



ENVIRONMENTAL NOISE ASSESSMENT

DONALDSON TORIT DCE DUST FILTRATION UNIT

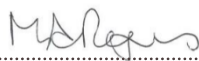
Wartsila UK Ltd - Havant

9th May 2023

THE WORKSAFE EXPERTS

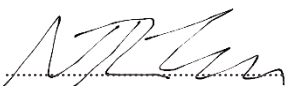
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Glossary of terms

Ambient Sound

Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far

[BS4142]

Attenuation

A reduction in the intensity of a sound signal.

A-weighting

The sound pressure level determined when using the frequency-weighting network A. The A-weighting network modifies the electrical response of a sound level meter so that the sensitivity of meter varies with frequency in approximately the same way that the sensitivity of the human hearing system.

The human ear has a non-linear frequency response, it is less sensitive at low and high frequencies and most sensitive in the range 1 to 4 kHz. The A-weighting is applied to measured or calculated sound pressure levels so that these levels correspond more closely to the response of the human ear. A-weighted sound levels are often denoted as dB(A).

Decibel dB

Unit level which denotes the ratio between two quantities that are proportional to power. The number of decibels corresponding to the ratio of two amounts of power is 10 times the logarithm to the base 10 of this ratio.

A linear numbering scale used to define a logarithmic amplitude scale, thereby compressing a wide range of amplitude values to a small set of numbers.

A unit that indicates that a quantity has a certain level above some pre-defined reference value.

The unit of measurement used for sound pressure levels. The scale is logarithmic rather than linear. The threshold of hearing is 0dB and the threshold of pain is 120dB. In practical terms these limits are seldom experienced and typical levels lie within the range 30dB (a quiet night time level in a bedroom) to 90dB (at the kerbside of a busy city street).

Equivalent Continuous A-Weighted Sound Pressure Level, $L_{Aeq,T}$

Value of the A-weighted sound pressure level in decibels of a continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time...

[BS4142]

Maximum Sound Level, $L_{pA,max}$

The highest value of the A-weighted sound pressure level that occurs during a given event or time period. The time weighting should be specified.

[BS5228]

Measurement Time Interval, T_m

Total time over which measurements are taken

[BS4142]

Percentile Level (Statistical Sound Level Indices L_{AN} , L_{A90})

L_{AN} is the dB(A) level exceeded N% of the time, measured on a sound level meter with the Fast (F) time weighting e.g. L_{A90} the dB(A) level exceeded for 90% of the time is commonly used to estimate background noise level. L_{A10} the level exceeded for 10% of the time is commonly used in the assessment of road traffic noise.

Rating Level, $L_{Ar,Tr}$

Specific sound level plus any adjustment for the characteristic features of the sound

[BS4142]

Reference Time Interval, T_r

Specified interval over which the specific sound level is determined

[BS4142]

Residual Sound

Ambient sound remaining at the assessment location when the specified sound source is suppressed to such a degree that it does not contribute to the ambient sound

Sound Pressure Level, L_p

- The level of the pressure of the sound above the intentionally accepted reference value of 20 μPa ($2 \times 10^{-5} \text{ N/m}^2$) which corresponds to the pressure of the quietest sound an average person can hear at the frequency of 1000Hz. It is a quantity that can be measured, thus the intensity of a sound can be derived from it.
- The sound pressure level is a measure of a dynamic variation in atmospheric pressure. The pressure at a point in space minus the static pressure at that point.
- A value equal to 20 times the logarithm to the base 10 ratio of the ratio of the root-mean-square pressure of a sound to a reference pressure, which is normally taken to be $20 \times 10^{-5} \text{ N/m}^2$

Sound Power Level L_w

The sound power level of a sound source in decibels is 10 times the logarithm to the base 10 of the ratio of sound power radiated by the source to a reference power. The reference power is 1 picowatt ($1 \times 10^{-12} \text{ watt}$).

The sound power level is the fundamental measure of the total sound energy radiated by the source per unit time.

A value equal to 10 times the logarithm to the base 10 of the ratio of the total acoustic power emitted by a source to a reference power, which is normally taken to be 10^{-12} watt

Specific Sound Source

Sound source being assessed

[BS4142]

Executive Summary

EEUK Ltd has been commissioned by Wartsila UK Ltd to undertake an environmental noise survey in and around their site in Havant, Hampshire to ascertain the potential impact of an operating Donaldson Torit DCE dust filtration system on nearby residential receptors that has been installed within the main yard of the site. The survey was carried out on the 9th May 2023 and this report has been prepared to aid with Wartsila's planning application for the unit.

Noise levels were measured around the dust filtration system to ascertain the main noise sources.

Noise levels were also measured on the site boundary at specific positions. The dust filtration unit when running was found to be audible on the site's southern and western boundaries, but largely inaudible on the northern boundary (closest to the nearest noise sensitive receptors).

Using the measured levels from the dust filtration unit, noise levels have been predicted for two potential noise sensitive locations in Abrams Way, Havant.

The BS4142:2014 +A1:2019 assessment indicates that the noise generated by the dust filtration unit is likely to have a **low adverse impact** at receptors to the north of the site. The assessment has been made for daytime hours as the unit only operates in this period. Background noise is largely dominated by the A27 dual carriageway.

WHO Guidelines on community annoyance are expected to be met at all noise sensitive receptors north of the site, whilst the internal noise levels in accordance with BS8233 are expected to meet a reasonable standard for daytime living areas.

