Cole Jarman

El Macho, 103 Portland Street, Manchester

Plant Noise Assessment

Report 13/4342/R01-0

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CHP Management

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Plant noise schedule

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Glossary of Acoustic Terms

1 Introduction

1.1 It is proposed to install a new kitchen extract fan at El Macho, Ground Floor 103 Portland Street, Manchester.

1.2 Cole Jarman have been appointed to conduct an assessment of the mechanical services noise in order to meet the noise requirements set by the local planning authority.

1.3 This report presents the existing noise levels at the site and sets out plant noise limits to which the units will need to adhere in order to meet the local planning authority's noise requirements.

1.4 This report also provides details of an assessment of the proposed extract fan and compares the results to the noise limits set, proposing mitigation measures as necessary.

2 Site Description

2.1 General

2.1.1 103 Portland Street is a seven storey building with a restaurant located at ground floor level and residential elements above. The building is located at the corner of Portland Street and Princess Street which are located to the north west and north east of the building respectively.

2.1.2 Attached to the south west and south east of the site are more seven storey buildings with a mixture of residential and commercial uses.

2.2 Proposed Installation

2.2.1 It is proposed to install a new kitchen extract fan within a plant room in the new restaurant demise. The exact termination point of the extract system is currently unknown with two options being explored.

2.2.2 One option is for the extract system to terminate at high level towards the rear of the restaurant. Another option is for the extract system to terminate at low level towards the front of the restaurant. Both of these options are assessed and detailed within this report.

2.3 Noise Sensitive Receptors

2.3.1 The nearest noise sensitive receiver to the proposed high level extract termination is located on the top floor of 103, Portland Street.

2.3.2 The nearest noise sensitive receiver to the proposed low level extract termination is located on the third floor of 103, Portland Street, overlooking Princess Street.

3 Council Guidance

3.1 Plant noise limits for all new mechanical services plant items to be installed at the development need to meet the noise requirement of Manchester City Council NSE6, as shown below;

"NSE6

Noise – External Equipment Insulation

Externally mounted ancillary plant, equipment and servicing shall be acoustically treated in accordance with a scheme designed so as to achieve a noise level of 5dB below the existing background (L_{A90}) in each octave band at the nearest noise sensitive location.

Reason – To safeguard the amenities of the occupiers of nearby residential accommodation."

4 Noise Survey Methodology and Instrumentation

4.1 An unattended noise survey as undertaken Friday 10th and Monday 13th January 2014.

4.2 The noise monitoring equipment was setup at one position on the roof of 103 Portland Street. This was chosen to be best representative of the existing noise climate at the nearest residential façade to the high level extract system.

4.3 Noise levels at the measurement position were dominated by road traffic noise from Princess Street . Road traffic noise from Princess Street will be the dominant noise source at the nearest windows to the low level extract the plant noise limits from this measurement position have been used for both assessment positions. This is expected to be a worst case assessment for the low level extract system.

4.4 The measurement location is shown on attached site plan 13/4342/SP1 and described below:

- MP1, façade measurement position located on the roof of 103 Portland Street. The microphone was located approximately 1.5m above roof level.

4.5 Measurements of the L_{Amax}, L_{Aeq} and L_{A90} indices were made over 10 minute periods (see the Glossary of Acoustic Terms for an explanation of the noise units used).

4.6 Noise measurements were made the equipment listed in table T1 below.

Item	Manufacturer	Type
Sound level analyser (class 1)	Norsonic	118
Acoustic calibrator	Norsonic	1251

T1 Equipment used during attended noise survey.

4.7 The microphone was fitted with a weatherproof windshield and was calibrated before and after the survey to ensure that a consistent and acceptable level of accuracy was maintained throughout.

4.8 The weather conditions when setting up the equipment were wet and cold with a slight northerly breeze. Weather conditions when picking up the equipment were dry with clear skies and no wind.

5 Noise Survey Results

5.1 The results of the attended noise measurements are shown in the attached schedule 13/4342/TH01.

5.2 The schedule shows that the minimum measured L_{A90} before 2300 hours was 48 dB(A). The minimum measured L_{A90} measured after 2300 hours was 46 dB(A).

