney, 2060  
 1800 4 PULSE

This report has been prepared by Pulse White Noise Acoustics Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Microsoft Datacentre (Australia) Pty Ltd. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Pulse White Noise Acoustics.

This report remains the property of Pulse White Noise Acoustics Pty Ltd until paid for in full by the client, Microsoft Datacentre (Australia) Pty Ltd.

**Pulse White Noise Acoustics disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.**



**TABLE OF CONTENTS**

**1 INTRODUCTION ..... 4**  
 1.1 Qualifications .....4

**2 OPERATIONAL NOISE EMISSION CRITERIA..... 5**

**3 ATTENDED MEASUREMENTS ..... 8**  
 3.1 Noise Descriptors and Terminology .....8  
 3.2 Attended Measurements of Mechanical Equipment .....9

**4 COMPLIANCE ASSESSMENT..... 10**  
 4.1 Compliance Predictions ..... 10

**5 CONCLUSION ..... 11**

**APPENDIX A: ACOUSTIC GLOSSARY ..... 12**

**TABLES**

Table 1 Measured noise emissions from diesel generator at the south-east corner of the site .....9  
 Table 2 Measured noise measurements from air handling unit at the south-east corner of the site.....9  
 Table 3 Predicted operational noise at commissioning locations, to satisfy the Arup Pty Ltd Operational Noise Management Plan (sourced from file ref. AC06, dated 10 July 2023) ..... 10

**FIGURES**

Figure 1 Arup Pty Ltd Operational Noise Limits (sourced from file ref. AC06, dated 10 July 2023) .....5  
 Figure 2 Arup Pty Ltd Operational Noise Management Plan (sourced from file ref. AC06, dated 10 July 2023) .....6  
 Figure 3 Arup Pty Ltd Operational Noise Management Plan (sourced from file ref. AC06, dated 10 July 2023) (cont.) .....7



## 1 INTRODUCTION

Pulse White Noise Acoustics (PWNA) has been engaged to undertake compliance measurements of the operational noise emissions from mechanical services, equipment and plant serving the Microsoft SYD05 data centre located at 757-769 Mamre Road, Kemps Creek NSW 2178.

This Operational Noise Verification Report addresses Condition B11 of SSD-10101987. This Condition is reproduced below:

- B11. Within three months of the commencement of operation of the development, the Applicant must prepare and submit an Operational Noise Verification Report for the development to the satisfaction of the Planning Secretary. The Operational Noise Verification Report must:*
- (a) be prepared by a suitably qualified, experienced and independent acoustic consultant whose appointment has been endorsed by the Planning Secretary;*
  - (b) demonstrate that noise verification has been carried out in accordance with:*
    - (i) the Australian Standard AS 1055:2018 Acoustics – Description and measurement of environmental noise (Standards Australia, 2018); and*
    - (ii) the EPA Approved Methods for the Measurement and Analysis of Environmental Noise in NSW (EPA, 2022)*
    - (iii) the Operational Noise Monitoring Plan established under condition B8(e);*
  - (c) include:*
    - (i) an analysis of compliance with noise limits specified in conditions B6;*
    - (ii) an outline of implemented at-source and transmission pathway mitigation measures and their effectiveness at reducing operational noise; and*
    - (iii) a description of contingency measures in the event implemented mitigation measures are not effective at reducing noise levels to comply with limits specified in condition B6 at all times.*

Arup Pty Ltd (Arup) have previously prepared a *Noise Verification Report*, file reference AC06, dated 10 July 2023. The Arup report outlines the certification of the SYD05 data centre site, including a description of noise sources, operational noise limits, and an Operational Noise Management Plan.

The commissioning testing undertaken by PWNA (i.e., the subject of this report) has been conducted in accordance with the Operational Noise Management Plan included within the Arup report, which was written to satisfy Condition B8(e) of SSD-10101987.

A glossary of acoustic terminology used throughout this report is included in Appendix A.

### 1.1 Qualifications

This Operational Noise Verification Report has been prepared by Alex Danon of PWNA, a suitably qualified acoustic engineer and a member of the Association of Australian Acoustical Consultants and the Australian Acoustical Society (Member ID 4082).