There are number of controls in place at the site to minimise noise disturbance, including no overnight running, the unit has been located behind existing buildings minimising line of sight to properties in Abrams Way, and insulation of ductwork.

The main recommendation is to continue the good practice being used on the site to minimise noise disturbances from the operation of this unit. Further measures such as enclosing the main motor unit and ensuring any exhaust/intake vent openings are located towards the southern boundary would help further to reduce any potential impact from noise levels on noise sensitive receptors.

Introduction

- 1.1 In order to provide an assessment of the noise as part of a planning application being made by Wartsila UK Ltd. EEUK Ltd has been commissioned to undertake an environmental noise assessment at their premises in Havant and in the surrounding locality to assess the potential impact of a recently installed dust filtration unit which has been transferred from another Wartsila site and re-located to the site in Havant.
- 1.2 The objectives of the survey were to:
- **conduct measurements close to the dust filtration unit to identify potential noise sources**
 - **establish the noise levels on the site boundary during the day**
 - **establish daytime background levels with the dust filtration unit not running or inaudible**
 - **conduct off-site measurements to assess potential impact.**
- 1.3 The survey was undertaken by Mark Rogers MIOA of EEUK Ltd on the 9th May 2023 and reflects the conditions prevailing at the time.

Legislation, Standards and Guidelines

National Planning Policy Framework

The Planning Policy Guidance Note PPG24 *'Planning and Noise'* published in 1994 outlined the considerations to be taken into account by local authorities in determining planning applications both for noise sensitive developments and for those activities which will generate noise.

The Guidance acknowledged that noise could have a significant effect on the environment and on the quality of life enjoyed by individuals and communities. However, it advises that while the planning system should be used to minimise the adverse impact of noise, planning authorities should not place unreasonable restrictions on development, or add unduly to the costs and administrative burdens of business.

This Planning Policy Guidance Note has been replaced by the National Planning Policy Framework, published in 2012.

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

Throughout the NPPF is the presumption in favour of sustainable development.

The presumption is subject to two exceptions. First it will not apply where any adverse impacts of allowing development would *"significantly and demonstrably"* outweigh the benefits when assessed against the policies in the NPPF as a whole. Secondly, the presumption will not apply where specific policies in the NPPF – such as those relating to green belt or national parks – indicate that development should be restricted.

With regards to noise, the NPPF notes that:

"The planning system should contribute to and enhance the natural and local environment by...

- **preventing both new and existing development from contributing to or being out at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"**

"Planning policies and decisions should aim to:

- **avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;**
- **mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;**
- **recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and**
- **identify and protect areas tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."**

BS 4142:2014 +A1:2019

British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- a) sound from industrial and manufacturing processes;
- b) sound from fixed installations which comprise mechanical and electrical plant and equipment;
- c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

BS4142 defines the following terms for describing existing and future noise levels:

- **Ambient Sound Level, $L_a = L_{Aeq,T}$**
Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far, at the assessment location over a given time interval, T
- **Specific Sound Level, $L_s = L_{Aeq,T_r}$**
Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T_r
- **Residual Sound Level, $L_r = L_{Aeq,T}$**
Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T
- **Background Noise Level, $L_{A90,T}$**
A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T , measured using time weighting F and quoted to the nearest whole number of decibels

The standard states that, when possible, the background sound level should be measured at the assessment location. It should be ensured that the measurement time interval is of sufficient duration to obtain a representative value of the background sound level.

BS4142 notes that where it is not possible to determine the specific sound level directly by measurement, it may be appropriate to determine the specific sound level by a combination of measurement and calculation.

Certain acoustic features can increase the significance of impact over the basic comparison between the specific sound level and the background sound level.

Subjectively and where appropriate, such as for instances where a new, proposed sound cannot be measured, the specific sound level should be corrected if a tonal or impulsive characteristic is expected to be present.

- **Tonality**

- Just perceptible, apply a penalty of 2dB**

- Clearly perceptible, apply a penalty of 4dB**

- Highly perceptible, apply a penalty of 6dB**

- **Impulsivity**

- Just perceptible, apply a penalty of 3dB**

- Clearly perceptible, apply a penalty of 6dB**

- Highly perceptible, apply a penalty of 9dB**

For other sound characteristics which are not tonal or impulsive but readily distinguishable, a penalty of 3dB can be applied.

Where a specific sound is intermittent and readily distinctive, a penalty of 3dB can be applied.

If the subjective method is not sufficient for assessing the audibility or prominence of tones or impulsive sounds, identification can be made using the one-third octave method and a correction of 6dB added if present.

When making an assessment the impact of a specific sound, an initial estimation is made by subtracting the measured background sound level from the rating level. Typically, the greater the difference, the greater the magnitude of impact:

- **A difference of around +10dB or more is likely to be an indication of a significant adverse impact**
- **A difference of around +5dB is likely to be an indication of an adverse impact**
- **The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact**
- **Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact**

Environmental Protection Act 1990

Chapter 43 of the Environmental Protection Act 1990 (EPA) makes provision for the improved control of pollution, including noise, arising from any industrial, commercial or activities of any other nature whatsoever.

Specifically, the EPA re-enacts the provisions of the Control of Pollution Act 1974; it restates the law defining statutory nuisances and improves the summary procedures for dealing with them.

Section 80 of the EPA empowers local authorities to deal with statutory nuisances when they occur. The level at which a noise is deemed to be a statutory noise nuisance is not defined in the EPA, this is left to the judgement of individual local authorities. The EPA also grants the right to private citizens to bring a court case against the owner/operator of a noise source.