5.3 The octave band noise data for the minimum measured background noise levels are shown in the table below

	Noise Emission Limit Octave Band Centred Frequency (Hz)								
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dB(A)**
Minimum noise level before 2300	59	51	49	45	44	39	23	18	48
24hr noise level	56	49	47	44	41	36	26	15	46

T2 Minimum measured noise spectrum

6 Plant Noise Limits

6.1 Plant noise limits for all new mechanical services plant items to be installed at the development need to meet the noise requirement of Manchester City Council NSE6 as detailed in section 2.3.2 above.

6.2 The plant noise limits during the day and night time periods have been calculated and are shown in the table below.

Plant noise limits at the nearest residential facade	**Noise Emission Limit Octave Band Centred Frequency (Hz)**							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Limits between 0900-2300	54	46	44	40	39	34	24	13
24hr noise limits	51	44	42	39	36	31	21	10

T3 Plant Noise Limits

7 Plant Noise Assessment

7.1 Plant Details

7.1.1 It is proposed to install 1 extract fan on the site. Details of the exact fan are provided below:

- Kitchen Extract – Vent Axia BSC5000/4/1

7.1.2 Noise data for the fan has been provided by the manufacturer and is shown in attached plant noise schedule 13/4342/PNS1. If this fan is changed then we will need to update our assessment.

7.2 Assessment

7.2.1 There are currently two proposed extract options. These are detailed below:

- Option 1 – The extract fan is to be installed in a plant room within the restaurant demise. The extract duct will then run externally up the rear of the building before terminating at roof level.
- Option 2 – The extract fan is to be installed in a plant room within the restaurant demise. The extract duct will then run externally to the front of the building before terminating at low level.

7.2.2 We have calculated the noise level generated by the proposed new plant at the nearest residential facades. For option 1 this is 1m from the nearest residential window on the top floor

of 103 Portland Street. For option 2 this is 1m from the nearest residential window above the extract termination on Princess Street.

7.2.3 Our assessments have taken account of radiation, distance losses, directivity, end reflection, and façade correction.

7.2.4 Our calculations have shown that in order to meet the proposed plant noise limits, for either extract option, it will be necessary to install an atmospheric side silencer on the proposed fan. The required insertion losses for the silencer for each option are provided within silencer schedule 13/4342/SS1.

7.2.5 With the silencer in place the calculated noise levels at the assessment positions for each option are shown in the table below along with the plant noise limits:

	Noise Emission Limit Octave Band Centred Frequency (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Option 1 (High Level)								
Calculated Noise Level	44	42	25	13	13	8	2	0
Limits between 0900-2300	54	46	44	40	39	34	24	13
Option 2 (Low Level)								
Calculated Noise Level	46	44	42	23	12	2	5	3
Limits between 0900-2300	54	46	44	40	39	34	24	13

T4 Calculated Noise Levels

7.2.6 Table T4 above shows that the predicted noise levels at the nearest residential façade will be below the plant noise limits in each octave band for both options and so are acceptable.

