The Lucky Club Terrace
Stables Market, Chalk Farm Road, Camden NW1 8AH
Plant Noise Assessment

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On behalf of: IMMERSIVE|LDN
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Contents

1.0 Qualifications and experience

1.1 My name is Richard Vivian. I am the founder and director of Big Sky Acoustics Ltd. Big Sky Acoustics is an independent acoustic consultancy that is engaged by local authorities, private companies, public companies, residents' groups and individuals to provide advice on the assessment and control of noise.

1.2 I have a Bachelor of Engineering Degree with Honours from Kingston University, I am a Member of the Institution of Engineering & Technology, the Institute of Acoustics, and the Institute of Licensing.

1.3 I have over thirty years of experience in the acoustics industry and have been involved in acoustic measurement and assessment throughout my career. My professional experience has included the assessment of noise in connection with planning, licensing and environmental protection relating to sites throughout the UK. I have given expert evidence in the courts, in licensing hearings, in planning hearings and inquiries on many occasions.

2.0 Introduction

2.1 Big Sky Acoustics Ltd was instructed by Mr George Hartshorn of The Lucky Club to carry out an assessment of the impact of noise from mechanical plant on the Horse Hospital Terrace at Stables Market, Chalk Farm Road.

2.2 A planning application has been made that includes the installation of an extractor canopy with associated motor and outlet vents above a cooking area.

2.3 This report was prepared following detailed discussions with the applicant and a visit to the site. I have carried out numerous noise measurement surveys and observations in the market and am familiar with the area, the horse hospital building, the previous operation of Fest at this site, and the recent planning and licensing applications for the current operator.

2.4 A glossary of acoustical terms used in this report is provided in Appendix A.

2.5 All sound pressure levels in this report are given in dB re: 20μPa.

2.6 All sound power levels in this report are given in dB re: 10^{-12} watts.

3.0 Criteria

NPPF

3.1 The revised National Planning Policy Framework (NPPF) was published by the Ministry of Housing, Communities and Local Government on 20 July 2021 and sets out the government's planning policies for England and how these are expected to be applied. This revised Framework replaces replaces the previous National Planning Policy Framework published in March 2012, revised in July 2018 and updated in February 2019.

3.2 Paragraph 81 of the NPPF requires that significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development.

3.3 References to noise can be found in Section 15 titled "Conserving and enhancing the natural environment". The NPPF states at Paragraph 174 sub-paragraph (e) *"Planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans".*

3.4 The NPPF states at Paragraph 185 that *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impacts on health and the quality of life; b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason".*

3.5 The comments about *adverse impacts on health and quality of life* are referenced[1] to the Noise Policy Statement for England (NPSE) published by the Department for Environment, Food & Rural Affairs in 2010. The NPSE is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

3.6 The NPSE sets out the Government's long-term vision to *'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development'* which is supported by the following aims:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life.*

3.7 The NPSE defines the concept of 'significant observed adverse effect level' (SOAEL) as *'the level above which significant adverse effects on health and quality of life occur'*. The following guidance is provided within the NPSE: *'It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding*

[1] NPPF at footnote 65

of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.'

3.8 The Planning Practice Guidance (PPG) on Noise published by Ministry of Housing, Communities & Local Government in March 2014 (last revised on 22 July 2019) is written to support the NPPF with more specific planning guidance on how planning can manage potential noise impacts in new development.

3.9 The PPG reflects the NPSE and states at Paragraph 001 that noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced).

3.10 The PPG clarifies at Paragraph 002 that it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect on whether noise is likely to pose a concern.

3.11 The PPG expands upon the concept of SOAEL (together with Lowest Observed Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.

3.12 Figure 1 is reproduced from PPG Paragraph 005 and summarises the noise exposure hierarchy, based on the likely average response. The PPG at Paragraph 005 considers that a noise impact with an effects level which is lower than SOAEL is acceptable but that consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).