With regards to the term 'nuisance' there is no specific definition in the Act, so the tests as at common law apply. A definition often used in Court is *"A nuisance is a material interference with a person's use or enjoyment of their land or property"*.

Case law supports the view that factors such as nature of noise, time of day or night it occurs, day of the week on which it occurs, how long it occurs for, how often it occurs and the character of the area in which it occurs should be taken into account when deciding whether the interference is material, as well as whether those affected are overly sensitive or whether they represent the "Man on the Clapham Omnibus".

In court proceedings for an offence, it is a defence to prove that 'best practicable means' were used to prevent or counteract the effects of noise. Under 79(9), 'best practicable means' is to be interpreted by reference to the following provisions:

- **"practicable" means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications;**
- **the means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures;**
- **the test is to apply only so far as compatible with any duty imposed by law;**
- **the test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances.**

World Health Organisation Document “Guidelines for Community Noise”

The World Health Organisation (WHO) published the document “Guidelines for Community Noise” in 2000. This states that general outdoor noise levels of below 50dB L_{Aeq} during the day are desirable to prevent ‘moderate’ community annoyance. The guidance also recommends the L_{Aeq} should not exceed 30dB indoors if negative effects on sleep are to be avoided.

World Health Organisation Document “Night Noise Guidelines for Europe”

The World Health Organisation (WHO) published their “Night Noise Guidelines for Europe” in 2009. These guidelines are applicable to the Member States of the European Region, and may be considered as an extension to, as well as an update of, the previous WHO *Guidelines for Community Noise* (1999).

It states an $L_{night, outside}$ of 40dB should be the target of the night noise guidelines (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. Where 40dB is not feasible in the short run for various reasons, an interim target of 55dB $L_{night, outside}$.

The guidelines also state that the correction for inside levels to outside levels should be 21dB, as this takes into account that even in well insulated houses, windows may be open for a large part of the year.

British Standard BS8233: 2014

The scope of BS8233: 2014 *Guidance on sound insulation and noise reduction for buildings* is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

The Standard suggests suitable internal noise levels within different types of buildings, including residential dwellings. It suggests that within bedrooms, an internal noise level of 30 dB $L_{Aeq,T}$ is a good standard, whilst 35 dB $L_{Aeq,T}$ is a reasonable standard. For living areas in the daytime, the Standard recommends 30 dB $L_{Aeq,T}$ as a good standard and 40 dB $L_{Aeq,T}$ as being a reasonable standard. BS8233 also states that individual noise events should not exceed 45 dB L_{Amax} in bedrooms at night.

Equipment and Strategy

- 3.1 Measurements were made using the following equipment:
- **CEL 633C Sound Level Meter (serial number 4222238)**
 - **CEL 120/2 Acoustic Calibrator (serial number 4723533)**
- 3.2 The Sound Level Meter was calibrated using the Acoustic Calibrator to a level of 114dB at a frequency of 1Khz immediately prior to use and upon completion of the survey. No variation in calibration signal occurred (>0.2dB).
- 3.3 Casella CEL undertook an external UKAS accredited calibration of the Sound Level Meter in March 2023¹ and the Acoustic Calibrator in March 2023. Copies of the calibration certificates are presented in Appendix B.
- 3.4 The weather conditions during the survey were overcast but dry, with 100% cloud cover with wind speeds varying between 0 and 2 m/s with a prevailing south-westerly airflow.
- 3.5 A representative of the client (Jayne Enright) selected the noise monitoring locations around the site in conjunction with Mark Rogers and the locations for the assessment are as follows:
- **1: Site Southern Boundary – full line of sight to dust filtration unit**
 - **2: Site Main Car Park Northern Boundary – no line of sight to dust filtration unit (used to represent background level at closest residential boundaries)**
 - **3: Site Western Boundary – full line of sight to dust filtration unit.**
 - **4: On public footpath on south side of properties in Abrams Way (north-west of site) – partial line of sight to unit.**
 - **5: On public footpath opposite Austin House in Abrams Way (looking towards Wartsila site) – no line of sight to unit.**
- 3.6 Measurements have been taken in the “free-field” 3.5m away from any reflective surfaces and the Sound Level Meter was positioned on a tripod at approximately 1.5m high above the ground. Where possible all interferences have been excluded from the assessment by the use of the pause function or by post processing of the data.
- 3.7 The background noise level has been measured in the absence of any noise generated by the dust filtration unit at a location considered representative of the local noise environment close to the nearest noise sensitive receptors to the site.

Site Observations and Comments

- 4.1 Wartsila UK Ltd provides services to the marine and energy markets.
- 4.2 The facility is situated in a predominantly commercial and industrial area, close to the A27 main trunk road which runs between Portsmouth and Chichester, and on towards Brighton. As a result, the road is extremely busy and tends to dominate the background noise environment. New residential developments have occurred directly north of the site and properties in Abrams Way and Longcroft Way to the Wartsila site's northern boundary for approximately 100 metres.
- 4.3 The majority of the manufacturing at the site occurs within the main site building with any noise well contained. However, there are some external vents and forklift activity within the main yard. Also located within the yard is a Donaldson Torit DCE dust filtration unit which extracts dust from some of the internal manufacturing processes. This unit has been re-located from another Wartsila site and is subject to a planning application and is the main focus of this report. This unit consists of a floor mounted motor fitted with a fan for cooling, filtration unit, dust bag collection unit and various lengths of ductwork. The unit only operates during the day so is turned off overnight.
- 4.4 The dust filtration unit is located within the site yard and is largely shielded from the residential properties to the north by the current site buildings. The top of the unit may however be visible from the second floor of Austin House as shown in the following photograph.