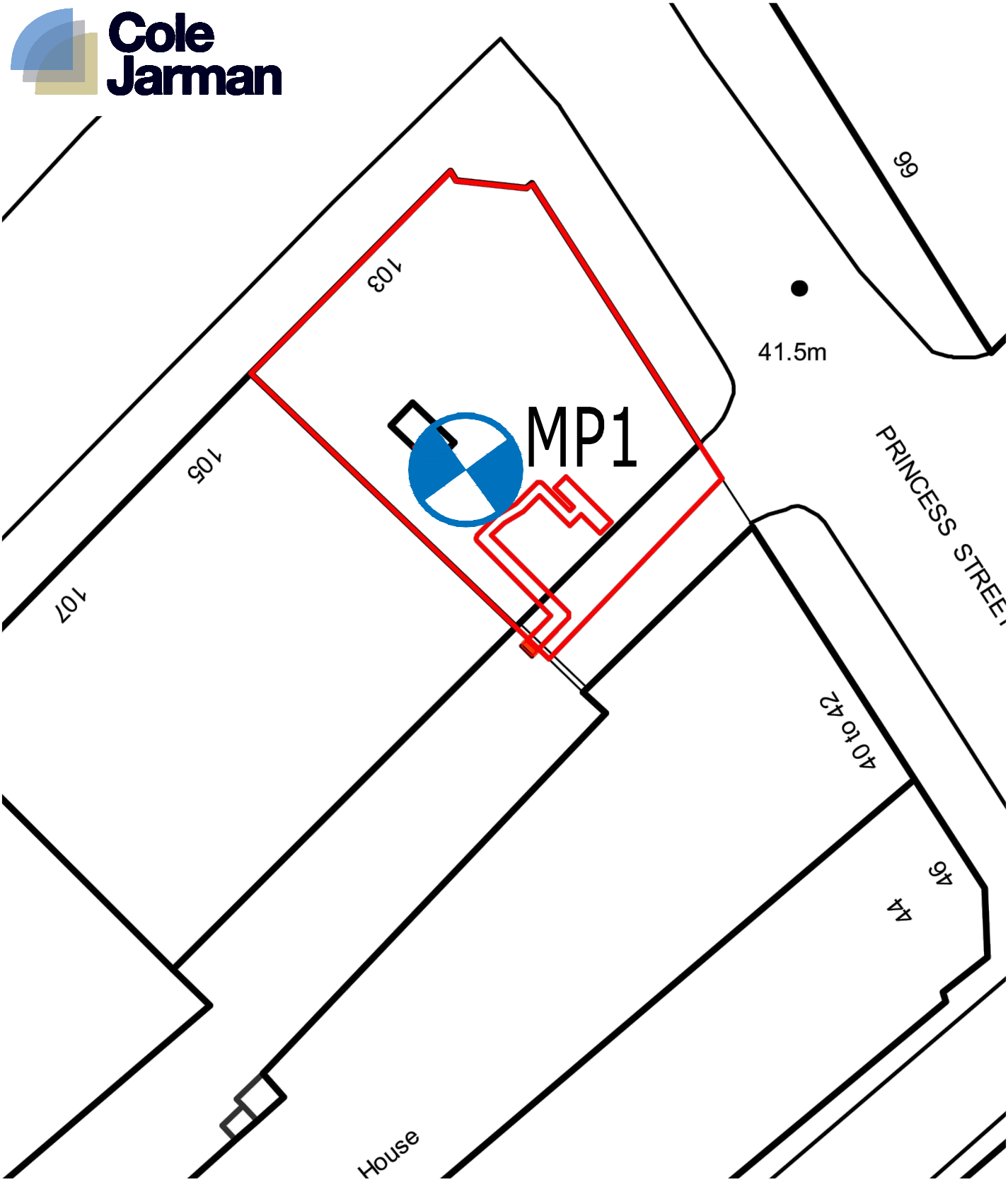
8 Conclusion

8.1 It is proposed to install a new extract fan at El Macho, 103 Portland Street, Manchester.

8.2 Plant noise limits for the proposed fan have been provided within this report. These are based on the results of a noise survey conducted at a location representative of the nearest residential façade and the requirements of the local council.

8.3 A plant noise assessment has been conducted for two proposed installations and silencers have been proposed for each option. Our assessment has shown that with the required silencer in place the plant noise limits will be achieved for either option.