3.13 When the significant observed adverse effect level boundary is crossed noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.

3.14 At the highest extreme, noise exposure would cause extensive and sustained adverse changes in behaviour and/or health without an ability to mitigate the effect of the noise. The impacts on health and quality of life are such that, regardless of the benefits of the activity causing the noise, this situation should be avoided.

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Figure 1: PPG Noise Exposure Hierarchy Table (revision date: 22.07.2019)

The London Plan 2021

3.15 The London Plan 2021 is the Spatial Development Strategy for Greater London. It sets out a framework for how London will develop over the next 20-25 years and is the Mayor's vision for Good Growth.

3.16 **Policy HC6** promotes the night-time economy[2], where appropriate, particularly in the Central Activities Zone, strategic areas of night-time activity, and town centres where public transport such as the Night Tube and Night Buses are available. It protects and supports evening and night-time cultural venues such as pubs, night clubs, theatres, cinemas, music and other arts venues, and encourages the management of the night-time economy through an integrated approach to planning and licensing.

Camden Local Plan Policies

3.17 The Local Plan was adopted by Camden Council on 3 July 2017 and has replaced the Core Strategy and Camden Development Policies documents as the basis for planning decisions and future development in the borough. Noise and vibration can have a significant impact on amenity, quality of life and well being. Local Plan Policies A4 (Noise and vibration) and A1 (Managing the impact of development) seek to protect residents of both existing and new residential developments and the occupiers of other noise-sensitive developments from the adverse effects of noise and vibration. Policy TC4 (Town centre uses) states that to manage potential harm to amenity or the local area, the LPA will, in appropriate cases, use planning conditions and obligations to address noise/vibration, fumes and the siting of plant and machinery.

3.18 Appendix 3 of the Local Plan supports these policies and sets out expected standard in terms of noise and vibration. Table C proposes noise levels applicable to proposed industrial and commercial developments (including plant and machinery) and indicates that night time noise levels outside a bedroom window that does not exceed 10dB below the existing background level would be rated as LOAEL (see Figure 1) and noise that is in the range of 9dB below and 5dB above the background noise level would be rated as LOAEL to SOAEL.

British Standard 8233

3.19 BS8233:2014 states that for steady external noise sources, it is desirable that the internal ambient noise level in dwellings does not exceed the guideline values in the table shown below.

[2] The night-time economy refers to all economic activity taking place between the hours of 6pm and 6am, and includes evening uses. Night-time economic activities include eating, drinking, entertainment, shopping and spectator sports, as well as hospitality, cleaning, wholesale and distribution, transport and medical services, which employ a large number of night-time workers - paragraph 7.6.1 The London Plan.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Figure 2: Indoor ambient noise levels for dwellings (from BS8233 Table 4)

3.20 Annex G of BS8233 informs that windows, and any trickle ventilators, are normally the weakest part of a brick and block façade. Insulating glass units have an insulation of approximately 33 dB R_w and, assuming suitable sound attenuating trickle ventilators are used, the resulting internal noise level ought to be determined by the windows. If partially open windows are relied upon for background ventilation, the insulation would be reduced to approximately 15 dB.

British Standard 4142:2014

3.21 BS4142:2014 replaces BS4142:1997.

3.22 The standard provides a method for rating the effects of industrial and commercial sound on residential areas. The standard advocates a comparison between the typical measured L_{A90} background noise (sound) level and L_{Aeq} (sound) noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction is applied.

3.23 The standard states that a difference between the rating level and the background level of around +10 dB is an indication of a significant adverse impact, depending on the context and a difference of around +5 dB is likely to be an indication of an adverse impact again depending on the context. Where the rating level does not exceed the background noise (sound) level, this is an indication of the specific sound source having a low impact (depending upon the context).

4.0 Plant noise prediction

4.1 The new plant is a simple kitchen canopy incorporating two Nicotra Gebhardt DDM9/9 centrifugal fans and is typical of small scale commercial restaurant plant. Manufacturer's data for the plant can be found at Appendix C.