- 4.5 The main noise sources identified around the dust filtration unit are the motor and fan unit located at floor level and are clearly audible within the main yard. Closer to the dust bag collection section of the unit there is a rhythmic 'thump thump' noise but tends to be less obvious as you move further back from the unit where the motor/fan noise dominates. The ductwork around the unit appears to be well insulated although it is unclear whether this is thermal or acoustic insulation.
- 4.6 On the site's northern boundary there is an existing enclosed air conditioning/compressor unit which was running but is not part of the dust filtration unit process.

- 4.7 The properties to the north of the site are separated from the Wartsila boundary by a 3 meter high embankment on top of which sits 2 meter high close board fencing.

Discussion of Results

- 5.1 From information supplied by representatives of the Client, EEUK Ltd considers the measured levels on the day of the assessment to be representative of normal operational conditions.
- 5.2 It should be noted however that the working environment can change on a daily basis.
- 5.3 The noise survey around the Donaldson Torit DCE dust filtration unit recorded the following levels, as shown in Table 1:

Table 1
Donaldson Torit DCE Dust Filtration Unit Noise Measurements

Activity/Process	Noise Level, dB L _{Aeq}	Comments
1m from main motor/fan unit	79.2	Motor/fan noise dominates
1m from main motor/fan unit (repeat)	79.7	Motor/fan noise dominates
1m from bag collection unit	78.5	Rhythmic 'thump thump' noise, adjacent motor/fan noise
5m from main dust filtration unit (south)	73.1*	Motor/fan noise
5m from main dust filtration unit (west)	67.7	Motor/fan noise
10m from main dust filtration unit (west)	64.2	Motor/fan noise
Main Gate into courtyard	62.1	Motor/fan noise audible, distant traffic noise from A27 just audible
Main Gate into courtyard	58.4	Unit turned off, A27 traffic noise dominates (background L _{A90} value = 56 dB)
Main Yard northern boundary, 2m from air compressor unit (not connected to dust filtration system)	58.4	Noise only coming from air compressor enclosure. Dust filtration unit not audible.

* Value used for the BS4142:2014 +A1:2019 assessment

- 5.4 As discussed previously, noise from the floor mounted motor unit tends to dominate the noise levels within the yard. However, the existing site buildings do provide significant screening to the northern boundary in the yard where noise here was dominated by an existing air compressor enclosure, with the dust filtration unit inaudible.

Table 2

Environmental Noise Measurements on Site Boundary and Off-site, dB (daytime)

	Time	Duration	L _{Aeq}	L _{A90}	L _{Amax}	L _{Amin}
Location 1, southern boundary (main gate)	09:35	10 mins	58.4	56.0	70.5	54.4
	Comments		Dust filtration unit off, A27 traffic noise dominates background environment.			
Location 2, northern boundary (car park)	09:55	30 mins	55.0	53.0	72.4	50.4
	Comments		Dust filtration unit off, A27 traffic noise dominates background environment.			
Location 3, Site western boundary	10:33	15 mins	60.2	56.5	80.5	60.2
	Comments		Dust filtration unit on and audible, road traffic from A27, birdsong.			
Location 4, public footpath, NW of site (off-site)	10:50	15 mins	59.5	57.0	65.3	54.5
	Comments		Dust filtration unit just audible, A27 traffic noise, reversing alarms from other parts of industrial estate, birdsong.			
Location 5, Abrams Way (off-site)	11:09	15 mins	58.1	52.5	81.9	50.3
	Comments		Traffic from A27 dominates. Site occasionally audible in lull in traffic noise (existing air compressor unit), birdsong.			
Location 2, northern boundary (car park)	11:40	30 mins	54.9	52.5	74.9	50.9
	Comments		Dust filtration unit inaudible, A27 traffic noise dominates background environment, no other factory noise evident.			

- 5.5 The dust filtration unit was clearly audible on the site's southern and western boundaries. The unit was also audible to a certain extent on the public footpath to the north-west (south side of Abrams Way residential properties) although traffic noise from the A27 was also clearly audible. The unit was largely inaudible on the northern boundary due to screening from existing buildings and noise from an existing air compressor enclosure.
- 5.6 Based on the information provided within Tables 1 and 2, an assessment of noise impact from the dust filtration unit is provided in the following sections of this report. The guidance document BS4142:2014 +A1:2019 has been used to ascertain the potential for any adverse impacts on the closest noise sensitive receptors taking into account the context of the existing noise environment.

5.7 In order to predict the noise levels at the nearest receptor(s), the following equation was used:

$$L_{P2} = L_{P1} - 20 \log(r_2/r_1)$$

where, r_1 is the distance from source to measurement location; and

r_2 is the distance from source to receptor

5.8 For the purposes of the assessment, the L_{Aeq} value measured 5m south of the unit has been used in the calculation of the Rating Level plus any corrections for noise character and screening, and has been used to compare against the background L_{A90} noise level. The background level used is the one measured on the site's car park northern boundary (with the unit either off or inaudible) which is considered to be representative of the daytime background noise at the nearest properties.