## 2 OPERATIONAL NOISE EMISSION CRITERIA

Noise criteria applicable to the operation of the data centre have been established in the *Kemps Creek Data Centre, Noise and Vibration Impact Assessment*, prepared by Arup Pty Ltd, dated 1 September 2022, submitted as part of the approved SSDA (SSD-10101987). These are reproduced in the *Noise Verification Report*, file reference AC06, dated 10 July 2023, prepared by Arup.

The Arup established project criteria for mechanical plant and equipment have been reproduced below. The operational noise limits have been extracted from Condition B6 of the Consent Conditions (SSD-10101987).

**Figure 1 Arup Pty Ltd Operational Noise Limits (sourced from file ref. AC06, dated 10 July 2023)**

10 July 2023

**4. Operational Noise Limits**

Operational noise limits are presented in Condition B6 of the Consent Conditions, reproduced below:

*B6. The Applicant must ensure that noise generated by operation of the development does not exceed the noise limits in Table 2.*

*Table 2 Noise Limits (dB(A))*

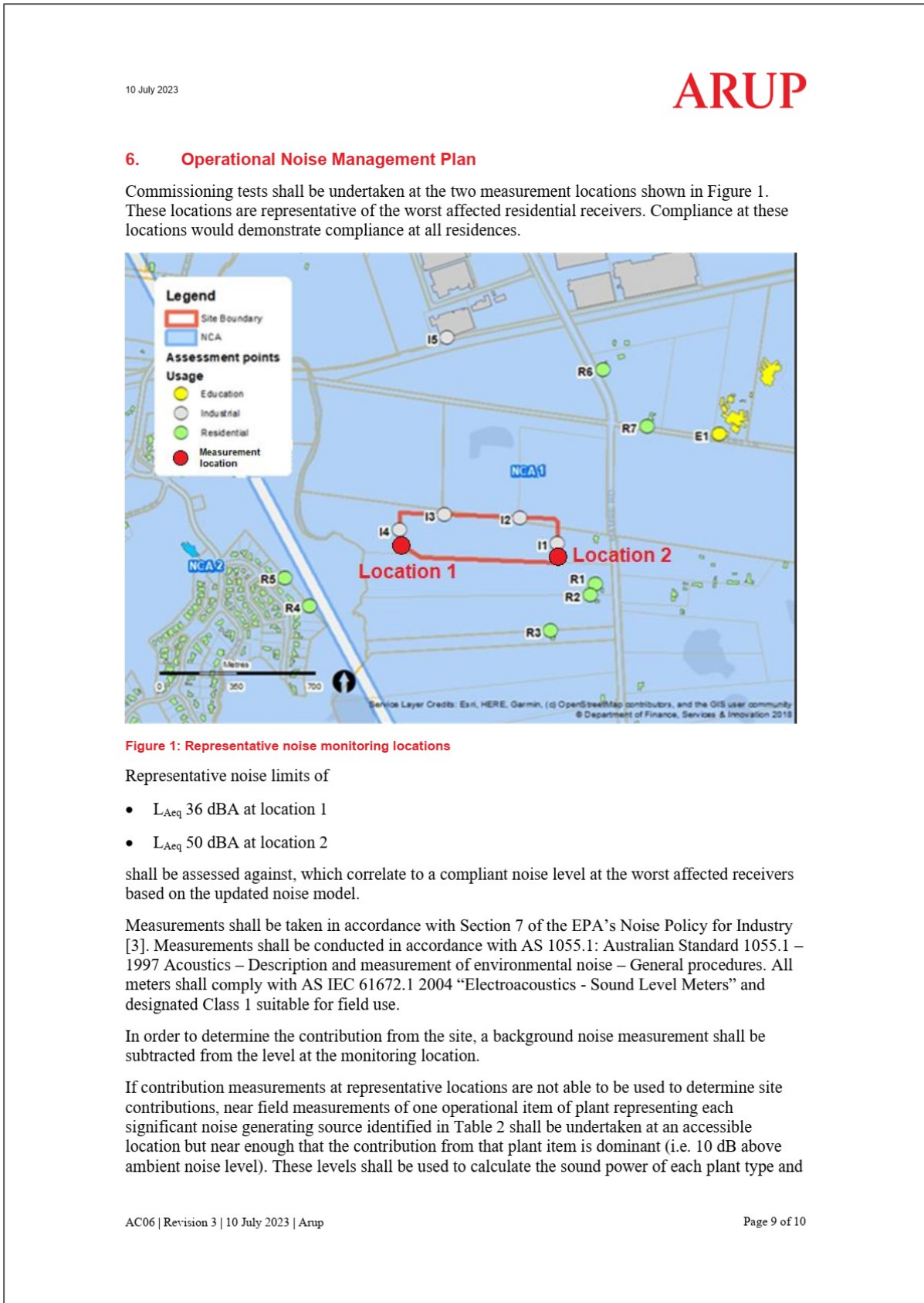
Location	Day <i>L<sub>Aeq</sub></i> (15 min)	Evening <i>L<sub>Aeq</sub></i> (15 min)	Night <i>L<sub>Aeq</sub></i> (15 min)
<i>Residential receivers near Medinah Avenue (Luddenham)</i>	37	32	28
<i>Residences within the MRP</i>	48	40	38