4.2 The maximum sound power level from each fan operating at full speed is 75dB L_{WA7}. A fan speed controller is installed to regulate airflow.

4.3 Predictions are based on maximum fan speed. Lower fan speeds, and hence lower sound levels, will be used in normal operation. It is anticipated that the maximum fan speed would only be used for purge ventilation.

4.4 Calculations assume the closest residential windows to be flats to the north of the site above commercial units and at a separation distance of at least 30m.

Figure 3: Canopy over cooking area, internal view.

Figure 4: Extract louvres, atmosphere side

Figure 5: Fan speed controller

4.5 The sound pressure level above has been calculated from the manufacturer's published sound power level, SWL, at distance of *r* from the source by the equation:

$$L_{\mathrm{p}} = L_{\mathrm{W}} + 10\log_{10}\left(\frac{S_0}{4\pi r^2}\right)$$

where $S_0 = 1\mathrm{m}^2$.

4.6 The resultant calculated SPL is 34dB, and there are two fans so if we assume perfect summation that give a resultant level of 37dB.

5.0 Assessment of plant noise levels

Noise Assessment - NPPF

5.1 There is a physical separation between the plant and noise sensitive receptors which are windows to residential flats on Chalk Farm Road.

5.2 There are no start-up noises and the plant is not tonal.

5.3 The plant will not have adverse impacts on health and quality of life arising from noise because of the design, the controlled hours of operation, and the physical location of the plant.

5.4 The existing site does not offer public access and has not been recognised as an area of tranquillity.

5.5 The plant does not contravene the NPPF by reason of noise.

Noise Assessment - BS 4142

5.6 Assessment is based on predicted plant noise from two fans operating at full speed with no duct, louvre or obstruction insertion losses, of 37dBA at the closest window.

5.7 BS 4142:2014 does state in paragraph 1.1 *"The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident"*, then, in apparent contradiction, goes on in paragraph 1.3 to state *"The standard is not intended to be applied to the derivation of indoor sound levels arising from sound levels outside, or the assessment of indoor sound levels"*.

5.8 It is considered that the acoustic environment would be acceptable in private external amenity space providing the BS 4142 rating noise level from the proposed use during the day does not exceed the prevailing L_{A90} typical background noise level by more than 5 dB.

5.9 BS 4142 states that certain acoustic features can increase the significance of impact of that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location a character correction should be applied to the specific sound level to determine the rating level. The rating correction is determined based upon the impulsivity and tonality of the sound noise level. The subjective method described in the standard describes the following rating corrections:

Tone just perceptible at receptor:	+ 2 dB;
Tone clearly perceptible at receptor:	+ 4 dB;
Tone highly perceptible at receptor:	+ 6 dB.
Impulsivity just perceptible at receptor:	+ 3 dB;
Impulsivity clearly perceptible at receptor:	+ 6 dB;
Impulsivity highly perceptible at receptor:	+ 9 dB.

5.10 The standard states that where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion. It also states that if intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

5.11 The rating correction applies to the sound as it will be perceived at the receptor. As a worst-case it is considered that neither tonality or impulsivity will be perceptible at the receptor as the maximum noise level from plant is below the average noise level expressed as an L_{AEq}, and below the background level expressed as an L_{A90}. The associated BS 4142 noise impact assessment is detailed in Figure 6 below.

	Night-time noise level
Typical background noise level, dB L_{A90}[3]	58
BS4142 Specific Source Noise Level, dB L_{Aeq}	37
BS4142 Rating Noise Level, dBA	37
BS4142 Assessment Level	-21

Figure 6: BS 4142 Noise Impact Assessment

5.12 The assessment indicates that difference between the background noise level and the rating noise level will be -21 dB. As levels of around +5 dB are considered acceptable this will therefore not generate any sort of adverse impact.