Table 3:

Predicted Noise Levels L_{Aeq} at the Nearest Receptor

	Specific Noise L_{Aeq}	Measurement Distance (m)	Predicted Noise Levels, dB L_{Aeq}	
			Receptor A Abrams Way (Austin House)	Receptor B Abrams Way (west end of road)
Donaldson Torit DCE Dust Filtration Unit	73	5	-	-
	Distance from source (m)		40	65
	Total Predicted Level (dB)		55	51

BS4142:2014 +A1:2019 Assessment

5.9 Based on the predicted noise level in Table 3, a BS4142:2014 +A1:2019 assessment has been conducted to assess if there are any potential adverse impacts on the nearest noise sensitive receptor due to the daytime operation of the dust filtration unit (it is understood there is no night-time running). The assessment is provided in Tables 4 and 5 below.

Table 4

Receptor A: Abrams Way (Austin House): BS 4142:2014+A1:2019 assessment, dB(A)

	Predicted noise level at receptor (dB L_{Aeq})	Attenuation due to shielding	Penalty for Tonality	Rating level (L_r)	Background Noise Level at Receptor (dB L_{A90})	Rating level over background
Operation of Donaldson Torit DCE Dust Filtration Unit	55	-10*	+2	47 (55-10+2)	53	-6

*The unit is generally well shielded from the nearest residential properties due to existing buildings. However, this is a conservative value as the higher part of the unit could be partially visible from the upper floor of Austin House.

Table 5

Receptor B: Abrams Way (west end of road): BS 4142:2014+A1:2019 assessment, dB(A)

	Predicted noise level at receptor (dB L_{Aeq})	Attenuation due to shielding	Penalty for Tonality	Rating level (L_r)	Background Noise Level at Receptor (dB L_{A90})	Rating level over background
Operation of Donaldson Torit DCE Dust Filtration Unit	51	-5*	+4	50 (51-5+4)	53	-3

*Some partial shielding is assumed due to the position of the main noise sources behind the existing site buildings.

- 5.10 The BS4142:2014 +A1:2019 assessment indicates that the operation of the dust filtration unit is not expected to give rise to any adverse impacts at the closest residential properties to the north, based on the noise levels recorded and within the context of the existing noise environment which is largely dominated by traffic noise from the A27.

WHO Guidelines

- 5.11 The World Health Organisation (WHO) published the document "Guidelines for Community Noise" in 2000.
- This states that general outdoor noise levels of below 50dB L_{Aeq} during the day are desirable to prevent 'moderate' community annoyance.
- The guidance also recommends the L_{Aeq} should not exceed 30dB indoors if negative effects on sleep are to be avoided.
- 5.12 Based on the noise levels predicted, the L_{Aeq} values from the dust filtration unit will meet this criterion, with maybe a minor exceedance (+1dB) at the west end of Abrams Way. It should be noted that noise from existing A27 road traffic generally exceeds the recommended 50 dB level.

BS8233: 1999

- 5.13 BS8233: 1999 recommends suitable internal levels for living areas in a residential building, those being 30dB $L_{Aeq,T}$ as a good standard and 40dB $L_{Aeq,T}$ as being a reasonable standard; it also suggests that within bedrooms, an internal noise level of 30dB $L_{Aeq,T}$ is a good standard, whilst 35dB $L_{Aeq,T}$ is a reasonable standard.
- 5.14 Based on the noise levels predicted from the site, allowing for attenuation of 15 dB for a partially open window the noise levels from the site are expected to meet a reasonable standard for daytime living areas.

Conclusions and Recommendations

- 6.1 An environmental noise survey has been conducted at and around the Wartsila UK Ltd site in Havant, Hampshire to ascertain the potential impact of a Donaldson Torit DCE dust filtration system on nearby residential receptors that has been installed within the main yard of the site.
- 6.2 Noise levels of up to 80 dB(A) were measured up to one metre from the dust filtration system with a floor mounted electric motor and associated cooling fan being the main noise source.
- 6.3 Noise levels were also measured on the site boundary at specific positions. The dust filtration unit when running was audible on the site's southern and western boundaries, but largely inaudible on the northern boundary (closest to the nearest noise sensitive receptors).
- 6.4 Using the measured levels from the dust filtration unit, noise levels have been predicted for two potential noise sensitive locations in Abrams Way, Havant.
- 6.5 The BS4142:2014 +A1:2019 assessment indicates that the noise generated by the dust filtration unit are likely to have a **low adverse impact** at receptors to the north of the site. The assessment has been made for daytime as the unit only operates in this period. Background noise is largely dominated by the A27 dual carriageway.
- 6.6 WHO Guidelines on community annoyance are expected to be met at all noise sensitive receptors north of the site, whilst the internal noise levels in accordance with BS8233 are expected to meet a reasonable standard for daytime living areas.
- 6.7 There are number of controls in place at the site to minimise noise disturbance, including no overnight running, the unit has been located behind existing buildings minimising line of sight to properties in Abrams Way, and insulation of ductwork (although unclear if this is for thermal or acoustic reasons).
- 6.8 The main recommendation is to continue the good practice being used on the site to minimise noise disturbances from the operation of this unit. Further measures such as enclosing the main motor unit and ensuring any exhaust/intake vent openings are located towards the southern boundary would help further to reduce the impact of noise levels on nearby noise sensitive receptors.

Figures

Figure 1: Noise Measurements with Dust Filtration System Running.