*Note Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017) (as may be updated or replaced from time to time). Refer to the plan in Appendix 3 for the location of residential sensitive receivers.*

*B7. The Applicant must ensure the operation of plant and equipment does not generate intermittent noise at receiver locations identified in Table 2 in accordance with Fact Sheet C of the NSW Noise Policy for Industry (EPA, 2017).*

The commissioning testing undertaken by PWNA (i.e., the subject of this report) has been conducted in accordance with the Operational Noise Management Plan included within the Arup report, which was written to satisfy Condition B8(e) of SSD-10101987. The Arup Operational Noise Management Plan has been reproduced below.

**Figure 2 Arup Pty Ltd Operational Noise Management Plan (sourced from file ref. AC06, dated 10 July 2023)**





**Figure 3 Arup Pty Ltd Operational Noise Management Plan (sourced from file ref. AC06, dated 10 July 2023) (cont.)**

10 July 2023

compared to those listed in Table 2. Noise levels which are no higher than those listed would demonstrate compliance.

**7. Contingency measures**

This section provides a summary of the management measures which may be considered for key plant items if residual exceedances remain post construction.

**Table 6: Summary of pre-mitigation and residual impacts**

Contingency measure	Applicable plant
Retrofit enclosures around roof top equipment	Condensers
Additional absorptive lining to louvred AHU plantroom	AHU plantroom
Barriers around site transformers	Site transformers

**8. References**

- [1] Arup, “Kemps Creek Data Centre - Noise and Vibration Impact,” Arup, Sydney, 2022.
- [2] Standards Australia, “AS 1055 Acoustics—Description and measurement of environmental noise,” Standards Australia, Sydney, 2018.
- [3] NSW Environment Protection Authority, “NSW Noise Policy for Industry,” NSW Environment Protection Authority , Sydney, 2017.

SYD05-06-07\_Y-S-0002 | Revision 3 | 10 July 2023 | Arup

Page 10 of 10



### 3 ATTENDED MEASUREMENTS

The mechanical plant of interest includes 480 Air Handling Units (8 per data hall) with fresh air inlets open to louvred plantrooms, and 62 enclosed diesel generators. The attended measurements were conducted between 11:00am and 12:30pm on Thursday 11<sup>th</sup> December 2025, when the mechanical plant was operating under typical operational load.

#### 3.1 Noise Descriptors and Terminology

Environmental noise constantly varies in level with time. Therefore, it is necessary to measure environmental noise in terms of quantifiable time periods and statistical descriptors. Typically, environmental noise is measured over 15-minute periods and relevant statistical descriptors of the fluctuating noise are determined to quantify the measured level.