Noise Assessment - BS 8233

5.13 The internal noise level has been calculated and used for the assessment of amenity.

5.14 For a typical construction of masonry walls, tiled roof and single glazing external noise will be attenuated by approximately 25-29dB. The insulation provided by any type of window when partially open will be in the region of 10-15dBA. Figure 7 below shows the typical noise level due to worst case plant noise only that will be expected inside noise sensitive receptors. Actual internal levels will be higher due to road traffic noise and other activity not associated with the plant.

5.15 These are the worst case values for rooms with windows on an unobstructed façade facing the noise source. This calculation also assumes the plant activity is continuous and at maximum speed.

Location	Predicted free-field level, L_{Aeq}	Internal level; window open, dB	Internal level; window closed, dB
Room with clear line of site to noise source	37	22-27	8-12

Figure 7: Estimated internal noise levels (rooms with clear line of sight)

[3] Historic surveys in the area indicate background noise levels on Chalk Farm Road in the late evening of 58-61dB L_{A90} (Ref: multiple attended noise surveys by Big Sky Acoustics in previous 5 years covering periods from 22:00-01:00hrs).

5.16 The values with windows open are below the guideline levels advocated in BS 8233 for indoor ambient noise levels for dwellings (from BS8233 Table 4) for daytime conditions and it is therefore considered that further mitigation measures will not be required. It should also be noted that the noise attributable to plant is significantly lower than noise due to existing background level and therefore would be entirely masked by existing ambient noise levels.

6.0 Conclusions

6.1 Big Sky Acoustics Ltd was instructed by Mr George Hartshorn of The Lucky Club to carry out an assessment of the impact of noise from new mechanical plant on the Horse Hospital Terrace at Stables Market, Chalk Farm Road.

6.2 Calculations indicate that noise from the canopy extraction plant will be significantly below the existing night-time background noise level at the nearest noise sensitive receptor, confortably in compliance with the noise levels set out in Appendix 3 of the Local Plan, and therefore below the Lowest Observed Adverse Effect Level (LOAEL) at the nearest noise sensitive properties. This means that noise from plant is in compliance with local and national planning policy.

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Appendix A - Terminology

Sound Pressure Level and the decibel (dB)
A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 140 dB (threshold of pain).

Frequency and Hertz (Hz)
As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz. Young people with normal hearing can hear frequencies in the range 20 Hz to 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

A-weighting
The ear does not respond equally to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dBA. A change of 3dBA is the minimum perceptible under normal everyday conditions, and a change of 10dBA corresponds roughly to doubling or halving the loudness of sound.

C-weighting
The C-weighting curve has a broader spectrum than the A-weighting curve and includes low frequencies (bass) so it i can be a more useful indicator of changes to bass levels in amplified music systems.

Noise Indices
When a noise level is constant and does not fluctuate over time, it can be described adequately by measuring the dB level. However, when the noise level varies with time, the measured dB level will vary as well. In this case it is therefore not possible to represent the noise level with a simple dB value. In order to describe noise where the level is continuously varying, a number of other indices are used. The indices used in this report are described below.

L_{eq} The equivalent continuous sound pressure level which is normally used to measure intermittent noise. It is defined as the equivalent steady noise level that would contain the same acoustic energy as the varying noise. Because the averaging process used is logarithmic the L_{eq} is dominated by the higher noise levels measured.

L_{Aeq} The A-weighted equivalent continuous sound pressure level. This is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Ceq} The C-weighted equivalent continuous sound pressure level includes low frequencies and is used for assessment of amplified music systems.

L_{Amax} is the maximum A-weighted sound pressure level during the monitoring period. If fast-weighted it is averaged over 125 ms , and if slow-weighted it is averaged over 1 second. Fast weighted measurements are therefore higher for typical time-varying sources than slow-weighted measurements.

L_{A90} is the A-weighted sound pressure level exceeded for 90% of the time period. The L_{A90} is used as a measure of background noise.