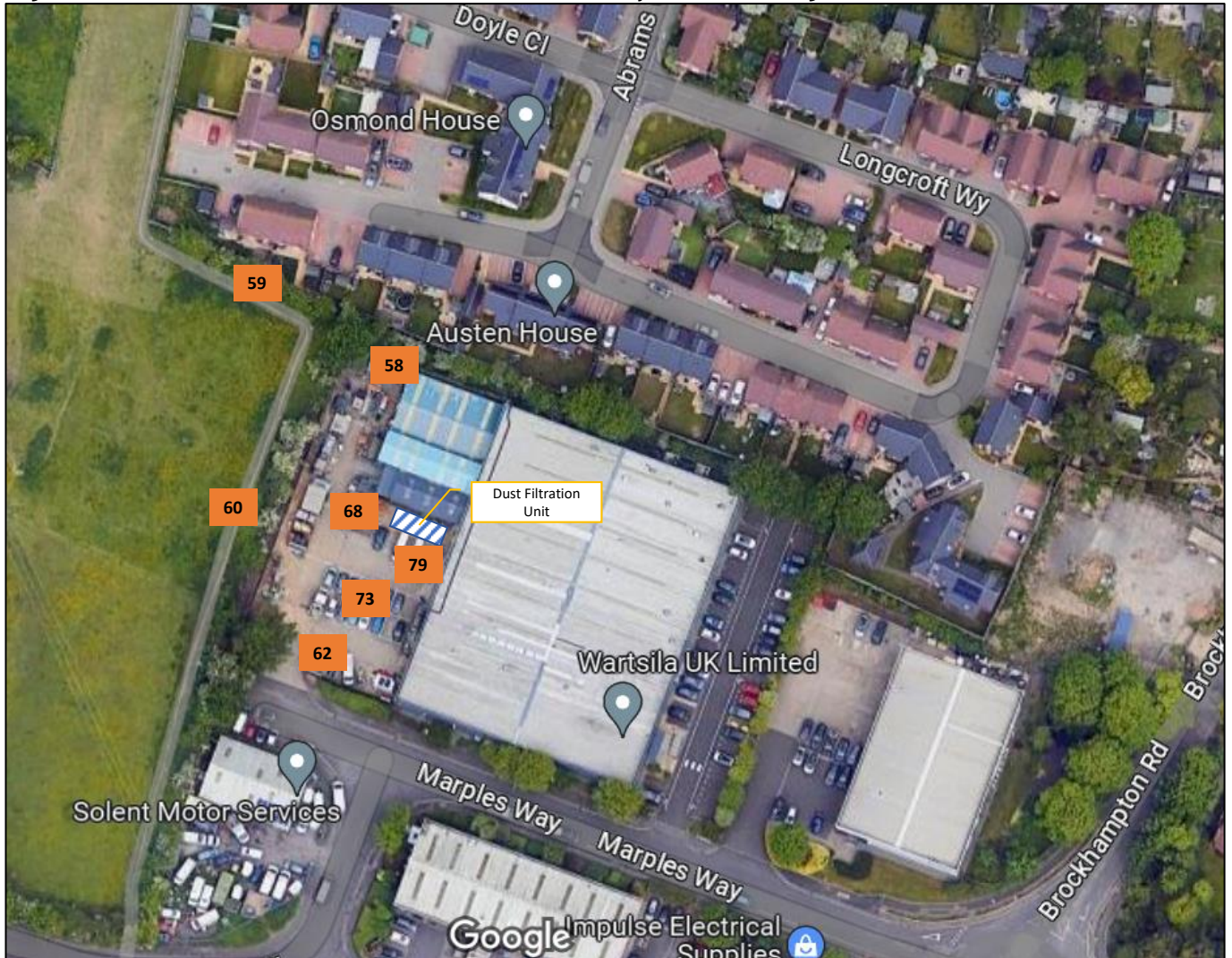


Figure 2: Environmental Noise Measurement Locations and Position of Noise Receptors used in the Report.



References

- 8.1 National Planning Policy Framework, 2012
- 8.2 British Standard 4142:2014 *Methods for rating and assessing industrial and commercial sound*
- 8.3 Environmental Protection Act 1990
- 8.4 World Health Organisation *Guidelines for Community Noise* 2000
- 8.5 World Health Organisation *Night Noise Guidelines for Europe* 2009
- 8.6 British Standard 8223: 2014 *Guidance on sound insulation and noise reduction for buildings*

Environmental Noise Measurement Sheets

Measurement Sheet

Surveyors: Mark Rogers			Job No: PN37812		Project: Wartsila UK Ltd, Havant			
Page: 1 of 6			Survey Date : 9 th May 2023					
Location 1: Southern Boundary, by main gate to yard			Microphone Ht: 1.5 m		Free Field ✓		Facade ✗	
Time On	Duration (mins)	L _{Aeq,T} dB	L _{A90,T} dB	L _{Amax,T} dB	L _{Amin,T} dB	L _{A50,T} dB	L _{A10,T} dB	Comments
09:35	10	58.4	56.0	70.5	54.4	57.5	60.0	Dust filtration unit not running, A27 road traffic dominates, birdsong.
<u>Wind Speed</u>						<u>Specific Conditions</u>		
0-2 m/s – SW direction						Calm	No	
<u>General Weather Conditions</u>						Fog	No	
Generally overcast						Precipitation	No	
						Frost	No	
						Tonal	No	
Start Calibration Level 114.0 dB				End Calibration Level 114.0 dB				
Calibration Traceability (UKAS)		Checked: Casella CEL				Date: 9 th May 2023		
<u>Sound Level Analyser</u>				<u>Calibrator</u>				
Type	Manufacturer	Serial Number		Type	Manufacturer	Serial Number		
633C	CEL	4222238		120/2	CEL	4723533		