Noise (or sound) consists of minute fluctuations in atmospheric pressure capable of detection by human hearing. Noise levels are expressed in terms of decibels, abbreviated as dB or dBA, the "A" indicating that the noise levels have been frequency weighted to approximate the characteristics of normal human hearing. Because noise is measured using a logarithmic scale, 'normal' arithmetic does not apply, e.g., adding two sound sources of equal values result in an increase of 3 dB (i.e., 60 dBA plus 60 dBA results in 63 dBA). A change of 1 dB or 2 dB in the sound level is difficult for most people to detect, whilst a 3 dB – 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change roughly corresponds to a doubling or halving in loudness.

The most relevant environmental noise descriptors are the LAeq, LA1, LA10 and LA90 noise levels. The LAeq noise level represents the "equivalent energy average noise level". This parameter is derived by integrating the noise level measured over the measurement period and is used to quantify the level of noise emitted by the source under investigation. It represents the level that the fluctuating noise with the same acoustic energy would be if it were constant over the measured time period.

The LA1, LA10 and LA90 levels are the levels exceeded for 1%, 10% and 90% of the sample period. These levels can be considered as the maximum noise level, the average repeatable maximum and average repeatable minimum noise levels, respectively. LA90 level is used to quantify the "background" noise level of the environment.

A glossary of acoustic terminology used in this memorandum is presented in Appendix A.



### 3.2 Attended Measurements of Mechanical Equipment

Attended external noise measurements were conducted between 11:00am and 12:30pm on Thursday 11<sup>th</sup> December 2025, in order to determine the operational noise levels, both as an overall noise level and in their component frequency spectra. Measurements were taken at various distances from plant and equipment, in-particular the emergency generators and mechanical air handling units (the most dominant noise sources).

The attended noise measurements were conducted using a Brüel & Kjær Type 2250 sound level meter (serial number 2709757) and a Brüel & Kjær Type 2270 sound level meter (serial number 2679267). Calibration of the sound level meters were checked prior to and following the measurements using a Brüel & Kjær Type 4231 sound calibrator (serial number 3009148). The calibrator emitted a calibration tone of 94 dB at 1 KHz. The drift in calibration did not exceed  $\pm 0.5$  dB. All equipment carries appropriate and current NATA (or manufacturer) calibration certificates.

The overall measured noise levels at different distances from an indicative emergency diesel generator located at the south-east most corner of the site are shown in Table 1 below. Note that the contribution of the background ambient noise was quantified via measurements on site, and subsequently removed from the noise levels presented in the below tables.

**Table 1 Measured noise emissions from diesel generator at the south-east corner of the site**

Plant Unit	Distance from Unit	LAeq dBA	LAeq dBA	LAeq dBA	LAeq dBA
	<b>Typical load condition</b>	<b>Intake End</b>	<b>Outlet End</b>	<b>Side (no door)</b>	<b>Side (with door)</b>
Emergency diesel generator (no load applied)	1 m	75	75	75	77
	20 m	58	-	57	-
	40 m	-	-	54	-
	60 m	-	-	52	-

The overall measured noise levels at different distances for a representative air handling unit are shown in Table 2 below. Measurements were taken externally, at set distances from the external inlet louvre.

Note that a site walk was conducted by the PWNA representatives on site to verify that the measured air handling unit was representative of the worst-case operation in terms of noise emissions along the building façade.

**Table 2 Measured noise measurements from air handling unit at the south-east corner of the site**

Plant Unit	Distance from Louvre	LAeq dBA
	<b>Typical load condition</b>	<b>Unit at the South-East Corner of SYD05</b>
Air handling units (Operating at typical load)	On external louvre	59
	1 m	57
	2 m	55
	4 m	53

In addition to the above, a noise level measurement was taken adjacent to 2 transformers located at the south-east corner of the site. At 2m from the 2 transformers, the sound pressure level was measured to be 56 dBA. This noise source is included in the predictions made at the commissioning locations.