End of Section



Title: Site Plan Showing Noise Measurement Position

Figure 13/4342/SP1

Project: El Macho, 103 Portland Street

Date: February 2014 Revision: -

Scale: Not to scale

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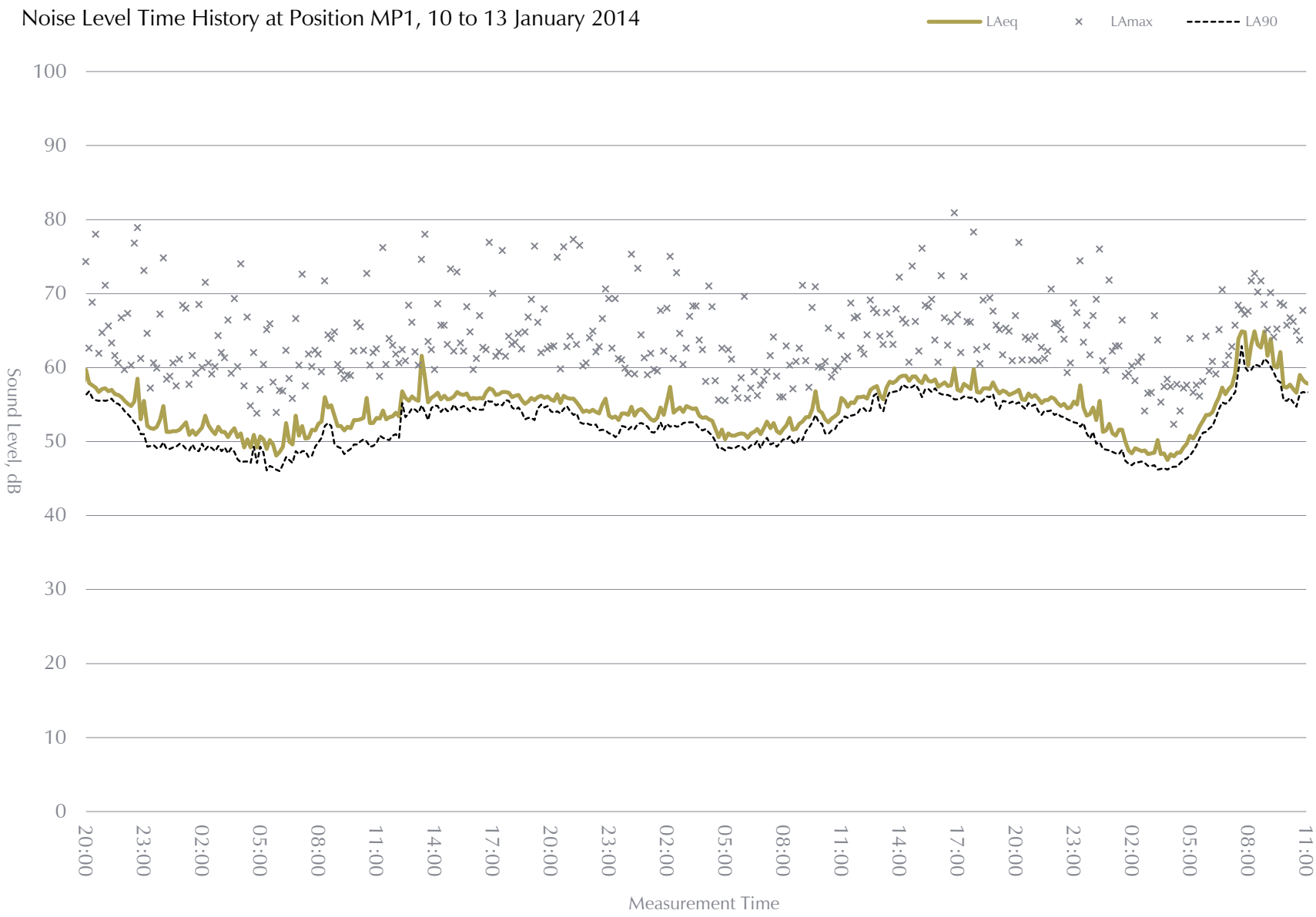

Figure 13/4342/TH01

Schedule of Mechanical Services Equipment Noise Levels, dB

System Ref	Details	Duty[1]	Data Type[2]	Octave Band Centre Frequency, Hz							
				63	125	250	500	1k	2k	4k	8k
KEF1 Vent-Axia BSC5000/4/1	Kitchen Extract	-	Mfr - Lw	80	79	76	72	75	75	68	61

Notes

[1] Duty in flow velocity (m^3/s) @ system pressure (Pa) unless otherwise stated
[2] Mfr refers to data supplied by the equipment manufacturer, Emp refers to data calculated using empirical formulae. Lw indicates noise data is in the form of Sound Power Levels, and Lp, Sound Pressure Levels at specified distance.

Schedule of Silencers.

Ref[1]	System/ Location	m^3/s [2]	Pa [3]	Dimensions (mm) [4]			Insertion Loss, dB[5] @ Octave Band Centre Frequency, Hz							
				H	W	L	63	125	250	500	1k	2k	4k	8k
SS1 High	High Level Extract Silencer	-	-		300Ø	300	0	1	2	3	8	9	8	7
SS1 Low	Low Level Extract Silencer	-	-	-	-	900	4	8	14	21	27	27	21	16

Notes

[1] RS, CT, AS and AL notation refers to Room Side, Cross Talk, Atmospheric Side and Acoustic Louvre respectively.
[2] Volume flow rate through silencer, m^3/s
[3] Maximum pressure drop, Pa
[4] Where "Vel < m/s" is stated instead of height and width dimension, silencers should be sized such that the stated air velocity (in m/s) is not exceeded. Air velocity is evaluated by dividing the flow rate by the entire cross-sectional area of the silencer, not just the open or free area.
[5] To be read in conjunction with specification 13/4342/SPC1

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} & L_{A90}:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

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