Measurement Sheet

Surveyors: Mark Rogers			Job No: PN37812		Project: Wartsila UK Ltd, Havant			
Page: 2 of 6			Survey Date : 9 th May 2023					
Location 2: Northern Boundary, site car park			Microphone Ht: 1.5 m		Free Field ✓		Facade ✕	
Time On	Duration (mins)	L _{Aeq,T} dB	L _{A90,T} dB	L _{Amax,T} dB	L _{Amin,T} dB	L _{A50,T} dB	L _{A10,T} dB	Comments
09:55	30	55.0	53.0	72.4	50.4	54.5	56.5	Dust filtration unit not running, A27 road traffic dominates, birdsong.
<u>Wind Speed</u>						<u>Specific Conditions</u>		
0-2 m/s – SW direction						Calm	No	
<u>General Weather Conditions</u>						Fog	No	
Generally overcast						Precipitation	No	
						Frost	No	
						Tonal	No	
Start Calibration Level 114.0 dB				End Calibration Level 114.0 dB				
Calibration Traceability (UKAS)		Checked: Casella CEL				Date: 9 th May 2023		
<u>Sound Level Analyser</u>				<u>Calibrator</u>				
Type	Manufacturer	Serial Number		Type	Manufacturer	Serial Number		
633C	CEL	4222238		120/2	CEL	4723533		

Measurement Sheet

Surveyors: Mark Rogers			Job No: PN37812		Project:			
Page: 3 of 6			Survey Date : 9 th May 2023					
Location 3: Western Boundary			Microphone Ht: 1.5 m		Free Field ✓		Facade ✗	
Time On	Duration (mins)	L _{Aeq,T} dB	L _{A90,T} dB	L _{Amax,T} dB	L _{Amin,T} dB	L _{A50,T} dB	L _{A10,T} dB	Comments
10:33	15	60.2	56.5	80.5	60.2	58.0	61.0	Dust filtration unit running and audible, A27 road traffic audible, birdsong.
<u>Wind Speed</u>						<u>Specific Conditions</u>		
0-2 m/s – SW direction						Calm	No	
<u>General Weather Conditions</u>						Fog	No	
Generally overcast						Precipitation	No	
						Frost	No	
						Tonal	Yes	
Start Calibration Level 114.0 dB				End Calibration Level 114.0 dB				
Calibration Traceability (UKAS)		Checked: Casella CEL				Date: 9 th May 2023		
<u>Sound Level Analyser</u>				<u>Calibrator</u>				
Type	Manufacturer	Serial Number		Type	Manufacturer	Serial Number		
633C	CEL	4222238		120/2	CEL	4723533		

Measurement Sheet

Surveyors: Mark Rogers			Job No: PN37812		Project:			
Page: 4 of 6			Survey Date : 9 th May 2023					
Location 4: Public footpath, NW of site, south of properties in Abrams Way			Microphone Ht: 1.5 m		Free Field ✓		Facade ✕	
Time On	Duration (mins)	L _{Aeq,T} dB	L _{A90,T} dB	L _{Amax,T} dB	L _{Amin,T} dB	L _{A50,T} dB	L _{A10,T} dB	Comments
10:50	15	59.5	57.0	65.3	54.5	59.0	61.0	Dust filtration unit audible, A27 road traffic dominates, birdsong.
<u>Wind Speed</u>						<u>Specific Conditions</u>		
0-2 m/s – SW direction						Calm	No	
<u>General Weather Conditions</u>						Fog	No	
Generally overcast						Precipitation	No	
						Frost	No	
						Tonal	Partially	
Start Calibration Level 114.0 dB				End Calibration Level 114.0 dB				
Calibration Traceability (UKAS)		Checked: Casella CEL				Date: 9 th May 2023		
<u>Sound Level Analyser</u>				<u>Calibrator</u>				
Type	Manufacturer	Serial Number		Type	Manufacturer	Serial Number		
633C	CEL	4222238		120/2	CEL	4723533		

Measurement Sheet

Surveyors: Mark Rogers				Job No: PN37812		Project:		
Page: 5 of 6				Survey Date : 9 th May 2023				
Location 5: footpath opposite Austin House, Abrams Way				Microphone Ht: 1.5 m		Free Field ✓	Facade ✕	
Time On	Duration (mins)	L _{Aeq,T} dB	L _{A90,T} dB	L _{Amax,T} dB	L _{Amin,T} dB	L _{A50,T} dB	L _{A10,T} dB	Comments
11:09	15	58.1	52.5	74.9	50.9	57.0	60.5	Site generally inaudible except in lull in traffic noise, A27 road traffic dominates, birdsong.
<u>Wind Speed</u>						<u>Specific Conditions</u>		
0-2 m/s – SW direction						Calm	No	
<u>General Weather Conditions</u>						Fog	No	
Generally overcast						Precipitation	No	
						Frost	No	
						Tonal	No	
Start Calibration Level 114.0 dB				End Calibration Level 114.0 dB				
Calibration Traceability (UKAS)		Checked: Casella CEL				Date: 9 th May 2023		
<u>Sound Level Analyser</u>				<u>Calibrator</u>				
Type	Manufacturer	Serial Number		Type	Manufacturer	Serial Number		
633C	CEL	4222238		120/2	CEL	4723533		