## 4 COMPLIANCE ASSESSMENT

Noise at the nearest residential receivers is dominated by traffic noise on surrounding roadways, and industrial noise from nearby surrounding sites. As a result of the large distances to the sensitive receivers, the contribution from plant and equipment from the data centre to the nearest noise sensitive receivers, and at the commissioning locations, is at a low noise level compared to the background ambient noise and is, therefore, unable to be determined via direct measurement. Thus, the noise level from the assessed plant and equipment is predicted based on measured noise levels at the data centre facility and then back calculated to the two commissioning locations, using the measurement data presented above.

This operational assessment considered the effects of the dominant noise generating equipment. This consisted of 480 Air Handling Units (continuously operational at typical loads), and 62 enclosed diesel generators (two operational at any given time for bi-monthly no load testing).

### 4.1 Compliance Predictions

The predicted noise emissions from the normal operation all air handling units, operating simultaneously, at the commissioning locations identified in the Arup Operational Noise Management Plan (sourced from file ref. AC06, dated 10 July 2023) are summarised in Table 3 below. The compliance measurements have been assessed against the representative noise level limits identified by Arup at the two commissioning test locations. Note that these locations are representative of the worst affected residential receivers. As such, compliance at these locations demonstrates compliance at all surrounding receivers.

Compliance is achieved at both commissioning measurement locations; see Table 3 below. As a result, compliance against the operational noise limits in Condition B6 of the Consent Conditions (SSD-10101987) has been achieved.

**Table 3 Predicted operational noise at commissioning locations, to satisfy the Arup Pty Ltd Operational Noise Management Plan (sourced from file ref. AC06, dated 10 July 2023)**

Receiver Location	Noise Level Limit (LAeq dBA)	Predicted LAeq Noise level (LAeq dBA)	Compliance
Commissioning Location 1 (see Figure 2)	36	30	Yes
Commissioning Location 2 (see Figure 2)	50	32	Yes



## 5 CONCLUSION

Pulse White Noise Acoustics (PWNA) has been engaged to undertake compliance measurements of the operational noise emissions from mechanical services, equipment and plant serving the Microsoft SYD05 data centre located at 757-769 Mamre Road, Kemps Creek NSW 2178.

The commissioning testing undertaken by PWNA has been conducted in accordance with the Operational Noise Management Plan included within the Arup report, which was written to satisfy Condition B8(e) of SSD-10101987.

Measurements of air handling units and emergency generators were conducted in close proximity to the noise sources at a variety of distances.

The compliance measurements have been assessed against the representative noise level limits identified by Arup at the two commissioning test locations. Note that these locations are representative of the worst affected residential receivers. As such, compliance at these locations demonstrates compliance at all surrounding receivers.

Compliance is achieved at both commissioning measurement locations. As a result, compliance against the operational noise limits in Condition B6 of the Consent Conditions (SSD-10101987) has been achieved.

Regards,

A handwritten signature in black ink, appearing to read 'Alex Danon', is written over a light blue horizontal line.

**Alex Danon**

Senior Acoustic Engineer

PULSE WHITE NOISE ACOUSTICS PTY LTD



## APPENDIX A: ACOUSTIC GLOSSARY

Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds; <ul style="list-style-type: none"> <li>0dB the faintest sound we can hear</li> <li>30dB a quiet library or in a quiet location in the country</li> <li>45dB typical office space. Ambience in the city at night</li> <li>60dB Martin Place at lunch time</li> <li>70dB the sound of a car passing on the street</li> <li>80dB loud music played at home</li> <li>90dB the sound of a truck passing on the street</li> <li>100dB the sound of a rock band</li> <li>115dB limit of sound permitted in industry</li> <li>120dB deafening</li> </ul>
dBA	<i>A-weighted decibels</i> The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dBA. Practically all noise is measured using the A filter. The sound pressure level in dBA gives a close indication of the subjective loudness of the noise.
Frequency	Frequency is synonymous to <i>pitch</i> . Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
L <sub>max</sub>	The maximum sound pressure level measured over a given period.
L <sub>min</sub>	The minimum sound pressure level measured over a given period.
L <sub>1</sub>	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L <sub>10</sub>	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L <sub>90</sub>	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L <sub>90</sub> noise level expressed in units of dBA.
L <sub>eq</sub>	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Sound Pressure Level, LP dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, Lw dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picroWatt.