Example noise levels:

Source/Activity	Indicative noise level dBA
Threshold of pain	140
Police siren at 1m	130
Chainsaw at 1m	110
Live music	96-108
Symphony orchestra, 3m	102
Nightclub	94-104
Lawnmower	90
Heavy traffic	82
Vacuum cleaner	75
Ordinary conversation	60
Car at 40 mph at 100m	55
Rural ambient	35
Quiet bedroom	30
Watch ticking	20

Appendix B - Application site location

Appendix C - Manufacturer's data

DDM 9/9 E6G2503 1F 4P 1V

Technical Data

DDM 9/9 E6G2503	Speed control	Curves	Nominal motor power W	Poles –	Phases	Connection	Mains frequency Hz	Max. power consumption W	Max. current consumption A	Speed 1/min
1F 4P 1V	(2)	[K5/K6]	550	4	1~		50/60	1611	6.8	1400

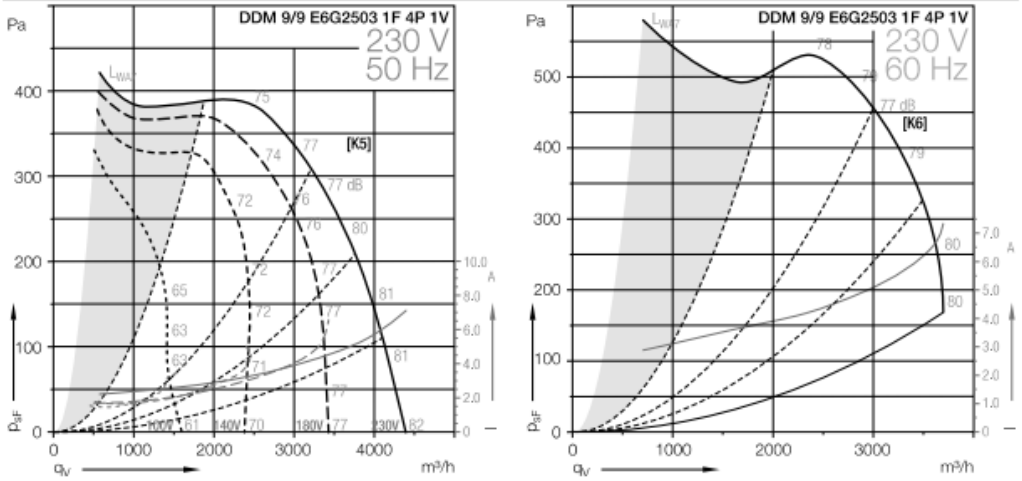
Technical Data

DDM 9/9 E6G2503	Operating Capacitor µF	Nominal capacitor voltage V	Motor protection class	Motor thermal class	Thermal protection	Media Temperature max. °C	Fan weight kg	Density of media kg/m³	Installation type (ISO 5801)	Article number
1F 4P 1V	20	450	IP10	F	EXT	40	17	1,2	B	6M02R8

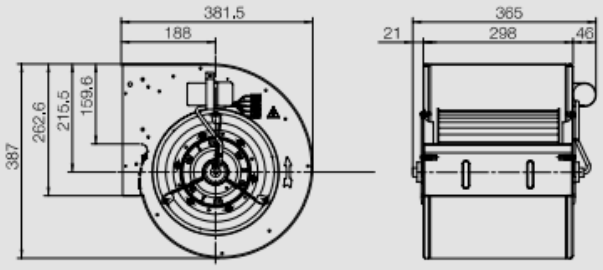
(1) = Speed controllable via Transformer
(2) = Speed controllable via TRIAC or Transformer
(3) = Speed controllable via Inverter
* = No speed control available
[HI] High speed, [ME] Medium speed, [LO] Low speed

Attention! We suggest to do not use the fan in the grey marked area! The noise ratings given in the performance curves are sound power level L_{WA7}, see „Technical Description".

Curves



Dimensions in mm, Subject to change.
DDM 9/9 E6G2503 1F 4P 1V +SCT



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