Measurement Sheet

Surveyors: Mark Rogers			Job No: PN37812		Project:			
Page: 6 of 6			Survey Date : 9 th May 2023					
Location 2: Northern Boundary, site car park			Microphone Ht: 1.5 m		Free Field ✓		Facade ✕	
Time On	Duration (mins)	L _{Aeq,T} dB	L _{A90,T} dB	L _{Amax,T} dB	L _{Amin,T} dB	L _{A50,T} dB	L _{A10,T} dB	Comments
11:40	30	54.9	52.5	74.9	50.9	54.0	56.5	Dust filtration unit not audible, A27 road traffic dominates, birdsong.
<u>Wind Speed</u>						<u>Specific Conditions</u>		
0-2 m/s – SW direction						Calm	No	
<u>General Weather Conditions</u>						Fog	No	
Generally overcast						Precipitation	No	
						Frost	No	
						Tonal	No	
Start Calibration Level 114.0 dB				End Calibration Level 114.0 dB				
Calibration Traceability (UKAS)		Checked: Casella CEL				Date: 9 th May 2023		
<u>Sound Level Analyser</u>				<u>Calibrator</u>				
Type	Manufacturer	Serial Number		Type	Manufacturer	Serial Number		
633C	CEL	4222238		120/2	CEL	4723533		

Calibration Certificates

www.casellasolutions.com

CASELLA

Certificate of Conformity and Calibration

Instrument Model:- CEL-633C
Serial Number 4222238
Firmware revision V006-05
Microphone Type:- CEL-251
Serial Number 6038
Preamplifier Type:- CEL-495
Serial Number 005672

Instrument Class/Type:- 1

Applicable standards:-

IEC 61672: 2013 / EN 60651 (Electroacoustics - Sound Level Meters)
 IEC 60651 1979 (Sound Level Meters), ANSI S1.4: 1983 (Specifications For Sound Level Meters)

Note:- The test sequences performed in this report are in accordance with the current Sound level meter Standard - IEC61672. The combination of tests performed are considered to confirm the products electro-acoustic performance to all applicable standards including superceeded Sound Level Meter Standards - IEC60651 and IEC60804.

Test Conditions:- 22.5 °C
 32 %RH
 1014 mBar
Test Engineer:- Chris Taylor
Date of Issue:- March 28, 2023



Declaration of conformity:-

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications. Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9001:2015 quality procedures. This product is certified as being compliant to the requirements of the CE Directive.

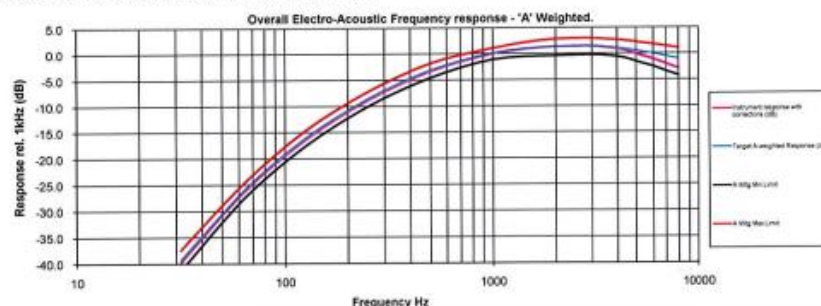
Test Summary:-

Self Generated Noise Test	All Tests Pass
Electrical Signal Test Of Frequency Weightings	All Tests Pass
Frequency & Time Weightings At 1 kHz	All Tests Pass
Level Linearity On The Reference Level Range	All Tests Pass
Toneburst Response Test	All Tests Pass
C-peak Sound Levels	All Tests Pass
Overload Indication	All Tests Pass
Acoustic Tests	All Tests Pass

Combined Electro-Acoustic Frequency Response - A Weighted

Combined Electro-Acoustic Frequency Response - A Weighted (IEC 61672-3:2006)

The following A-Weighted frequency response graph shows this instruments overall frequency response based upon the application of multi-frequency pressure field calibrations. The microphones Pressure to Free field correction coefficients are applied to pressure response. Reference level taken at 1kHz.



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tested to CEL-63X test sheet TP444 revision 02-00

Page 1 of 1

CASELLA

**Certificate of
Conformance and Calibration for**

CEL-120 Acoustic Calibrator

Applicable Standards :- IEC 60942: 2003 & ANSI S1.40: 2006

CEL-120/1 Class 1 ☒

CEL-120/2 Class 2 ☐

Serial No: 4723533

Firmware: 04

Temperature: 22.6 °C Pressure: 1022 mb %RH 32

Frequency = 1.00kHz $\pm$ 2Hz T.H.D. = < 1%	Calibration Level
SPL @ 114.0dB Setting	<u>113.98</u> dB
SPL @ 94.0dB Setting (CEL-120/1 only)	<u>93.94</u> dB/N.A

Engineer [Signature] Date :- 29 MAR 2023

Company test equipment and acoustic working standards, used for conformance testing, are subject to periodic calibration, traceable to UK national standards, in accordance with the company's ISO9001 Quality System.

DECLARATION OF CONFORMITY

This certificate confirms that the instrument specified above has been produced and tested to comply with the manufacturer's published specifications and the relevant European Community CE directives.

Casella

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Certificates of Competency



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Institute of Acoustics
Diploma

in

Acoustics and Noise Control

This is to certify that

Mark Anthony Rogers

has satisfied the Examining Board in the
General Principles of Acoustics
and Specialist Modules in

Law and Administration

Noise Control Engineering

Project (Merit)

Chairman of Examining Board

K. A. [Signature]

Secretary of Institute

G. [Signature]

Date June 1998